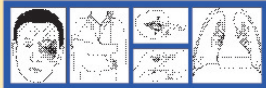


د طبي عامو ستونځو عملي لارښود

(انگليسي)

ډاکټر مالټي ايل وان بلومرودر

Afghanic



ننگرهار طب پوهنځی



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2014

Funded by
Kinderhilfe-Afghanistan

Practical Guide to Common Medical Problems (in English)

Dr Malte L von Blumroeder

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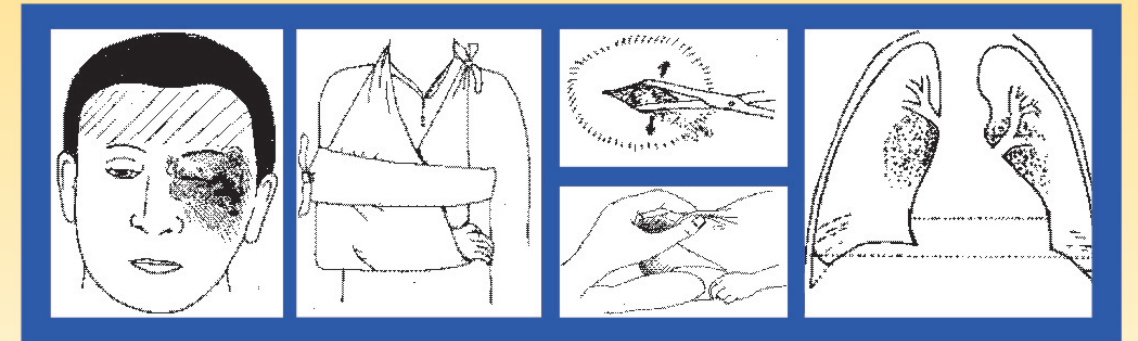


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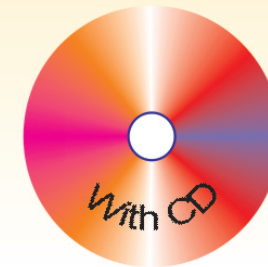
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Dr Malte L von Blumroeder

Practical Guide to Common Medical Problems (in English)



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Message from the Ministry of Higher Education



In history books have played a very important role in gaining knowledge and science and they are the fundamental unit of educational curriculum which can also play an effective role in improving the quality of Higher Education. Therefore, keeping in mind the needs of the society and based on educational standards, new learning materials and textbooks should be published for the students.

I appreciate the efforts of the lecturers of Higher Education Institutions and I am very thankful to those who have worked for many years and have written or translated textbooks.

I also warmly welcome more lecturers to prepare textbooks in their respective fields so that they should be published and distributed among the students to take full advantage of them.

The Ministry of Higher Education has the responsibility to make available new and updated learning materials in order to better educate our students. Finally I am very grateful to German Committee for Afghan Children and all those institutions and individuals who have provided opportunities for publishing medical textbooks.

I am confident that this project should be continued and textbooks can be published in other subjects too.

Sincerely,

Prof. Dr. Obaidullah Obaid

Minister of Higher Education

Kabul, 2014

Publishing Medical Textbooks

Honorable lecturers and dear students!

The lack of quality textbooks in the universities of Afghanistan is a serious issue, which is repeatedly challenging students and teachers alike. To tackle this issue we have initiated the process of providing textbooks to the students of medicine. In the past three years we have successfully published and delivered copies of 136 different books to the medical colleges across the country.

The Afghan National Higher Education Strategy (2010-1014) states:

“Funds will be made available to encourage the writing and publication of textbooks in Dari and Pashtu. Especially in priority areas, to improve the quality of teaching and learning and give students access to state – of – the – art information. In the meantime, translation of English language textbooks and journals into Dari and Pashtu is a major challenge for curriculum reform. Without this facility it would not be possible for university students and faculty to access modern developments as knowledge in all disciplines accumulates at a rapid and exponential pace, in particular this is a huge obstacle for establishing a research culture. The Ministry of Higher Education together with the universities will examine strategies to overcome this deficit. One approach is to mobilize Afghan scholars who are now working abroad to be engaged in this activity.”

Students and lecturers of the medical colleges in Afghanistan are facing multiple challenges. The out-dated method of lecture and no accessibility to updates and new teaching materials are the main problems. The students use low quality and cheap study materials (copied notes & papers), hence the Afghan students are deprived of modern knowledge and developments in their respective subjects. It is vital to compose and print the books that have been written by lecturers. Taking the situation of the country into consideration, we desperately need capable and professional medical experts who can contribute to improving the standard of medical education and Public Health throughout Afghanistan. Therefore enough attention should be given to the medical colleges.

For this reason, we have published 136 different medical textbooks from Nangarhar, Khost, Kandahar, Herat, Balkh and Kapisa medical colleges and Kabul Medical University. Currently we are working to publish 20 more medical textbooks for Nangarhar Medical Faculty. It should be mentioned that all these books have been distributed among the medical colleges of the country free of cost.

All published medical textbooks can be downloaded from www.ecampus-afghanistan.org

The book you are holding in your hands is a sample of a printed textbook. We would like to continue this project and to end the method of manual notes and papers. Based on the request of Higher Education Institutions, there is the need to publish about 100 different textbooks each year.

As requested by the Ministry of Higher Education, the Afghan universities, lecturers & students want to extend this project to the non-medical subjects e.g. Science, Engineering, Agriculture, Economics, Literature and Social Science. It should be remembered that we publish textbooks for different colleges of the country who are in need.

I would like to ask all the lecturers to write new textbooks, translate or revise their lecture notes or written books and share them with us to be published. We will ensure quality composition, printing and distribution to the medical colleges free of cost. I would like the students to encourage and assist their lecturers in this regard. We welcome any recommendations and suggestions for improvement.

It is worth mentioning that the authors and publishers tried to prepare the books according to the international standards but if there is any problem in the book, we kindly request the readers to send their comments to us or the authors in order to be corrected for future revised editions.

We are very thankful to German Aid for Afghan Children and its director Dr. Eroes, who has provided fund for this book. We would also like to mention that he has provided funds for 40 other medical textbooks in the past three years which are being used by the students of Nangarhar and other medical colleges of the country.

I am especially grateful to GIZ (German Society for International Cooperation) and CIM (Centre for International Migration & Development) for providing working opportunities for me during the past four years in Afghanistan.

In Afghanistan, I would like to cordially thank His Excellency the Minister of Higher Education, Prof. Dr. Obaidullah Obaid, Academic Deputy Minister Prof. Mohammad Osman Babury and Deputy Minister for Administrative & Financial Affairs Prof. Dr. Gul Hassan Walizai, Chancellor of Nangarhar University Dr. Mohammad Saber, Dean of Medical Faculty of Nangarhar University Dr. Khalid Yar as well as Academic Deputy of Nangarhar Medical Faculty Dr. Hamayoon Chardiwal, for their continued cooperation and support for this project.

I am also thankful to all those lecturers that encouraged us and gave us all these books to be published and distributed all over Afghanistan. Finally I would like to express my appreciation for the efforts of my colleagues Ahmad Fahim Habibi, Subhanullah and Hekmatullah Aziz in the office for publishing books.

Dr Yahya Wardak

CIM-Expert at the Ministry of Higher Education, February, 2014

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Practical Guide to Common Medical Problems

Dr. Malte von Blumröder

This PRACTICAL GUIDE TO COMMON MEDICAL PROBLEMS covers the whole range of diseases and medical problems that a general health professional in Afghanistan will encounter. From diarrhoea to common skin problems, safer maternal health to high blood pressure, mental health problems to first aid in injuries - the diagnosis and management of every common or important medical problem is explained. The book takes the reader through the different causes of a problem and then enables him to make a diagnosis based on clinical signs and basic investigations.

Helpful features include:

- Clear management guidelines for all conditions that are based on the best available evidence.
- Incorporation of the present national guidelines.
- More than 240 figures and diagrams explaining disease processes, clinical features and practical procedures.
- Summaries and lists of health messages, key information and differential diagnoses.
- Essential drug list on coloured pages as a quick reference.
- Useful forms such as a weight-for-age chart or mother's card that can be copied and used.

From the prefaces:

This is a basic medical textbook appropriate for Health Care in Afghanistan, covering the common diseases, the effects of culture, and the resources available. The book is surely required reading and a practical reference tool for all current and future doctors, nurses, pharmacists and their students.

Dr. John V Howard, Royal College of General Practitioners, International Committee, London, UK

The author has well understood the existing pathology of diseases in Afghanistan, and he knows about the problems of the medical staff who provide basic health care. Therefore, he has been able to produce a valuable asset that will answer many practical medical questions.

Prof. Dr. Nader Ahmad Exeer, Head of the Internal Department of Aliabad Hospital, Kabul, Afghanistan

The Practical Guide to Common Medical Problems is also available in Dari.

OTHER PRACTICAL GUIDES PUBLISHED BY IAM:

- ▶ **PRACTICAL DRUG GUIDE** - a handbook for the correct prescribing of essential drugs
Dr. Malte von Blumröder. 1999. (English, Dari and Pashto)
- ▶ **PRACTICAL PAEDIATRIC GUIDE**
Dr. Malte von Blumröder. 1999/2000. 3rd English and 4th Dari reprint 2005. (English and Dari)
- ▶ **PRACTICAL GUIDE TO MENTAL HEALTH PROBLEMS**
Sian Hawkins. 2005. (English, Dari and Pashto)

iam



London, UK

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Dedication

In the life of people as well as in the history of countries, there are happy times and deep valleys of fear and uncertainty. Afghanistan and its people have seen very difficult days. I hope and pray that this Practical Guide to Common Medical Problems will contribute to the rebuilding of the country and will help to improve the health and lives of its people to whom I dedicate this book. I would like to dedicate it with words from a psalm of David that I personally treasure very much and often read, especially when life is difficult:

*The LORD is my shepherd;
I have everything I need.
He lets me rest in fields of green grass
and leads me to quiet pools of fresh water.
He gives me new strength.
He guides me in the right paths,
as he has promised.
Even if I go through the deepest darkness,
I will not be afraid, LORD,
for you are with me.
Your shepherd's rod and staff protect me.*

*You prepare a banquet for me,
where all my enemies can see me;
you welcome me as an honoured guest
and fill my cup to the brim.
I know that your goodness and love
will be with me all my life;
and your house will be my home as long as I live.
(Psalm 23)*

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Acknowledgements

After completing my Practical Paediatric Guide, I did not think about starting work on another book. However, the requests and encouragement of many Afghan medical students and doctors changed my mind. Tim Mindling, IAM's acting director in 2001 when the future of Afghanistan was very uncertain, encouraged me to sit down and start work in the hope of a better future. Dr. CR Schull was a great help when he offered me to freely use his excellent textbook *Common Medical Problems in the Tropics and Subtropics*, which supplied me with good ideas while I was working on the first draft of this book. I am also thankful to Prof. David Morley from TALC who encouraged the idea of this book.

When I set out to work, I received help from many sources and would like to thank the following specialists and organisations who gave valuable input: Dr. Andrew Furber, Public Health Specialist, Leeds, UK (chapter 1 and 3), Dr. Justin Burdon, General Practitioner, Newcastle, UK (chapter 2), Dr. Barbara Crosse, Infectious Diseases and Oncology Specialist, Huddersfield, UK, and Dr. Qasem Afzel, Infectious Diseases Specialist, Infectious Diseases Hospital, Kabul (chapter 4), HealthNet International (malaria section), Kathy Fiekert, Health Programme Consultant, Kabul (chapter 5), Susan Obenschain, IAM Mother and Child Health Programme, Kabul (chapter 6), Mr. David Hanson, Ear Nose and Throat Specialist, Leeds, UK (chapter 7), Dr. Ludger Blecher, Respiratory Diseases Specialist, Wuerzburg, Germany (chapter 8), Dr. Jörg-Hartmut Gutknecht, Gunzenhausen, Germany and Dr. Kyung N Park and Dr Kyung A Park, General Surgeons, IAM, Mazar-e-Sharif (chapter 10), Dr. Tony Wing, Consultant Urologist, London, UK (chapter 11), Dr. Farid Bazger, ORA, Kabul (AIDS and STIs), Dr. Nicholas Jackson, Consultant Haematologist, Walsgrave Hospital, UK (chapter 12), Prof. Nader Ahmad Exeer, Specialist in Internal Medicine, Aliabad Hospital, Kabul (chapter 13), Dr. Homayuun Darmangar, Specialist in Orthopaedics, Mazar-e-Sharif (chapter 14), Dr. M. Nader Alemi, Specialist in Psychiatry, Mazar-e-Sharif and Dr. Marjory Foyle, Consultant Psychiatrist, London, UK (chapter 16), Dr. Toni Grosshauser, ORA (drug addiction), Dr. Olive Frost, UK and Dr. Carolyn J Watts, IAM, Kabul, both Specialists in Gynaecology and Obstetrics, (chapter 17), Dr. Richard Lewis, Ophthalmologist, IAM, Noor Hospital, Kabul (chapter 19), Dr. Lawrence Ness, Consultant Radiologist, Lancaster, UK (appendix chest x-ray).

A special thanks goes to the Ministry of Public Health in Afghanistan for providing access to their resource centre so that I could ensure that their present policies and guidelines are all included in this book.

In order to make sure that the information presented is up-to-date, I am grateful for the support of the British Medical Association, London, UK; Dr. Etzel and Verena Gysling of Infomed Publishers, Switzerland and DI-FAEM, Tübingen, Germany for supplying me regularly with free copies of the British Medical Journal, Infomed Screen, Pharma-Kritik and Tropical Doctor.

It is very special to me that this book has found the support of the Royal College of General Practitioners, London. I would like to thank especially Dr. John Howard and Dr. Garth Manning.

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Without a good translation into Dari, this book would be of little value to those health professionals for whom I have written it. I would like to thank Dr. Naqeebullah Jami for his hard and reliable work of the translation and typing. Dr Zia Amoon, Ophthalmologist, Mazar-e-Sharif also contributed to the translation. Again, this book would have been impossible without the help of my dear friend, Dr Nader Alemi. He, although very busy in his hospital, took time to review and proofread the Dari translation as well as always being available with valuable advice.

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This book had the full support of my family and I am thankful that we, as a family, were able to see it as something that we all wanted to see happening, even if it sometimes meant sacrifices. Similarly, I thank the IAM who like an extended family encouraged and helped wherever they could.

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- World Health Organisation (WHO) for figures 2-25, 6-3, 9-2, box worms, figures 15-2, 15-19 and A-2, taken from *King M, Primary Child Care, Oxford: 1985*; figure 2-3 adapted from *Model chapters for textbooks - IMCI Integrated Management of Childhood Illness, Geneva 2001*; figures 6-5, 6-6, 9-3, 12-2, 21-1, A-1, A-5, A-10 adapted from *Management of the child with a serious infection or severe malnutrition - Guidelines for care at the first-referral level in developing countries. Geneva: WHO 2000*. Figure 17-10 from *Kangaroo Mother*

Care - a Practical Guide, Geneva 2003; figures 17-7 and 17-8 adapted from *Managing Complications in pregnancy and childbirth: a guide for midwives and doctors, Geneva: WHO 2003*, and weight-for-age chart, partograph and Mother card for Afghanistan 2004.

There is no space to name or recall the many occasions when discussions with Afghan colleagues encouraged and guided me in the way this book should be outlined. However, living in Afghanistan and working alongside its people means a lot to me, and I apologize if I cannot name every colleague or friend by name.

Last but not least, I would express deep gratitude to those friends and churches in Germany (especially in Windhagen and Northeim) who gave generously in order to make this book available at an affordable, highly subsidized price.

Dr Malte von Blumröder

January 2005

Preface

It is not surprising to me that the earlier book by the author *Practical Paediatric Guide* has been so successful for a variety of reasons and I believe that this book, following a similar format, will follow suit.

In the first place, it provides a basic medical textbook appropriate for Health Care in Afghanistan, covering the common diseases, the effects of culture, and the resources available. The author's first hand experience and advice from local colleagues ensures its content's validity.

The format also emphasises the common problems that cause the greatest impact on the health of the people of Afghanistan. The presentation and layout is familiar to Primary Care Generalist Professionals - that of pattern recognition, enabling more efficient problem-solving, by means of the illustrations both in diagram and in written scenarios.

The book is surely required reading and a practical reference tool for all current and future doctors, nurses, pharmacists and their students (Primary Health Care

Professionals). In Afghanistan, as in other countries, these professionals will have a current or future training and educational role for the community health care workers themselves; this book will provide an essential text to support the problem based approach to teaching and learning that is sensibly promoted.

So, from whatever perspective of health care in Afghanistan you are looking, this book will act as a catalyst to remind you to work ever more closely with your colleagues for the benefit and health of your patients.

The Royal College of General Practitioners in the United Kingdom is very proud that one of its members is working to support the health care of the people of Afghanistan both directly and through the educational impact of this book.

Dr John V Howard January 2005

Chairman RCGP International Committee
Chairman MRCGP (INT) Board
Royal College of General Practitioners
London, UK

Recommendation

This Practical Guide to Common Medical Problem is a valued achievement that reflects the scholarly views and hard work of the author.

The author has well understood the existing pathology of diseases in Afghanistan, and he knows about the problems of the medical staff who provide basic health care. Therefore, he has been able to produce a valuable asset that will answer many practical medical questions. In addition to its many other helpful features, the essential drug list in the annex has enriched the usability of the book.

In my review of the book, I found it very useful for nurses, medical students, young doctors, and pharmacists, especially for all those who work in remote areas of the country. Once again, I congratulate Dr Malte von Blumröder to his great achievement.

Sincerely,

Prof. D. Nader Ahmad Exxer January 2005

Head of the Internal Department of Aliabad Hospital
Kabul, Afghanistan

1. Good health care with limited resources

Many drops make a river

Recent decades have brought rapid developments in new medical technologies and drugs. However, in most parts of the world, the availability of these resources is limited. This causes difficulties for health professionals as well as for their patients. Those who suffer most in such a situation are the poor. The poor have the greatest health needs but for them access to even the limited resources is very difficult. This situation has been described as the inverse care law: the most needy people have the least access to health care.

A health professional who provides health care under such difficult circumstances faces various problems. On one hand, he may struggle to earn enough money for himself and his family. On the other hand, he would like to help many people but feels restricted because the resources for diagnosis and treatment are limited. Some health professionals feel frustrated because their training concentrated on theoretical topics and medical technologies that are not relevant to the situation they now work in.

How about you? Do you feel well equipped and trained to work in such a difficult situation where resources are limited? Do you feel discouraged by the burden of disease, suffering and death?

This book wants to encourage you. You can provide effective health care wherever you work. This chapter summarizes how you can do that. Even with limited resources, you can enable people, families and communities in your home country to live in better health. If everyone is doing his best, the situation will improve. Remember: 'Many drops make a river'.

Opportunities and limitations of health care systems

The solution to poverty and poor health is not just better health services. Many factors affect health, for example lack of work, lack of land, lack of clean water or lack of education. This chapter will concentrate on health care, but you should be aware of these other factors.

The standard medical system: hospitals, doctors and clinics

People fall ill and need treatment and cure. Hospitals, doctors and clinics have the important role of providing treatment for the ill. Health care professionals are highly regarded by the people. People will listen to them and so doctors, pharmacists and nurses have the

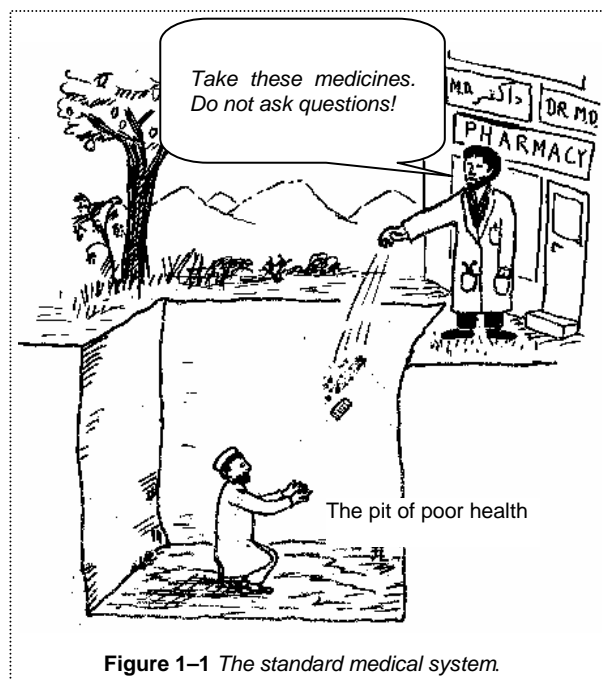


Figure 1-1 The standard medical system.

opportunity to increase people's understanding of health and disease. However, these opportunities are often missed and people are treated as shown in figure 1-1. It has been said that if you only treat patients, that is like trying to empty an ocean with a teaspoon. If you only treat patients, the following will happen: *the same patient with the same illness comes back to the same clinic to get the same medicine to return home to the same environment to get the same illness...* because the living situation that made the patient ill in the first place, has not changed. Therefore treatment without health education cannot improve health long-term.

Another problem of the standard medical system is that it can only reach a limited number of people. The poor or those living in remote areas may never be able to use it at all (see figure 1-2).

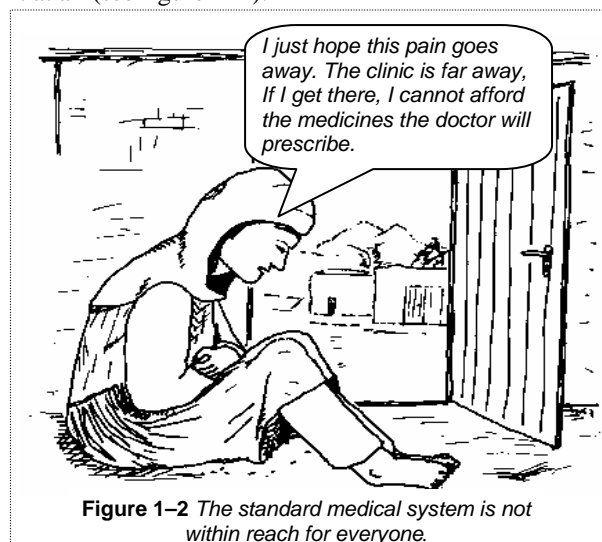


Figure 1-2 The standard medical system is not within reach for everyone.

Community health care (CHC)

Community health care is not opposed to the traditional system. It does not mean one clinic for every village. Community health care recognises that doctors and hospitals play a vital role in health care. The difference to hospitals, doctors and clinics is that community health care concentrates more on promoting good health care than on curing disease.

Health promotion is done by community health workers. A community health worker is a person who lives in his own community. He understands its traditions and can respond to the specific needs of the people. He works together with the people with the aim that they learn how they can improve situations that make them ill (health promotion; see figure 1–3).



The community health workers and the community work together to improve their health.

Figure 1–3 Community Health Care.

How you can provide good health care

Afghanistan has suffered enormously and has seen terrible destruction. The task of improving health seems overwhelming, but remember, 'Many drops make a river'. The following four suggestions are drops that you can add to the river of improving the health of your people in your country. The result would be good health care as shown in figure 1–4.

1. Co-operate with others

In order to improve health, everyone concerned with health care must work together. Hospitals, doctors and clinics reach only about 10% of the population. They need community health workers to reach all people. On



Figure 1–4 Good health care - helping others to care for themselves.

the other hand, patients in a community who fall ill need referral to the curative services for investigations and treatment. Treatment and health promotion must go hand in hand (see figure 1–5).

- Wherever possible, co-operate with those who provide health care in the community. If you do so, they will refer patients to you when needed. But you need them to improve health, see case studies in box.

How community health care affects survival: two case studies

Mustafa was 14 months old. He suffered from severe malnutrition. His only two brothers had died already. When his mother arrived at the hospital, Mustafa was in shock from chronic diarrhoea and dehydration.

Emergency treatment helped him to survive the first days, and he was diagnosed with tuberculosis. After two months of treatment he was a different boy. He was smiling and playing again. He was discharged home in a very good condition, still continuing his TB treatment. 2 months later we heard that he had died. The hospital had no links to the community and no follow-up at the family's home was possible.

Hussein was 12 months old. He also suffered from severe malnutrition. He was brought to the nutrition rehabilitation centre. He received treatment for sepsis and his mother was shown how to feed him. She went home and was visited the same day by a community health worker who helped her to feed Hussein. She was visited every day at first, and later every week. Once, Hussein became very ill and the mother brought him to the health worker she knew. The health worker sent Hussein to the clinic where he received treatment.

SUMMARY

Mustafa did not survive because there was no link between the hospital and the community. The co-operation between the nutrition centre and the community saved Hussein's life. Hussein remained well. This also helped other mothers to understand how to provide good and cheap nutrition for their children.



Figure 1-5 Community Health Care and curative services need each other.

2. Know well the medical areas that make a real difference to mortality and morbidity

Progress has not only been made in developing new drugs and new technologies. Research into resource poor situations has found effective and simple ways to reduce mortality and morbidity. Preventive and curative methods have specifically been developed for difficult situations where resources are limited. They enable health professionals in resource poor countries to practice medicine that is based on the best available evidence of its effectiveness (*Evidence-based medicine = EBM*). It has been proven that these developments have a major impact on death, ill health and suffering.

➤ You will find all the major developments in this book. Learn them well and put them into practice:

- Improving nutrition (see page 45-46)
- Immunizations (see page 34)
- Management of the common childhood killer diseases (acute airway infections, diarrhoea and measles; see chapters 8 and 9 and pages 32-33)
- Principles of integrated care (for example Integrated Management of Childhood Illness = IMCI - see page 7)
- Safer maternal and newborn health (antenatal care, delivery care, postpartum care, family planning and care of the newborn, see chapter 17)
- Malaria and TB (see pages 28-29 and chapter 5)
- First aid and accident prevention (see chapter 21)
- Improvement of public health (see pages 1-2 and 91)

Health is more than just the cure of illness and prevention of death. The standard medical system concentrates on the management of acute illness. To improve a patient's quality of life, always consider the impact of the illness on his life as well:

- Preventing disability (see pages 144 and 158)
- Improving mental health (see chapter 16)
- Supporting a patient with chronic illness (see page 22)

In terms of treatment, the main issues to practise are:

- Using standard management guidelines and prescribing rationally (see pages 19-21)

3. Use every opportunity to give a relevant health message

➤ If you want to help patients, explain to them about their illness in a way they can understand. The aim of health education is to increase patients' knowledge and awareness. This should lead to a change in health behaviour.

Sometimes a health professional looks down on what he calls an uneducated villager. This is a poor attitude. A good doctor is able to give advice in such a way that even an uneducated patient can understand it (for a negative example see figure 1-6).

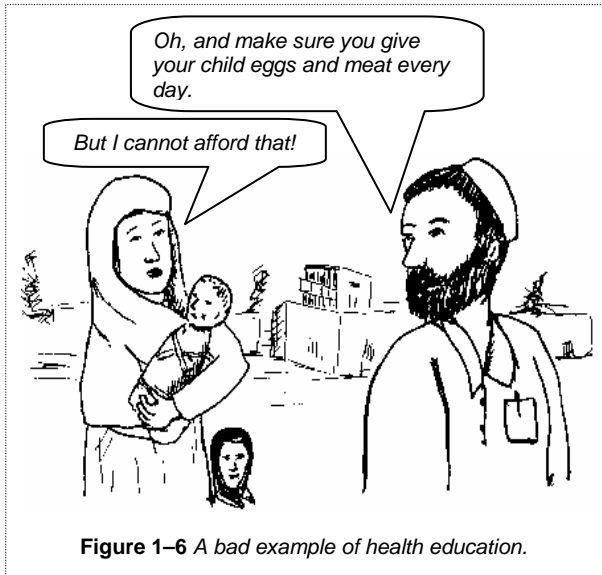
Your explanations will save lives. Health education is as important as the treatment of the actual disease because it serves the whole family and community (see case report in box). Sadly, if a doctor becomes busy, health education is the first thing that is left out. If this happens, you return to the bad situation in figure 1-1.

➤ Sometimes doctors put up posters in their waiting room but their patients often cannot understand the health message of these posters. Try to find posters with relevant health messages that can be understood by everyone, even the illiterate.

➤ You will find key health messages in the appropriate sections of this book. Picture charts are available from various NGOs. It would be useful for pharmacists and nurses to keep health message charts as a reference to be able to give effective health messages. It is very useful to give health messages to patients waiting in waiting areas of hospitals or clinics.

Survival depended on knowledge - a true case report

Fighting raged in the large city and hundreds of families had fled into the mountains. It was summer. The water supply was poor. Many children were suffering from diarrhoea, some had died. The women noticed one mother. Their children also suffered from diarrhoea but they did not become very ill or were at the risk of dying. 'Why is that?' they asked that mother. 'I have learnt how to prepare a special drink when my children get diarrhoea,' she replied. This mother then taught the others how to prepare a food-based oral rehydration solution to prevent dehydration.



4. If you are a teacher...

Training in many countries concentrates on the learning of basic science facts and advanced hospital treatment. This is very often not relevant to the situation the student will work in later.

- If you are a teacher, make sure you cover all the main areas that have been explained under section 2 in this chapter. These are the most important topics for a situation where resources are limited.
- Try to use a *problem-orientated teaching* approach. Everyone who has practised medicine will remember a patient with a certain disease better than the theoretical facts about that disease. Problem-orientated

teaching starts with a problem. Then the students think how they would approach this problem.

They discuss and learn the background of the illness, differential diagnosis and the ways to solve this problem, even with limited resources. Through this way of teaching, students will recall what they have learnt when they face real patients. This teaching method gives a deeper understanding of how to solve problems than memorising facts about a disease.

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2. Good history taking and examination

You can only initiate correct management if you first correctly identify a patient's disease and problems. The way to the correct diagnosis is through good history taking and examination. Look for symptoms (things the patient feels and tells you) and signs (things that you notice during physical examination). Symptoms and signs tell you how ill the person is and what kind of illness and problems he has. More than 90% of all diagnoses can be made from a history and examination alone.

Pickering, a world famous physician, said, 'We must teach the student to collect the facts.' This gathering of information must be done in a systematic way. Otherwise important information is missed. Inexperienced students and young doctors often draw conclusions too fast if they find one symptom or sign, which they think fits with a certain illness. The examination is then continued only superficially and only used to confirm the expected diagnosis. All findings that do not fit are neglected or misinterpreted. You can avoid this mistake if you regard history taking and examination as an objective gathering of information. First you gather all the information, then you interpret it. This interpretation should result in a working diagnosis and a problem list, see box. These provide the basis for logical management.

In many hospitals the results of history and examination are recorded on a special sheet. Such a sheet contains space for all relevant parts of the history and examination (see figure 2-1). A doctor records his findings in the requested spaces. This sheet helps him not to miss parts of the assessment. For resource poor countries, such a printed sheet may be too expensive. However, it is even more important for health professionals in re-

source poor situations to know how to do a thorough and systematic patient assessment because they will often have to rely on clinical features. If their knowledge of history, examination and clinical signs is poor, their diagnostic skills will also be poor. And as a result the patient management will also be of poor quality.

A German proverb states rightly: 'It is only through practising that someone becomes a master.' Use every opportunity to practise a thorough assessment. Use this chapter and go through every step of the assessment. Write down your findings on a piece of paper covering all the areas shown in figure 2-1.

When you examine a patient you can only detect abnormalities that are present at the time of your examination. It is only the history taking that can reveal how an illness developed over a time interval. Therefore, history taking is as important as the physical examination. History and examination belong together and complement each other. For example a patient who suffered a severe asthma attack in the early morning may have an entirely normal chest examination when you examine him in the afternoon. In this case, you will miss the diagnosis of asthma unless you take a good history.

When to do a full assessment?

You will not always be able to do a full examination, especially in outpatient clinics. This is acceptable. However, always do a full assessment in the following situations:

1. The patient is very ill.
2. The patient's disease could affect more than one part of his body.
3. You are not certain of the diagnosis and need to exclude other possible diagnoses.
4. Previous treatment has failed to cure the problem.
5. You admit the patient to hospital.

When is a partial assessment sufficient?

In outpatient clinics, when the patient is not very ill and the affected body system is obvious, take a history and do a physical examination that is related to the presenting complaint and the possible diagnoses (see figure 2-2).

However, in the following two patient groups always check for other diseases as well. This will only take a few moments:

1. Children under 5 years
2. Women of childbearing age

Many of these patients suffer from other underlying conditions that are not related to their presenting problem. If you identify these underlying conditions while they are still mild, you can prevent them from becoming

Contents and results of a full assessment

The aim of a full assessment is to be able to make a provisional diagnosis (working diagnosis) or to make a list of all the diseases that could be causing the patient's main symptoms and signs.

CONTENTS OF ASSESSMENT

Take a history

1. Main presenting complaint
2. History of presenting complaint
3. Drugs, allergy and immunisations
4. Past medical history
5. System enquiry
6. Family and social history

Examine the patient

1. General observations
2. Systematic examination of all body systems, starting with the one related to the presenting complaint

RESULTS OF ASSESSMENT

1. You can make a working diagnosis and problem list.
2. You can decide whether further investigations are needed.
3. You can choose logical treatment.

Name: _____ Sex: _____ Age: _____ Date: _____
 Family name: _____
 Place of origin: _____

HISTORY
 Main presenting complaint (PC): _____
 History of presenting complaint (HPC): _____

Drugs (name, dosage, duration): _____
 Allergies: _____
 Smoking: _____
 Immunizations (children):

BCG	DPT 1	DPT 2	DPT 3	Measles
OPV 0	OPV 1	OPV 2	OPV 3	OPV 4

 (women age 15-45 years):
 Tetanus toxoid 1 _____ TT 2 _____
 TT 3 _____ TT 4 _____ TT 5 _____
 Vitamin A and deworming (children): Vitamin A _____ Mibendazole _____

Past medical history (PMH): _____

Systems enquiry:

General condition:	
Cardiovascular and respiratory system:	Gastrointestinal system:
Genito-urinary system:	Nervous system:
Mental health:	Mono-skeletal system:
Ears and eyes:	Skin:

Family and social history: _____

PHYSICAL EXAMINATION
 General impression: Ill or well:

NO	mild	severe
----	------	--------

 Weight: _____ Height: _____

Head and neck:

Malnutrition	Dehydration	Fever	Difficult breathing
Jaundice	Anaemia	Cyanosis	Depression or strange behaviour

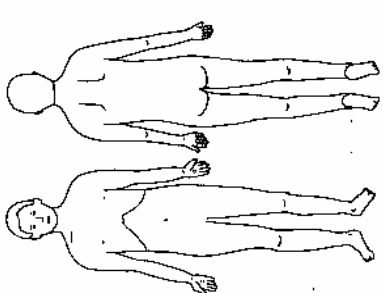
Eyes: _____
 Ears, nose, throat (ENT): _____
 Lymph nodes: _____

Cardiovascular system: Pulse: _____ / mmHg _____ Apex beat _____
 Respiratory system: Breathing rate: _____ /minute Chest indrawing: Yes No
 Position of trachea: _____
 Chest movements: _____
 Percussion: _____
 Auscultation: _____

Abdomen: _____
 Inspection: _____
 Tenderness: _____ Guarding: _____ Rebound: _____
 Liver: _____
 Spleen: _____
 Kidneys: _____
 Masses: _____
 Genitalia: _____
 Rectal examination: _____
 Musculoskeletal system: _____

Skin: _____
 Nervous system: _____
 Conscious level: _____
 Neck stiffness: _____
 Coordination: _____

	Time	Power	Reflexes	Sensation
Arms right				
Arms left				
Legs right				
Legs left				

Indicate abnormal findings:
 

PROBLEM LIST AND MANAGEMENT PLAN
 Working diagnosis: _____
 Differential diagnoses: _____
 Other problems: _____
 Investigations: _____
 Management plan: _____
 Relevant health education: _____
 (What is the most important thing that the patient needs to learn?): _____
 Your name and signature: _____

Figure 2-1 Example of inpatient record sheet. All blanks should be filled in. (See pages 267-268 for a large copy that you can photocopy and use.)

Good Health Care Centre

Date: _____

Name: _____ **Family name:** _____ **Sex:** _____

Age: _____

Presenting complaint (PC): _____

History of presenting complaint (HPC): _____

Other important information: _____

Physical examination: _____

Working diagnosis: _____

Problems: _____

Investigations: _____

Management plan: _____

Important health education: _____

Figure 2–2 Example of outpatient record sheet. Use the back to write a prescription.

severe or causing death. This is the concept of the Integrated Management of Childhood Illness (IMCI). It means that a child who is treated for one illness is always checked and treated for the other major killers of children. For example, even if a child comes only with a simple conjunctivitis, you still do this basic check (see figure 2–3).

Similarly check women of childbearing age (1) for anaemia and (2) whether they have completed their tetanus immunisation.

A similar approach as IMCI to adolescent and adult illness has been developed (IMAI) and will be implemented in the coming years.

How to take a good history

You can take a complete history in most cases in a few minutes. If the patient may have a mental problem or had a convulsion, also take the history from a relative or other witness. If you want to check afterwards whether your history is complete, summarize your history and then ask the patient whether you have understood him correctly. The patient can then clarify information.

At the top of your record sheet write down the date, patient’s name and family name, his sex and age. In hospital notes, also mention the reason for admission and who referred the patient (self-referral or referral by another health professional).

IN ALL CHILDREN UNDER 5 YEARS DO THE FOLLOWING QUICK ASSESSMENT:

1. CHECK FOR DANGER SIGNS

Ask:

1. ‘Is the child able to drink?’
2. ‘Did the child have any convulsions?’
3. ‘Has the child been vomiting?’

Look:

4. Does the child look well or ill? (Lethargic or unconscious)

2. ASSESS MAIN SYMPTOMS

1. **Malnutrition?** (Severe wasting, foot oedema)
2. **Cough and difficult breathing?** (Count respiratory rate, look for chest indrawings and listen for stridor)
3. **Diarrhoea? Dehydration?**
4. **Anaemia?** (Look for palmar pallor)
5. **Fever?** (Look for signs of meningitis and measles)
6. **Ear problems?** (Look for discharge and swelling behind the ear: mastoiditis)
7. **Eye problem?** (Look for pus, and for corneal clouding, a sign of vitamin A deficiency)

3. CHECK IMMUNIZATION STATUS

BCG + OPV 0	DPT1+ 0PV 1	DPT 2 + OPV 2	
DPT 3 + OPV3	Measles + OPV 4		

4. CHECK VITAMIN A STATUS

All children between 6 months and 5 years should receive one dose of vitamin A every 6 months.

5. CHECK DEWORMING STATUS

All children from 1 year onwards should receive a single dose of mebendazole every 6 months.

This assessment helps you:

1. Not to overlook problems and to identify hidden dangers
2. To decide on the urgency of a child’s treatment:
 - Emergency treatment or urgent referral
 - Management as outpatient
 - Treatment at home with home remedies

➤ Always remember to give relevant health education

Figure 2–3 How to assess all children under 5 years.

1. Main presenting complaint (PC)

- Find out the patient’s reason why he has come to you today.
 - Ask him: ‘What is your problem?’

2. History of the presenting complaint(s)

- Find out how the illness has developed. For each symptom ask for the following information:

- **Onset and duration:** ‘When and how did the illness begin?’ (Suddenly or gradually)
- **Development of the symptom:** ‘Has it changed?’ ‘Is it getting better or worse?’

If the patient complains about pain find also out about (1) **site:** ‘Where does it hurt?’ (2) **radiation:** ‘Does the pain spread to any other place?’ (3) **character:** ‘Do you feel the pain all the time or does it come and go?’ (4) **severity** and (5) **factors relieving or worsening the pain:** ‘Does anything start the pain, make it better or worse?’

Instead of asking direct questions, you may also start by asking the patient: ‘Tell me more about your problem.’ Often this approach provides you with more relevant information by letting the patient talk first, before you ask direct questions to clarify things. Listening to the patient also helps you to find out what he thinks about his problem and what worries him. This knowledge will help you to give the patient relevant advice that he will understand and follow.

- Is there anyone in the patient’s household with a similar problem?

3. History of drugs, allergies and immunisations

Ask the patient:

- ‘Have you already taken any drugs or traditional medicines?’
- ‘Are you allergic to any drugs?’ (Particularly penicillin)
- ‘Have you been fully immunized?’ (Important in children and women of childbearing age)
- ‘Do you smoke?’

4. Past medical history (PMH)

Ask the patient about his past medical history so that you find out about previous health problems that could be relevant to his present complaint or need special consideration.

- ‘Have you been previously seriously ill or admitted to hospital?’
- ‘Did you have any operations or accidents?’
- ‘Have you been treated for tuberculosis?’

5. Systems enquiry

Sometimes a patient does not mention relevant symptoms unless you ask for them. He may think they are not important. He may not want to talk about them. The aim of the systems enquiry is to make sure you do not miss relevant symptoms. The information you ask for during the system enquiry includes all the main symptoms of diseases in each of the major body systems. Do not repeat questions you have already asked. If you find a new symptom, ask for full details about it.

- General condition:
 - Appetite normal?
 - Weight loss?
 - Fever?
 - Pain?
- Cardiovascular and respiratory system:
 - Cough?
 - Sputum?
 - Difficulties breathing?
 - Chest pain?
 - Swollen legs?
- Gastrointestinal system:
 - Nausea or vomiting?
 - Diarrhoea or constipation?
 - Abdominal pain?
 - Abdominal swelling or lump?
 - Difficulties swallowing?
 - Jaundice?
- Genito-urinary system:
 - Pain when passing urine?
 - Blood in the urine?
 - Loin pain?
- Nervous system:
 - Headache?
 - Convulsions?
 - Weakness of arms or legs?
- Mental health:
 - Very sad or worried?
 - Problems with sleep?
- Motor-skeletal system:
 - Pain, stiffness or swelling of joints?
 - Back pain?
- Ears and eyes:
 - Problems with hearing or seeing?
 - Ear discharge?
- Skin:
 - Rash? Lumps or swellings?
- Gynaecological:
 - Normal menstrual periods? When was the last menstrual period? (It is important to know whether or not a female patient of childbearing age is pregnant)
 - Abnormal vaginal bleeding or discharge?

6. Family and social history

- Ask about the patient’s family and social situation. Many diseases, for example malnutrition, have their origin in social difficulties:
 - ‘Who lives with you in the same household?’
 - ‘Have there been any recent health problems in your family?’
 - ‘Who is working and what?’ ‘What is the family’s monthly income?’
 - ‘Who in your family can read and write?’
 - ‘Where do you get drinking water from?’
 - ‘Have you got access to a toilet?’

How to do a good physical examination

Through history taking you get a good idea about the patient's problem. His main symptoms often indicate in which body system to expect the cause of his problem.

As already said, it is essential to develop a routine of physical examination. This routine will help you not to forget anything important. You can only learn how to perform a good physical examination by spending a lot of time practising. Always be thorough. Explaining a good physical examination takes several pages in this book. In practice it will only take a few minutes.

On the following pages is explained how to fully examine a patient and which signs to look for. If you find an abnormal sign, look specifically for further signs. For example if the abdomen is distended, find out whether this may be caused by fluid, a mass or something else. How to further assess an abnormal sign and how to reach a diagnosis is explained in the chapter dealing with that body system. In this chapter, you learn mainly how to systematically collect information.

Look at the patient

General observations (figure 2-4)

Observe the general appearance of the patient while you talk to him. You may notice a disability, unrelated to the complaining problem but still important to consider (for example contractures of old poliomyelitis).

- Does the patient look ill or well? (Figure 2-5)
- Is the patient malnourished?
- Is the patient dehydrated?
- Is the patient breathing fast or with difficulties?
- Is the patient anaemic?
- Is the patient jaundiced?
- Is the patient cyanosed?
- Has the patient got a fever?
- Does the patient seem to be in pain?
- Does the patient seem to be depressed? Does he show strange behaviour?

Examine the patient

The information obtained through history and observation often suggests which body system is affected by disease. Examine this body system first. Then examine each part of the body in turn. The order is not important as long as you cover all systems.

If you examine a young child, examine him while he is sitting on his mother's knees. First count the respiratory rate, and then gently examine the abdomen, the respira-

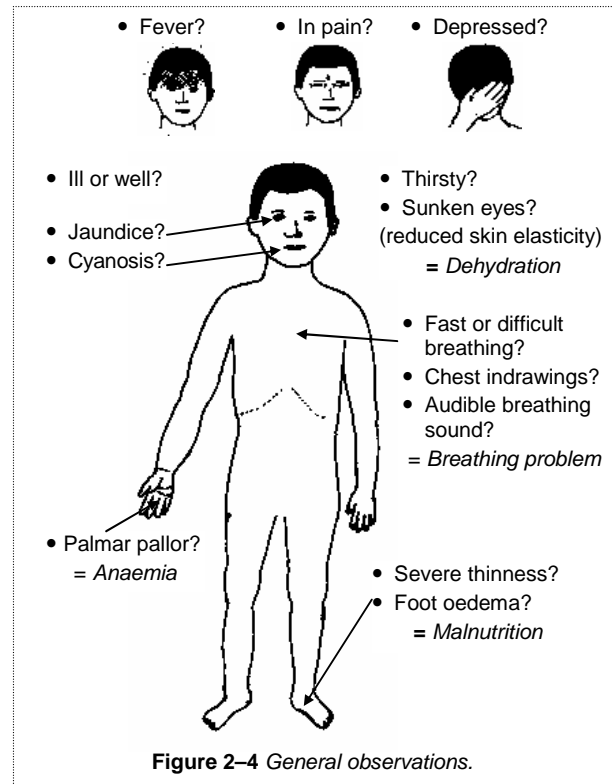


Figure 2-4 General observations.

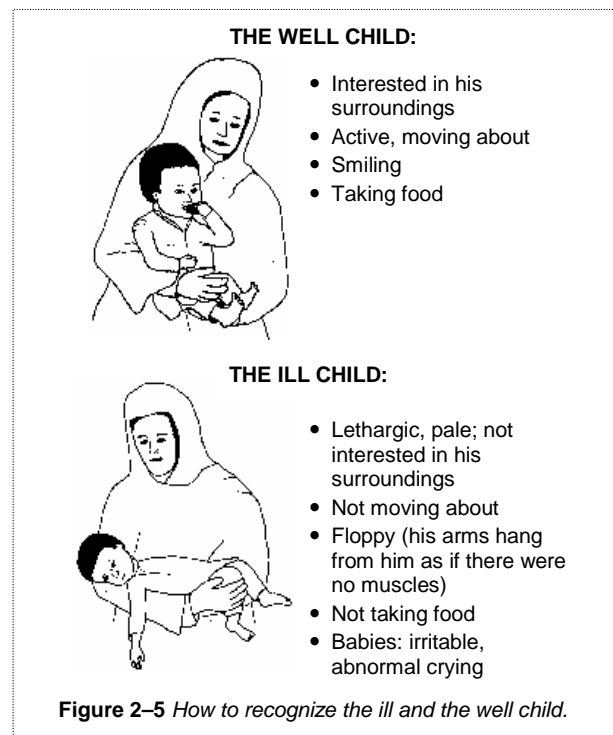


Figure 2-5 How to recognize the ill and the well child.

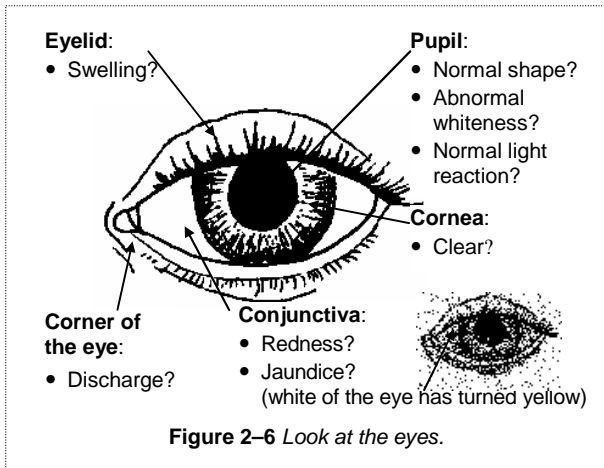
tory system and the other systems. Examine the ears and throat at the end because this is likely to upset the child.

During each part of the clinical examination follow four steps:

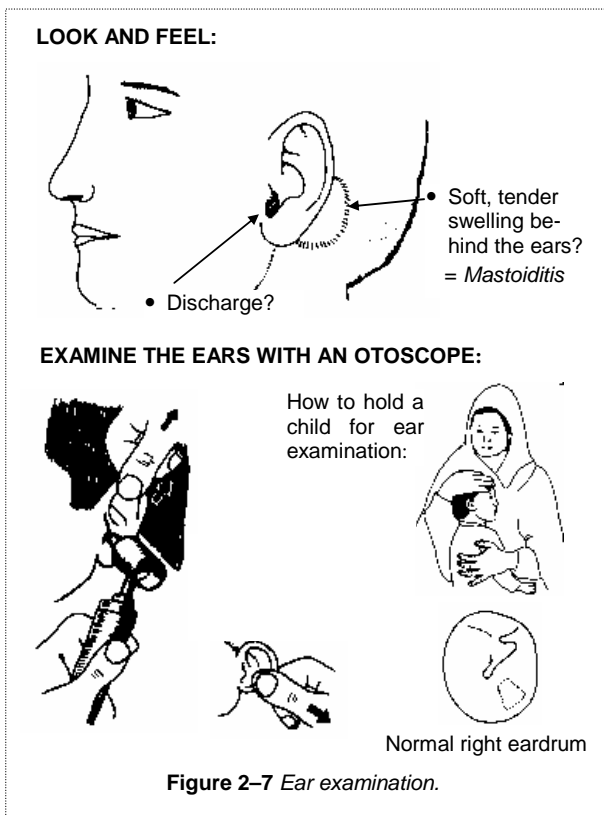
1. **Inspection:** look and observe.
2. **Palpation:** feel with your hands.
3. **Percussion:** tap and listen.
4. **Auscultation:** listen (usually with a stethoscope).

Head and neck (including eyes, ears, nose and throat)

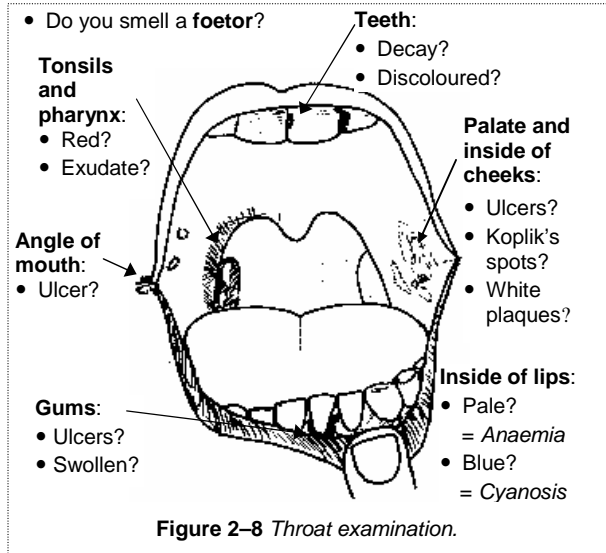
- Look at the **eyes** (see figure 2-6):
 - Jaundice?
 - Sunken eyes?
 - Dry eyes?
 - Redness, abnormal whiteness or discharge?
 - Abnormal pupils?
 - Abnormal cornea?



- Look at the **ears and nose** (see figure 2-7):
 - Discharge?
 - Swelling behind the ear?
 - Deformity of the nose?
 - Normal eardrums? (Examine with an otoscope)

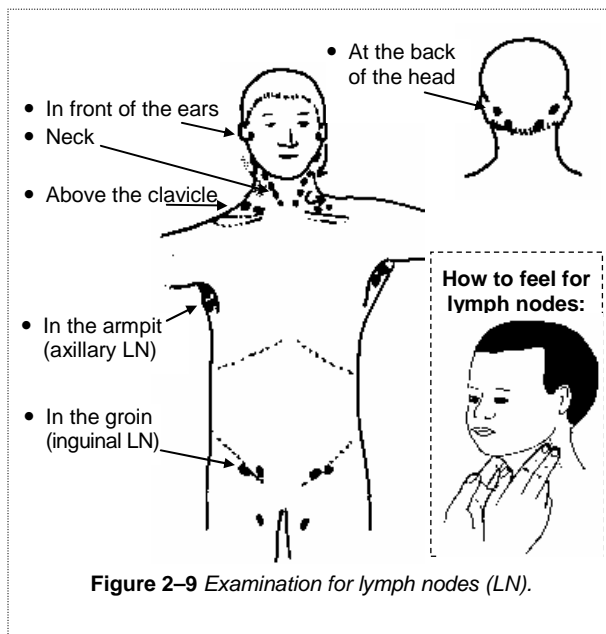


- Ask the patient to open his mouth and look systematically at the **lips, teeth, gums, inside of cheeks and pharynx** (see figure 2-8):
 - Sore angles of mouth?
 - Inside of lips: pale or blue?
 - Teeth: decayed or discoloured?
 - Gums: swollen or bleeding?
 - Inside of cheeks: plaques or spots?
 - Pharynx: redness, ulcers or exudate on tonsils?



Lymph nodes

- Look at the neck and feel for **swelling or lumps** (see figure 2-9). Then feel for other lymph nodes (axillary, supraclavicular and inguinal). For each swelling decide about the following:
 - Red and hot?
 - Tender?
 - Firm, soft or fluid inside?



Heart and circulation (cardiovascular system)

- Feel the **radial pulse** just medial to the radius bone with two forefingers. Do not use your thumb (see figure 2-10). Note the following:

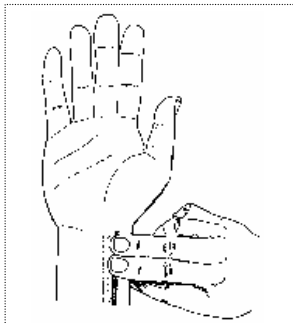
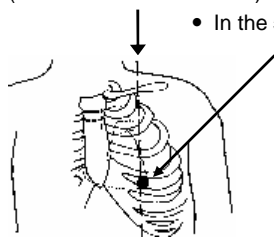


Figure 2-10 How to feel the radial pulse.

- **Rate:** normal, fast or slow pulse? (Do not guess the pulse rate but count it: count the pulse for 15 seconds and then multiply your result by 4. The result is the pulse rate per minute. Normal pulse rate in adults is 60-80 beats/minute. If less than 50 beats/minute = bradycardia; if more than 100 beats/minute = tachycardia.)
 - **Rhythm:** regular or irregular?
 - **Volume:** normal, weak or not palpable? (Normally you can feel the pulse beat strongly. This means that each contraction of the heart pumps the normal amount of blood into the arteries.)
- Put one hand on the chest and feel whether the **apex beat** is at the normal position or is deviated (see figure 2-11).

You feel the apex beat normally:

- In line with the middle of the clavicle (mid-clavicular line = MCL)
- In the 5th intercostal space



Displaced apex beat:

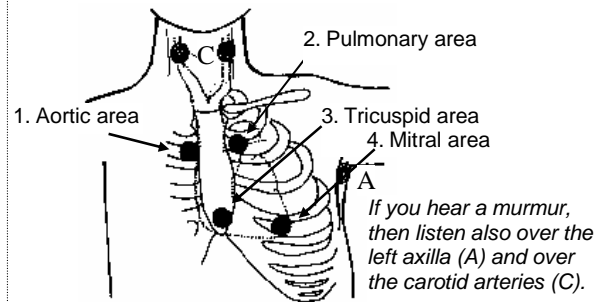


The apex beat is displaced if you feel it further to the side or further down than normal.

Figure 2-11 The apex beat.

- Listen with a stethoscope to the **heart sounds** (see figure 2-12).
- Measure the **blood pressure** (see figure 2-13): normal, low or high?
- Look and feel for ankle or sacral **oedema**.

Listen to the heart at the following four places:



Normally, you hear two heart sounds (the first heart sound represents closure of mitral and tricuspid valves, the second heart sound closure of aortic and pulmonary valves). The blood flow through the heart is usually silent. If blood flows through an abnormally narrow or dilated part of the heart, it causes a turbulence that you hear as a murmur. Sometimes you find a murmur if the blood flow is increased (for example in fever or anaemia).

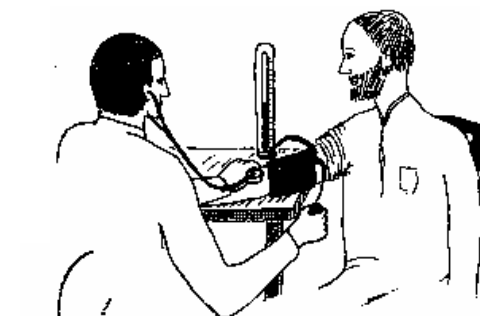
Figure 2-12 How to listen to the heart.

THE BLOOD PRESSURE (BP):

When the heart beats it pumps the blood into the big arteries. These stretch and then slowly push the blood through the small arteries into the capillaries before the next heart beat. Some blood remains in the arteries before the heart beats again, so there is always pressure in them. When the heart pumps blood into the arteries the pressure is highest (= the 'systolic blood pressure' - in adults normally 100-135 mmHg). The pressure in the arteries is lowest just before the heart pumps more blood into the arteries (= the 'diastolic blood pressure' - in adults normally 70-85 mmHg).

HOW TO TAKE THE BLOOD PRESSURE:

1. The arm should be supported. Wrap the cuff tightly around the upper arm. Do not put the cuff over clothes but unwrap sleeves first. Be aware: if the cuff is too small, the BP measurement will be too high; if the cuff is too large, BP will appear to be too low.



Brachial artery

2. Feel the brachial pulse and inflate the cuff rapidly to about 30 mmHg above the point where the pulse disappears.
3. Listen with the stethoscope over the brachial artery and deflate the cuff at a rate of 2-3 mmHg per second. Listen to the auscultation sounds (Korotkoff sounds). The very first appearance of sounds = *systolic blood pressure*. The point at which all sounds finally disappear = *diastolic pressure*.
4. Record the exact measurement.

NOTE: In children, it is sometimes difficult to hear the sounds. In this case feel the brachial pulse while you deflate the cuff. The systolic blood pressure is the point when the brachial pulse reappears.

Figure 2-13 Blood pressure measurement.

Chest (respiratory system)

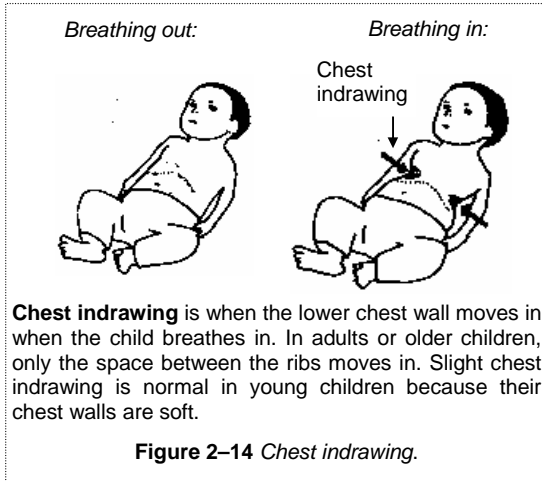
○ Look:

- **Fast breathing?** (Count the respiratory rate, do not guess it)

Definition of fast breathing:

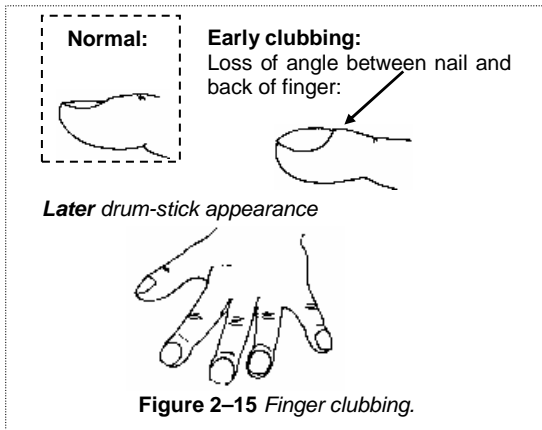
Younger than 2 months	60 or more breaths per minute
2–12 months	50 or more breaths per minute
1–5 years	40 or more breaths per minute
Adults and children over 5 years	30 or more breaths/min.

- **Chest indrawing** (retractions)? (See figure 2–14)
- If chest symptoms, look at the sputum for blood or pus.



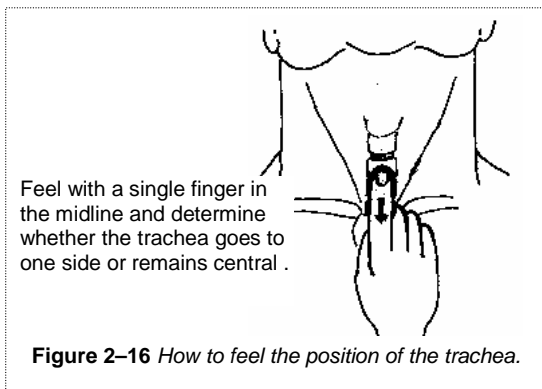
○ Look at the **hands**:

- **Finger clubbing?** (See figure 2–15)

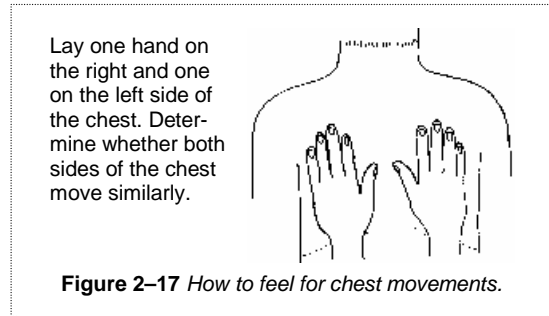


○ Feel:

- Is the **trachea** central or deviated? (See figure 2–16)

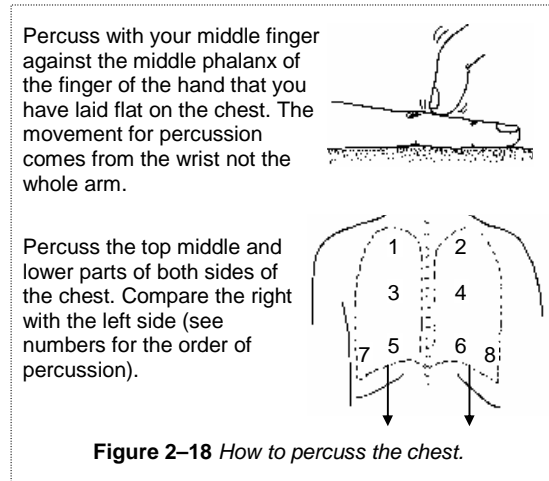


- **Symmetrical chest movements?** (See figure 2–17)



○ **Percuss** systematically all areas of the chest (see figure 2–18). Abnormalities may be found all over the chest or only localised at a certain part. Describe the percussion sound:

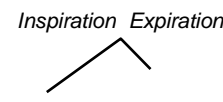
- **Resonant?** (= Normal)
- **Hyperresonant?** (The sound is like the sound of a drum)
- **Dull?** (You can imitate the sound when you percuss on your leg)



○ Ask the patient to breathe gently through his mouth. **Listen with a stethoscope** at the top, middle and lower parts of both sides of the chest and then in the axilla. Listen to the area above the clavicle. Compare right and left side. Abnormalities may be found all over the chest or only localised at a certain part.

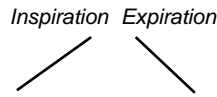
- Same **loudness of breathing sounds** at both sides, or are the breath sounds reduced or missing at a certain area?
- Which **type of breathing sounds?** Describe their quality as vesicular or bronchial:

- **Vesicular breathing** is normal and heard over all lung areas except over the trachea and the main bronchi behind the sternum. In vesicular breathing, inspiration is about two times longer than expiration. There is no gap between ins- and expiration.



- **Bronchial breathing** is abnormal except over the trachea and main bronchi behind the sternum. It is a harsh breathing sound. You can imitate it by putting the tip of the tongue on the roof of your mouth and breathing in and out through the open

mouth. Typically the duration of inspiration to expiration is the same. There is a short pause between ins- and expiration.



- **Additional abnormal sounds?** Describe what you hear and when (during breathing in or breathing out):
 - *Crepitations* (sometimes also called crackles or rales). They can be fine (you can imitate it by rubbing your hair in front of your ear), medium or coarse (you can imitate it by blowing air through a straw into a cup with water).
 - NOTE: in young children with a common cold crepitation-like sounds can get transmitted from the nose into the lung. They are not a sign of lung pathology but are called referred sounds.
 - *Wheeze* (sometimes also called rhonchi) are whistling sounds that you hear mainly during breathing out.
 - *Pleural rub* sounds like leather that is bent.

Abdomen (gastrointestinal and urogenital system)

To examine the abdomen, ask the patient to lie on his back with a small pillow under his head, arms beside the sides and knees slightly bend. This will help to relax the abdominal muscles and makes examination easier. Small children may be examined on their mother's arm.

Do not examine through clothes but expose the abdomen from the chest margin to the groin. For describing your findings, divide the abdomen into different areas (see figure 2–19).

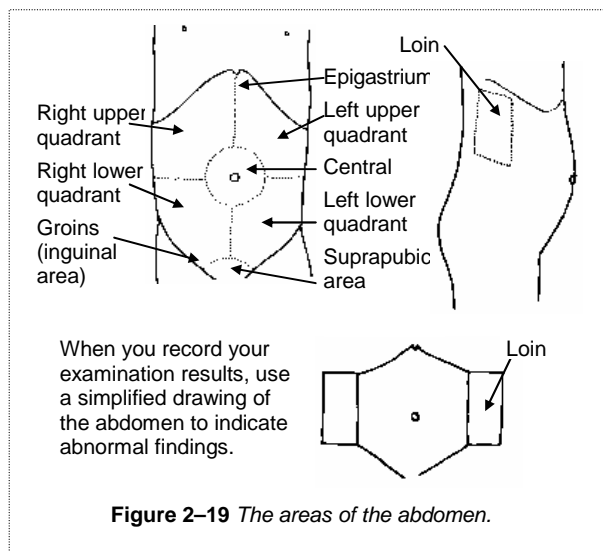


Figure 2–19 The areas of the abdomen.

- Look:
 - Large abdomen; distended?
 - Obvious lumps?
 - Scars?
 - Is the abdomen moving when the patient is breathing?

- Feel:
 1. **Tenderness?** Palpate each quadrant of the abdomen. Your hand should be flat on the abdomen and you feel very gently by bending your finger. While you are doing this, watch the patient's face for any expression of pain. Start palpation at the area that is furthest away from where the pain is.
 - Is the abdomen soft or hard (rigid)?
 - Are there any areas of tenderness? Where? How severe is the tenderness?

If tenderness, find out whether there is (1) *guarding* or (2) *rebound tenderness* (see figure 2–20). Guarding is an involuntary muscle spasm to protect from pain. Rebound tenderness is a sign of peritoneal inflammation.

Test rebound tenderness by quickly taking away your fingers from a tender area during deep palpation. If the patient feels extra pain when you do this, he has rebound tenderness.

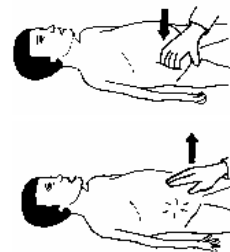


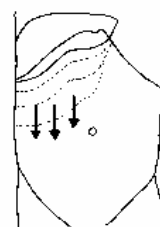
Figure 2–20 How to test for rebound tenderness.

2. **Enlarged organs and masses?** (See figure 2–21+22).
 - Feel for the different abdominal organs (liver, spleen, kidneys, bladder and uterus).
 - Then palpate deeply for abnormal masses. If you feel a mass or an enlarged organ, define its size and exact location.

HOW TO FEEL THE LIVER:

The liver enlarges straight downwards. Therefore, start palpating in the right lower quadrant:

Press gently with your flat hand on the abdomen and move slowly upwards. Feel for the edge of the liver with the side of your index finger. Note the texture of the liver and whether it is tender or not.



HOW TO FEEL THE SPLEEN:

The spleen enlarges towards the right abdomen. Therefore, start palpating in the right lower quadrant and move towards the left upper quadrant.

Feel with the flat side of your right hand. Use the left hand to push the spleen gently forward.



Figure 2–21 How to feel for liver and spleen.

HOW TO FEEL THE KIDNEYS:

The kidneys are situated retroperitoneal (behind the abdominal cavity). Palpate with both hands, one from the front, the other from the back. Normally you cannot feel the kidneys.

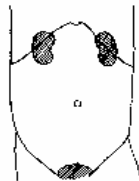


Figure 2–22 How to feel for the kidneys.

How to differentiate between enlarged spleen and enlarged kidney

- An enlarged spleen is common, an enlarged kidney is rare.
- Remember that the spleen is located inside the abdomen while the kidneys are located behind the abdominal cavity, therefore:
 - In splenomegaly, you cannot get your finger between the mass and the ribs but you can feel the medial and lower borders of the mass. In kidney enlargement, you can get your fingers between mass and ribs but cannot feel its medial and lower margins.
 - In splenomegaly, percussion sounds over the mass are dull; they are normal (tympanic) in kidney enlargement.

How to identify a pelvic mass

You cannot get your hands below the mass if it comes from the pelvis.

- If the patient is pregnant, determine the size of the uterus (fundal height) and the position of the baby (see pages 184 and 189).
 - Ask the patient to stand up and ask him to cough while you feel his groin for *hernia*. A hernia will increase in size when the patient coughs.
- Percuss to determine the cause of an enlarged abdomen. Decide whether the percussion sound is tympanic (normal), hypertympanic (too much air) or dull (mass or fluid). Listen with a stethoscope for bowel sounds (for details see page 98).
- Examine the rectum, if indicated. Tell the patient at each stage of the examination what you are going to do. Lie him on his left side with his knees bent and drawn up to his chest:
- Look at the anus for lumps and fissures.
 - With a lubricated glove, gently insert your finger into the rectum. Feel the size and consistency of the prostate gland and feel for tenderness and masses. When you take your finger out, look for blood on the glove.
- A vaginal examination is indicated in the following situations:
- Abnormal vaginal bleeding or discharge.
 - Unclear abdominal pain.
 - Masses that may originate from the pelvis.
 - To assess birth progress during labour.

Arms, legs and spine (musculoskeletal system)

Normally the bones, joints and muscles (musculoskeletal system) are only examined briefly when you exam-

ine neighbouring systems unless there is a specific musculoskeletal problem or unclear fever. Always compare the opposite arms and legs (see figure 2–23).

○ **Observe how the patient walks.**

Examine **arms and legs**:

- Look for *deformities*, *swelling*, *redness*, *muscle wasting* or *discharging sinuses*.
- Feel for *tenderness*.
- Test the *range of movements* and assess *function*. Move the joint passively (you do it) and actively (the patient moves it). This must be done gently to find out how far the patient can move his joint? What stops him moving it (for example pain or stiffness)?

Examine the **spine**:

- Look at the spine and feel with your finger down the spine for deformity, especially a gibbus.

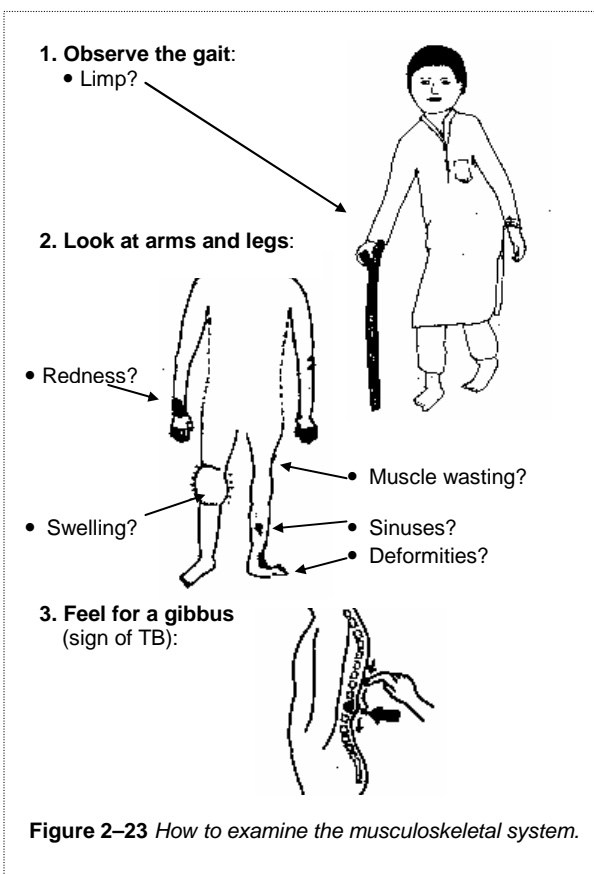


Figure 2–23 How to examine the musculoskeletal system.

Nervous system

Normally the nervous system is only examined briefly. Examination also includes testing vision and hearing.

○ Assess the **consciousness level, orientation, mood and speech**:

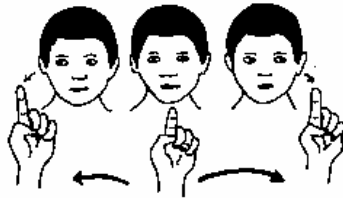
- *Consciousness*. Does the patient respond when you talk to him? If he does not because of disturbed consciousness, then assess the depth of unconsciousness (see page 169).

- **Orientation.** Is the patient confused? Ask him: 'Do you know where you are?' 'Do you know why you are here?'
- **Mood.** What is the patient's emotional state: is he depressed or does he show strange behaviour?
- **Speech.** Is his speech normal?

○ **Examine the patient's face** for obvious damage to the cranial nerves. For a basic examination, look for:

- **Asymmetry** of the face or facial movements?
- Look at the *pupils* to see whether they are both the same size. Then shine a torch into the eyes and see whether the pupils respond normally (becoming smaller in size) - for abnormal pupils see page 169).
- **Test eye movements** (see figure 2-24).

Ask the patient to follow your finger with his eyes without moving his head. Move your finger from side to side and up and down and observe the patient's eye movements:



Normal:

- The eyes follow smoothly.

Abnormal:

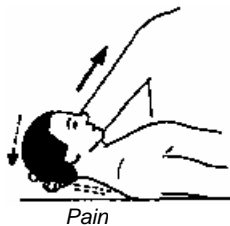
- One eye looks in a different direction (possible brain damage or problem of eye muscles)
- The eyes follow in jumps or jerks (possible brain damage)

Figure 2-24 How to test eye movements.

○ If fever or headache, examine for **signs of meningitis** (see figure 2-24).

ADULTS and CHILDREN:

- **Neck stiffness?**



- **Kernig's sign?**

You can straighten a healthy person's leg without hurting him. You cannot do this if he has meningitis.



CHILDREN:

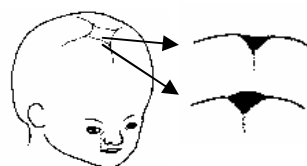
- **Head between knees sign?**

You can easily put a healthy child's head between his knees. You cannot do this if he has meningitis.



CHILDREN under 1 year:

- **Bulging fontanelle** (in a child who is not crying)

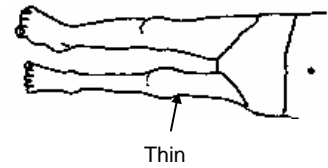


- Normal:**
- Level, pulsating
- Meningitis:**
- Bulging (swollen), not pulsating

Figure 2-25 How to examine for meningitis.

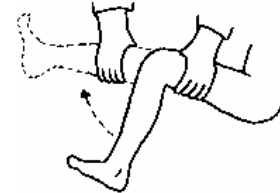
○ **Examine arms and legs:**

- **Muscle wasting?** (Are both legs the same?)



- **Test muscle tonus** (move elbow or knee):

- Normal?
- Very floppy?
- Resistance to movements (spasticity)?



- **Test muscle power:** ask the patient to move his feet by himself, then against your resistance.



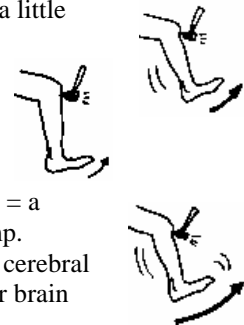
Are the patient's legs/arms equally strong on both sides? Ask him for example to straighten his leg against your resistance.

○ Test the **knee jerk** (tendon reflex). With the leg relaxed and partly bent, tap the tendon just below the patella.

- **Normal** = the knee jumps a little

- **Reduced or absent** = the knee moves very little or not at all (floppy paralysis, or the patient did not relax)

- **Over-active** (exaggerated) = a slight tap causes a big jump. Typical of spasticity from cerebral palsy, spinal cord injury or brain damage.



○ **Test sensation:** does the patient feel light touch and pain? Compare the sensation of both arms and both legs with each other:

	Normal	Reduced	Absent
Arm (right or left)			
Leg (right or left)			

If weakness or abnormal sensation, note which parts are affected, for example:



- **Look at the patient's skull and spine** for injuries or deformities. Feel with your finger down the spine for a bump (gibbus of tuberculosis).
- **Test the patient's eye to hand coordination.** Ask him to move his finger quickly between your finger and his nose and back again. *Abnormal:* misses or has difficulties (poor coordination, poor balance or loss of position sense).
- **Test the patient's balance.** Observe him standing with his feet together with his eyes open and then his eyes closed (see figure 2–26). *Abnormal:* excessive swaying and loss of balance. If present when eyes open: cerebellar problem. If only present when eyes are closed: loss of position sense.

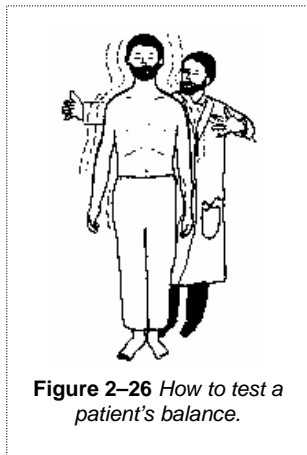
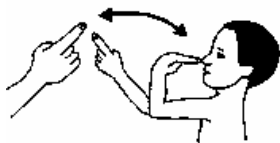


Figure 2–26 How to test a patient's balance.

Skin and hair

Important for the diagnosis of skin diseases is their location and their morphology (type of skin lesion). The morphology of two skin diseases may be similar but their location is different and this helps you to reach the diagnosis. Therefore examine the patient's whole body and describe your findings carefully. If you find an abnormality note:

1. Location?
2. Type of lesion?
3. Symmetrical or asymmetrical distribution?

NOTE: always look for signs of skin infections and scabies (see figure 2–27).

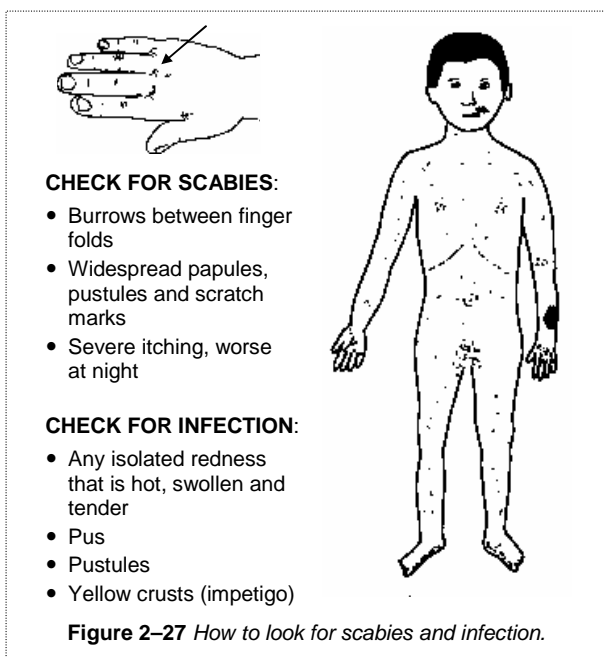


Figure 2–27 How to look for scabies and infection.

How to reach a working diagnosis and problem list

After completion of history and examination:

1. **Make a diagnosis or differential diagnoses** for the patient's presenting problem.
2. **Make a list of additional problems.**

Then base your management on these.

1. Make a diagnosis or differential diagnoses

For each main symptom or sign think about a possible diagnosis. Be aware that a number of different conditions can cause the same symptom or sign. However, each condition has typical clinical features that others have not. Look for these features to differentiate between the conditions that you consider as differential diagnosis. Make a working diagnosis (provisional diagnosis). This is the disease that is most likely to cause the patient's symptoms. If all your normal and abnormal findings do not fit this diagnosis, do not make it fit but consider alternatives. Make a list of all diseases that could be causing the patient's main symptoms and signs. These possible diagnoses are called differential diagnoses.

In this book, you find for each symptom or sign a list of the important conditions that could cause them. In each chapter is then described how to differentiate between these conditions by their typical clinical features or by simple tests.

Think about prognosis

The prognosis is what you think will happen to the patient because of his condition. This will help you to understand the urgency of treatment or referral and to decide about your treatment aim:

- Is the patient at risk of dying or is his illness only mild?
- Will the patient improve quickly or slowly?
- Is the patient's condition acute or chronic?

When to arrange further investigations

Arrange for further investigations in the following situations:

- You are uncertain about the diagnosis. Investigations will help to confirm the working diagnosis or to decide which differential diagnosis is the correct one.
- You have identified a patient's problem but need to find the cause of it (for example in heart failure or anaemia).
- You need a 'baseline' to see if the patient gets better or worse (for example creatinine in renal failure).

When you order a test, always think why you need the result of that test. If a test is not likely to influence your management, it is usually not necessary.

2. Make a list of additional problems

While examining the patient for other underlying conditions you may have found other problems. Make a list of these as well and consider them in your management plan. Examples are:

- **Complications of the present illness** that need special attention (for example paralysed legs in a patient with spinal tuberculosis).
- **Underlying medical problems** that need treatment (for example anaemia).
- **Disabilities that affect a patient's life** (for example poor vision).
- **Social problems** (for example a widow with little outside support. It is good to know about this situation so that you can arrange treatment that she can afford; or even offer her free treatment).

How to assess a patient's progress

It is an important part of patient management to judge and monitor the effect of the treatment. Assess a patient who is admitted to a hospital at least once daily. But you should also sometimes ask outpatients to come back for review.

To assess a patient's progress do the following:

1. Find out how the patient feels about his progress. Ask him: 'Do you feel better?'
2. Examine the systems affected by his illness to judge the progress objectively. Look for complications.
3. Look at the results of tests, the fever chart, in- and output chart and vital signs to judge the patient's progress objectively.

As a result of this assessment:

1. Think again about the patient's problem list and ask yourself: am I addressing all of the patient's problems? Has he developed any new problems?
2. Decide about your further management plan: should you continue the present treatment or should you change it?

How to communicate your findings to other health professionals

Sometimes you refer patients to other health professionals or to a hospital; or during a ward round in hospital you introduce patients to other doctors. This is a

time to show that you can intelligently summarize all relevant findings. Every doctor should be able to explain his management approach and to justify it from history, normal and abnormal findings and test results.

Referral letter

Whenever you refer a patient, write a referral letter. This should contain the following information:

1. The patient's name, age and sex
2. Presenting complaint
3. Relevant history and findings during examination
4. Your working diagnosis and list of problems
5. Results of investigations
6. Your management so far

Most important:

7. *Your reason for referral.* Clearly write down why you refer the patient and what you expect the other health professional to do.

Presentation on a ward round

Presentation of a new case on a ward round should include:

1. The patient's name and age.
2. Presenting complaint and a description of the main symptom.
3. Relevant history and findings. Do not only mention abnormal signs but also relevant normal findings (for example it is important to know that there is no neck stiffness in a patient with fever and headache).
4. Your working diagnosis and list of additional problems. Be able to explain why you have reached your working diagnosis.
5. Your management plan.

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3. Good management of patients

A chain is only as strong as its weakest link - your management of patients is only as strong as its weakest part

After assessing the patient as described in the previous chapter, you have reached a working diagnosis and have made a problem list. Now you need to decide how to manage the patient's problems. Management of patients consists of many different aspects. You can compare the steps that take place from the moment the patient tells you about his problem until he has completed his treatment with links of a chain (see figure 3-1). *A chain is only as strong as its weakest link. Similarly, your management of patients will only be as good as its weakest part.*

For example you are very skilled in history taking and examination and reach a good working diagnosis easily. However, your prescribing skills are poor. Prescribing is your weakest area. The quality of the total patient management will be poor because you do not prescribe the appropriate medicine. Another example: you always prescribe the correct medicine for an illness but the patients do not understand how to take it. This would then be a weak link in the chain of your management of patients. Again the end result of your management of patients will be of poor quality.

In this chapter we will look at the different steps of patient management. We will analyse each area to see what makes it strong and what makes it weak. At each step take a moment to consider how strong your management is in that area. Remember: a chain is only as strong as its weakest link. Management of patients will only be as good as its weakest part.

1. Assessment - defining a patient's problems

Good history taking and examination skills are necessary to reach the right diagnosis. The following problems could show that assessment of patients is a

weak part in your management of patients:

- You are not quite sure how to examine the different body systems. You leave out important parts of the examination (for example you do not count the breathing rate in children).
 - At the end of the assessment, you are not sure about the probable diagnosis or possible differential diagnoses.
 - You send the patient for unnecessary or unreliable investigations.
 - You are not sure about the diagnosis but you are ashamed to refer the patient to another doctor.
- If you think the assessment of patients is your weak area, then work carefully through the previous chapter. To practise the described approach, assess fully as many patients as possible and write down your findings as explained.

2. Treatment - choosing effective and safe treatments

Generally, treatment can have two aims. It can be aimed at a cure (for example surgery for appendicitis), or to relieve symptoms and make the patient feel better (for example pain relief).

Treatment consists of three areas: (1) health education (2) non-drug treatments and (3) drug treatment (prescribing). Prescribing is discussed in more detail below under '3. Selecting appropriate drugs and prescribing'.

The aim of **health education** is to improve a patient's understanding about his disease or problem. He learns what he can do himself to improve his health. This could include his understanding of the need to take his medication, learning how to use oral rehydration solution or becoming able to recognise danger signs (for example a woman learns which signs could indicate danger during a pregnancy). A person's understanding will always be influenced by his own ideas and especially traditional beliefs (see box).

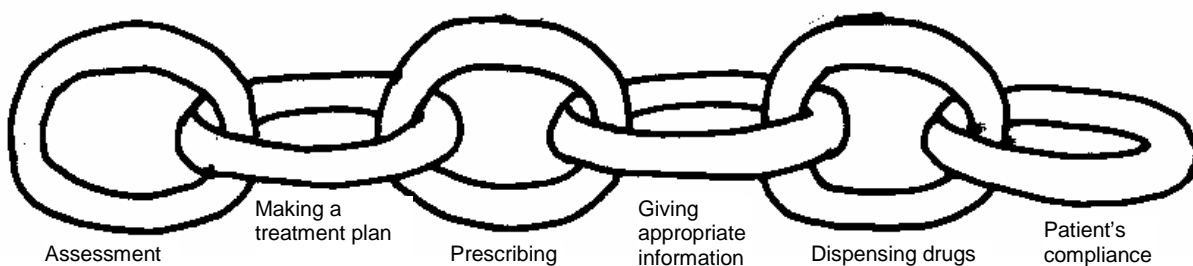


Figure 3-1 From assessment to compliance - which is your weakest link in the management of patients?

Traditional beliefs and health education

Many Afghans think that most diseases have 4 causes:

1. God's will
2. An imbalance between hot and cold
3. Jinns (spirits)
4. The evil eye.

These beliefs lead to traditional practices. You need to consider these practices for your management of patients. Use the following categories to classify each practice:

- **Good practices.** Encourage these practices.
- **Bad (harmful) practices,** for example dangerous diets for children with measles. Strongly discourage bad practices and find culturally acceptable alternatives. For example painting a newborn's umbilicus with gentian violet instead of using dangerous traditional colours that can transmit tetanus.
- **Practices that are not good but also not harmful.** Ignore these practices; they can be continued.

Non-drug treatments can, for example, consist of special positioning or nursing care, diet, physiotherapy or dressings.

What is good treatment?

Often different health professionals will use different treatments for the same illness. Not all the different treatments are of the same quality. Some may even be wrong. Others may be expensive. Some treatments are only based on personal beliefs but when assessed by scientific studies do not show any benefit. Others are outdated.

Standard treatments have been developed for most common illnesses. These are based on carefully researched and tested evidence. This means it is known and proven that they are effective. If you follow these standard treatments, you have many advantages:

- The confusion about different ways in treating disease is reduced and you know that your treatment is good and effective.
- Standard treatments are relevant for resource-poor countries.
- Standard treatments are based on essential, affordable drugs that are usually available.
- Standard treatments have been shown to reduce mortality and morbidity.

The following problems could show that choosing effective and safe treatment is a weak part in your management of patients:

- You do not know the best, *evidence-based* treatment for a condition.
 - You treat the symptoms and not the cause (for example you treat anaemia without finding out why a patient is anaemic).
 - You do not give relevant health education.
- If you feel uncertain about a best treatment, look it up. All treatments recommended in this book follow international standard recommendations for resource-poor situations.

- Do not feel ashamed to discuss a patient with colleagues, or to refer a patient. No one can know everything. It is a sign that you are a good health professional if you know your own limits.

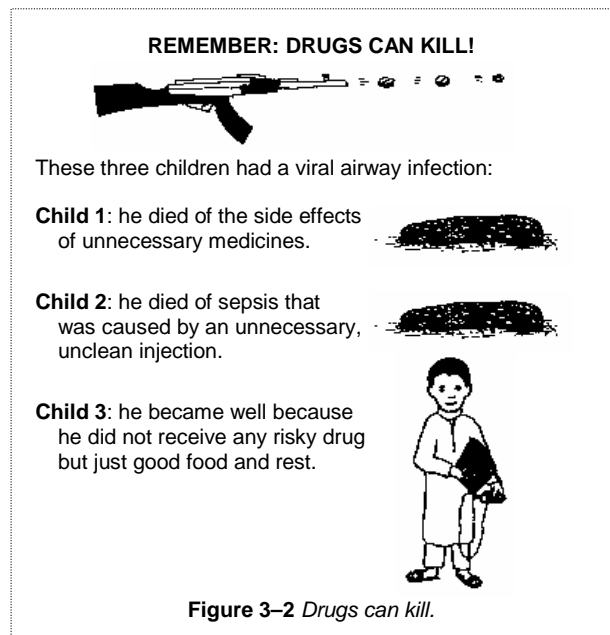
3. Selecting appropriate drugs and prescribing

Almost every patient leaves a consultation with a prescription. In most countries with limited resources, families use most of the money they spend on health-care in buying drugs. This affects especially the poor who may have no money left after buying medicines.

Health professionals have an enormous responsibility to prescribe in a logical (rational) way. Of course, if you work as a private doctor you will have to consider your own income. But this does not mean you cannot prescribe drugs in a rational way. It is also in the interests of private doctors to develop a reputation for curing patients, for having fewer side effects and for only prescribing important medicines.

Rational prescribing means more than just writing a prescription. It describes the management process we compare in this chapter with the chain. Rational prescribing means that you correctly define a patient's problem, choose the best non-drug and drug treatment, then select an appropriate drug, inform the patient about the correct use of this drug, and finally evaluate the treatment response.

Sadly, many health professionals worldwide do not follow the rules of rational prescribing. They cause great harm to the health and life of people (see figure 3–2).



The following problems could show that prescribing is a weak part in your management of patients:

- You prescribe many drugs (*polypharmacy*). You may prescribe one drug for each symptom, instead of treating the cause of a patient's problem. You may

think you must always prescribe a certain number of drugs whatever a patient's problem.

Dangers: prescribing many drugs makes it difficult for a patient to understand how to take the drugs. Cure becomes less likely. Some patients will only be able to afford a few of each tablet. Then, for example, they may die of pneumonia because they only bought three tablets of an antibiotic, instead of the full course.

- You use *antibiotics* when they are not indicated, especially in simple diarrhoea and viral airway infections. Often you prescribe more than one antibiotic at the same time.

Dangers: the antibiotic will not be effective when really needed (for bacterial resistance see box).

Bacterial resistance

In the last decades we have seen a dramatic increase and spread in drug-resistant bacteria. Many major infectious diseases (for example tuberculosis and typhoid fever) become increasingly difficult to treat because resistant bacteria will not respond to the antibiotics used.

The main cause of bacterial resistance is the wrong use of antibiotics. This includes:

- Antibiotics are prescribed when they are not needed.
- Wrong antibiotics are chosen to treat specific infections.
- Antibiotics are given in an incorrect dosage or for an incorrect duration.
- Patients do not complete the prescribed course of antibiotics (poor compliance).
- Low quality antibiotics are used.

Changes are difficult but everyone can help to fight against the threat of bacterial resistance:

1. Prescribe antibiotics only when they are needed.
2. Follow standard guidelines to make sure you always prescribe the most appropriate antibiotic.
3. Make sure you give antibiotics in the right dose and that the patient understands how long to take them for.
4. Reserve newer antibiotics (for example ciprofloxacin or ceftriaxone) for very serious and possibly drug-resistant cases.
5. Help to increase the understanding among health professionals and patients that incorrect use of antibiotics will damage health instead of improving health.

- You prescribe *multivitamins and tonics* to children with malnutrition.

Dangers: children die unnecessarily of malnutrition because families spend money on useless medicines. Families get the wrong idea that malnutrition is best treated with medicines instead of good nutrition.

- You use *injections* when they are not indicated.

Dangers: risk of local or generalized infections or nerve damage. One third of all injections are given in an unsafe way. About two thirds of all injections are given unnecessarily. Injections are expensive and increase costs for the family.

- You do not use drugs from the essential drug list. You prescribe *expensive drugs* unnecessarily (for example you use a third generation, broad-spectrum antibiotic when a simple first-line antibiotic is sufficient).

Dangers: unnecessary costs for the family. In chronic illnesses, the patient is unlikely to be able to afford the drug long-term.

- If you think this could be a weak area in your management of patients, consider the factors that influence your prescribing (see box).

Important factors that influence prescribing

Doctor's beliefs about the expectation of patients

Doctors may believe that patients expect many medications and an injection. If patients do not receive these, they would go to another doctor who is willing to prescribe them.

However, doctors often judge patients' expectations wrongly. One study showed that doctors believed that patients always expected an injection. It was true that some patients asked for injections. However, many patients disliked injections and only accepted them because they believed 'The doctor knows best'. This shows that wrong prescribing of doctors causes wrong ideas in patients.

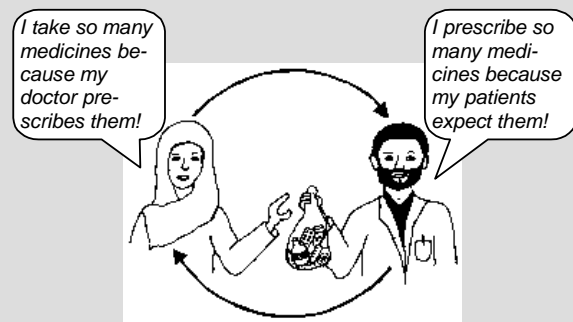


Figure 3-3 The vicious cycle that leads to overuse of medicines.

Bad role models

Many health professionals have inappropriate role models. If you have never seen rational prescribing practised, you may think it will never work.

Influence of drug companies

Drug companies promote drugs because they want to sell them. In situations where no-one controls whether what drug companies say is true, drug companies often make wrong claims about the indications and effectiveness of their products. For example a drug company told doctors to suspect giardia or amoebae in all cases of diarrhoea and treat it immediately with metronidazole. This is wrong because this drug is only needed in a very small proportion of cases.

- Try to put the following rules into practice. You may find this advice hard to follow. Please remember, every single piece of advice you follow is a victory for health and better health care. For an example of a good prescription see figure 3-4.

- Write the diagnosis on the prescription.
- Prescribe and explain oral rehydration solution (ORS) for every child with diarrhoea and explain how to use it.
- Spent time explaining and giving relevant health education.
- Treat causes rather than symptoms.
- Use only essential drugs.
- Use as few medicines as possible - thinking honestly, for most patients 1-3 drugs would be sufficient.
- Mark the most important drug on your prescription.

Dr. Wise and Careful
Good Health Care Centre
 Integrity Street, Capital City

Date: 9.1.2005

Name: Sharif Family name: Babar Sex: M
 Age: 29

Diagnosis: 1. Giardiasis
 2. Epilepsy (last convulsion 4 months ago)

Rx

1. Tablets Metronidazole 400mg
 N=15
 Take 5 tablets once daily
 all at the same time for 3 days
 (= treatment for giardia)

2. Tablets Phenobarbital 100mg
 N=60
 - Take 2 tablets every night.
 - Do not stop them.
 - Come back for review in 4 weeks.

Dr. Careful

Figure 3-4 Example of a good prescription.

- Do not give antibiotics unless they are really needed.
- Do not give injections when medicines by mouth will work equally well.
- Do not treat malnutrition with multivitamins and tonics. Give good nutritional advice instead.

4. Giving patients appropriate information

It may be difficult to judge by yourself whether giving patients appropriate information is your strong or your weak area. Think honestly whether your information covers the following points. If not, giving information could be a weak part in your management:

- You have understood a patient's concerns, ideas and expectations.
- You always take time to explain to a patient how and why he should follow the prescribed treatment.
- You give a relevant health message. In all your advice, the patient must understand 'Why' he should do what you tell him. For example he must understand why ORS is important for children with diarrhoea, and not only how to prepare and use ORS. Only if he has understood 'Why', then he will follow your instructions.
- It is very helpful to write down important health messages or instructions regarding the treatment. Although this takes time, it will improve patients' compliance.

5. Dispensing of drugs

All your work is wasted if the patient does not receive the correct drug with correct instructions in the correct dosage for the correct duration! Pharmacists are key people. Make sure they are not the weakest link in your patient management chain.

Possible **problems with dispensing drugs** are:

- Wrong interpretation of the prescription (for example because of poor handwriting).
- Dispensing the wrong drug.
- Giving wrong dosages.
- Insufficient time to explain to patients how to take the medication.
- If you are uncertain about the quality of dispensing, ask patients to show you the drugs they have received. Ask the patients to repeat what they understood of the pharmacist's explanations.
- Talk to your dispenser and discuss with him how to achieve the following ideal situation:
 - The patient repeats the instructions back to the dispenser.
 - The need for compliance, especially of the most important drug (for example antibiotic in pneumonia) is stressed.
 - Each drug is labelled. Instructions about how to take the medicine are written (or marked) in a way the patient understands.
 - A key health message, relevant for the patient's problem, is explained.

6. Patient's compliance

Compliance is when a patient follows the advised treatment. Studies have shown that only 50% of patients know how and when to take their drugs. Others will not follow the advised treatment because the doctors did not prescribe as they expected. Others will not be able to afford the prescribed drug.

The problem that a patient does not follow his treatment has been mentioned already several times when we looked at other steps of the management of patients. This shows that there is not one single factor that improves compliance but several factors. Each link related to compliance determines whether a patient will follow the suggested treatment or not. If he will not, then this is a weak part in your management. Please do not think it does not matter whether or not a patient follows the treatment. Do not think that it is his own decision and fault if he does not. The main factor that determines whether the patient will follow the treatment or not is your communication with him and your explanations.

- Check a patient's understanding by asking him to come back after he had been to the pharmacist. Ask him to show you the drugs the pharmacist gave him. Ask him to explain to you how he will take them.

- Ask the patient to repeat the main health message to find out whether he has understood it. It is not a sign that the patient has understood if you ask him: 'Have you understood?' and he answers, 'Yes'. Make sure he can repeat the message and the explanations. A patient must have understood 'Why' he should follow your advice.
- If you are too busy to check the patient's understanding, then ask someone else to check it. The pharmacist or the nurse are appropriate people to do this.

Special case: the patient with a chronic illness

Patients with chronic conditions need special attention. Examples of chronic illnesses are chronic psychosis, asthma, epilepsy, high blood pressure or rheumatoid arthritis. Chronic means 'for a long time' but does not necessarily mean 'severe'.

Why only 20% of all chronically ill patients follow their treatment

Only about 20% of all patients with chronic illness follow long-term treatment. This results in poor health, high costs, and disability. The poor compliance with treatment and poor management of chronic illness has several reasons:

- **Patient's reasons.** Many patients have no concept of chronic illness and think everything is curable. In conditions that cause no symptoms (for example high blood pressure) patients do not think treatment is necessary. In some conditions treatment is only given to stop disease progression but does not improve symptoms. Then the patient sees no benefit and feels that treatment is not successful.

Patients have learnt to take medicines for illnesses. They have not learnt the importance of how to look after themselves (self care), for example by doing physiotherapy exercises every day.

- **Health professional's reasons.** Many doctors are used to dealing with acute health problems. They do not know how to treat chronic illness. They treat only the acute symptoms of the chronic illness but do not consider long-term treatment strategies. When they think about illness, they think about either cure or death. They do not think about quality of life and look for ways of reducing disability and allowing people with chronic illness to lead a normal life.

Treating chronic illness in a society where most expect cure is not very rewarding.

Because of lack of co-operation, individual health professionals will treat a patient but will not co-operate with others, for example physiotherapists.

- **Pharmacist's reasons.** The supply of necessary drugs may be unreliable (for example anti-epileptic drugs are not always available). Sometimes doctors prescribe very expensive drugs for patients with chronic illness that these patients cannot afford to buy long-term.

How you can improve compliance with treatment

1. **Educate the patient.** Talking to the patient and his family is the key to successful long-term treatment. The most important point is to ask the patient about his specific concerns, ideas about his illness and expectations about his treatment. Only if you know his ideas, you will be able to explain to him in a way that is meaningful to him.

- Explain to the patient the proposed treatment in all details. Do not give any false promises but provide realistic information. However, concentrate on the positive effects of the treatment.
- In conditions that do not cause symptoms, explain to the patient that this reflects therapeutic success. It does not mean that the illness has resolved.
- Give the patient clear instructions about follow-up.
- Write down the main points that the patient needs to know.

2. **Select appropriate drugs.** When you choose a drug, make sure the patient can afford to buy it long-term. Choose a drug that is likely to be always available.

All this will take more time than a usual consultation. However, this investment is rewarded many times over in the future years of treatment.

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4. Fever

Fever is a rise of body temperature above normal levels. Normal temperature is between 36.6-37.4°C (97.9-99.3°F) but fever is diagnosed when temperature is 38°C (100.4°F) or more. If possible confirm the symptom of fever by measuring the temperature with a thermometer (see box). If a thermometer is not available, the best method for finding out whether a patient has fever or not is to feel the temperature of the patient's chest with the back of your hand. If the chest feels hot, the patient is likely to have fever.

Fever is usually caused by infections but it is not a sign of bacterial infection. It can be caused by viral infections and many non-infectious causes (see box). It is a common mistake to treat fever routinely with an antibiotic. The correct way is first to find the cause of fever and then to treat that cause.

There is no evidence that it is beneficial to reduce fever caused by infections with paracetamol. Reduce fever with paracetamol, ibuprofen or acetylsalicylic acid (Aspirin - contraindicated in children) only in those patients who are in discomfort with the fever or whose fever is very high (above 39.5°C/103.1°F°).

How to measure the temperature

Make sure the thermometer is clean before you use it. Shake the mercury well down. Keep the thermometer in position for at least 5 minutes.

In adults, take the temperature in the mouth or axilla.

In young children, take the temperature in the fold of the groin or rectally.

Causes of fever

COMMONEST

- Infection (bacterial, viral or parasitic)

LESS COMMON

- Inflammation (for example rheumatoid arthritis)
- Dehydration
- Overheating (for example heat stroke)
- Tumours
- Drug-induced fever
- Poisoning

How to assess a patient with fever

Full assessment is explained in chapter 2. In a patient with fever, some of the assessment areas of special importance are summarized below.

Take a history

- Find out details about the fever:
 - Sudden or gradual onset? (For interpretation see box)
 - Duration?
 - Pattern of fever? (For interpretation see box)
- Any other symptoms besides the fever? (For example cough or pain)
- Any recent operation or delivery?
- Being already treated? With which drugs?
- Anyone else in the household with a similar problem?

Common causes of fever according to onset and fever pattern

ONSET OF FEVER

Sudden onset of fever	<ul style="list-style-type: none"> • Malaria • Bacterial infection • Viral infection
Gradual onset of fever	<ul style="list-style-type: none"> • Typhoid fever • Tuberculosis • Brucellosis

FEVER PATTERNS

Biphasic fever The initial fever is followed by 1-2 days without fever, then the fever returns.	<ul style="list-style-type: none"> • Viral infections
Relapsing fever Attacks of fever return in regular or irregular intervals.	<ul style="list-style-type: none"> • Malaria • Brucellosis
Constant fever	<ul style="list-style-type: none"> • Septicaemia (including typhoid fever)
Fever swings There are wide swings in the temperature during the same day. Phases with high fever are followed by phases without fever. Often there are localized signs.	<ul style="list-style-type: none"> • Severe pyogenic disease (disease with pus, for example an abscess)

Examine the patient

General observations

- Ill or not? (See also figure 2-5 on page 9)
- Malnutrition? Jaundice? Dehydration?

Examination of the different body systems

- Ears, throat and teeth: signs of infection? In children: Koplik's spots as a sign of early measles?
- Enlarged lymph nodes?

- Respiratory system:
 - Fast breathing?
 - Chest indrawings?
 - Crepitations?
- Heart:
 - Heart murmur?
- Abdomen:
 - Tenderness?
 - Enlarged liver or spleen?
 - Palpable masses?
- Bones and joints:
 - Swelling? Redness?
 - Limited or painful joint movements?
- Nervous system:
 - Abnormal conscious level?
 - Neck stiffness?
- Skin rash?

Investigations

The following investigations may be helpful. For when to sent a patient for these tests, see below under 'How to reach a working diagnosis'. It is important to get all tests done at a reliable laboratory so that you can trust the results, otherwise you may be misled.

Total and differential white blood cell count (WBC count)

White blood cells (WBC) are defence cells. Total and differential WBC counts help to differentiate between causes of fever. In a differential count, the percentage of each type of WBC in the blood is estimated. Certain diseases cause typical changes within the total number of WBC and within the number of the different types of WBC. According to these changes, decide to which group your patient belongs:

Total WBC count

- Increased number of white blood cells (leucocytosis)
- Normal number of white blood cells
- Low number of white blood cells (leucopenia)

Differential WBC count

- Neutrophilia (increased number of neutrophiles)
- Lymphocytosis (increased number of lymphocytes)
- Eosinophilia (increased number of eosinophiles)
- Abnormal white cells

It also helps to consider the WBC results together with the duration of fever (see box).

Erythrocyte sedimentation rate (ESR)

The ESR is a measure of the distance that red blood cells fall through a column of blood during one hour (a second measure after 2 hours does not provide additional information). ESR is not a specific diagnostic test

How to interpret WBC results in fever

The following tables show typical WBC results of common conditions. Remember that some patients will be exceptions. These patients will not show the typical result although they have the disease. Always consider the results together with history and clinical findings.

The tables only contain diseases presenting with fever. For example eosinophilia may be associated with allergies or asthma but these are not listed because they usually do not cause a fever.

WBC IN ACUTE FEVER

WBC over 8.000/mm³ (leucocytosis)	<ul style="list-style-type: none"> ● Bacterial infection ● Collection of pus (abscess)
More than 50% lymphocytes (lymphocytosis)	<ul style="list-style-type: none"> ● Viral infections ● Typhoid fever ● Brucellosis

WBC IN CHRONIC FEVER

WBC over 10.000/mm³ mainly leucocytes (neutrophil leukocytosis)	<ul style="list-style-type: none"> ● Bacterial infection ● Collection of pus (abscess) ● Amoebic liver abscess
Less than 5000/mm³ WBC (leucopenia)	<ul style="list-style-type: none"> ● Typhoid fever ● Disseminated tuberculosis ● Malaria ● Severe septicaemia ● Brucellosis
Normal total and differential WBC	<ul style="list-style-type: none"> ● Localized tuberculosis ● Brucellosis ● Malaria ● Severe septicaemia ● Endocarditis ● Cancer ● Inflammatory diseases
More than 50% lymphocytes (lymphocytosis)	<ul style="list-style-type: none"> ● Viral infection ● Typhoid fever (especially if the total number of WBC is low) ● Brucellosis
More than 5% eosinophiles (eosinophilia)	<ul style="list-style-type: none"> ● Parasitic infections when the parasites have invaded tissues: <ul style="list-style-type: none"> – Strongyloides – Hydatid disease (not always) ● Rare: Lymphoma
Abnormal WBC	<ul style="list-style-type: none"> ● Leukaemia

The total WBC numbers given are for adults. For normal values in children refer to a paediatric book.

for a certain disease. A raised ESR only indicates that something is wrong with the patient (see box). ESR depends on many factors. It is raised in anaemia and is affected by room temperature and age of chemicals. Therefore its usefulness is often limited.

Malaria blood film

For details see below under malaria.

How to interpret ESR results in fever

Normal Less than 15 mm/h	<ul style="list-style-type: none"> • Viral illness • Bacterial illness (early or not severe) • Tuberculosis
High Above 30 mm/h	<ul style="list-style-type: none"> • Bacterial illness (including sepsis) • Anaemia • Rheumatic fever • Tuberculosis • Rheumatoid arthritis • Nephrotic syndrome • Leukaemia
Very high Above 80 mm/h	<ul style="list-style-type: none"> • Rheumatic fever • Leukaemia • Tuberculosis • Nephrotic syndrome • Malignant tumour

Urine examination

Urine examination is important in patients with unclear fever (especially in young children). It may show an otherwise unrecognised urinary tract infection (see page 114).

Gram stain

Microscopy of gram-stained smears (for example of pus, fluid from effusions or cerebral spinal fluid) is a simple and useful examination to identify the type of bacteria causing the infection.

Sputum examination

Sputum for acid-fast bacilli (AFB) is essential if pulmonary tuberculosis is suspected (see page 38).

Cultures

Cultures (for example of blood, urine, stool or cerebrospinal fluid) are useful (1) to confirm a bacterial infection, (2) to identify the responsible bacteria, and (3) to determine the bacteria's sensitivity to common antibiotics. However in practice, good quality cultures are rarely available. It may be better not to get a culture than to get a result of poor quality, which may be misleading.

Cerebral spinal fluid (CSF)

CSF is examined in suspected bacterial meningitis (see page 160).

Chest x-ray

A good quality chest x-ray may be helpful in identifying a pulmonary cause of fever (see chapter 'Chest x-ray'). It will confirm the suspicion of miliary tuberculosis.

NOTE: pulmonary tuberculosis is not diagnosed by chest x-ray but by sputum examination. Similarly, pneumonia is usually diagnosed by clinical signs and a chest x-ray is rarely needed.

Ultrasound

Abdominal ultrasound can be helpful, for example in diagnosing a liver abscess.

How to reach a working diagnosis and treat accordingly

After you have assessed the patient, decide to which of the following three groups the patient belongs:

1. Patients with acute fever and localizing signs.
2. Patients with acute fever and no localizing signs.
3. Patients with fever for more than 2 weeks.

1. Patients with acute fever and localizing signs

If a patient shows clinical features or a typical history, which indicate the cause of the fever (localizing signs), diagnosis is usually simple:

Diagnostic guidance from the history	Likely diagnosis
A woman who has given birth in the last four weeks	Puerperal sepsis, mastitis
Recent abdominal or pelvic operation or injury	Peritonitis, liver abscess, subphrenic or pelvic abscess
Living in an area with a high risk of malaria	Malaria (in a high risk area, more than 5% of fever cases in children are due to malaria)

Diagnostic guidance from clinical features	Likely diagnosis
Ear pain	Otitis media
Sore throat	Throat infection (for example tonsillitis)
Cough with fast breathing or dyspnoea	Bacterial pneumonia
Localised painful lymph node swelling	Abscess, local infection, plague - rare
Severe abdominal pain	Appendicitis, typhoid fever, peritonitis from perforation
Diarrhoea with blood	Bacillary dysentery
Dysuria, frequently passing urine, loin pain	Urinary tract infection, pyelonephritis
Joint pain and swelling	Septic arthritis
Bone pain	Osteomyelitis
Severe headache and neck stiffness	Meningitis
Jaundice	Malaria, typhoid fever, sepsis or another severe infection. NOTE: in viral hepatitis, the fever usually settles before the jaundice appears
Child: generalised skin rash, conjunctivitis, cough	Measles
Redness of skin	Cellulitis, erysipelas
Black crusted skin lesion	Anthrax
Breastfeeding woman with breast tenderness	Mastitis
Spontaneous bleeding (for example from gums or in skin)	Haemorrhagic fever, sepsis

Management is explained in the chapter dealing with that problem.

2. Patients with acute fever and no localizing signs

In the absence of localizing signs, assess the severity of the patient's condition. Children in particular may show no focal signs but can be severely ill and need urgent treatment. The following are *danger signs*, both in children and adults, which indicate a severe disease:

- ✗ Severe weakness
- ✗ Lethargy
- ✗ Inability to drink
- ✗ Disturbed consciousness
- ✗ Fast breathing or breathing difficulties
- ✗ Diarrhoea with blood (dysentery)
- ✗ Convulsions
- ✗ Frequent vomiting
- ✗ Limited production of urine
- ✗ Purpuric rash

Patients who appear well

1. **Give general advice** about how to care for a patient with fever:
 - Do not cover the patient; do not let a child wear warm clothes because this makes the fever worse.
 - Ventilate the patient's room well. Fresh air does not harm the patient.
 - Give the patient lots of clean water or tea to drink because fever makes the patient lose more fluids.
 - If the fever makes the patient feel uncomfortable or if the fever rises above 39.5°C (103.1°F), give paracetamol.
2. **Teach the patient and his family the main danger signs** that indicate that an illness with fever may have become dangerous (see above).
3. *If a young child* has no signs of an upper airway infection and there is no cause of his fever, then treat for malaria.
4. **Review the patient** if the fever has not settled after 2 days, or earlier if he becomes more ill.

NOTE: do not give antibiotics routinely because most of these patients will suffer from a self-limiting viral illness.

Patients who appear very ill

Treat the patient urgently for the most likely cause or causes of his fever. If he is very ill, start immediate treatment for the most likely cause or causes even before you get the results of the investigations.

1. The following *investigations* are often helpful:
 - Total and differential WBC
 - Blood film for malaria
 - Urine microscopy
 - Chest x-ray (if you suspect miliary tuberculosis)
 - Blood culture
 - Lumbar puncture (if you suspect meningitis)

2. *Treat for the following conditions:*
 - Septicaemia (sepsis)
 - Malaria
 3. *Treat any additional problems* (for example malnutrition, dehydration, shock or anaemia).
 4. To children under 5 years, give a single high dose of *vitamin A*.
 5. *Review the patient at least once every 24 hours.* This is important (1) to make sure that the patient's condition is not deteriorating but is getting better (2) to recognise complications early, and (3) to look for new signs that could make the diagnosis clear.
- NOTE: be aware that it may take 48-72 hours before an antibiotic shows a noticeable effect. A common cause for changing antibiotics wrongly is that doctor (and patient) have not waited long enough for the first antibiotic to become effective.

If the patient is not improving:

- Examine him again thoroughly.
- Check that he took the prescribed antibiotics. Check that the dosage was correct.
- Arrange for a chest x-ray if you did not get one already.

3. Patients with fever for more than 2 weeks

Fever continuing for more than 2 weeks is called chronic fever. For common causes see box. Always consider non-infectious causes as well, especially inflammatory disease or a tumour. Examine the patient repeatedly.

Clinical features sometimes help to find the cause:

- Chronic fever and cough for more than 3 weeks is likely to be pulmonary tuberculosis.
- In typhoid fever, the fever continues for up to four weeks. A fever persisting for more than 4 weeks is not likely to be typhoid fever. Consider tuberculosis.
- If joint or back pain, consider brucellosis.
- If living in a malarious area, consider malaria.

Common causes of fever for more than 2 weeks

- Tuberculosis (often extra-pulmonary, also miliary TB)
- Typhoid fever
- Brucellosis
- Malaria
- Cancer
- Inflammatory disease (for example chronic arthritis)
- Drug-induced fever
- Intra-abdominal abscess
- Rare: AIDS

Specific infections

SEPSIS (SEPTICAEMIA)

In sepsis, bacteria enter the blood stream. The body defences are unable to fight these bacteria. At special risk are malnourished children. The bacteria cause severe generalised symptoms. In other infections, bacteria usually only multiply in a certain localized area, for example, in pneumonia infection is limited to the lungs. In septicaemia, bacteria multiply in the blood stream and many body systems are affected. Bacteria in sepsis often produce toxins, which are also responsible for the severe symptoms, for confusion or the feared septic shock. In septic shock, the toxins cause circulatory failure through dilatation of the blood vessels.

Spread of bacteria into the blood stream can occur in almost any bacterial infection: pneumonia, urinary tract infections, skin infections and typhoid fever. Sometimes, unsterile surgical instruments or needles cause septicaemia.

For sepsis in malnourished children see page 51, for sepsis in newborns see page 201, and for sepsis within four weeks after delivery or abortion see page 198.

Clinical features

- Very ill and lethargic patient
- High intermittent fever with rigors, or constant fever. Be aware that especially malnourished children and newborn babies may have no fever or are hypothermic.
- Frequent vomiting
- Fast pulse
- Sometimes diarrhoea, jaundice, bleeding into the skin or anaemia
- Enlarged spleen
- If **septic shock**:
 - Low blood pressure, weak or not palpable peripheral pulses
 - Mental confusion
 - Fast breathing
 - Delayed refill time (see page 241)

Investigations

- Total WBC above 12,000/mm³ or less than 4,000/mm³ (= sign of very severe sepsis)
- Blood culture positive for bacteria
- To identify complications: blood glucose (to identify hypoglycaemia), haemoglobin (to identify anaemia), creatinine or urea (to identify acute renal failure)

Management

1. If the focus of infection is known, treat with the **antibiotic appropriate for that infection**.
2. If the focus is not known, treat with **antibiotics that cover all likely bacteria**. Depending on costs and

availability, give one of the following (for dosages see box):

- **Ampicillin + gentamicin + metronidazole** IV/IM for 10 days. Once the patient's condition is stable, change ampicillin from IV/IM to oral amoxicillin.
- Or **chloramphenicol**, which is cheap. If injections are not possible, you can give chloramphenicol orally because it is well absorbed. It also penetrates well into the cerebrospinal fluid.
- Or **ceftriaxone**. It has the advantage that you give it in a once daily dose.

NOTE: sometimes **cloxacillin** is added to the antibiotics to provide additional cover for Staphylococcus.

3. **Treat also for malaria** unless you can exclude it.
4. **Maintain circulation** with Ringer Lactate or sodium chloride 0.9% and treat septic shock early. The amount given is similar to the treatment of severe dehydration. As a general rule give IV fluids fast until you can feel a strong radial pulse.
5. Give one single dose **vitamin A** to all children.
6. Give **oxygen**.

Antibiotics for sepsis of unknown origin

Ampicillin + gentamicin (+ metronidazole)

The combination of **ampicillin + gentamicin** will cover the most likely bacteria responsible for a sepsis. If sepsis from the abdomen is possible, add **metronidazole**.

- **Ampicillin** IV or IM 100 mg/kg divided into 3-4 doses

2-12 months	250-500 mg	3 times daily
1-5 years	500 mg	3 times daily
6-12 years	1 g	3 times daily
Adults	1-2 g	3 times daily

- **Gentamicin** IV or IM 7.5 mg/kg as one single daily dose

It is important to calculate the gentamicin dose carefully because of serious side effects if the dose is too high.

To give one single daily dose is as effective as dividing the dose and may have fewer side effects.

2-12 months	20-60 mg	once daily
1-5 years	60-100 mg	once daily
6-12 years	100-200 mg	once daily
Adults	180-360 mg	once daily

- **Metronidazole** orally 22.5 mg/kg/day divided into 3 doses. For dosages see page 283.

Or chloramphenicol IV, IM or oral

Start with 75-100 mg/kg/day divided into 3-4 doses; reduce to 50 mg/kg/day after 48 hours if the patient's condition is stable.

2-12 months	62.5-125 mg	3 times daily
1-5 years	125-250 mg	3 times daily
6-12 years	500 mg	3 times daily
Adults	750 mg	3 times daily

Or ceftriaxone IM or slowly IV (give over 3-4 minutes)

If you give more than 1g IM, give it at more than one site. Give children 20-80 mg/day.

2-12 months	200-500 mg	once daily
1-5 years	500 mg-1 g	once daily
6-12 years	1-2 g	once daily
Adults	2-4 g	once daily

7. Look for and treat other common **complications of sepsis**:

- Very high fever and confusion or hypothermia
- Hypoglycaemia
- Dehydration
- Anaemia
- Acute renal failure
- Heart failure

NOTE: high doses of steroids are not beneficial in sepsis or septic shock.

MALARIA

Malaria is caused by a parasite called Plasmodium, which is transmitted through bites of infected anopheline mosquitoes. Malaria transmission occurs from April to November (Hamal to Aqrab). The number of cases of malaria is increasing because of the lack of health services, lack of control strategies and mass movement of people. Most malaria (about 80-90%) in Afghanistan is the result of infection with Plasmodium vivax. This causes a non-fatal illness with fever, and also relapses due to parasites that are dormant in the liver for several years after the initial infection. The other type of malaria, Plasmodium falciparum malaria, can cause severe and complicated malaria and is a cause of mortality, especially in children and pregnant women. It occurs especially in the months from September to November (Sumbula to Aqrab). A problem with this type is also the development of drug resistance. In one study, only one third of cases of Plasmodium falciparum malaria in eastern Afghanistan were found to be sensitive to chloroquine. Another study currently underway further confirms the rapid development of resistance to chloroquine and even Fansidar.

The following Afghan provinces have a high malaria risk: Baghlan, Faryab, Kunar, Balkh, Kunduz, Laghman, Nangahar and Takhar.

Malaria in pregnancy carries significant risks for the mother and the foetus. Another consequence of malaria, especially in pregnancy and in young children is anaemia. The anaemia is worsened if the patient has already been anaemic, for example due to poor nutrition.

Late diagnosis of malaria and lack of effective treatment facilities (including non-availability of second line medication) have an enormous contribution to malaria related morbidity and mortality.

Clinical features

Incubation period is two weeks or longer. There are no diagnostic clinical features. The diagnosis is based on probability. Suspect malaria if someone lives in or has been to a malarious area and presents with the following symptoms:

- **Fever of more than 38°C (100.4°F) and no other obvious cause of fever.** Be aware that the fever pattern is non-specific for several weeks in the beginning of the illness. Do not rely on it for diagnosis.

Patients with malaria often but not always have the following symptoms:

- Headache and muscle pains
- Enlarged spleen

Symptoms of **severe malaria** (at particular risk of severe malaria are children and pregnant women):

- ✗ Severe vomiting
- ✗ Dehydration
- ✗ Jaundice
- ✗ Disturbed consciousness, coma (consider cerebral malaria in all unconscious patients with fever)
- ✗ Convulsions
- ✗ High fever of more than 40°C (104°F)

NOTE: in Afghanistan during the transmission season, only 25-30% of the fevers are due to malaria. While you treat all such cases with anti-malarials, do not ignore other illnesses, which cause similar symptoms. Ideally, malaria diagnosis should be based on microscopy.

Investigations

Blood film for malaria parasites. Be aware that a negative smear does not exclude malaria.

Management of uncomplicated malaria

1. **Treat with antimalarial drugs** (for dosages see box):
 - **If reliable laboratory diagnosis is not available**, give oral *sulfadoxine + pyrimethamine* (Fansidar) as one single dose + oral *chloroquine* for 3 days.
 - **If falciparum has been confirmed** by a reliable laboratory, give oral *sulfadoxine + pyrimethamine* (Fansidar) as one single dose + oral *artesunate* for 3 days.
 - **If vivax has been confirmed** by a reliable laboratory, give oral *chloroquine* for 3 days.
2. **Advise the patient:**
 - He should come back if fever continues for more than 3 days after starting treatment, or if he develops jaundice or progressive drowsiness.
 - Explain to him how to avoid being bitten by mosquitoes (see below 'Prevention').
3. Treat high fever with paracetamol.
4. *If the patient still has fever or a positive laboratory result for asexual parasites for more than 3 days after treatment*, consider the following possibilities:
 - The patient has not taken the medicines or has vomited them back.
 - The parasites are resistant. Give oral **quinine** for 7 days.
 - The fever is not caused by malaria. Consider an alternative diagnosis.
5. *If the fever reoccurs within 28 days of the initial treatment*, consider the following possibilities:
 - The parasites are resistant. Check another blood film. Give oral **quinine** for 7 days.

- The new fever is not caused by malaria. Consider an alternative diagnosis.

Management of severe malaria

If a patient has any of the above symptoms of severe malaria, treat him as severe malaria. If there is doubt about the diagnosis, for example if an unconscious pa-

Drugs for malaria treatment

For the correct combinations according to the clinical situation see text.

- **Artesunate** orally 4 mg/kg once daily for 3 days.

Day 1, 2 + 3	
1-3 years	50 mg
4-5 years	100 mg
6-12 years	150 mg
Adults	200 mg

- **Artemether** IM as one single dose for a minimum of 3 days but longer if the patient does not regain consciousness.

Give 3.2 mg/kg on day 1, and then 1.6 mg/kg on the following days:

Day 1		Day 2+3	
1-5 years	40–60 mg	20–30 mg	
5-12 years	60–120 mg	30–60 mg	
Adults	150–200 mg	75–100 mg	

- **Chloroquine** orally once daily for 3 days. On the first two days, give 10 mg/kg, on the third day 5 mg/kg, which is half the dose of the initial doses:

Day 1 + 2		Day 3	
1-5 years	150 mg	75–100 mg	
5-12 years	300 mg	150 mg	
Adults	600 mg	300 mg	

If the patient vomits within 30 minutes after taking chloroquine, he must repeat the full dose. If he vomits 30 minutes-1 hour later, he must repeat half the dose.

- **Quinine** orally or IM 30 mg/kg/day divided into 3 doses.

2-12 months	50 mg	3 times daily
1-5 year	100–150 mg	3 times daily
6-12 years	150–300 mg	3 times daily
Adults	600 mg	3 times daily

NOTE: always dilute IM quinine to a concentration of 60 mg/ml solution. You do this by diluting 2 ml ampoules containing 150 mg per ml with 3 ml water for injection; or by diluting 2 ml ampoules containing 300 mg per ml with 8 ml water for injection. If a patient needs IM or IV treatment, give quinine for a total of 10 days.

Intravenous treatment: never inject quinine directly IV but always give it by infusion over 4 hours 3 times daily:

Give a loading dose of 20 mg/kg over 4 hours and then 10 mg/kg 8 hours after the start of the previous dose. Repeat every 8 hours until the patient can take quinine orally. Dilute quinine in 5% glucose (dextrose) and continue a glucose infusion in between the dosages because one of the risks of IV quinine is severe hypoglycaemia. The other main risk is severe low blood pressure if quinine is injected too fast.

- **Sulfadoxine + pyrimethamine (Fansidar)** orally as one single dose. Tablets are 500+25 mg. Ideally, the patient should take the single dose under your supervision to make sure he takes it.

Under 1 year	½ tablet
1-5 years	1 tablet
6-12 years	2 tablets
Adults	3 tablets

tient may suffer from meningitis or cerebral malaria, treat him for both conditions at the same time. For drug dosages see box.

1. **Give artemether** IM as one single dose for 3 days. Give it for longer if the patient does not regain consciousness. As soon as the patient can swallow, give one single dose of oral **sulfadoxine + pyrimethamine** (Fansidar);

or

give **quinine** by IV infusion or IM. As soon as the patient can swallow, give oral **sulfadoxine + pyrimethamine** (Fansidar) as one single dose + oral **artesunate** for 3 days. Instead of these two follow up drugs, you can also give oral quinine until 7 days of treatment are completed.

2. **Treat complications** (for example convulsions or severe anaemia).

Management of malaria in pregnancy

In the first trimester treat with **quinine** orally 3 times daily for 7 days.

In the second and third trimester, treat as below:

1. *For confirmed falciparum malaria* give oral sulphadoxine + pyrimethamine (Fansidar) + oral artesunate once daily for 3 days.
2. *For confirmed vivax malaria* give oral chloroquine for 3 days.
3. *For clinically diagnosed malaria* give sulphadoxine + pyrimethamine (Fansidar) orally one single dose + chloroquine orally for 3 days.

Prevention

Malaria can be prevented by following methods:

- **Using bed nets and window screens.** These are most effective if impregnated with an insecticide, for example permethrin, deltamethrin or lambda-cyhalothrin. If a family cannot afford or obtain a bed net, they should use treated chaddors.
- **Spraying the walls** of inside rooms with pesticides. The best time to do it is July (Saratou).
- **Destroy mosquito-breeding places.** This means cleaning up trash dumps and stagnant water pools.
- **Wearing long-sleeve clothes,** especially at late afternoon and dusk because these are the times when the mosquitoes mainly bite. Chaddors treated with permethrin provide the best protection during dawn and dusk.

Reporting

Periodically, epidemic malaria emerges when certain conditions are right. If there is a significant increase in the number of malaria cases at a clinic this should be reported either to the regional Malaria Reference Centre, or to the regional office of HealthNet International who will investigate and control the epidemic. In addition, accurate records should be kept of malaria cases in the area, so that malaria control can be effectively organised.

TYPHOID FEVER

People get typhoid fever when they eat food or drink water that has been infected with salmonella bacteria. The food or water has become infected through contact with the faeces of a patient or a carrier of salmonella bacteria. Carrier means that a person excretes the bacteria without showing any symptoms of the disease. Some carriers excrete the bacteria through their urine.

Typhoid fever is an important cause of septicaemia and mortality. Untreated, about 10% of patients die, but this can be reduced to 1% with correct treatment. Mild infections are common.

Clinical features

Incubation period is usually 10-20 days (sometimes 3-50 days). Suspect typhoid fever in any patient with a high-grade fever of more than 3 days duration who shows any of the features below (for details see figure 4-1):

- Ill, drowsy and lethargic
- Continuous high fever that increases stepwise during the first week
- Severe loss of appetite
- Severe headache
- Enlarged liver or spleen
- Diffuse abdominal tenderness
- Confusion
- In adults: constipation; in children: diarrhoea and vomiting
- Cough

Untreated, the illness lasts about 4 weeks. It is usually a slow process until the patient has regained full strength.

Investigations

Diagnosis is usually based on clinical features. A low or normal total WBC count with leucopenia supports the diagnosis. Young children often show a leucocytosis.

The Widal test should no longer be used because it often gives wrong results and can be very misleading. Many non-typhoid conditions can cause a positive test. The test can also be negative although a patient is actually suffering from typhoid fever.

In suspected perforation: ultrasound or abdominal x-ray.

Management

Patients can usually be treated at home but follow them up closely. Refer to hospital those patients who are very ill and those with persistent vomiting, severe diarrhoea and a lot of abdominal distension.

1. **Choose the correct antibiotic** (for dosages see box). Increasing resistance of typhoid bacteria makes treatment more difficult. To avoid the development of further resistance, it is very important to follow recommended treatment guidelines:

CLINICAL FEATURES OF TYPHOID FEVER:

Severity varies from patient to patient. Young children often present with diarrhoea and vomiting.

- Very lethargic
- Severe loss of appetite
- Often dehydration
- Headache
- Abdominal distension
- Diffuse abdominal tenderness
- Enlarged spleen and liver



- Cough and signs of bronchitis or pneumonia

COMPLICATIONS AND CAUSES OF DEATH:

(usually during week 3 and week 4)

- Gastrointestinal perforation (abdominal distension and tenderness worsen, pulse rises. Abdominal ultrasound: free fluid)
- Gastrointestinal bleeding (rectal bleeding, sudden shock)
- Myocarditis
- Overwhelming toxæmia
- Rare: typhoid meningitis (children under 5 years)

CLINICAL COURSE IF UNTREATED:

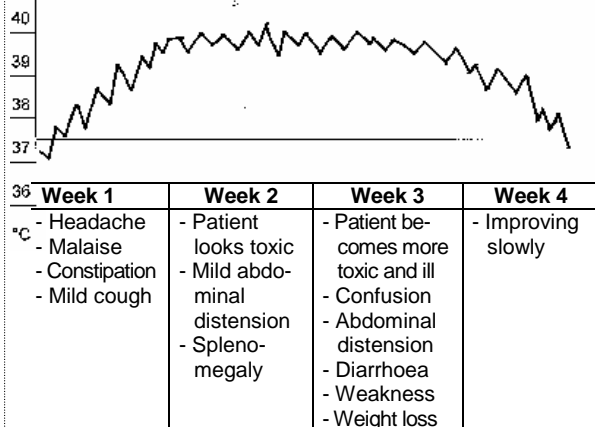


Figure 4-1 Typhoid fever.

- If a patient is not severely ill, give oral **chloramphenicol** (or amoxicillin or co-trimoxazole). Assess him after 3 days of taking correct treatment. Do not just look at the fever but also at a patient's general condition (for example loss of appetite or lethargy). If he has not improved give one of the antibiotics recommended for severe and possibly multi-drug-resistant typhoid fever.
- If a patient is severely ill, or if there is no improvement after 3 days therapy with chloramphenicol, give oral **ciprofloxacin** (or ofloxacin) or **ceftriaxone** IM/IV (or cefotaxime IV/IM). Judge the response to the antibiotic after 3 days. If there is no improvement, change the antibiotic, for example from ciprofloxacin to ceftriaxone.

NOTE: do not believe that giving several antibiotics at the same time will improve cure rate. Very soon, such wrong prescribing will increase drug resistance.

Then typhoid fever in your region will become untreatable.

- Continue a soft and easily digestible diet unless the patient develops abdominal distension or ileus.
- Reduce fever with paracetamol.
- Give one single dose **vitamin A** to all children.
- If the patient is very ill, in shock or confused, give **dexamethasone**. Give a first dose (loading dose) of 3 mg/kg, and then 1 mg/kg every 6 hours for 2 days. Steroids do not increase the rate of complications if antibiotic treatment is appropriate.
- Treat dehydration, anaemia and other complications.** Gastrointestinal bleeding is treated by replacing blood loss unless there is evidence of perforation. In this case surgery is indicated.

Antibiotics for typhoid fever

FIRST LINE ANTIBIOTICS

Give one of the following if the patient is not severely ill:

- Chloramphenicol.** Give orally unless the patient is vomiting or having diarrhoea. Then give initially IV. Do not give IM. Start with 75–100 mg/kg/day divided into 3-4 doses, reduce to 50 mg/kg/day after 48 hours. Treat for 14 days.

2–12 months	62.5–125 mg	3 times daily
1–5 years	125–250 mg	3 times daily
6–12 years	500 mg	3 times daily
Adults	1 g, then 750 mg	3 times daily

- Amoxicillin** orally. Treat for 14 days.

2–12 months	125 mg	4 times daily
1–5 years	250 mg	4 times daily
6–12 years	500 mg	4 times daily
Adults	1 g	4 times daily

- Cotrimoxazole** orally

1–5 years	240 mg	2 times daily
6–12 years	480 mg	2 times daily
Adults	960 mg	2 times daily

NOTE: in future, oral **azithromycin** may become another alternative, especially in children (see below).

SECOND LINE ANTIBIOTICS (RESERVE ANTIBIOTICS)

Give one of the following if the patient is severely ill or if the patient has not improved after 3 days of treatment with a first line antibiotic.

- Ciprofloxacin** orally. Avoid in children younger than 12 years, unless they are severely ill. Treat for 10-14 days. Fever usually goes down after 3-5 days.

Adults	500 mg	2 times daily
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(Alternatively give **ofloxacin** 200 mg orally 2 times daily.)

- Ceftriaxone** IM or slowly IV (give over 3-4 minutes). If you give more than 1 g IM, give it at more than one site. Treat for 10-14 days.

2–12 months	200–500 mg	once daily
1–5 years	500 mg–1 g	once daily
6–12 years	1–2 g	once daily
Adults	2 g	once daily

- Cefotaxime** slowly IV over 3-4 minutes.

Children	200 mg/kg/day divided into 3 doses
Adults	1 g 3 times daily

NEW DEVELOPMENTS

- Azithromycin** (a new macrolide antibiotic) has been shown to be an effective alternative, especially for children with uncomplicated typhoid fever.

Management of a relapse

10-20% of all patients who were treated with the correct antibiotics will suffer a relapse after initial recovery. A relapse typically occurs about 1-2 weeks (sometimes up to 2 months) after stopping the antibiotic. It is usually milder and shorter than the initial illness. Rarely a second or third relapse may occur. Relapse does not mean drug resistance. You can treat the patient with the same antibiotic that you used to treat his first attack. The relapse rate is lower if a patient has been treated with quinolone antibiotics (ciprofloxacin or ofloxacin).

Prevention

Improvement of water supplies and the safe disposal of stools reduce the incidence of typhoid fever. The following points are important (see also pages 91-92):

- Use clean drinking water.
- Wash your hands before preparing food, before eating food, and after passing stool.
- Wash fruits and vegetables with clean water. Those that cannot be peeled should be cooked before being eaten.
- Use toilets.

BRUCELLOSIS

Brucellosis is an infection that is usually transmitted through unboiled milk products or raw meat. Some people get infected when they have a cut or wound and come into direct contact with infected sheep, goats, cattle or camels.

Clinical features

Incubation period is about 2-4 weeks. Without treatment, brucellosis may last for several years.

The disease can start in two different ways:

- Slow onset.** The patient develops fever of varying intensity, night sweats, chills and weakness over one or more weeks. Other symptoms are weight loss, headaches and muscle pain.
- Acute onset** of sepsis-like symptoms with high fever, fatigue and night sweating.

Brucellosis shows features of many other illnesses with fever but the following are typical:

- Fever continues for weeks or months, or comes and goes every 2-4 weeks.
- Severe pain in bones and joints, especially lower back and weight-bearing joints (knee and hip). The pain may be so severe that the patient is unable to walk.
- Enlarged spleen or liver and enlarged lymph nodes.
- The patient often feels depressed.
- Epididymo-orchitis.
- Serious complication: endocarditis.
- Rare: neurological disease like meningitis or encephalopathy.

Helpful investigations

- Normal WBC or low total WBC count and lymphocytosis.
- Low haemoglobin.
- A positive brucellosis-agglutination-test is suggestive of brucellosis but false positive results do occur.

Management

- In adults, give **streptomycin** 1 g IM once daily for 2-3 weeks + oral **doxycycline** 200 mg once daily for 6 weeks;
or
give oral **rifampicin** + oral **doxycycline** once daily for 6 weeks. Give the drugs 12 hours apart (for example, rifampicin in the morning and doxycycline in the evening). This combination is usually used for relapses.
- In children under 8 years, give **co-trimoxazole** + **streptomycin** (or rifampicin) for 6 weeks.
- In pregnancy or breastfeeding women, give **rifampicin** for 6 weeks.

NOTE: If there is evidence of joint or localised organ involvement, treat for 12 weeks. If there are neurological signs, give 3 drugs (streptomycin + doxycycline + rifampicin or co-trimoxazole). If endocarditis, give long-term treatment.

Prevention

Infection can be prevented (1) by boiling milk before drinking or making other milk products (2) by washing hands after contact with animals (3) by not eating raw or partially cooked meat, and (4) by veterinary control of brucellosis infection in animals.

MEASLES

Measles is one of the most serious childhood infections. About 5-10% of all children with measles die. Children do not only die during the acute illness. Mortality is also increased during the months following measles because the measles virus weakens a child's immunity for many months. This makes a child more susceptible to infections and malnutrition.

The measles virus invades the superficial part of the cornea and conjunctiva. This causes the typical red, watery eyes. If a child has low body reserves of vitamin A, a corneal ulcer and blindness may rapidly develop as the result of secondary bacterial or herpes virus infection.

Measles is very contagious and about 90% of non-immune children who come in contact with a measles case will develop measles. The infection is spread directly by respiratory secretions (droplet-infection).

Clinical features

Incubation period is 10-14 days. Suspect measles in any child between 9 months and 5 years who presents with fever, cough, nasal discharge and red eyes. Before the

typical rash appears, you can find Koplik's spots inside the cheeks. For further features see figure 4-2.

Complications occur in about 5-10% of all children. At special risk are (1) malnourished children (2) children who have been infected by another child in the same household, and (3) those living in crowded conditions like a refugee camp (see box).

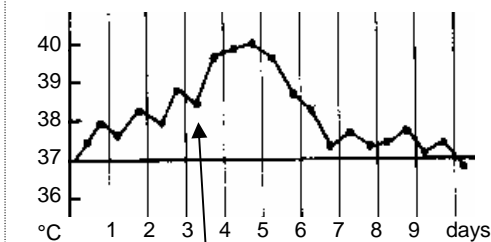
Management

To manage appropriately, decide which group the child belongs to:

- Measles without complications
- Measles with eye or mouth complications (pus draining from the eyes or mouth ulcers)
- Severe complicated measles (✕ any general danger sign ✕ clouding of cornea or ✕ deep and extensive mouth ulcers)

THE CLINICAL COURSE OF MEASLES:

The **fever** rises rapidly when the rash appears, and the child becomes ill. The fever resolves 3-4 days after the onset of the rash. If the fever continues for more than 4 days after the appearance of the rash, or if it returns, suspect a secondary bacterial infection.

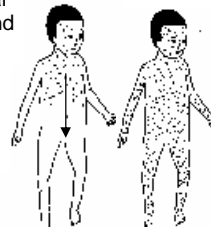


First signs:

- Cough, nasal discharge and red eyes
- Koplik's spots (look like 'sprinkled salt')



Rash:



COMPLICATIONS:

- Corneal ulcer (blindness)
- Mouth ulcers
- Secondary bacterial infections (pneumonia, ear or eye infection)
- Diarrhoea
- Croup
- Malnutrition
- Re-activation of old TB focus
- Encephalitis

Figure 4-2 Measles.

Assessment for complications in measles

- **Malnutrition?** (Wasting, foot oedema)
- **Pneumonia?** (Fast breathing, chest indrawings)
- **Croup?** (Stridor = harsh breathing sound on breathing in)
- **Vitamin A deficiency?** (Dry eyes, cloudy cornea)
- **Bacterial conjunctivitis?** (Pus at the corners of the eye)
- **Diarrhoea or dehydration?**
- **Mouth ulcers?**
- **Otitis media?** (Ear pain, acute discharge or a red eardrum)
- **Secondary bacterial infection?** (Fever for more than 4 days after the rash appeared)

1. If possible, **refer the following children with severe complicated measles to hospital** for observation:

- Severely malnourished children
- Children under 1 year
- Children with severe pneumonia
- Children with croup
- Children with severe dehydration
- Children with diarrhoea - more than 5 times daily

2. **Advise the family about good nutrition:**

- Breastfeeding must be continued.
- The child should be given extra good food (for example superflour see page 46). He needs two additional feeds during the two weeks following the illness.

NOTE: discourage harmful beliefs. Measles is recognised by most Afghans. There are many traditional ways for treating a child with measles. Ask the family what they are doing with their child and discourage harmful practices.

3. **Give vitamin A.** A corneal ulcer can develop rapidly, especially in a child with vitamin A deficiency. This can result in blindness. Vitamin A does not only reduce the risk of blindness. It has also been shown to generally shorten the duration of the illness and to reduce complications and mortality.

Give the first dose on the day you see the child and a second dose the next day. In children under 2 years, give a third dose after two weeks (under 6 months 50,000 IU; 7-12 months 100,000 IU; over 1 year 200,000 IU).

4. If you see pus (the earliest place where pus appears is at the inner corners of the eyes) or if you will not be able to review the child, give **tetracycline eye ointment** 4 times daily for one week.

5. **Explain eye and mouth care:**

- Wash the eyes at least 4 times daily with warm clean water or tea. Do not apply traditional eye medicines or eye drops containing steroids.
- Put a pinch of salt in clean water. Wipe the mouth with a clean cloth soaked in this water at least 4 times a day.

6. **Review a child with eye or mouth complications after 2 days.** In uncomplicated measles, ask the parents to bring the child back after 2 weeks; or earlier if he develops any of the following danger signs:

- ✘ New cough
- ✘ Difficult breathing
- ✘ Recurrence of fever
- ✘ Blood in stools
- ✘ Inability to drink

7. **Follow up a child for several months after the illness** to detect and treat malnutrition and complications early. Ideally, monitor a child's growth by weighing him regularly and plotting his weight on a growth chart.

Prevention

Measles and all its disastrous consequences could easily be prevented by immunisation. Give measles vaccine to

all children when they are 9 months old. Under 9 months, a child is usually well protected from measles by antibodies from his mother.

When a child comes to you for whatever reason, ask about previous immunisations. Give measles vaccine to all non-immunized children from 9 months up to at least 2 years. If possible, give it on the same day you see the child.

During an outbreak of measles, the age for giving measles vaccine should be lowered to 6 months. These children need a second dose at the age of 9 months. Children with a case of measles in their household should be immunized immediately because measles spreads very rapidly.

Malnutrition is not a contraindication to measles vaccine but a very strong indication to immunize. Immunise severely malnourished children at 6 months of age and repeat at 9 months.

CONGO-CRIMEAN HAEMORRHAGIC FEVER

This illness is called haemorrhagic fever because spontaneous bleeding (haemorrhage) occurs as part of the illness. The infection is transmitted (1) by tick bite (2) through tissue from infected sheep, goats or cattle, and (3) through blood or other body fluids of patients. Sometimes, epidemics occur with larger number of cases in the same area. In the last few years there have been several cases in the border area of Afghanistan and Pakistan.

Clinical features

The incubation period is 1-6 days.

- Sudden onset of fever with headache, muscle pains, chills and vomiting
- Facial flushing, petechial rash and bleeding on the soft palate
- In more than 25% of cases: severe bleeding and collapse on day 4 or 5 of the illness
- Sometimes diarrhoea and severe abdominal pain with enlarged liver

Helpful investigations

Measurement of specific antibodies that can be detected from day 6 of the illness.

Management

1. Treat complications.
2. If available, the antiviral drug ribaverin is useful.
3. Prevent further spread of the infection among the hospital staff and the patient's family.
 - Isolate the patient in a separate hospital room.
 - Everyone who approaches the patient should wear masks, gloves and gowns because the infection can be transmitted through contact with a patient's blood or body fluids.

- Dispose of a patient's blood and body fluids safely (chlorination) and destroy all contaminated clothes or bedding.

Prognosis

About 30% of patients die. Those patients who recover will show improvement from about day 10 after the onset of the illness.

Immunisations

Each year, many children die from diseases that could be prevented by vaccines. Immunisation programmes are implemented by the *Expanded Programme on Immunisation (EPI)*. Six diseases were originally included in EPI: diphtheria, pertussis, tetanus (DPT vaccine), tuberculosis (BCG vaccine), measles and polio (Oral Polio Vaccine = OPV). Hepatitis B may be added in future. Tetanus immunisation is included in DPT Vaccine but is also given to pregnant women or women of childbearing age and adolescent girls to prevent neonatal tetanus.

Always follow the schedule that has been decided by the Ministry of Health. The following schedule is recommended for Afghanistan at the time of publication of this book:

At birth	BCG
At birth up to day 7	OPV 0
At 6 weeks	DPT 1/OPV 1
At 10 weeks	DPT 2/OPV 2
At 14 weeks	DPT 3/OPV 3
At 9 months	Measles/OPV 4

No booster dose is recommended for any of the six vaccines at any age.

Problems with immunisations

Perhaps the most important and most difficult part of an immunisation programme is to create awareness about the usefulness of immunisations. People, including health professionals, may have misconceptions about immunisations. Often they think that ill children should not be immunized. This is often not correct. Other problems of immunisation programmes are poor organisation (for example, vaccinators do not arrive at the arranged time) or interruption of the cold chain. If vaccines are not kept at the right temperature they lose their effectiveness.

The following are **true contraindications** to immunisation:

- *Children with severe acute illnesses* like pneumonia, meningitis and bacillary dysentery.
- *Children who experience severe adverse reactions* (side-effects) following a dose of vaccine should not be given a second dose of the same vaccine. Severe adverse reactions are collapse, shock, convulsions

without fever, encephalitis, severe allergic reactions and severe local reactions.

- *Children with immune deficiency* diseases or children who are immunosuppressed as the result of drug therapy (for example high-dose steroids or AIDS) should not be given live vaccines. Of the above immunisation schedules, BCG, measles and oral polio are live vaccines. Severe malnutrition is not a contra-indication but an urgent indication for immunisation.

You can safely immunize children with the following conditions:

- Upper respiratory tract infections with fever below 39°C
- Diarrhoea with fever below 39°C
- Malnutrition, including severe malnutrition
- Allergy or asthma
- Children who are treated with antibiotics
- Chronic heart, lung, liver or kidney diseases
- Premature or low birth weight babies
- Convulsions
- Children who are breastfed

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5. Tuberculosis

Tuberculosis (TB) is one of the main killers worldwide. However, almost all patients with newly diagnosed TB, especially those presenting early, could be cured if they were properly treated. Good treatment means that patients receive daily medication according to a recommended treatment regimen for the correct length of time. Good treatment is also the most important way to prevent the spread of TB because good treatment makes infectious patients non-infectious.

Poor TB treatment fails to cure the patient. It perhaps leaves him with drug-resistant tubercle bacilli, making it difficult for anyone else to cure him. Poor treatment slightly prolongs the life of a patient. The result is that he spreads the disease to more people (see figure 5-1).

How tuberculosis develops (see figure 5-2)

TB is caused by infection with the bacillus *Mycobacterium tuberculosis*. Adults with active pulmonary TB are the main source of TB infection. The lungs of a person with active pulmonary disease may develop cavities (spaces), which are full of TB germs. When the person coughs, large numbers of TB germs from the lungs are sprayed into the air in tiny droplets. People in close contact with that person are at risk of inhaling these droplets and become infected with TB.

It is important to understand the difference between **TB infection** and **TB disease**. Someone exposed to TB germs who becomes infected has TB infection (or latent TB). Once infected with TB, a person remains infected for the rest of his life. However, most people do not develop TB disease because their body defences are strong enough to control or kill the TB bacilli.

Sometimes the infection progresses to TB disease. This is more likely to happen if a person's body defences are weak or if a person becomes infected with a large dose of TB bacilli (for example because he lives in the same household with a patient).

Infection with TB bacilli usually occurs in childhood. When a person becomes infected with TB, the primary complex forms about 4-8 weeks later. It consists of a focus in the lung and in the nearest lymph node next to the bronchi. Some bacilli are carried to other parts of the body. Primary infection is often asymptomatic; some children develop an unspecific febrile illness. *In some children whose body defences are weak*, the infection may rapidly go on to TB disease. The most serious forms of TB disease are TB meningitis and disseminated TB (miliary TB), which affects many parts of the body at the same time. *In other people*, TB bacilli remain dormant (sleeping) in the lungs or other parts of the body. If later the body defence of that person becomes weak, the dormant TB bacilli may multiply and cause disease. This can happen many years

THE SPREAD OF TUBERCULOSIS:

What happens if pulmonary TB is not treated?

Research has shown that a patient with pulmonary TB (☹) who does not receive any treatment will die after about 2 years. During this time, he will infect about 20 other people with TB bacilli. 2 out of these 20 people will develop TB disease: one sputum smear positive and one sputum smear negative case. The sputum positive patient will continue transmission of TB. Therefore, when the infectious patient dies, there will be another person with infectious TB disease.



What happens if TB is poorly treated?

If a patient is poorly treated for TB, he may live longer but will still die. He will die after about 4 instead of 2 years. This means, he will infect 40 people with TB during these 4 years. 4 out of these 40 people will develop TB disease, of which are 2 sputum positive. Therefore, when this patient dies the number of people with contagious TB has doubled. *This shows that poor quality TB management increases TB in a community!*



What happens if TB is treated well?

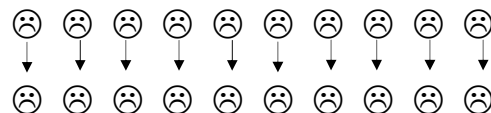
If you treat TB well, the patient survives and you block the transmission of TB in the community



SUMMARY: for the community, it is better not to treat TB than to treat it poorly!

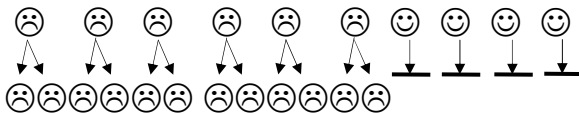
EXAMPLES:

- **No treatment**, the number of patients with infectious TB remains the same:



- **If you cure less than 50% of all your patients** with infectious TB you cause more harm than good! The number of people with TB will increase!

Example: 6 partly treated, 4 are cured, and the number of patients with infectious TB after 4 years is 12 instead of 10 (!):



- **If you cure more than 70% of all your patients** (WHO target 85%) with infectious TB you begin to cause more good than harm for your community. The number of people with TB will become less.

Example: 2 are not cured, 8 are cured, and the number of patients with infectious TB after 4 years is 4 instead of 10(!):

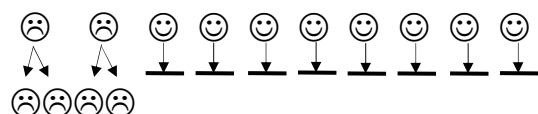


Figure 5-1 The consequences of good and bad TB treatment for the community.

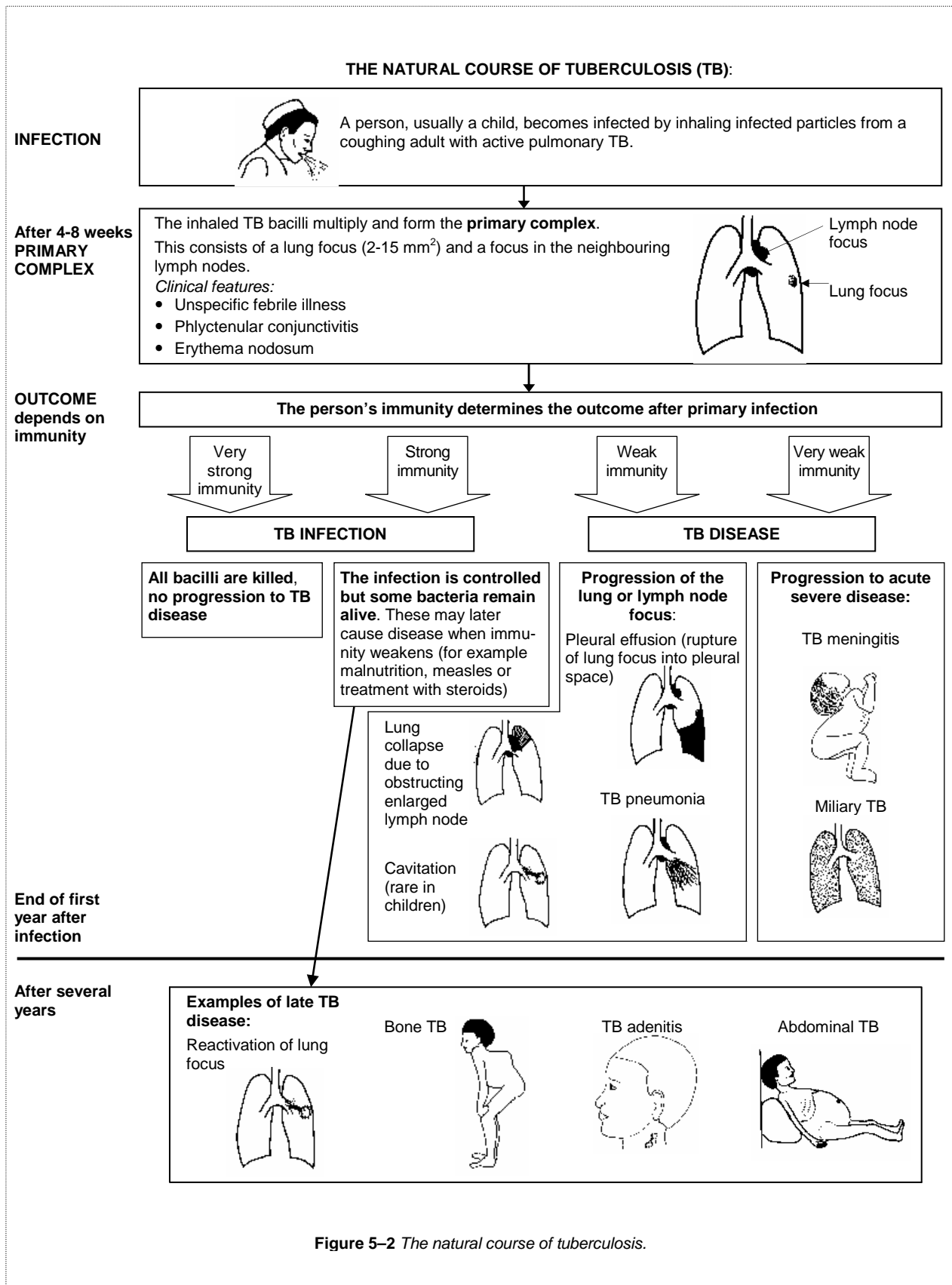


Figure 5-2 The natural course of tuberculosis.

after the original TB infection and can present as pulmonary disease or extra-pulmonary disease (for example TB disease in the lymph nodes, bones or abdomen).

In adults, pulmonary TB is more common than in children. In children, if TB disease develops, most children do not develop pulmonary TB until adolescence.

When to suspect tuberculosis

In adults, suspect pulmonary TB in any patient with the following symptoms (see figure 5–3):

- Cough for more than three weeks
- Blood in the sputum
- Increasing weakness and weight loss
- Chest pain for more than one month

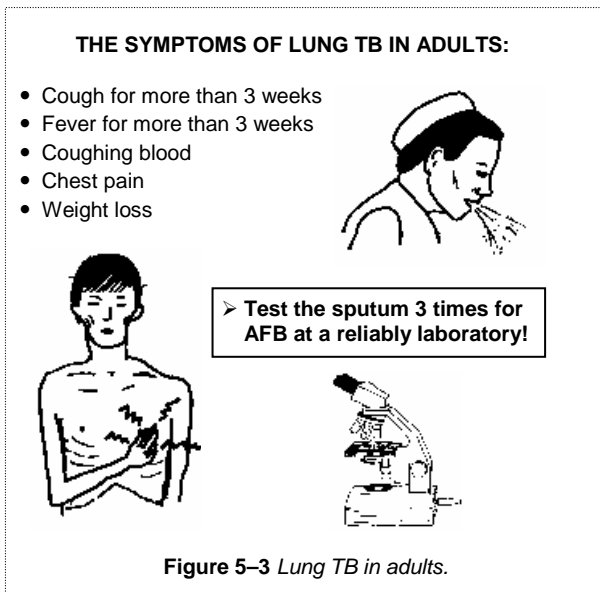
In children, pulmonary symptoms are less common. At risk of TB disease are children who had close contact with someone who had a positive sputum smear. Suspect TB if such a child becomes ill and shows any of the following symptoms:

- Persistent fever
- Chest pain or pleural effusion (pulmonary TB)
- Gradual onset of swelling of one joint (TB arthritis)
- Stiff back, sometimes with spinal hump, and slow onset of weakness in arm or leg (spinal TB)
- Swollen painless lymph node (lymph node TB)
- Distended abdomen with ascites (abdominal TB)

Very dangerous:

- ✘ Fever, headache, vomiting attacks, neck stiffness and increasing drowsiness (TB meningitis)
- ✘ Fever, very ill, weakness, weight loss, sometimes enlarged liver or spleen (miliary TB)

NOTE: adults can also develop all these clinical features but these types of TB are more common in children and adolescents. Always consider the differential diagnoses (for example not every patient with gradual onset of swelling of one joint will have TB).



How to diagnose pulmonary tuberculosis

Assess the patient

Take a history

- Ask about details of the symptoms.
- Did the patient take treatment for TB before? If yes:
 - How was TB diagnosed?
 - Who had diagnosed it?
 - Which drugs did the patient take?
 - Which drug dosage did he take?
 - For how long did he take the drugs?
- Is there anyone else in his household who is coughing, or is there a child who is ill?

Examine the patient

In a patient with suspected pulmonary TB, physical signs are often not very helpful. However, examine every patient carefully.

- **General condition?** Some patients are well despite advanced lung disease. Others are very ill with weight loss.
- **Examine the lungs.** Often there are no abnormal signs. If there are abnormal signs (for example crepitations, bronchial breathing, a localised wheeze), you often find them in the upper part of one or both lungs.

Investigations

Reliable:

- **Microscopy of the sputum** is by far the most reliable (and the cheapest) method. Examine three sputum samples, of which one should be early morning sputum. The sputum is examined for acid-fast bacilli (AFB). If only one sample is positive and the others are negative, it is best to repeat the sputum tests to confirm TB with a further positive result because errors can occur. Many laboratories offer sputum examination. However, only use a laboratory that is specialized in diagnosing TB because a correct result depends on well-trained and motivated laboratory workers and well-maintained equipment.

NOTE: sputum examination will be negative in many patients in whom you suspected pulmonary TB. This is because many different diseases cause symptoms similar to pulmonary TB. If sputum examination in a patient with suspected pulmonary TB is negative, consider the differential diagnoses (see box).

Consider the following differential diagnoses if sputum is negative for AFB

- **Pneumonia.** The symptoms usually come on suddenly. Pneumonia responds rapidly to treatment with antibiotics. The x-ray may look like TB.
- **Bronchiectasis.** There is usually a lot of purulent sputum. The patient has coughed up sputum often for many years.
- **Asthma.** The patient has attacks of night-time cough and wheeze. Wheeze is not common in TB.
- **Chronic obstructive airways disease.** The patient is usually older and has been a smoker for many years. He is short of breath on exertion, coughs and produces sputum. On examination you often hear a wheeze and some crepitations. The patient suffers repeated lung infections.
- **Sputum negative pulmonary TB.** Not all patients with pulmonary TB have bacilli in their sputum. This means that they do not spread the disease. If you suspect sputum negative TB, give the patient a trial of 2 weeks of co-trimoxazole or amoxicillin. If there is no improvement, repeat the sputum examination after 4 weeks.
- **Hydatid lung disease.** On a chest x-ray you see cysts that can look like cavities. Sometimes you find eosinophilia in the differential WBC.
- **Lung cancer.** The patient has usually been a smoker for many years. In the x-ray a tumour may break down into a cavity and look like TB.
- **Lung abscess.** There is usually a lot of purulent sputum. The patient has fever and is very ill.

Not reliable:

- **Chest x-rays** are expensive and unreliable. You cannot diagnose active TB with certainty on x-ray alone. Pneumonia and other chest diseases often look similar to TB. Many patients will have old, non-active TB changes on x-ray. You must examine the sputum. However, a chest x-ray is helpful when you suspect miliary TB. A normal chest x-ray, for practical purposes, excludes TB.
- **Tuberculin test** is not a reliable method for diagnosing TB. It measures the body's response to TB by showing whether TB antibodies are present. This means it shows whether a patient has been infected with TB. However, it does not indicate whether the patient has TB disease. In malnourished patients, tuberculin test may be negative although a patient is suffering from TB disease.
- **Blood examinations** are not helpful for diagnosing pulmonary TB.

How to diagnose extra-pulmonary tuberculosis

Figure 5–4 summarizes the clinical features of the main forms of extra-pulmonary TB.

MILIARY TB

Miliary TB is due to the spread of large numbers of TB bacilli through the blood stream, which the patients

- **Lymph node TB:** gradual enlargement of lymph nodes. Later: discharge (see page 64)
- **Abdominal TB:** fever, weight loss, abdominal pain, ascites. enlargement of lymph nodes (see pages 91, 103 and 104)
- **Urinary tract TB:** urinary tract infection not responding to antibiotics, painless haematuria, renal colic, craggy mass of the epididymis (see pages 117 and 123)
- **Bone or joint TB:** gradual onset of pain and swelling of bone or joint, severe muscle wasting. Later: discharge (see pages 148-149)
Spinal TB: back pain, stiffness. Later: gibbus, paralysis (see pages 154-155)
- **TB meningitis:** gradual onset of headache, vomiting, increasing drowsiness while neck stiffness develops. Later: convulsions, coma (see pages 160 and 161)
- **Skin TB:** ulcer that is slow to heal, large regional lymph nodes (see page 231)
- **Miliary TB:** fever, very ill, weakness (see below)

Figure 5–4 Main features of extrapulmonary tuberculosis.

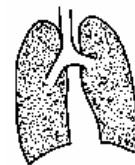
defences are too weak to kill off. Especially malnourished children and pregnant women are at risk. If untreated, almost all patients with miliary TB will die.

Clinical features

- Fever, often gradual in onset, weakness and weight loss
- Ill patient
- Often fast pulse and fast breathing
- Sometimes enlarged liver and spleen

Helpful investigations

- Typical chest x-ray: diffuse, evenly distributed, small shadows (see figure 5–5). The shadows vary from 1-10 mm in diameter. Its appearance has been compared with that of a snowstorm. Chest x-ray may be normal in the early stages of the disease.
- Sputum test is usually negative for TB.



Typical x-ray signs:

Diffuse, evenly distributed small shadows throughout the lung (varying from 1-10 mm in diameter)

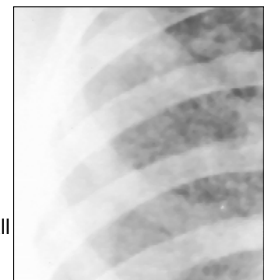


Figure 5–5 Miliary tuberculosis.

How to manage a patient with tuberculosis

Treat a patient with TB by following these steps, which are further explained below:

1. Decide whether you are the best person to treat the patient.
2. Find a person who will make sure that the patient takes his drugs every day until he has completed his treatment.
3. Define the patient's treatment category.
4. Choose the correct treatment regimen according to the patient's category.
5. Choose the correct dose for each drug.
6. Educate the patient and his family about TB and its treatment.
7. Follow up the patient.

NOTE: keep yourself informed about the current national guidelines on TB control before diagnosing and treating patients. The official guidelines are regularly updated and should be followed.

1. Decide whether you are the best person to treat the patient

Whenever possible, TB patients should be treated by a national TB control programme. If there is a well-functioning programme that supervises the treatment in your area, refer all suspected and all proven cases to them. If there is no reliable TB programme, treat patients only according to recommended guidelines. If you follow these guidelines, almost all patients will be cured.

2. Find a person who will make sure that the patient takes his drugs

One of the most important factors in the cure of a patient is that he takes his tablets daily until the total duration (usually 8 months) of treatment is completed. Interrupted or incomplete treatment is the main cause of failure to cure a patient, for the development of drug resistance and for the poor cure results of many TB programmes. Already interrupting TB treatment for a few days can lead to drug resistance!

The following avoidable problems can lead to incomplete or interrupted treatment. Take a moment to reflect whether you can identify any of these problems in your management of TB patients. If yes, then change your way of managing TB and you will be able to cure more patients:

Problem 1: the patient has not understood the importance of completing the treatment. He stops the treatment when he feels better.

➤ **Solution:** educate the patient and his family about TB and its treatment (see below under '6. Educate

the patient'). Then ask them to repeat the information in their own words to make sure they have understood it.

Problem 2: the patient is too poor to buy the medicines for the whole time of the treatment.

➤ **Solution:** refer the patient to a TB programme where he gets free medication. In this case, send a referral letter with the patient.

Problem 3: The TB drugs, which the patient is taking, are suddenly no longer available - a common and sad problem in poorly managed TB programmes (see figure 5-6).

➤ **Solution:** once a patient starts treatment, the total number of tablets that a patient needs to complete his course is put aside and is not handed out to other patients.

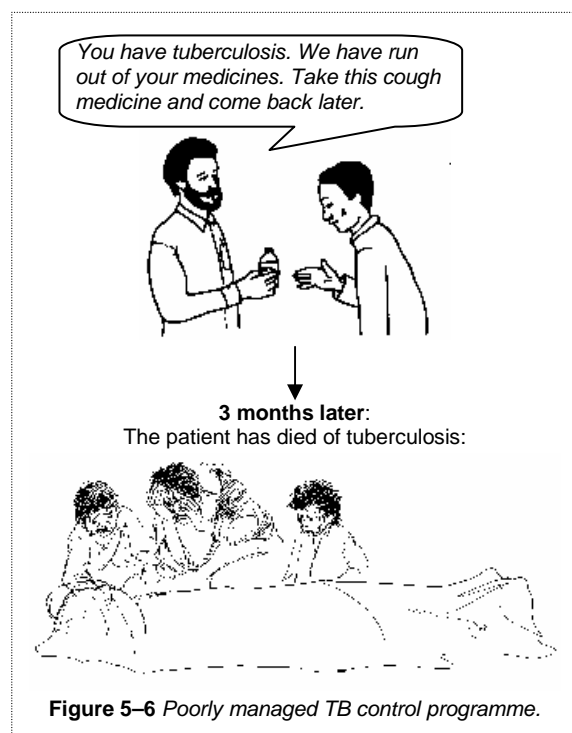


Figure 5-6 Poorly managed TB control programme.

Problem 4: the patient moves to another area.

➤ **Solution:** tell the patient that he must inform you if he plans to move house. Then you can find a way for him to continue his treatment.

To avoid the disastrous problem of a patient not completing or interrupting his treatment, many strategies have been tried. The most successful one in a situation like in Afghanistan is to have the patient take every dose under supervision. This is called DOT: Direct Observed Treatment. This means that the patient has to come to your clinic every day, or may even be admitted during the intensive phase. Alternatively, a village or family is asked to nominate a respected person to be a volunteer. The volunteer and the patient receive education (1) about TB disease (2) about how to take the drugs and (3) about common side effects of the drugs. Then the patient and the volunteer go back to their village with a limited drug supply. During intensive phase,

drugs are usually given out for one week, during maintenance phase for one month. The volunteer observes that the patient takes his medicine every day and marks this down on the treatment card. Then they return to get more medicines and you can reinforce the important health messages and deal with any problems. Of course, the success of DOT depends on your motivation to take time explaining about TB, and not just writing a prescription.

3. Define the patient's category (treatment group)

There are three different categories (treatment groups) of patients. Each group will receive a different treatment regimen. Answer the following questions to determine the category of a patient:

1. What is the type of TB disease? (For example pulmonary TB or spinal TB)
2. If pulmonary TB: is it sputum positive or sputum negative?
3. Is the patient very ill?
4. Has the patient already been treated for TB?

Category 1:

- New cases of smear positive pulmonary TB.
- Other newly diagnosed seriously ill patients with severe forms of TB (TB meningitis, miliary TB, TB pericarditis, TB peritonitis, bilateral or extensive pleural effusion, spinal TB with neurological complications, smear negative pulmonary TB with extensive involvement of the lungs).

Category 2:

- Relapses, treatment after interruption and treatment failures.

Category 3:

- Patients with smear negative pulmonary TB or extrapulmonary TB who are not very ill.
- Children under 15 years with sputum smear negative pulmonary TB.

4. Choose the treatment regimen according to the patient's category

Only use recommended drug combinations to treat TB. Never use a single drug or add a single drug to a failing regimen because resistance will develop rapidly.

TB treatment consists of two phases:

1. **The initial (intensive) phase.** In this phase, a combination of three or more drugs is used to kill as many TB bacilli as possible and to prevent the development of drug resistance. This initial phase should last for a minimum of 2 months.

2. **The continuation (maintenance) phase.** In this phase fewer drugs, usually 2, are given. Even if the patient feels well, this phase must be continued for long enough to kill all the remaining bacilli. Depending on the treatment regimen, this phase lasts usually 6 months.

In pulmonary TB, the sputum should be examined at the end of the intensive phase and at the end of the continuation phase to confirm cure. What to do if the patient remains sputum positive is explained below.

NOTE: TB treatment regimens are usually summarized in the following way: a number indicates the duration in months; letters indicate the drugs that should be given for that length of time. For example 2HRZ means 2 months of isoniazid + rifampicin + pyrazinamide. Below you find both, the summarized way as well as the regimen in full text.

Treatment for category 1:

2HRZE/6HT. This means:

Initial phase (months 1-2):

Daily: isoniazid (H) + rifampicin (R) + pyrazinamide (Z) + ethambutol (E).

An alternative to ethambutol is streptomycin (S).

Continuation phase (months 3-8):

Daily: isoniazid (H) + thioacetazone (T) - if thioacetazone is not available, give ethambutol instead.

The patient should attend the clinic daily for the first 2 months (or take the drugs in his own village under daily supervision by a volunteer), and then he should be given a weekly supply for the continuation phase.

If the sputum is still positive at the end of the initial phase, continue the initial phase for one more month (except streptomycin) and then start the continuation phase. Repeat sputum testing every month. If the sputum is still positive at 5 months after starting treatment, the patient is called a treatment failure and is moved into category 2.

NOTE: Children under 15 years are treated with 2HRZ/6HT if drug resistance is not a big problem.

Treatment for category 2:

2HRZES/1HRZE /5HRE. This means:

Initial phase (months 1-3):

Months 1-2:

Daily: isoniazid (H) + rifampicin (R) + pyrazinamide (Z) + ethambutol (E) + streptomycin (S).

Month 3: As for the first 2 months but do not continue streptomycin (S).

Continuation phase (months 3-8):

Daily: isoniazid (H) + rifampicin (R) + ethambutol (E).

The patient should take his drugs supervised daily for the whole of the 8 months because the regimen contains rifampicin for the entire time of treatment. If a patient becomes resistant to rifampicin because of interrupted

PRE-TREATMENT WEIGHT						
	Under 5 kg	5-10 kg	11-20 kg	21-32 kg	33-50 kg	Over 50 kg
Isoniazid (H)	5 mg/kg daily	50 mg	100 mg	200 mg	300 mg	300 mg
Rifampicin (R)	10 mg/kg daily	75 mg	150 mg	300 mg	450 mg	600 mg
Pyrazinamide (Z)	25 mg/kg daily	250 mg	500 mg	1000 mg	1500 mg	2000 mg
Ethambutol (E)	<i>Do not use in children under 6 years!</i>			800 mg	800 mg	1200 mg
Streptomycin (S)	15 mg/kg daily	250 mg	500 mg	500 mg	750 mg	1000 mg
Thioacetazone (T)	2.5 mg/kg daily	25 mg	50 mg	100 mg	150 mg	150 mg

treatment, he is almost incurable. If the patient is still sputum positive at the end of this re-treatment regimen, you must assume that he is a multi-resistant case of chronic TB and that it will not be possible to cure him.

Treatment for category 3:

2HRZ/6HT. This means:

Initial phase (months 1-2):

Daily: isoniazid (H) + rifampicin (R) + pyrazinamide (Z).

Continuation phase (months 3-8):

Daily: isoniazid (H) + thioacetazone (T).

5. Choose the correct dose for each drug

A drug dose is calculated according to the *weight before treatment* (pre-treatment weight), see box above. Drug preparations combining two or more anti-TB drugs can be used if their quality is assured.

NOTE: streptomycin is contra-indicated in pregnancy because it may cause deafness in the baby. In a patient who takes ethambutol, check his vision regularly, ideally using colour charts.

Additional drugs in TB treatment

- **Vitamin A:** give one single dose to all children with TB.
- **Pyridoxine** (vitamin B₆): do not routinely give pyridoxine unless the patient has signs of isoniazid-induced numbness in his feet or hands.
- **Steroids** (for example prednisolone or dexamethasone):
 - Never give steroids to patients with suspected TB who are not on treatment.
 - Never use steroids routinely because of their side effects.
 - Steroids may be useful for the severely ill patient and may help to reduce the outpouring of fluid into the abdomen (ascites), pleural space (pleural effusion) or pericardium (pericardial effusion).
 - Steroids may be used in TB meningitis but it is not proven that they are beneficial.

NOTE: do not prescribe multivitamins because they are useless. Good nutrition with protein- and energy-rich food is important.

6. Educate the patient and his family about TB and its treatment

The patient, his family or the chosen volunteer must understand the following points:

1. **The drugs must be taken every day**, all at the same time one hour before food. Even missing the dose for a few days can mean that the TB germs develop resistance to the drugs and that a cure for the patient will become impossible.
2. **The patient will start feeling better after a few weeks, but this does not mean that he is cured.** It means that the treatment is effective and he will be cured if he completes the full course. The disease is still there and it will take 8 months (depending on the treatment regimen used) until all TB germs are killed. Stopping too early can mean that TB reoccurs and then it may be impossible to cure the patient.
3. **Sometimes the drugs can have side effects.** The commonest are joint pains, numbness of hands or feet, jaundice or ringing in the ears. Very dangerous is worsening of vision. The patients should come to see you if any of these occur (see box on next page).
4. *If sputum positive TB*, explain the principles of 'How to prevent the spread of TB' (see box on next page).
5. *If other members of the household* develop a cough and fever for more than 3 weeks they should be checked for TB. If any child living in the household becomes ill with an unclear illness, he should also be checked for TB.

7. Follow up the patient

It is very important to have a written record that the patient should keep. Otherwise, whoever sees the patient later may not know at which stage of the treatment he is. It is not enough to give a prescription of drugs.

Ask the person who will observe the patient's treatment, and the patient himself to sign a treatment form and to confirm that they promise that the patient will take his drugs every day as prescribed.

The written record should contain:

1. The patient's type of TB disease and his category.

Management of side effects of anti-TB drugs

First exclude other causes that may be responsible for the symptoms (for example scabies when the problem is itching).

MINOR SIDE EFFECTS

- **Nausea, abdominal pain** (pyrazinamide, rifampicin): give the drugs with food.
- **Joint pains** (pyrazinamide): give aspirin or ibuprofen.
- **Burning sensation in the feet** (isoniazid): give pyridoxine (vitamin B₆) 100 mg once daily.
- **Orange or red urine** (rifampicin): reassure the patient that this is normal.

SERIOUS SIDE EFFECTS

- **Itching, skin rash:**
 - (Thioacetazone): stop all anti-TB drugs, if severe with low blood pressure, give steroids and IV Ringer-Lactate. Restart treatment after skin rash has resolved. Replace thioacetazone by ethambutol and never give it again.
 - (All other drugs): give an anti-histamine (for example promethazine)
- **Ring of ears, dizziness or deafness** (streptomycin): stop streptomycin, give ethambutol instead.
- **Jaundice** (isoniazid, rifampicin, pyrazinamide, rarely thioacetazone): stop all drugs until the jaundice improves, which usually takes 3-7 days. Then restart them all.
If jaundice recurs, stop the drugs again and restart them stepwise. Start with isoniazid and add another drug every 4 days. If the patient turns jaundiced after introducing a drug, discontinue that drug.
- **Loss of vision** (ethambutol): stop ethambutol and never give it again.
- **Confusion** (most anti-TB drugs): stop all drugs, assess for drug-induced liver failure.
- **Shock, purpura, renal failure** (rifampicin): stop rifampicin.

2. Sputum results.
3. The date when you started treatment and the date when treatment should be completed.
4. The drug regimen the patient should take and the dose for each drug.
5. Details about how long you supplied the patient with drugs for and on which day he should return for more drugs.
6. Space for the supervising volunteer to mark every day when he has observed the patient taking the medication.

Special situations

TB IN PREGNANCY

All TB drugs, except streptomycin are safe to give in pregnancy.

How to prevent the spread of tuberculosis

- Sputum is the most important source of infection. Therefore, tell people not to spit, because spitting spreads disease.
- Direct sunlight kills TB bacilli in 5 minutes but bacilli may survive for years in the dark. Therefore, tell people to ventilate their rooms every day because this reduces the spread of TB.
- Avoid overcrowded living wherever possible.
- Make sure patients with TB take the full treatment. Correct therapy rapidly reduces infectiousness, usually within 2 weeks. Then the patient is no longer a risk to his family. But if he does not complete the treatment for the full period, he may relapse and again become infectious. Then it may not be possible to cure him.

NOTE: extra-pulmonary TB or children with primary complex are not infectious. Sharing food does not spread TB.

THE NEWBORN WHOSE MOTHER HAS ACTIVE TB

A newborn whose mother has sputum positive TB should receive prophylaxis with isoniazid. Breastfeeding should be continued because the risk of the baby dying because of not being breastfed is far greater than the risk of catching TB from his mother. Give the baby **isoniazid** for 6 months (5 mg/kg once daily = about 15 mg. This is about a quarter of a tablet isoniazid 100 mg). Do not immunize the baby with BCG at birth but after finishing the isoniazid.

If the mother is sputum negative at birth, give the baby BCG immunisation and follow him up, ideally by monthly weighing and plotting his weight on a growth chart.

TB IN CHILDREN

An important part of management is finding the person who has infected the child. Look amongst the child's household members for an adult who has a chronic cough and other signs of pulmonary TB. Examine and treat the adult appropriately. Tell the family that it is possible that the person has also infected other children and that they should send any child to you who becomes ill.

SUSPECTED RELAPSE OF TB

If a patient has completed correct treatment without interruption, recurrence of TB is unlikely. Look for other possible causes. For example, a patient who had advanced pulmonary TB will often develop bronchiectasis, which causes chronic cough. Always check the sputum and look for other causes before you consider retreating a patient (for differential diagnosis of chronic cough see page 76).

How to stop tuberculosis in a community

If you want to stop TB in your community:

1. **Treat all patients strictly according to the above guidelines and make sure that patients take their medicines every day.**
2. **Identify and treat people with sputum positive pulmonary TB.** This is called case finding.
3. **Teach people how to prevent the spread of TB** (see box).
4. **Help people resist TB infection:**
 - *Immunize all newborns with BCG.* This will not stop TB bacilli to enter the body but in most cases, the body will control or kill the bacilli. BCG vaccine especially reduces the risk of TB meningitis and miliary TB.
 - *Immunize children against measles.* Measles weakens a child's immunity for several months after the measles illness and makes the child more susceptible to TB disease.

- *Treat malnutrition properly.*
- *Advise patients to stop smoking* because tobacco damages the natural defence mechanisms in the lungs.
- *If you treat patients with steroids for longer than 2 weeks, give the patient isoniazid once daily as prophylaxis.*

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6. Nutrition and malnutrition

A person needs good food to grow well, work well and stay healthy. Many diseases are caused or made worse by poor nutrition. In pregnant women, poor nutrition can lead to increased obstetric complications and poorer health. Malnutrition contributes to more than half of all deaths of young children. Well-fed children get ill - sometimes - but usually recover on their own. Malnourished children get ill - frequently - and die more often. Diarrhoea, measles or respiratory infections are usually not dangerous for well-fed children, but those with malnutrition are many times more likely to die from these diseases. In addition to the higher morbidity and mortality, malnourished children under the age of 2 years have smaller brains than normal children. This means they develop and learn slower. They are less likely to get good jobs later and will become less able workers. They will be less able to provide for their own children later. Therefore, improving nutrition in this generation will help improve the health of future generations.

Lack of certain nutrients causes specific deficiencies. For example lack of vitamin A may cause blindness, lack of iron causes anaemia and lack of vitamin D causes rickets.

Critical times for children, which often result in nutritional deficiencies, are (1) the first days after birth (2) the time of weaning and (3) whenever a child gets diarrhoea, measles or any other illness. Women are especially at risk of nutritional deficiency during pregnancy.

What everyone should know about good nutrition

Good nutrition consists of a balanced diet of food out of each of the different food groups:

- 1. Body-building foods:** *proteins*. They are necessary for growth, for making healthy muscles and brains, repair of body systems damaged by injury or disease and for body defence. Vegetable protein (for example beans) is as good as animal protein (for example eggs, milk products or meat) if vegetables are roasted, ground and mixed with rice or wheat. Everyone should eat enough body-building foods every day.
- 2. Energy-giving foods:**
 - *Carbohydrates* form the base of a meal (for example rice, wheat or potatoes). They are like wood for a fire. The harder a person works the more energy food he needs. But a diet of these foods alone, without proteins, makes our bodies weak.
 - *Fats* are a concentrated form of stored energy (for example cooking oil). Our bodies change fat into sugar when more energy is needed. Some fat or

oil should be added to a meal because it increases the meal's energy content without increasing its bulk.

- 3. Protective foods** (for example vegetables and fruits): *vitamins* and *minerals* protect from infections and help the body to function well. People become sick if they do not eat foods with all the necessary vitamins.

Every health professional should know and be able to explain the basic rules of good nutrition. The mother card summarizes feeding recommendations during sickness and health (see pages 269-270). Try to get copies of the card and use it when you talk to the family. Let them take it home to remember the main messages.

The six rules of good nutrition

Rule 1: *start breastfeeding within 1 hour after delivery and continue until the child is 2-3 years old.* For the first 6 months, give a baby breastmilk only. Breastmilk is the best food for babies. Breastfed babies are healthier and have a lower mortality rate than non-breastfed babies (for more information about breastfeeding see pages 202-203).

Rule 2: *start weaning with additional porridge at the age of 6 months and mix it with protein-rich food.* Add some oil or fat to a meal. It softens the mix and increases its energy content without increasing its bulk. Weaning is a critical time in a child's life. If weaning foods are of poor quality or prepared under unclean conditions a baby will become ill and malnourished. Excellent weaning foods are superflour, lank bread porridge, shola and mash porridge.

Rule 3: *give protective food at least two times daily.*

Rule 4: *give a child at least four meals daily.* Avoid sugar, especially between meals, because sugar will reduce a child's appetite and damage the teeth.

Rule 5: *continue feeding when a child is ill.* When he has recovered from an illness give him one extra meal per day for 2 weeks (see below 'Feeding during infections').

Rule 6: *prepare a child's food freshly and cleanly* (see 'Prevention of diarrhoea' on pages 91-92).

Feeding during infections

A child's appetite is poor during infections and he eats less food. Infections increase the demand for nutrients and use up reserves. In addition, nutrients are not well absorbed during diarrhoea. Some families give their ill children an insufficient diet because of traditional beliefs. All these factors increase the risk of malnutrition.

Once a child has become malnourished, he will suffer more infections, which in turn will worsen his nutritio-

nal status (see figure 6-1). The same also applies to adults, but they are less vulnerable to malnutrition than children.

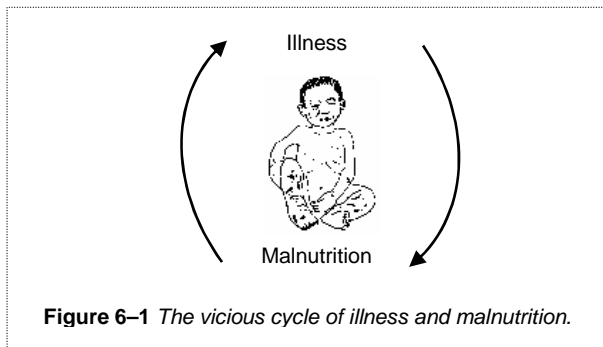


Figure 6-1 The vicious cycle of illness and malnutrition.

Good nutrition is therefore very important during any illness. **Always explain to families of sick children the following:**

1. A child needs good food to recover from an illness. *Offer him frequent meals of nutrient-rich food.* The aim is to give a child as much nutrient-rich food as he will accept. Add one teaspoon of oil or fat to each feed to improve its energy content.
NOTE: if you are uncertain which food to recommend, advise superflour (see below).
2. Every illness uses up a child's nutritional reserves. Therefore, *give a child one extra meal every day for two weeks after recovery and offer him extra good food during each meal.*
3. Do not give multivitamins or tonics to improve recovery from infections. It is a wrong belief that multivitamins can strengthen a child or improve his appetite.

Good local energy-rich and nutrient-rich foods

Superflour, lank bread porridge, shola and mash porridge are examples of energy-rich, nutrient-rich and locally available foods. They can be used:

1. As weaning food.
2. As an extra high-energy food for children who are ill.
3. To treat malnourished children.
4. As extra strengthening food for pregnant women or breastfeeding mothers.

For example superflour:

Take equal amounts of: • wheat or another whole cereal grain • rice and • chickpeas or other small pulse/legume.

1. Clean and dry the ingredients.
2. Roast, without using oil, each of them separately.
3. Allow them to cool and grind each of them separately to flour.
4. Take an equal amount of each flour and mix them together. This mixture is called superflour. It can be prepared at home and stored away like any other flour.

How to prepare food from the superflour: take one glass of water and add 3-4 tablespoons of the flour mixture. Boil it and add some oil. Stir it until it has the consistency of pudding. The amount of water may be varied according to the age of the child. The same is true for the oil additions. If the child is not malnourished, add an almond size of oil. If the child is malnourished, add a walnut size of oil. If given to a pregnant woman or breastfeeding mother, make it into a drink.

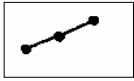
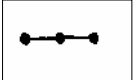
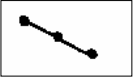
How to use superflour-porridge as weaning food: start by giving it in addition to breastmilk 1-2 times daily. The porridge is given first and then the breast is offered. Add fruit or vegetables to at least 2 meals a day to provide protective nutrients. Its taste can be varied according to the likes of the individual child. Some of the superflour can be added when baking bread.

Growth monitoring

Only healthy children grow well. You can watch how a child grows if you use a growth monitoring chart, also called 'Road to Health Chart'. The chart will show you when things are going wrong long before you or the mother would notice it. This means that you can find and treat problems at an early stage and so prevent illness, disability and death. Monitor the growth of all children, at least until 2 years of age.

Everyone working in the health sector must be familiar with the Road to Health Chart and know how to fill it in and interpret it (see figures 6-2).

When you look at the chart, a single weight measurement and its position on the chart is not so important. You cannot tell from a single measurement whether a child is putting on weight or losing it. You want to know the direction of the growth curve:

- If a child's growth curve is **rising** and following the direction of the thick lines it indicates good health. 
- If the weight curve is rising less steeply than the thick lines or is not rising at all (**flat line**) a child is not gaining weight well. He is therefore not growing well or not growing at all. This indicates danger. A flat curve is usually a sign of poor nutrition. 
- ❌ **If the growth curve is falling**, this is a sign of great danger. A fall in the growth curve means the child is losing weight. This usually indicates infection. 

Malnutrition in children

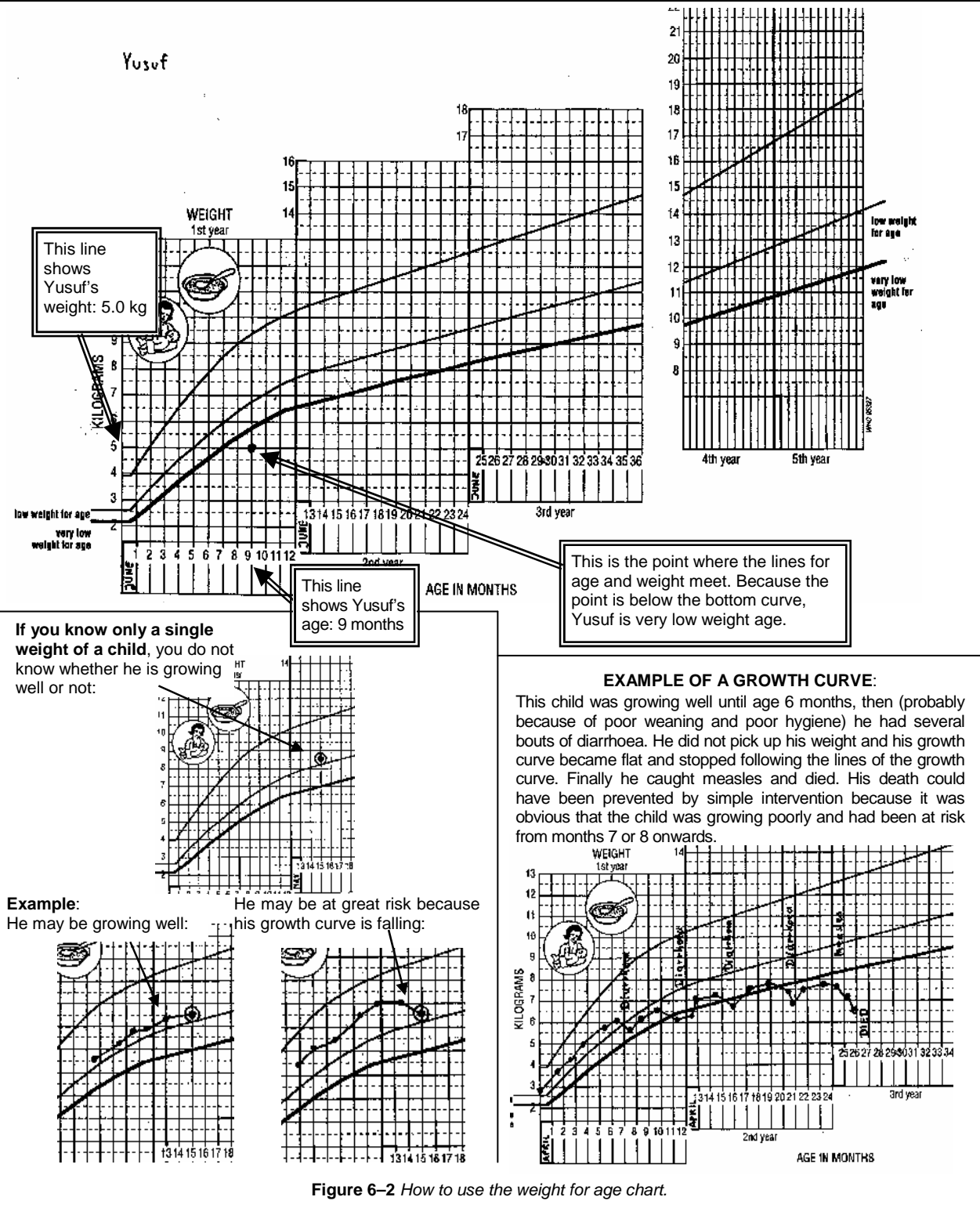
Malnutrition is a medical and a social problem. The medical problem results partly from the social situation. It is the end result of chronic poor nutrition, poverty,

WEIGHT FOR AGE CHART:

Weight for age compares the child's weight with the weight of other children who are the same age. You will identify children whose weight is below the bottom curve, which means they are very low weight for age. They need special attention. However, children above the bottom curve of the chart can also be malnourished. A single measurement does not give you all information you need. Therefore, monitor the growth of children. *You find a growth chart that you can copy and use on page 271.* Give it to mothers to keep and to bring back when they come to see you.

HOW TO USE A WEIGHT FOR AGE CHART:

1. Fill in the child's name.
2. Calculate the child's age in months.
3. Weigh the child and determine his weight for age and decide:
 - Normal weight for age (= between the upper and middle curves)
 - Low weight for age (= between the middle and bottom curves)
 - Very low weight for age (= below the bottom curves)
4. If previous measurements, determine the direction of the child's growth curve:
 - Rising parallel to the curves (= good growth)
 - Horizontal (= dangerous)
 - Falling (= very dangerous)
5. Fill in any important health or life events that help in understanding growth problems (for example 'diarrhoea' or 'mother died').



poor understanding of disease and nutrition and incomplete immunisations. If you see malnutrition only as a medical problem, the child is likely to become malnourished again when he returns home. It is important to consider the social circumstances, to identify the common causes of malnutrition and to give appropriate advice to the family. Common problems are • difficulty breastfeeding • use of a feeding bottle • the child is not actively encouraged to eat • no additional feeding during a time of illness • poor food hygiene • inappropriate weaning foods and • a severe underlying illness (for example tuberculosis).

Clinically, we differentiate between protein-energy malnutrition (PEM) and specific nutritional deficiencies (for example vitamin A deficiency syndrome). Usually, a child with PEM will also lack one or more micronutrients, especially iron and vitamin A.

PEM is the commonest form of malnutrition (see figure 6–3). There is a lack of both energy and body-building foods. Marasmus is classical starvation when a child looks ‘all skin and bones’ or resembles a ‘little old man’. Children with marasmus feel very hungry, which means feeding them is usually easy. Kwashiorkor is less common. Children have a swollen moon-face, swollen feet and legs, flaking-paint skin and thin hair. They are usually lethargic and have poor appetites. This means they are difficult to feed. The clinical management is the same for both.

How to identify malnutrition

Most children with mild or moderate malnutrition appear like ordinary children. Their malnutrition is not obvious to the family or even to a doctor or health worker. This hidden group of malnourished children has higher than average health risks because they have no body reserves if they fall ill. Their ‘hidden malnutrition’ can only be detected if you measure a child. There are several possibilities. The recommended way is to weigh the child, plot his weight on a growth chart (weight-for-age) and compare with previous weights (growth monitoring). An easy method is to measure the mid-upper-arm circumference (MUAC), which remains almost the same between the ages of 1-5 years. If it is less than 12.5 cm, the child is almost certainly malnourished (see figure 6–4). However, the MUAC is not a good method for monitoring growth.

In order not to miss malnourished children, assess every child who comes to you for malnutrition (see figure 6–5):

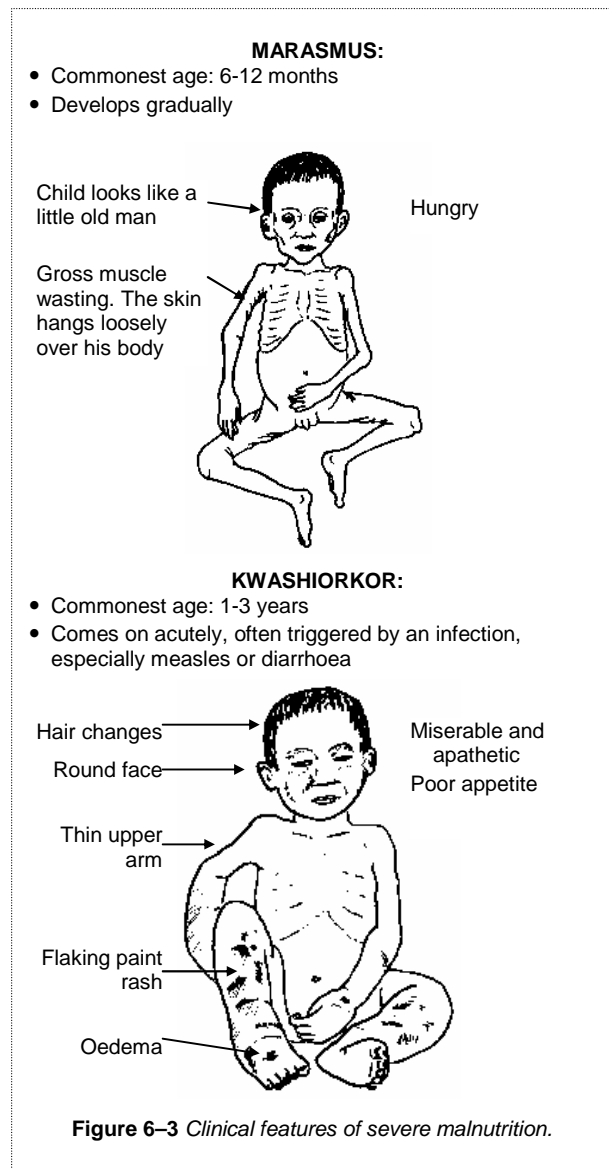
○ Signs of severe malnutrition?

- *Severe thinness?* (Look especially at the bottom for severe muscle wasting)
- *Oedema of both feet?*

○ Signs of other nutritional deficiencies?

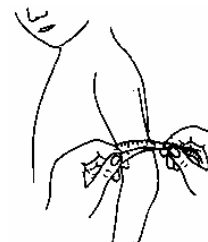
- *Anaemia?* (Look at the palms for palmar pallor, see page 127; measure haemoglobin)
- *Eye signs of vitamin A deficiency?* (See page 220)

After you have assessed the child, **decide to which group he belongs:**



HOW TO MEASURE THE MUAC:

1. Measure at the left arm while it is hanging down.
2. Measure the circumference of the middle of the upper arm.
3. Do not pull the tape so tight that folds appear in the child's skin.

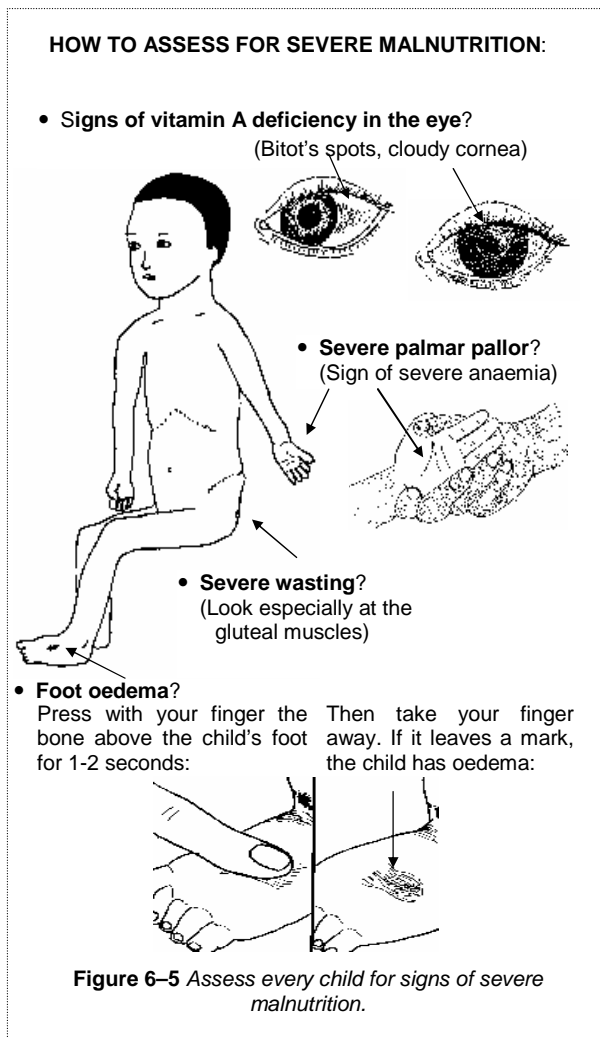


INTERPRETATION OF THE MUAC:

- **Children 1-5 years old:** if less than 12.5 cm = severe malnutrition
- NOTE: All children with oedema are classified as severe malnutrition whatever their MUAC.
- **Newborn:** if less than 8.7 cm = low birth weight
- **Pregnant women:** if less than 22.5 cm = significant malnutrition

Figure 6–4 The mid-upper-arm-circumference (MUAC).

- No malnutrition and no anaemia
- Non-severe malnutrition and/or or non-severe anaemia
- Severe malnutrition and/or severe anaemia



How to assess a malnourished child

Do a full physical assessment. The following summarizes the most important points.

Take a history

- Age? (The age may help you to find out why a child has become malnourished)
- Ask about *feeding*:
 - 'Do you breastfeed your child?' 'How many times during the day?' 'Do you also breastfeed during the night?'
 - 'Does the child eat any other food or fluids?' 'Which foods or fluids?' 'How many times per day?' 'How large are the servings?' 'Who feeds the child and how?'
- Appetite?
- Diarrhoea?
 - Duration and onset? (Acute or chronic)
 - Diarrhoea with or without blood?
- Chronic cough? (Possible symptom of tuberculosis)
- Recent measles?

- Contact with tuberculosis?
- Family circumstances:
 - Who is working and doing what? Monthly income?
 - Death of sibling?
 - Where does the family get drinking water from?
 - Access to a toilet?
- Immunisations completed?

Examine the child

- **Lethargy or disturbed consciousness?**
- **Dehydration?** If the usual criteria (sunken eyes, skin elasticity) to assess dehydration are used in severe malnutrition, dehydration is over diagnosed and over treated because sunken eyes and loss of skin elasticity are also signs of malnutrition itself. This may result in overloading a child with fluid and causing heart failure. Instead of the usual criteria, use the following classification in children with diarrhoea and severe malnutrition:
 - No signs of shock and lethargy or loss of consciousness = *'some' dehydration*.
 - Signs of shock and lethargy or loss of consciousness = *severe dehydration*.
- **Fast breathing?** (Possible sign of pneumonia, heart failure or sepsis)
- **Severe palmar pallor?** (Sign of severe anaemia; if yes, measure haemoglobin)
- **Measure body temperature:**
 - *Fever?*
 - *Hypothermia?* Hypothermia is a sign of severe infection. A child is hypothermic if rectal temperature is less than 35.5°C (95.9°F) or axillary temperature less than 35°C (95°F). If you do not have a thermometer, feel the calves or in the armpit of a child. If these are cold, the child is hypothermic.
- **Focal signs of infection?** (For example skin or eye infection)
- **Signs of shock?** (Cold hands and feet, weak or impalpable radial pulse and impaired consciousness)
- **Eye signs of vitamin A deficiency?**
- **Mouth ulcers? Oral thrush?**
- **Scabies?**

Investigations

Low blood sugar (less than 54 mg/dl or 3.0 mmol/l)? (See figure 6-6) Hypoglycaemia is a sign of severe infection, or it indicates that the child has not been fed for 4-6 hours. If you cannot measure blood sugar, assume hypoglycaemia in any child who is lethargic, unconscious or has hypothermia.



Figure 6-6 Where to do a heel stab to obtain blood in a young infant.

Other helpful investigations are • haemoglobin • urine examination for infection • stools for giardia and • chest x-ray. However, if not available, children can be managed well without.

NOTE: electrolytes (sodium, potassium) are rarely helpful and may lead to inappropriate treatment. Tuberculin test is usually negative in severe malnutrition because of the impaired immune response.

How to manage non-severe malnutrition

1. **Find out in detail how the mother is feeding the child.** Identify the problem areas and give appropriate advice about feeding (see above, 'What everyone should know about good nutrition') and hygiene (see pages 91-92).
2. **Check immunization status.**
3. **Treat for worms and give vitamin A** if the child has not had these treatments within the last 6 months.
4. **Treat for anaemia** if palmar pallor or Hb is below 11.0 g/dl.
5. **Make follow up appointments** to see the child every 4 weeks. Monitor the child's growth with a growth chart. Teach the mother danger signs (see page 270).

How to manage severe malnutrition

Severely malnourished children should ideally be managed at a specialised unit during the acute and rehabilitation phase. However, if good follow-up of home care through health workers is possible, an earlier discharge is possible.

Management consists of three phases (see figure 6-7):

1. **Stabilisation phase** (week 1). Its aim is to stabilise the child's condition. This includes looking for and treating acute medical problems and stabilising the body's metabolic functions.
2. **Rehabilitation phase** (weeks 2-6). Its aim is to help the child regain his normal weight quickly.
3. **Follow-up phase.** Its aim is (1) to prevent relapse, and (2) to make sure that the child is growing well.

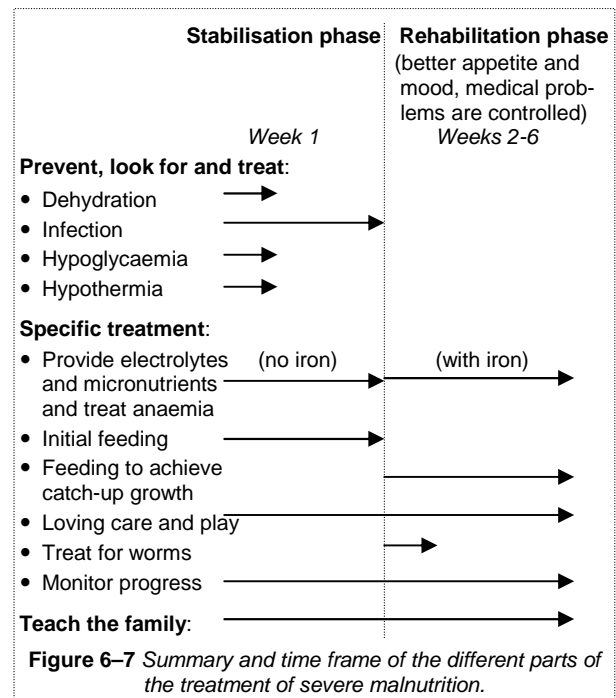
1. Stabilisation phase

Dehydration, infection, hypoglycaemia and hypothermia are the main killers of malnourished children during the first days of treatment.

NOTE: for treatment of persistent diarrhoea see pages 90-91. Do not give diuretics to treat oedema.

Prevent and treat dehydration

Whenever possible, rehydrate with oral fluids. IV fluids easily cause overhydration, heart failure and death. Breastfeeding should be continued during rehydration.



After replacing the fluid deficiency, continue replacing ongoing losses (give 50–100 ml = ¼–½ cup per stool).

A child with severe malnutrition has disturbed electrolytes (especially high sodium) and needs half-strength ORS or IV solutions. High intakes of sodium may cause heart failure.

- **Severe dehydration:** there is only one indication for IV fluids: a child with diarrhoea and signs of shock who is lethargic or unconscious. Give Ringer-Lactate solution with 5% glucose (or sodium chloride 0.45% with 5% glucose). If these are not available, give Ringer-Lactate solution. Give 15 ml/kg over 1 hour. Repeat if a child has improved but has not fully recovered. If the child fails to improve, consider septic shock.

Monitor respiratory rate and pulse to recognize fluid overload early. If respiratory rate or pulse become faster (breathing by 5 breaths/minute and pulse by 25 beats/minute) or if there is puffiness around the eyes, then stop IV fluids.

- **'Some' dehydration:** if a child with diarrhoea has no signs of shock, assume 'some dehydration'. Give Rehydration Solution for Malnutrition (ReSoMal) 70–100 ml/kg over 12 hours. Start with 5 ml/kg (usually about 15–30 ml) every 30 minutes. After 1 hour, give 10 ml/kg. If the child is too weak to drink that amount, give it slowly via nasogastric tube.

If ReSoMal is not available, prepare the following half-strength ORS solution:

- Take one package ORS. Mix it with 2 litres of clean water (8 cups) instead of 1 litre.
- Add 2 large tablespoons sugar (50 g).
- Add 40 ml electrolyte mineral solution (= 2 tablespoons). If not available, mix your own solution: add 50 g (= 625 mmol) potassium chloride (KCL) to 500 ml water. Then add 40 ml of this solution to your half-strength solution.

Prevent and treat infection

In severe malnutrition the usual signs of infection, such as fever are often absent. Infections (especially pneumonia, urinary tract infection and sepsis) are common in severe malnutrition. Suspect *severe* infection if a child shows any of the following clinical features:

- ✘ Unable to breastfeed
- ✘ Lethargic or looking ill
- ✘ Hypothermia
- ✘ Hypoglycaemia

Management

- Treat any **specific infection** with the appropriate antibiotic.
- **If there is no obvious sign of infection** give oral *co-trimoxazole* 30 mg/kg for 5 days (child under 8 kg 120–240 mg 2 times daily; 8–15 kg 240–480 mg 2 times daily).
- **If a child shows any of the features of severe infection** give *ampicillin* + *gentamicin*:
 - *Ampicillin*. Give 100–200 mg/kg/day IM/IV divided into 3–4 doses (child under 8 kg 250–500 mg 3 times daily; 8–15 kg 500 mg–1 g 3 times daily) for 2 days, then change to oral amoxicillin for 5 days.
 - *Gentamicin*. Give 7.5 mg/kg IM/IV once daily for 7 days (calculate the dose carefully, the daily dosage is usually between 15–60 mg).

Alternative to gentamicin + ampicillin in severe infection is ceftriaxone 40–80 mg/day IM once daily (child under 8 kg 250–500 mg; 8–15 kg 500–750 mg).

If a child does not improve within 48 hours, add *chloramphenicol* 75 mg/kg/day divided into 3 doses IM/IV for 4 days (child under 8 kg 62.5–125 mg 3 times daily; 8–15 kg 125–250 mg 3 times daily).

If the child has not improved after 1 week, reassess and consider tuberculosis.

Skin changes in kwashiorkor include skin patches that peel easily with raw skin underneath that becomes easily infected. Apply gentian violet or nystatin cream to sores and apply zinc oxide cream to the raw areas.

Prevent and treat hypoglycaemia

- **To prevent hypoglycaemia** feed a severely malnourished child at first every 2 hours, also during the night.
- **If a child with hypoglycaemia has collapsed** or his consciousness is disturbed give 5 ml/kg of a glucose 10% solution IV (or 50 ml of 10% solution via nasogastric tube) in addition to treating for infection and possibly dehydration. If the child does not improve, repeat.

NOTE: prepare a 10% glucose solution by taking one part of a 50% glucose solution. Mix it with 4 times that amount of sodium chloride 0.9% or water for injection.

- **If a child is able to drink**, give glucose orally: mix 3.5 tablespoons clean water with 1 rounded tablespoon sugar and give this sugar water to the child. Start feeding immediately afterwards.

Prevent and treat hypothermia

- **Prevent hypothermia** by dressing the child including his head and keeping the child close to the mother. Do not bath him.
- **Treat hypothermia** by keeping the child close to his mother's skin (kangaroo care, as described for the newborn, see page 199). Make sure the child is clothed (including his head). Cover with a warm blanket. Treat all hypothermic children for hypoglycaemia and infection.

Provide electrolyte and micronutrients and treat anaemia

Severely malnourished children are often deficient in micronutrients like vitamin A, folic acid, zinc, iron, potassium and magnesium. Deficiencies in **vitamin A** and **zinc** impair the immune system. Vitamin A supplementation has been shown to reduce mortality from diarrhoea and measles and to prevent blindness. Zinc reduces mortality from diarrhoea, pneumonia and improves growth. Iron improves mental abilities and growth but is not recommended during the acute stabilisation phase because it may worsen existing infection. Other vitamin deficiencies are less important and multivitamin preparations play no great role in the treatment of malnutrition. They are often misleading. Families must understand that malnutrition is cured by good nutrition but not by multivitamin pills or tonics.

Providing the essential micronutrients is often difficult because a suitable preparation is not available. If available, add an electrolyte-mineral solution (containing potassium, magnesium, zinc and copper) to the diet or to ORS. Alternatively, give a vitamin preparation that should ideally contain 5 mg folic acid, 2 mg zinc and 0.3 mg copper but not any iron. Add potassium to the feeds (see below).

1. **Give one dose vitamin A** (retinol) immediately, on the next day and after 2 weeks (under 6 months 50,000 units; 7–12 months 100,000 units; over 1 year 200,000 units).
2. **Give oral folic acid** 5 mg once daily for 1 month.
3. **If severe anaemia** (haemoglobin below 4 g/dl or haemoglobin 4–6 g/dl + signs of shock or heart failure), give a **blood transfusion**. Give 10 ml/kg whole blood very slowly over 3 hours. To avoid the risk of fluid overload, give furosemide (1 mg/kg) IV at the start of the transfusion. Monitor pulse and breathing every 15 minutes. If either increases (breathing by 5 breaths/minute and pulse by 25 beats/minute), transfuse more slowly.

NOTE: do not give iron (ferrous sulphate) during the stabilisation phase.

Start cautious feeding with specially prepared food

In severe malnutrition, all body functions have slowed down. Metabolic mechanisms need time to readjust to food intake and food processing. Too much food, especially protein, during the initial phase can lead to heart failure and death.

Treatment centres will start with special formulas. However, even when referral is not possible and resources are limited, a malnourished child can be treated at the child's home. In this situation, it is very important that you teach and show what to do, and that you supervise the family closely. You must give realistic instructions that the family can follow. Start appropriate feeding immediately. To avoid overloading the impaired organs and to prevent hypoglycaemia, the child must be fed frequently, if necessary by nasogastric tube.

The choices of food depend on what is available:

- **First choice:** give a modified milk diet made of dried skim milk (DSM), sugar and oil. Start with a modified milk containing 25 g dried skim milk, 100 g sugar, 30 g vegetable oil and enough clean water to make up to 1000 ml. Mix the milk, sugar and oil to a paste. Slowly add warm boiled water to make a total volume of 1000 ml. Alternatively, give fresh cow's milk (300 ml and 100 g sugar and 20 ml oil) and add warm, boiled water to make 1000 ml. Make sure that the milk is prepared under clean conditions.

The severely malnourished child is very fragile and needs small frequent feeds. Gradually increase the volume of the feed and gradually decrease the feeding frequency. Show the mother how to feed the child with cup and spoon. If the mother is breast-feeding, she should offer the breast after he child has been given the prescribed amount of special milk. Make every effort to keep up the breastmilk supply.

The child must be fed during the night as often as possible, but at least two times. Many severely malnourished children die during the night because they are not fed and kept warm.

The *recommended feeding schedule* is as follows:

Days	Frequency of feeds	Volume/kg/ feed	Volume/kg/24 hours
1+2	Every 2 hours	11 ml/kg/feed	130 ml/kg/24 hours
3-5	Every 3 hours	16 ml/kg/feed	130 ml/kg/24 hours
6+7	Every 4 hours	22 ml/kg/feed	130 ml/kg/24 hours

If the child has a good appetite and no oedema, you may only need to feed him for one day at each level.

Add extra potassium to the feeds. Mix 50 g (= 625 mmol) potassium chloride (KCL) to 500 ml water. Add 10 ml of this solution to each 500 ml of milk feed.

- **Second choice:** give good complementary foods (for example superflour) and add one teaspoon oil. Avoid foods that contain more than 40 ml whole milk/kg/24 hours or added salt. Do not add salt to the food. Use the same feeding schedule as above.

Provide loving care and play for the child

Encourage the family to play with the child, to talk to him and to comfort him. This improves appetite and recovery.

2. Rehabilitation phase

The return of a child's appetite and improved mood shows that you can start the rehabilitation phase. There is no need to wait for oedema to disappear.

Continue appropriate feeds

In the rehabilitation phase, very high intakes of energy and nutrients are needed. These help to promote rapid growth. Offer the child as much food as he wants.

At first, feed the same special milk mix that you started in the stabilisation phase. Increase its amount gradually to 150–200 ml/kg/24 hours. The child's appetite is a good guide and you can give more if the child wants it. Give the food every 4 hours. Increase the amount of food, especially its energy content. Add, for example, one teaspoon cooking oil (or a walnut size oil) to each feed. Continue giving many small feeds because the child's stomach capacity is small. After one week, start introducing appropriate family foods.

Continue providing micronutrients

Continue the micronutrients that you started in the stabilisation phase but now add iron. Give oral ferrous sulphate 10–25 mg/kg/day for 3 months (child under 8 kg 50 mg 1–2 times daily; 8–15 kg 100 mg 2 times daily).

Treat for worms

Give to children over 1 year oral mebendazole 500 mg one single dose (or 100 mg 2 times daily for 3 days) or pyrantel 10 mg/kg/day for 3 days (children 7–12 months 62.5 mg once daily; 1–5 years 125 mg once daily).

Monitor progress

Weigh the child every day and plot the weight on a growth chart:

- If the weight gain is good (more than 10 g/kg/day), continue with the same treatment.
- If the weight gain is between 5–10 g/kg/day, check whether the child is taking all the prescribed feeds, or whether you have overlooked infection.
- If the weight gain is poor (less than 5 g/kg/day) do a full assessment.

If a malnourished child does not improve:

1. Make sure the child's food is prepared correctly.
2. Make sure the child is offered enough food day and night.
3. Make sure the child is eating the food. If he refuses his feeds, examine for oral thrush or mouth ulcers and discuss the need for stimulation through play.
4. Make sure the child takes his micronutrients.
5. Consider underlying infection, especially tuberculosis. Get a chest x-ray, urine microscopy, blood film for malaria and stool test for giardia. Treat according to the results.
6. Look for any other underlying problem (for example cleft palate, heart disease or leukaemia).
7. Examine the stool for giardia or give oral metronidazole 20 mg/kg/day divided into 3 doses for 7 days

(child under 8 kg 25–50 mg 3 times daily; 8–15 kg 50–100 mg 3 times daily).

Give missing immunisations

Malnutrition is not a contra-indication but an absolute indication for immunisations. The measles vaccine is the most important. Give it to all severely malnourished children at age 6 months and repeat at 9 months.

Follow up the child and teach the family

Weigh the child every week for one month, and then once a month. Plot his weight on a growth chart. From the onset of treatment you should have started teaching the family. The important points they must have understood are:

1. Why their child has become malnourished.
2. What they can do to prevent the child from becoming malnourished again:
 - To know how to provide good nutrition.
 - To know how to feed their child during an illness (for example diarrhoea).
3. Understand that good nutrition and not medicines or multivitamins make a child grow well.

Severe malnutrition in adults

Malnutrition in adults occurs during times of famine, in conditions of deprivation (for example imprisonment under bad conditions) or through underlying conditions like tuberculosis, mental illness, drug abuse, diabetes mellitus, AIDS or cancer.

How to assess an adult with malnutrition

Take a history

- Chronic cough or sputum?
- Fever?
- Any other symptoms?
- Present foods. What has he been eating?
- Addicted to drugs?

Examine the patient

Do a full physical examination to look for underlying diseases. Even if the malnutrition has not been caused by infection in the first place, malnourished adults often have underlying infections. As in children, look for hypothermia, hypoglycaemia and infections.

Investigations

- Haemoglobin
- Blood sugar to test for hypoglycaemia (a complication of malnutrition) or hyperglycaemia (diabetes mellitus as a cause of wasting)

- Sputum for AFB (tuberculosis)
- Chest x-ray
- Consider testing for HIV-antibodies (AIDS).

Management of severe malnutrition in adults

Treatment is similar to that of children.

1. Stabilisation phase

Provide appropriate feeding

If possible, give the same high-energy milk, electrolytes and micronutrient or superflour as for children. The aim of the stabilisation phase is to give enough food to stop the loss of further weight. Severely malnourished adults are at risk of death if they are suddenly overloaded with protein. The amount of high-energy milk needed for an adult is less than for small children (11–18 years 2.0–2.5 ml/kg/hour; over 19 years 1.7 ml/kg/hour).

Provide electrolyte and micronutrients

1. Give vitamin A (retinol) 200,000 IU one single dose, except in pregnancy.
2. Provide electrolytes and minerals and treat anaemia as described for children.

Treat medical complications

Treat and prevent hypoglycaemia and hypothermia. Treat infection with appropriate antibiotics. If there is no specific illness, use the same antibiotics as for children (gentamicin is contra-indicated in pregnancy).

2. Rehabilitation phase

An improving appetite indicates the beginning of rehabilitation. Adults often become very hungry, refuse milk feeds and demand enormous amounts of food. Give food that is based on traditional foods (for example superflour) with added oil, mineral and vitamin mix. Allow the patient to eat as much as he wants.

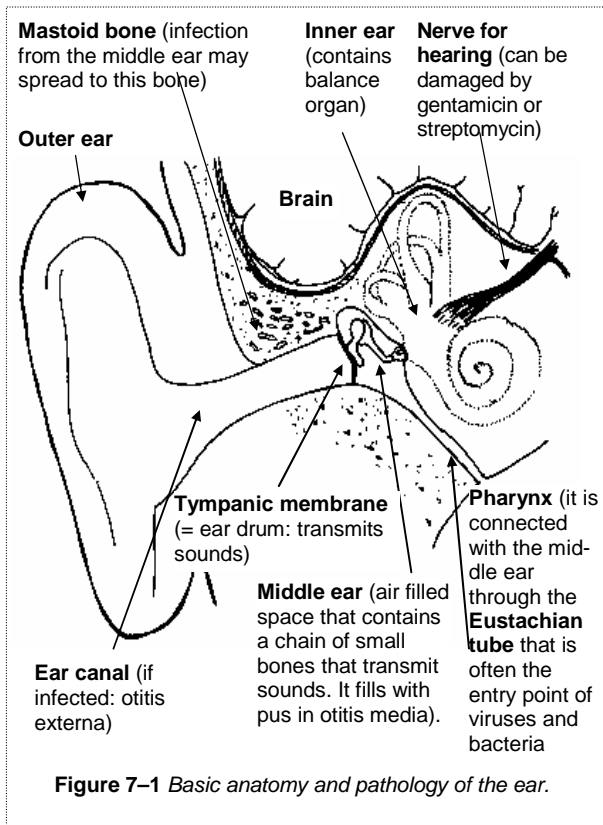
If an adult does not improve, it is usually because he refuses to follow your treatment or because of an underlying illness that has not been diagnosed (for example diabetes mellitus, tuberculosis, cancer or AIDS).

References

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7. Ear, nose and throat problems and neck swellings

Only a few ear, nose and throat problems may cause death. However, early recognition of disease and good treatment are important in preventing disability or complications. For example poorly treated acute otitis media may lead to chronic ear discharge, which is the commonest cause of preventable deafness.



EAR PROBLEMS

The commonest presentations of ear problems are pain, ear discharge and difficulty in hearing.

How to assess a patient with an ear problem

The basics of the assessment of the ear are explained on page 10. Below is only a summary that focuses on the interpretation of abnormal findings. You should study this page together with page 10.

Take a history

- Ask for details of the problem, especially its duration (chronic if longer than 2 weeks).

Examine the patient

- Observe whether the patient has problems hearing you while you talk to him.
- Examine the ear:
 - Ear discharge?
 - Tender swelling behind or above the ear? (Sign of mastoiditis)
 - Pain when gently pulling the outer ear? (Sign of infection of the ear canal)
 - Swelling of ear canal? (Sign of infection of the ear canal)
 - Abnormal eardrum? (See figure 7-2 on the next page)
- Feel the lymph nodes in front of the ear and in the neck.
- Examine the throat, neck and teeth for abnormalities.

Ear pain or ear discharge

For the common causes of **ear pain** see box. If ear examination is normal, always consider referred pain from teeth, throat or neck problems.

Causes of ear pain

COMMON

- Acute otitis media
- Pain referred from the teeth, throat, parotid gland, spine or jaw joint

LESS COMMON

- Otitis externa
- Injury
- Boils
- Herpes infection

In **ear discharge** (see box) the important questions are:

1. Is the ear discharge acute (less than 2 weeks) or chronic (more than 2 weeks)?
2. Is the discharge from the ear canal (otitis externa) or from the middle ear (otitis media)?

You can differentiate between discharge from otitis media and otitis externa by clinical examination:

Otitis media	Otitis externa
No swelling of the ear canal	Swelling of the ear canal
No pain on pulling the ear	Pain on pulling the ear
No swollen lymph nodes	Swollen lymph nodes in front of the ear
Perforated ear drum	Normal eardrum
Often mucoid discharge	Never mucoid discharge

Causes of ear discharge**COMMON**

- Chronic suppurative otitis media
- Acute otitis media with perforation of the eardrum

LESS COMMON

- Otitis externa
- Injury (discharge with blood)
- Cerebrospinal fluid (clear discharge after head injury)
- Foreign body in the ear canal

NOTE: ear wax is normal but it concerns many people and may be mistaken for pus. It looks brown.

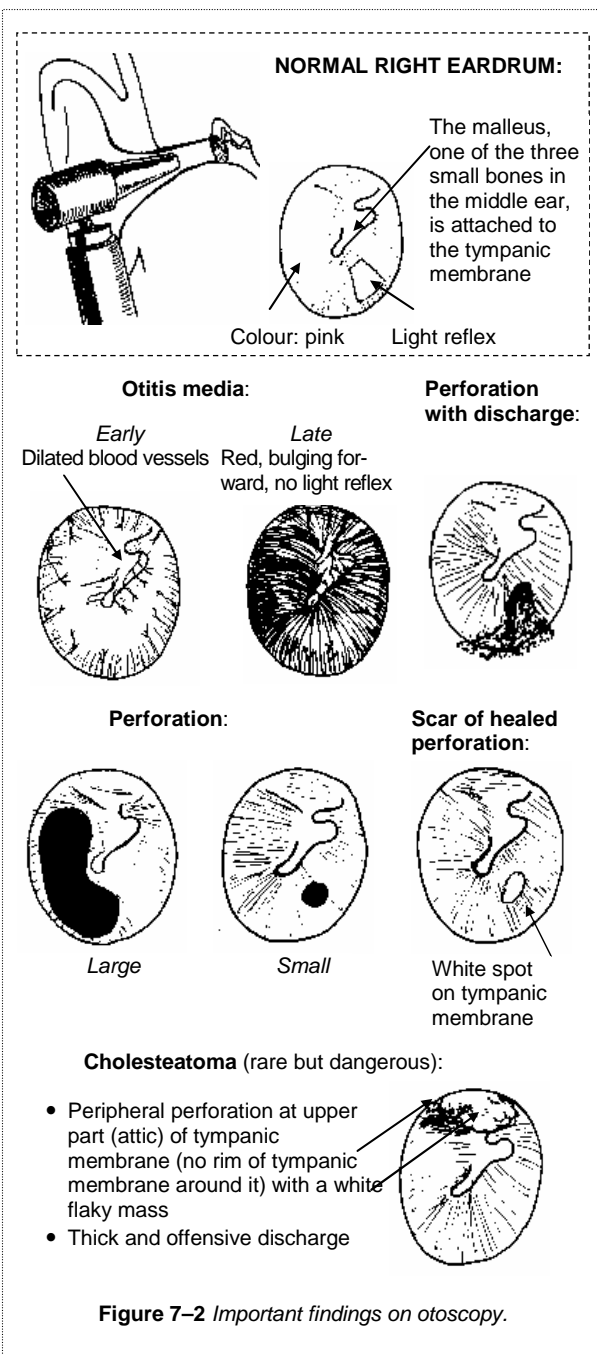


Figure 7-2 Important findings on otoscopy.

ACUTE OTITIS MEDIA

Otitis media is an acute infection of the middle ear. It usually develops after a common cold when bacteria or viruses reach the middle ear through the Eustachian tube. Fluid then collects in the middle ear and causes pain due to the increase of pressure. If the eardrum ruptures, pus discharges from the ear and the patient starts feeling better. Otitis media occurs mainly in young children. It is more common in homes where people smoke cigarettes.

Clinical features

- Pain and feeling fullness in the ear
- Very inflamed eardrum (see figure 7-2)
- If the eardrum has burst, discharge from the ear for less than 2 weeks

NOTE: fever may be the only sign of otitis media in young children

Complications (see figure 7-3 on the next page):

- **Chronic ear discharge and deafness.** If the eardrum has burst, pus discharges into the ear canal. The discharge may continue for several weeks and the eardrum does not heal. This means the patient has developed chronic suppurative otitis media.
- **Mastoiditis.** Sometimes infection spreads from the middle ear to the mastoid bone and causes mastoiditis. Without treatment, mastoiditis can cause meningitis or brain abscess. Clinical features of mastoiditis are fever, ear discharge, pain and a tender swelling behind or above the ear over the mastoid bone, which pushes the ear forward.

Management

1. Many cases in young children get better without antibiotics. To identify those who need antibiotics you need to reassess children after 2 days. This is difficult to achieve. Therefore give oral *co-trimoxazole* or amoxicillin for 5 days; or you can treat children between 3 and 10 years with a short course of amoxicillin 750 mg 2 times daily for 2 days.

2. If pus is discharging from the ear, show how to **dry the ear by wicking** (see figure 7-4):

- a. Roll a soft, absorbent cotton cloth into a wick. Never use a stick.
- b. Insert the wick in the ear and remove it when it is wet.
- c. Then take a new, clean wick. Clean the ear at least 3 times daily until it is dry.

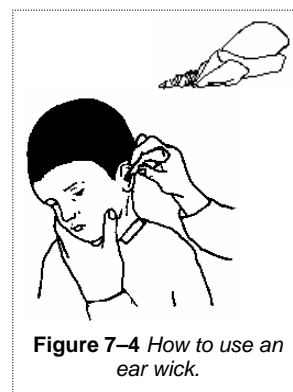
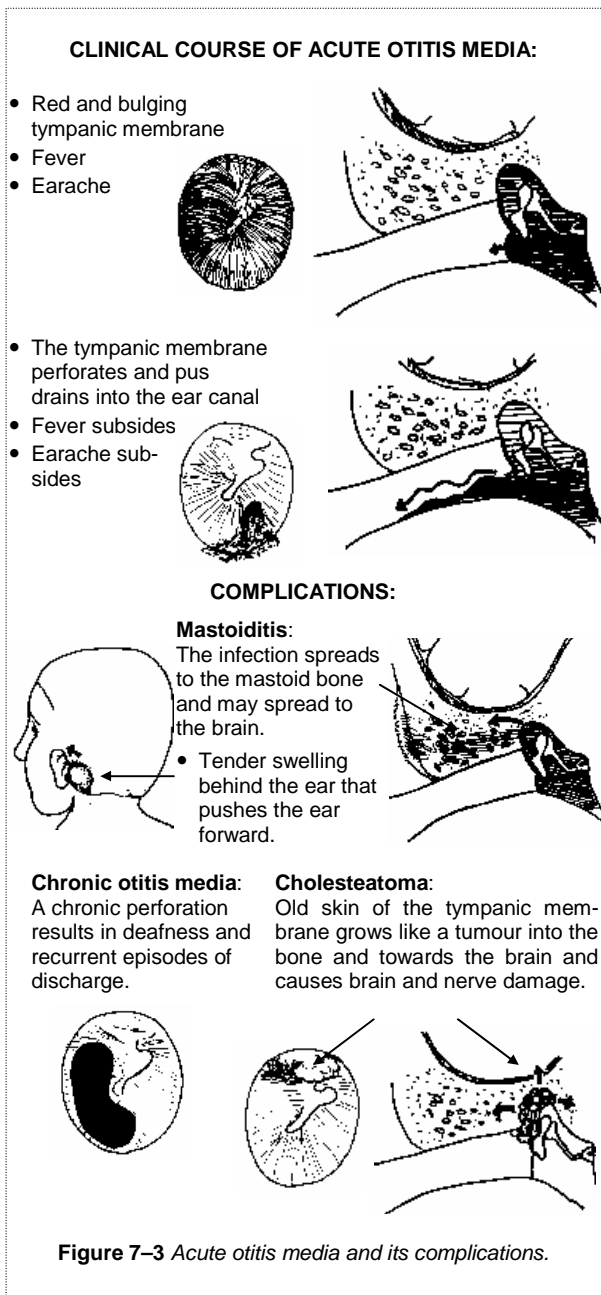


Figure 7-4 How to use an ear wick.

3. Treat pain or high fever with paracetamol.
4. Reassess after 5 days.



If there is still pain or discharge, continue the antibiotic without interruption for 5 more days.

If there is a tender swelling behind the ear and high fever, the child may have developed **mastoiditis**. Drain the abscess and give procaine penicillin IM for 7-14 days (or ampicillin IM/IV for 2 days followed by oral amoxicillin for 14 days).

If the patient is seriously ill, treat with chloramphenicol + benzylpenicillin IV (or ceftriaxone IM/IV).

CHRONIC OTITIS MEDIA

Chronic otitis media follows poorly treated acute otitis media. Additional risk factors for children to develop chronic otitis media are not being breastfed, malnutrition and exposure to cigarette smoke.

Chronic otitis media causes hearing loss because of pus in the ear canal and a hole in the eardrum.

Clinical features

- Ear discharge persisting for more than 2 weeks. The discharge comes and goes, sometimes the ear is dry.
- Perforated eardrum.
- ✘ **DANGER:** rarely the discharge is continuous, thick and foul smelling and the perforation is at the upper edge of the tympanic membrane (see figure 7-2). This is called *unsafe discharge* because a **cholesteatoma** may develop. This is a tumour-like growth of old skin that grows into the skull bone and causes nerve or brain damage. The patient is usually an older child or adult who has had ear problems for several years. Refer urgently to an ENT specialist for operation.

Management

An ear that produces chronic discharge can only heal when it is dry. Therefore, the main treatment is drying the ear. Sometimes a hole in the eardrum does not heal although the ear becomes dry. Such an ear will discharge from time to time. Treat these repeated episodes of ear discharge in the same way as described below.

1. **Explain the need to keep the ear dry** except for prescribed ear medicines. Show how to dry the ear as described above. Make sure that the patient and his family understand that the eardrum can only heal when the ear becomes dry. It will usually take about 1-2 weeks for the ear to stop draining.
2. **Apply antibiotic eardrops** after cleaning the ears (for example gentamicin ear drops 3 times daily for 7 days). After the drops have been put into the ear, the patient should lie on the opposite side for 5 minutes so that the drops can reach the middle ear.

NOTE: although chronic otitis media is an infection, systemic antibiotics do not usually help. Only give antibiotics as for acute otitis media if the patient has not had any before. Otherwise, give oral antibiotics only if the patient develops fever and earache because these are signs of a secondary acute ear infection. Quinolone antibiotic drops (ciprofloxacin eye drops are used) are expensive but have been successfully used in chronic ear discharge that did not respond to gentamicin. However, drying the ear remains the most important part of the treatment.

3. **Explain to the family** the following health messages:
 - Babies who are breastfed and children in whose household no one smokes cigarettes have less ear infections.
 - Discharging ears lead to hearing loss, which leads to poor learning.

OTITIS EXTERNA

Otitis externa is an infection of the ear canal. It is usually caused by bacteria or, less commonly, fungi.

Clinical features

- Itching or ear pain that may be severe
- Ear discharge
- If severe, swelling of ear canal or external ear
- Enlarged and painful lymph nodes in front of the ear

Management

1. **Clean the ear** with a wick 3 times daily as described above.
2. Insert **gentian violet** for 3 days.
If not improving, give gentamicin ear drops (eye drops can be used) every 6 hours.
3. *Only if the otitis externa is severe with swelling of the ear, give oral erythromycin or cloxacillin for 5 days (if not improving ciprofloxacin).*

FOREIGN BODY IN THE EAR CANAL

A foreign body in the ear canal is a rare cause of discharge or pain. Try to remove it by syringing the ear. Use a large syringe (at least 10 ml size, better 50 ml). Fill it with clear body-warm water and syringe the ear *very gently*. If you push the water in too hard, you may perforate the eardrum and cause serious harm. If you cannot remove the foreign body by syringing, refer the patient to an ENT specialist.

Deafness

Deafness is a serious handicap when people want to talk to each other. In children, hearing problems disturb speech development and make learning difficult.

For causes of deafness see box. Wax in the ear is the only cause of deafness that is easy to cure. Suspect it if wax totally obstructs your view of the eardrum. Syringe the ear gently as explained above. If the wax is very hard, put a few drops of cooking oil in the ear 2 times daily for 3 days to soften the wax. Then syringe the ear canal.

Deafness in adults that is getting slowly worse is usually age-related deafness and cannot be cured. A hearing aid may help.

If a person was close to a loud noise (for example an explosion), this may have permanently damaged his hearing.

It is easier to prevent deafness than to treat it. The commonest preventable causes of deafness are:

- **Chronic otitis media.** Prevent deafness by early and correct treatment of otitis media.
- **Streptomycin or gentamicin** may cause deafness (1) if given in a wrong dose (too much) (2) if given for too long or (3) if given during pregnancy when the drugs may cause deafness in the baby. Prevent deafness by using these drugs only when indicated and always in the correct dose. Stop them or reduce the dose when a patient complains of ringing in the

Causes of deafness

COMMON

- Chronic suppurative otitis media
- Large perforation of eardrum

LESS COMMON

- Congenital
- Endemic cretinism
- Noise trauma
- Old age deafness
- Side effects of drugs such as streptomycin, gentamicin or high doses of frusemide
- Ear canal blocked by wax
- Complication of neonatal jaundice or meningitis

ears, which is the first sign of ototoxicity. Never give streptomycin in pregnancy.

- **Meningitis and neonatal jaundice.** Prevent deafness by diagnosing and treating these diseases early.

TINNITUS

If a person suffers from deafness, he will sometimes hear a ringing or buzzing noise (tinnitus) in his ear. Explain to the patient that this is not dangerous. Because of deafness, the brain does not receive sounds of a certain frequency. Instead the brain makes the person hear the missing sounds as tinnitus. The tinnitus tends to get better with time because the person gets used to it. Drugs do not help and are useless.

Rarely tinnitus occurs with severe recurrent attacks of vertigo that last for minutes or hours. Vertigo means that the patient has the impression that his surroundings are rotating around him. In these cases, the patient is likely to be suffering from Meniere's disease, which is related to physical or emotional stress. Treat the vertigo with promethazin or chlorpromazine. Assure the patient that he is not suffering from a dangerous brain disease.

NOSE PROBLEMS

The commonest nose problems are nasal discharge, nasal blockage or nosebleeds.

How to assess a patient with a nose problem

Take a history

- Ask for details about the problem.
- One or both nostril affected?

Examine the patient

- Nasal discharge?
- Deformity of nose or septum?
- Assess severity: can the patient breathe through his nose?

Nasal discharge or blockage

Nasal blockage or nasal discharge do not need treatment unless the person has difficulties breathing through the nose. They are often symptoms of common cold or allergy. They can also occur after a nasal injury with deviation of the nasal septum. If the discharge is with pus and comes only out of one nostril, suspect a foreign body. For further causes see box.

Causes of nasal discharge or blockage

COMMON

- Common cold
- Allergic rhinitis

LESS COMMON

- Sinusitis
- Deviated nasal septum after injury
- Foreign body

RARE

- Diphtheria
- Nasal tumours or benign nasal polyps

COMMON COLD

Clinical features

Common cold is a viral infection that presents with tiredness, slight fever, headache, sneezing and a runny nose. It lasts about one week. Secondary bacterial infection is rare.

Management

If needed, treat nasal discharge and blockage:

1. Advise the patient to sniff salt water into the nostrils to clear the discharge. To prepare salt water, add one pinch of salt to one cup of clean water.
2. If the nasal discharge affects the feeding of a baby, clean his nose with some drops of salt water.

NOTE: do not use nose drops or sprays that cause constriction of the nasal blood vessels (for example ephedrine nose drops) for longer than 5 days. If used for longer periods, the drops themselves may make the nasal mucosa swell, which results in chronic nasal blockage and discharge.

ALLERGIC RHINITIS

Clinical features

Allergic rhinitis is an allergic reaction of the nasal mucosa of the nose, for example to pollen. The discharge

is watery and seasonal. Seasonal means that the symptoms are worse at certain times of the year. Allergic rhinitis is accompanied by a blocked nose, sneezing attacks and often red and itchy eyes (see figure 7-5).

Management

1. Try to reduce exposure to the allergen.
2. Give an antihistamine (for example chlorphenamine or promethazine).

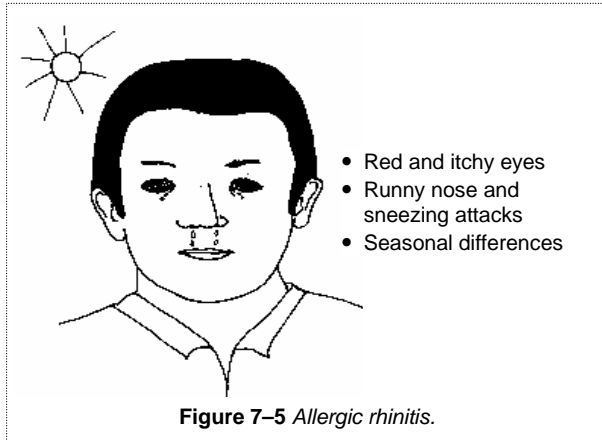


Figure 7-5 Allergic rhinitis.

FOREIGN BODY IN THE NOSE

A nasal foreign body may present with purulent discharge that typically comes only out of the affected nostril. Close the unaffected nostril and ask the patient to blow through the other. If the foreign body does not come out this way, refer to an ENT specialist.

SINUSITIS

Sinusitis is an infection of the paranasal sinuses. It is usually a viral infection that will improve by itself (see figure 7-6). Mild sinusitis accompanies many cases of common cold.

Clinical features

- Headache that gets worse when bending down and nasal discharge with pus
- Facial pain or tenderness on percussion of cheek or forehead

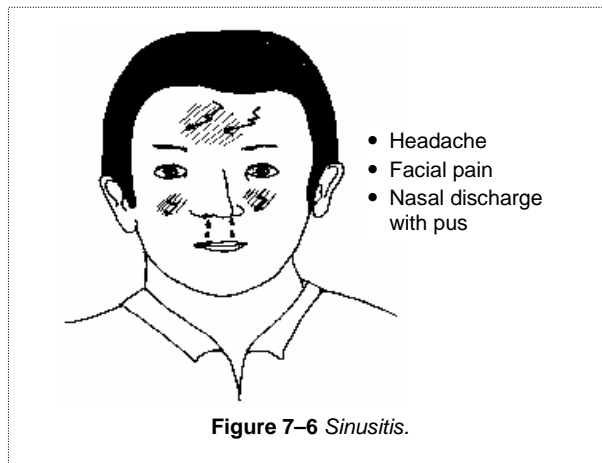


Figure 7-6 Sinusitis.

NOTE: swelling of the cheeks does not occur in sinusitis. If there is swelling of the cheeks, suspect a dental abscess or skin infection.

Management

Most cases resolve without specific treatment. If severe, give oral amoxicillin for 7-14 days.

Nosebleeds (epistaxis)

Nasal bleeding usually originates from the anterior part of the septum. Always check the blood pressure and look for the cause of the nosebleed (see box). Look for signs of shock or anaemia because a nosebleed can cause a significant blood loss, especially in elderly people.

Causes of nosebleeds

COMMON

- Trauma
- Hyperaemia of the nasal mucosa from common cold or allergic rhinitis

LESS COMMON

- High blood pressure
- Typhoid fever
- Rheumatic fever

RARE

- Blood disorders

Management

1. **Sit the patient up** to reduce blood pressure in the head. He should lean forward so that he does not swallow his blood.
2. **Compress the soft part of the nose** from both sides for 10 minutes.
3. *If simple compression does not stop the bleeding*, add 1 ml adrenaline (epinephrine) 1:1000 solution to 9 ml clean water or saline. Soak a piece of cotton wool with 1 ml of this solution and put it in the anterior part of the nose. Apply compression again for 10 minutes. Then remove the cotton wool.
4. *If a patient has repeated nosebleeds*, put Vaseline inside the nose on the nasal septum every night.
5. **Treat any underlying cause** (for example high blood pressure).

THROAT PROBLEMS

The commonest throat problems are pain, mouth ulcers or swollen and painful gums.

How to assess a patient with a throat problem

The basics of the assessment of the throat are explained on page 10. Below is only a summary that focuses on interpretation of abnormal findings. You should study this page together with page 10.

Take a history

- Ask for details of the problem.
- Assess severity: is the patient able to eat and drink?

Examine the patient

- Look for neck swellings and feel for enlarged lymph nodes.
- Examine the throat with a light (see figure 7-7).

Pharynx

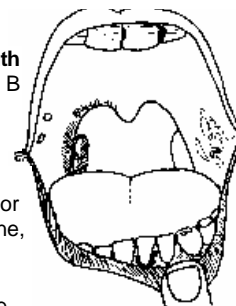
- Redness (inflammation, often viral)
- Ulcers (often a combination of different causes such as poor mouth hygiene, malnutrition, viral infections)
- Exudate on tonsils (streptococcal tonsillitis, some viruses. If membranes go beyond the tonsils: diphtheria)
- Swelling of one side and uvula not in midline (abscess = quinsy)

Angles of mouth

- Sore (vitamin B deficiency, thrush)

Gums

- Bleeding (poor dental hygiene, stomatitis, scurvy)
- Swelling (see bleeding, also treatment with phenytoin)
- Ulcers (stomatitis)



Teeth:

- Discoloured? (tetracycline treatment)
- Dental decay?
- Dental abscess?

Inside of cheeks

- White spots like salt (Koplik's spots of early measles)
- White plaques and ulcers (oral thrush)

- #### Inside of lips
- Pale (anaemia)
 - Blue (central cyanosis)

Figure 7-7 Common or important abnormal findings on throat examination.

Sore throat

The most important question in a patient with sore throat is whether it is a viral throat infection (viral pharyngitis) or streptococcal tonsillitis. Viral pharyngitis is harmless and will get better by itself after a few days. Do not treat it with antibiotics. Streptococcal tonsillitis will also get better by itself, but if untreated it may lead to rheumatic fever or glomerulonephritis. To prevent these, give penicillin. For other causes of sore throat see box on next page.

Causes of sore throat	
<i>COMMON</i>	
<ul style="list-style-type: none"> • Viral pharyngitis • Streptococcal tonsillitis • Mouth ulcers • Oral thrush • Breathing through mouth due to nasal blockage 	
<i>RARE</i>	
<ul style="list-style-type: none"> • Diphtheria 	

Differentiate between *viral pharyngitis* and *streptococcal tonsillitis* by clinical features:

	Viral pharyngitis	Streptococcal tonsillitis
Onset	Gradual onset	Sudden onset
Severity of pain	Mild pain	Severe pain
Throat examination	No exudate on the tonsils	Exudate on the tonsils
Signs of common cold	Signs of common cold	No signs of common cold
Fever	Mild fever	Often high fever

Management of viral pharyngitis

1. Advise gargling with salted water.
2. If needed, give paracetamol for pain.

Management of streptococcal tonsillitis

1. In order to kill all streptococcal bacteria in the throat, the patient needs penicillin for 10 days. Give one single dose **benzathine penicillin** by deep IM injection (children 1-5 years 600,000 IU; 6-12 years 1.2 million IU; adults 2.4 million IU). This is the treatment of choice because the levels of penicillin in the throat remain high for up to 10 days. The disadvantages of benzathine penicillin injection are (1) that it is very painful and (2) that it may cause sterile abscesses or sciatic nerve injury if given wrongly.

Alternatively, give oral penicillin V for 10 days.

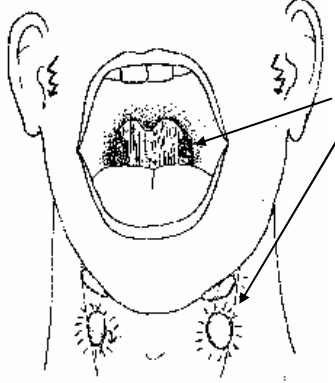
If penicillin allergy, give oral **erythromycin** for 10 days.

2. **Treat complications** (see figure 7-8)
 - **Peritonsillar abscess (quinsy)**. In the early stages, antibiotics may be effective. If pus has formed, drain the abscess. Then give procaine penicillin IM for 10 days. If possible, a tonsillectomy should be performed a few weeks later because of the risk of recurrence.
 - For management of late complications (starting after 2-4 weeks) see page 142 (**rheumatic fever**) and page 118 (**glomerulonephritis**).

DIPHTHERIA

Diphtheria is a rare but serious acute infection of the tonsils, pharynx, larynx or nose (see figure 7-9). It is

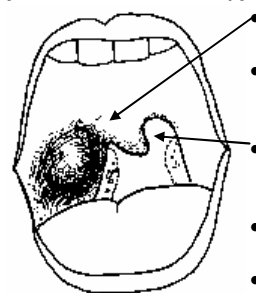
STREPTOCOCCAL TONSILLITIS:



- Ill with fever
- Very painful throat
- Exudate on tonsils
- Swollen and tender lymph nodes
- Sometimes referred earache
- No signs of upper airway infection

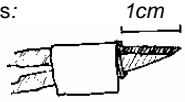
COMPLICATIONS:

Early: peritonsillar abscess (quinsy):



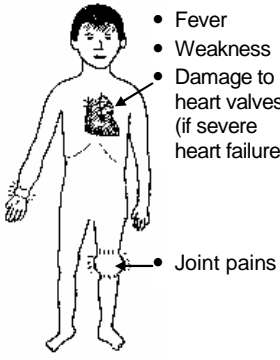
- Affected side is swollen and very painful
- The affected tonsil is pushed towards the midline
- The uvula is not in the midline but displaced away from abscess
- Difficulty opening the mouth
- Difficulty swallowing
- Excessive salivation

To drain the abscess use a guarded scalpel that will prevent you from going too deep: wrap tape around the blade so that only 1cm of it remains:



Late (after 2-6 weeks):

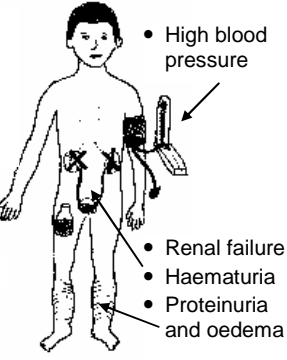
Rheumatic fever



- Fever
- Weakness
- Damage to heart valves (if severe heart failure)
- Joint pains

For details see page 142.

Post-streptococcal glomerulonephritis



- High blood pressure
- Renal failure
- Haematuria
- Proteinuria and oedema

For details see page 118.

Figure 7-8 Streptococcal tonsillitis and its complications.

caused by *Corynebacterium diphtheria*. Usually, children are affected. Spread is directly through respiratory droplets. An untreated patient is infectious for 3 weeks. If he is treated he becomes non-infectious within 24 hours. Diphtheria is preventable by immunisation.

Clinical features

Incubation period is 2-5 days. The clinical features are caused (1) by the local effect of destructive infection

and (2) by the effects of diphtheria toxin on the heart, peripheral nerves and sometimes the kidneys. The illness can vary from mild to severe. Its presentation and severity depends on which part of the respiratory tract is affected:

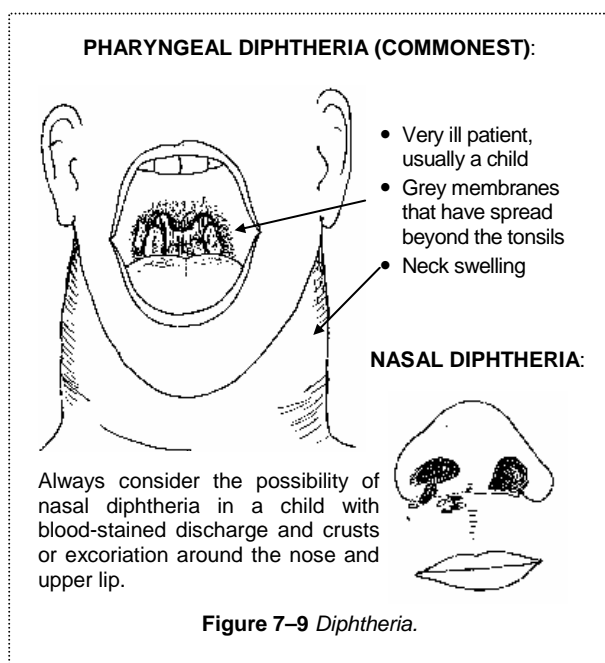
- **Commonest: pharyngeal diphtheria.** Slow onset with fever and sore throat. Typically, you find patches of greyish membrane on one or both tonsils. The membranes stick firmly on and cannot be pushed away as pus can be. They spread outside the tonsils and start bleeding when you try to remove them. The lymph nodes of the neck are swollen and in severe cases there is neck swelling.
- **Nasal diphtheria.** Blood-stained purulent nasal discharge. Excoriation of nostril and upper lip. The illness is often mild.
- **Tracheo-bronchial diphtheria.** The membranes have spread down the respiratory tract and cause hoarseness, and stridor. Membranes and oedema obstruct the airways and may cause severe respiratory difficulties.
- **Severe malignant diphtheria.** The patient rapidly becomes very ill. You find neck swelling due to oedema of the soft tissues and enlarged lymph nodes.
- **Skin diphtheria** see page 232.

Complications:

Patients who have survived the acute destructive phase of the illness may die suddenly from diphtheria toxin as late as 8 weeks after the illness. Common toxic effects are damage to the heart muscle (myocarditis) and paralysis of peripheral nerves. Commonest is paralysis of the nerves innervating the palatal muscles causing swallowing difficulty (dysphagia), and of the muscles moving the eyes.

Investigations

If available, get a throat swab (Dacron swab) to confirm



diphtheria. Do not delay treatment while waiting for the result.

Management

1. **Treat at hospital.**
2. **Bedrest** during the acute phase.
3. Give **procaine benzylpenicillin** IM or benzylpenicillin IV for 7-14 days. For mild cases, oral penicillin V or erythromycin are also effective.
4. Give **diphtheria antitoxin** (20,000–60,000 units; in severe malignant diphtheria 80,000–100,000 units) IM/IV to neutralise the circulating toxins because the antibiotic will kill the bacteria but cannot stop the effects of toxin that has already been released. If horse antitoxin is used, give a test dose of 0.1 ml subcutaneously and wait for 20 minutes. Keep adrenaline ready. Give the full dose if no allergic reaction.
5. *If stridor develops*, give dexamethasone. Tracheotomy may be needed.
6. Give **benzathine benzylpenicillin** IM (or oral erythromycin) **as prophylaxis to all household members.**

Mouth ulcers

Mouth ulcers are a common problem. Especially at risk are children with measles and malnutrition. Suspect mouth ulcers in any child who refuses to eat or drink and is irritable. Many conditions may cause mouth ulcers (see box). One of the main dangers of mouth ulcers is that they make drinking and eating painful. This may cause dehydration or malnutrition.

Causes of mouth ulcers

- Angular stomatitis
- Oral thrush (candidiasis)
- Herpes gingivostomatitis
- Inflammation of the gums (acute necrotizing ulcerative gingivitis)
- Stress-related
- Poor oral hygiene
- Part of a chronic inflammatory disease (for example inflammatory bowel disease)

General management of mouth ulcers

1. **Improve oral hygiene by regular cleansing of the mouth.** Add one pinch of salt to one cup of clean water and let the patient gargle with this solution at least 4 times a day. If the patient is unable to do this, wipe the mouth with a clean cloth soaked in this salt solution at least 4 times daily.
2. **Apply gentian violet 0.5% to the ulcers** in the mouth after cleansing the mouth. Do not use a solution stronger than 0.5% because that itself can cause mouth ulcers.

3. *If the mouth is so sore that eating is painful*, give paracetamol every 6 hours about 1 hour before each meal. Make sure the patient drinks enough so that he does not become dehydrated.
4. In children, **stop bottle-feeding** and use spoon and cup instead.
5. *If there is a foul smell* from the mouth, give oral metronidazole for 5 days.
6. **Treat any specific cause**, see below.

ANGULAR STOMATITIS

Typical clinical features are cracks and ulcers at the corners of the mouth. These may be caused by malnutrition, vitamin B deficiencies or excessive saliva. Always look for signs of malnutrition and other nutritional deficiencies.

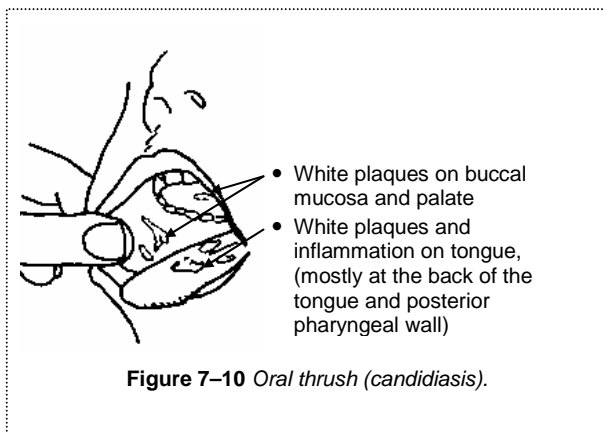
Give nutritional advice and consider giving vitamin B complex.

ORAL THRUSH (CANDIDIASIS)

Oral thrush is a fungal infection inside the mouth, see figure 7–10. It is common in malnutrition, after treatment with antibiotics, in advanced cancer and in AIDS.

Clinical features

- Painful eating. A baby may refuse his feeds.
- Typical white grey plaques on the tongue, inside the cheeks and on the palate or gums. Inflammation and ulcers are common.



Management

1. Give **nystatin** (100,000 units) 4 times daily after feeding. If a solution is not available, let an older child suck on nystatin tablets. For a younger child, crush tablets, mix with some clean water and put in their mouth.

If nystatin is not available, apply gentian violet 0.5% solution 2 times daily for 10 days.

2. *In babies*, ask (1) whether the mother is bottle-feeding and (2) whether she uses a dummy (pacifier). Advise strongly to stop both. Instead of the bottle, they should use spoon and cup for feeding.

3. *In ill patients* follow the advice about good oral hygiene (see previous page).

MOUTH CANCER

Risk factors for developing mouth cancer are smoking or chewing tobacco. In older people, suspect mouth cancer (1) if a mouth ulcer does not heal within three weeks or (2) if you find red or white firm patches on the tongue or inside the cheeks (leukoplakia). Refer to an ENT specialist.

Inflammation of the gums

For causes of bleeding gums see box.

Causes of bleeding gums

- Poor oral hygiene, stomatitis
- Infection
- Bleeding disorder (for example leukaemia or aplastic anaemia)
- Scurvy (vitamin C deficiency)

INFLAMMATION OF THE GUMS (acute necrotizing ulcerative gingivitis)

Acute necrotizing ulcerative gingivitis is a bacterial infection caused by poor oral and dental hygiene and malnutrition. You find swollen and painful gums that bleed easily.

1. **Scrape off the dark yellow crust** (tartar) that forms where the teeth meet the gums.
2. Give oral **penicillin V** (or metronidazole) for 5 days.
3. **Teach good dental hygiene** (see box on the next page).

SCURVY (Vitamin C deficiency)

Scurvy is caused by deficiency of vitamin C. It is rare but has occurred in recent years in areas affected by famine. It develops when people do not have any fruits, green leafy vegetables or potatoes to eat. Usually the patient is also deficient of other micronutrients such as folate and iron.

Clinical features

- General body weakness, anaemia, weight loss and low-grade fever
- Muscle, joint and bone pains; in young children swelling of the bones due to subperiosteal haemorrhages
- Swollen gums that bleed easily, later the teeth fall out
- Bleeding into the skin

Good dental hygiene - how to keep teeth and gums clean and healthy

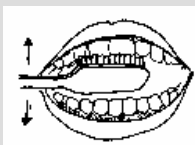
Taking good care of teeth and gums is important because strong and healthy teeth are needed to chew and digest food well. Painful cavities and sore gums, that can be prevented by good dental hygiene, may lead to serious infections that may affect other parts of the body.

HOW TO KEEP TEETH AND GUMS HEALTHY:

1. Avoid sweets and sweet drinks.
2. Brush the teeth well at least 2 times every day.

Brush the teeth starting from the gums to the teeth like this (not just from side to side).

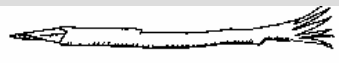
Brush the front, back, top and bottom of all teeth.



3. To prevent inflammation of the gums, it helps to clean under the gums regularly by passing a strong thin thread between the teeth. At first, this may cause some bleeding but soon the gums will be healthier and bleed less.

Do not bottlefeed children. Start brushing their teeth as soon as the first teeth erupt.

A toothbrush is not necessary, you can use the twig of a tree (maswAk) and sharpen one end to clean between the teeth, and chew on the other end and use the fibres as a brush.



Toothpaste is not necessary, water is sufficient if you rub well. Rubbing the teeth with something soft but a little rough is what cleans them. Salt can be used to rub the teeth instead of toothpaste.

Management

1. Give **ascorbic acid (vitamin C)** 3 times daily for 1-2 weeks until symptoms have resolved (children 2-12 months 50 mg 3 times daily; 1-12 years 100 mg 3 times daily; adults 250 mg 3 times daily). Severe general weakness and bleeding usually improves within 48 hours, haematomas within 2 weeks. Then continue with the same dose 1-2 times daily for 2 weeks or until the nutritional supplies have improved.
2. Apply gentian violet to the swollen gums.

NECK SWELLINGS

Neck swellings are a common problem (see box). They are often caused by lymph gland swellings that accompany many viral upper airway infections. A chronic swelling is often caused by TB.

How to assess a patient with a neck swelling

The basics of the assessment of the neck are explained on page 10. Below is only a summary that focuses on interpretation of abnormal findings. Study this page together with page 10.

Causes of neck swellings

COMMON

- Lymphadenopathy
- Lymphadenitis
- Tuberculous adenitis

LESS COMMON

- Mumps
- Bacterial parotitis
- Skin infection, including skin TB
- Tooth abscess
- Goitre
- Submandibular gland

RARE

- Lymph node cancer (lymphoma)
- Lymph node metastasis (for example from cancer of the larynx)

Take a history

- Ask for details about the swelling, especially:
 - Duration?
 - Discharge?
 - Other symptoms?

Examine the patient

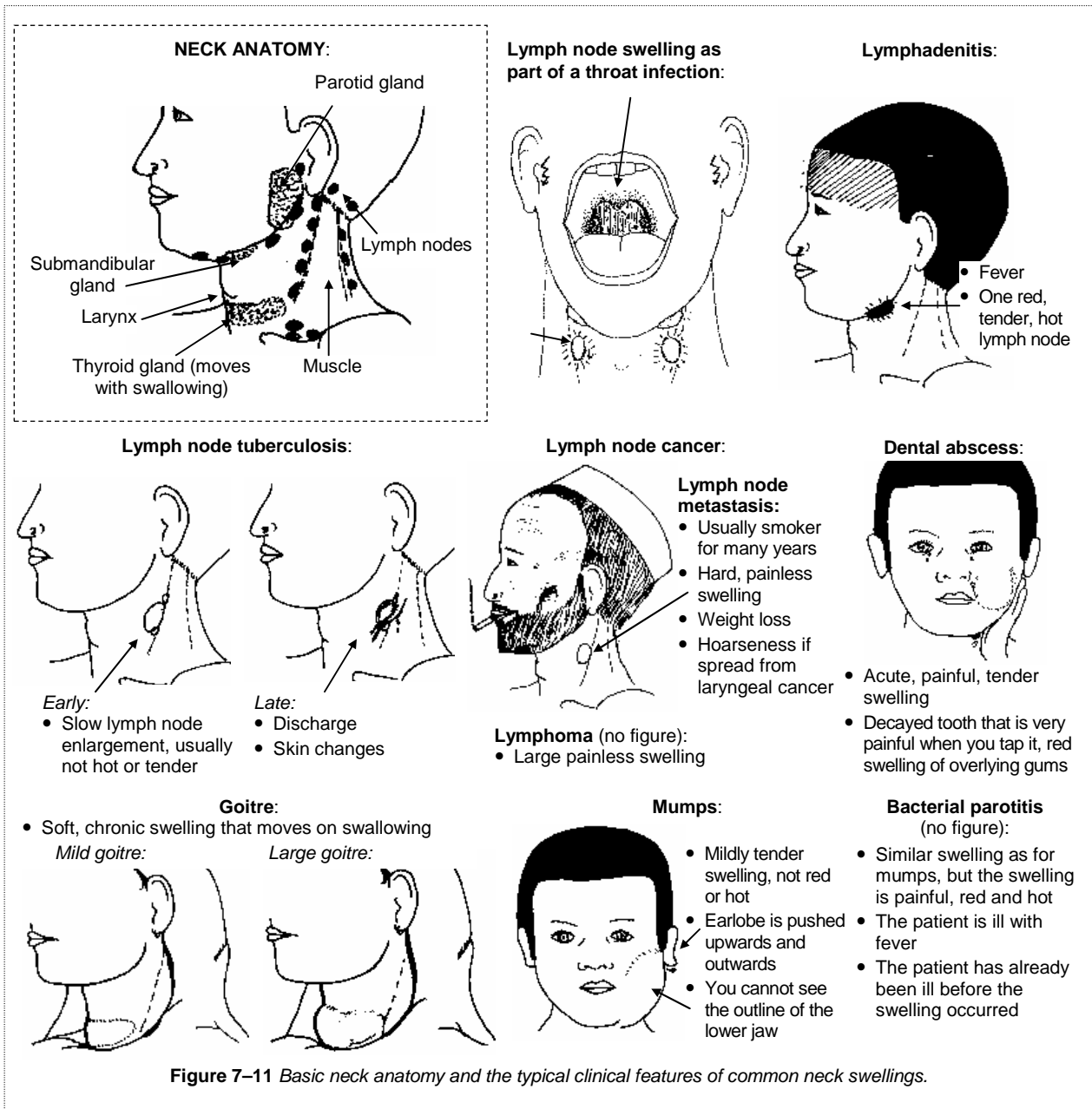
(See figure 7–11 on the next page.)

- Scars or sinuses? (Signs of tuberculosis)
- Feel the swelling and determine:
 - Size?
 - Hard, soft or fluctuant?
 - Tender? Warm? Red? (Signs of infection)
- If you suspect an enlarged thyroid gland, ask the patient to swallow. A goitre moves up and down with swallowing.
- If you think it is a swollen lymph node, examine all lymph node sites. Look for infection in the area that is drained by the swollen lymph node.
- Enlarged spleen or liver? (Possibly signs of a viral illness or, less commonly, lymph node cancer)

How to reach a working diagnosis

After history and examination, you will know the answers to the following two questions:

1. **What is the location and origin of swelling?**
 - Lymph node
 - Parotid gland
 - Tissue swelling
 - Enlarged thyroid gland (goitre)
 - Submandibular gland (rare)
2. **Are there any signs of inflammation?** (Tenderness, redness and heat)
 - **Yes**, infection is likely.
 - **No**, no acute infection.



LYMPHADENOPATHY

Most people have a few small (less than 1cm) non-tender lymph nodes in the neck region. These represent past reactions to minor infections and injuries. Many viral illnesses cause lymph node enlargement. No treatment is necessary.

LYMPHADENITIS

Lymphadenitis is a bacterial infection of a lymph node. The infection has usually started from a throat infection.

Clinical features (see figure 7-11)

- (Sometimes) fever and generally not feeling well
- Tender, red and hot lymph node swelling
- If you feel fluctuation, an abscess has formed

Management

1. If an abscess has developed, drain it. Be aware that there are many structures in the neck region that you can easily damage if you are not careful.
2. Give **procaine penicillin** IM for 5 days (or oral penicillin V or amoxicillin). If penicillin allergy, give oral erythromycin.
3. If not improving after 3 days or if the redness increases and spreads, give **chloramphenicol + cloxacillin** for 8 days.

TB ADENITIS

Adenitis is a common presentation of TB (see fig. 7-11).

Clinical features

- Lymph node swelling develops gradually. It is usually not tender, very red or hot.

- *Early signs:* one large firm lymph node and several smaller ones near to it but no changes of overlying skin.
- *Late signs:* the nodes stick together and the skin is fixed over them. The nodes are becoming soft and form abscesses that discharge through the skin. A TB abscess is a so-called 'cold abscess'. This means, it is not tender, very red or hot.

Management

TB adenitis is not dangerous and not contagious. Treat as category 3 (see page 42) but only in the following situations:

1. The patient has a painless gland swelling *with discharge*.
2. The patient is under 18 years and has a swelling in the neck region that has not responded to a 2-week course of co-trimoxazole.
3. The patient has a biopsy result that confirms active TB.

NOTE: in about 25% of all patients the nodes will enlarge under treatment or abscesses will develop. Do not change treatment if this happens. It does not indicate treatment failure but is a hypersensitivity reaction to the tuberculin that is released by the killed TB bacilli.

Do not excise TB lymph nodes, unless you do it because you are uncertain of the diagnosis and want to get a histological examination. Both aspiration and incision of cold abscesses may lead to the development of sinuses.

LYMPH NODE CANCER (see figure 7-11)

Suspect lymph node cancer (lymphoma) if the swelling is painless and large. Sometimes a patient complains about fever, weight loss and weakness.

Cancer of the throat or larynx may spread to lymph nodes in the neck. In these cases, you find a hard painless lymph node swelling in the neck. The patient is usually older and has smoked for many years.

Diagnosis of lymph node cancer is confirmed by biopsy and histology.

MUMPS

Mumps is a viral infection of the parotid glands.

Clinical features

Usually children are affected. Mumps starts with mild fever and pain when eating. After one or two days, a tender swelling develops in the region of one or both parotid glands (between the lower jaw and ear) that subsides after one week (see figure 7-11).

Sometimes painful swellings of other glandular organs occur: the salivary glands, the pancreas, ovary or the testes (orchitis). Orchitis resolves after 4 days. It may cause testicular atrophy. Infertility is rare. A rare complication is meningo-encephalitis.

Management

No treatment is necessary.

ACUTE BACTERIAL PAROTITIS

Acute bacterial parotitis usually occurs in a sick person who is not eating, drinking or caring for his mouth properly.

Clinical features

- Difficulties opening the mouth
- Fever
- Hard, tender, hot and often red swelling of the parotid gland. If fluctuation, an abscess has formed.

Management

1. Regularly cleanse the mouth as described under on page 61.
2. Give procaine penicillin IM (or in mild cases oral penicillin V).
3. Ensure sufficient fluid intake to prevent dehydration.
4. Give paracetamol for pain.
5. If an abscess has formed refer to an ENT specialist for drainage.

Prevention

Cleanse regularly the mouth of a sick person.

SUBMANDIBULAR SALIVARY GLAND SWELLING

This swelling is caused by accumulation of saliva secondary to blockage of the salivary duct, usually by a stone. The swelling occurs at meal times and becomes less over the following hours.

Advise to drink plenty and to eat raw lemon to increase salivation. If no improvement occurs, refer to an ENT specialist.

TOOTH ABSCESS

A tooth abscess is the result of tooth decay. Dental decay (caries) has destroyed a tooth and infection spreads through the tooth to the jaw (see figure 7-11).

Clinical features

- Very painful swelling. You cannot feel its edges.
- Decayed tooth. The gum overlying that dental root is very tender, red and swollen.

Management

1. Give oral **amoxicillin** 1 g 3 times daily for 5 days (or a short course of 3 g as one single dose that is repeated once after 8 hours).
2. *If no response*, add **metronidazole** (adults 200 mg 3 times daily for 3-7 days).

3. Pull the affected tooth out 2 days after starting the antibiotic.
4. Advise about good dental hygiene (see box on page 63).

GOITRE (STRUMA)

Goitre is a chronic, soft, symmetrical painless swelling at the lower front of the neck. It typically moves on swallowing. It is caused by abnormal enlargement of the thyroid gland. It usually indicates iodine deficiency, which may have serious consequences (see pages 207-208).

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8. Respiratory problems

Respiratory problems are among the commonest health complaints. With the increase of cigarette smoking, chronic respiratory problems are increasing. Acute respiratory infections (ARI) are the commonest cause of death in children. Where the standard management guidelines for the treatment of ARI are used, mortality is reduced.

The main presenting symptoms of respiratory diseases are cough, breathlessness, and fast breathing. Other symptoms are chest pain, wheeze, stridor or coughing up blood.

How to assess a patient with a respiratory problem

The assessment of the respiratory system is explained on pages 12-13. Below is a summary that focuses on interpretation of abnormal findings. Study this summary together with pages 12-13.

Always look for danger signs that indicate severe respiratory disease (see box on the next page).

Different parts of the examination provide you with different information:

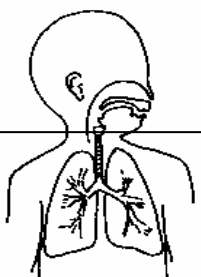
MAIN FUNCTIONS OF THE RESPIRATORY SYSTEM:

- Gas exchange.** Oxygen is taken from the air and put into the blood. In exchange the waste product carbon dioxide is removed from the blood (if the oxygen concentration in the blood is reduced, the patient becomes cyanotic).
- Protection.** Pathogens and particles are removed, and pathogens are destroyed through immune mechanisms. These protective mechanisms are damaged by smoking.

THE RESPIRATORY TRACT:

Upper respiratory tract (diseases are usually mild)

Lower respiratory tract (diseases are often severe)

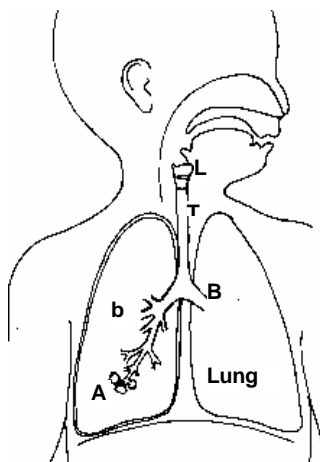


The **larynx (L)** contains the vocal cords.

Symptoms of disease: Hoarseness, stridor (sign of obstruction), cough

The **trachea (T)** divides into the left and right **bronchus (B)**. Each bronchus divides into **smaller bronchi (b)**, which end in small sacs, called **alveoli (A)**.

Symptoms of disease: Wheeze (if the bronchi are partly obstructed, for example in asthma), cough, dyspnoea

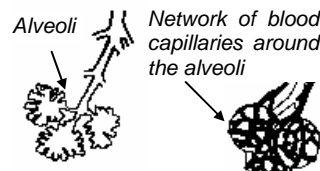


OXYGEN EXCHANGE:

Oxygen is taken up by the blood in the alveoli.

Examples of disturbance of gas exchange:

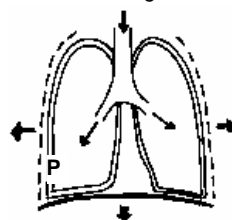
- Pneumonia (the alveoli and surrounding tissues are filled with pus)
- Pulmonary oedema (the alveoli and surrounding tissues are filled with fluid)
- Shock or severe anaemia (there is not enough blood or haemoglobin to take up the oxygen from the lungs)



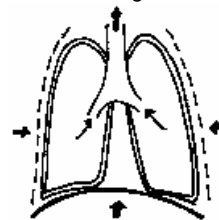
BREATHING IN AND BREATHING OUT:

The lungs are covered by two layers of a thin membrane, called **pleura (P)**. One layer is attached to the chest wall and the other to the lungs. There is normally nothing in between the two layers of pleura and they can move easily. During breathing in, the chest wall muscles move outwards and the **diaphragm (D)** downwards. Because a negative pressure develops between the two layers of pleura, the lung follows the expansion of the chest wall and expands so that air can flow in. During breathing out, the muscles relax and the lungs, which are elastic, contract and pull the chest wall and diaphragm with them.

Breathing in:



Breathing out:



What happens in respiratory disease:

If large parts of the lung are damaged or diseased, the lung will not be able to meet the oxygen demand of the body, especially on exertion. To try to meet the increased oxygen demands, breathing will become faster. If the demands cannot be met through faster breathing, additional muscles (accessory muscles) will be used to move the chest wall. Clinical sign is chest indrawing. Chest indrawing indicates a severe and possibly dangerous respiratory problem.

Figure 8-1 Respiratory system: basic anatomy, physiology and pathophysiology.

Danger signs in respiratory disease

Children under 5 years

Signs of severe disease:

- ✗ Chest indrawing
- ✗ Nasal flaring
- ✗ Stridor

Signs of very severe, life-threatening disease:

- ✗ Inability to drink
- ✗ Vomiting everything
- ✗ Convulsions
- ✗ Lethargy or unconsciousness
- ✗ Severe breathing difficulties

Adults and children over 5 years

Signs of severe disease:

- ✗ Breathing difficulties
- ✗ Fast breathing (over 30 breaths/minute)
- ✗ Stridor

Signs of very severe, life-threatening disease:

- ✗ Severe breathing difficulties
- ✗ Central cyanosis
- ✗ Lethargy, unconsciousness or confusion
- ✗ Severe breathing difficulties
- ✗ Low blood pressure

1. *Counting respiratory rate and looking for chest indrawings* together with general observation tell you how severe the condition is.
2. *Feeling the position of the trachea* tells you about the changes of lung volume of one chest side, *feeling of the chest movement* tell you about the location of pathology.
3. *Percussion and auscultation* give you additional information about the type of lung disease.

Take a history

Ask for details about the problem:

- Acute or slow onset?
- Duration? (More or less than 3 weeks)
- Similar symptoms previously?
- If cough: worse during day or night?
- If sputum: a lot or a little? Which colour? Any blood with it?
- Any associated problems? (For example weight loss or fever)
- Smoking?
- Being already treated? With which drugs?
- In children younger than 5 years, ask about the following *danger signs*:
 - ✗ Convulsions?
 - ✗ Unable to feed?
 - ✗ Persistent vomiting?

Examine the patient

Look and observe:

- Ill or well? Breathless?

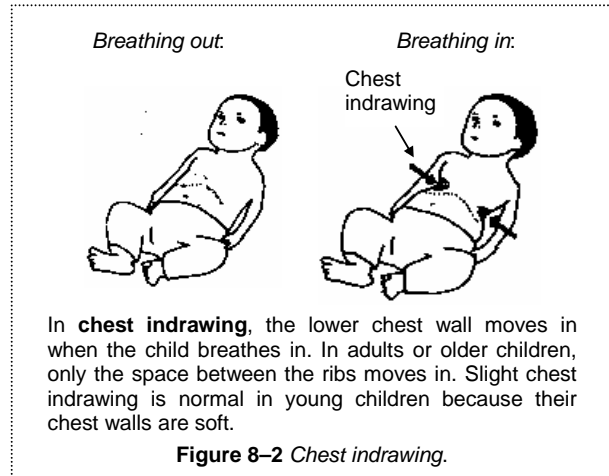
- Central cyanosis*? (Look inside the lips and at the tongue - it is a sign of hypoxia)

- Fast breathing* ? (Count the respiratory rate)

Definition of fast breathing:

Younger than 2 months	60 or more breaths per minute
2–12 months	50 or more breaths per minute
1–5 years	40 or more breaths per minute
Adults and children over 5 years	30 or more breaths/min.

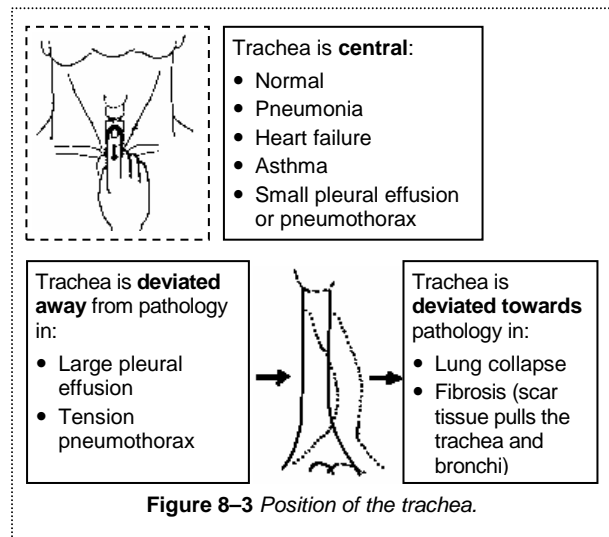
- Chest indrawing*? (See figure 8–2)



- Breathing sound that can be heard without stethoscope*: stridor (harsh noise on breathing in) or wheeze (whistling sound on breathing out)?

Feel:

- Trachea in central position or deviated? (See figure 8–3)



Compare both sides of the lungs with each other:

- Are both sides of the chest moving the same way? (If one side moves less, that is the side with disease)
- Areas of dullness or hyperresonance on percussion? (See box on the next page)

Listen to all chest areas with a stethoscope (see box):

- Same loudness of breathing on both sides? (See box)
- Breathing sounds vesicular or bronchial? (See box)
- Additional abnormal sounds: crepitations, wheeze or pleural rub? (See box on the next page)

Causes of abnormal findings on percussion

UNEQUAL CHEST MOVEMENTS
 Pathology is on the side that moves less.

PERCUSSION

Hyperresonance (more air than normal)

- Pneumothorax
- Hyperinflation (for example in asthma)

Dull (less air than normal)

- Pleural effusion
- Pneumonia
- Lung collapse

Causes of abnormal findings on auscultation

REDUCED OR MISSING BREATHING SOUNDS
 (Indication of reduced or absent air movement)

- Pleural effusion
- Pneumothorax
- Lung collapse

BRONCHIAL BREATHING
 (Indication that the bronchi are open but no air reaches the smaller airways)

- Pneumonia
- Fibrosis (Scarring)
- Abscess
- Tumour

NOTE: in lung collapse and pleural effusion there is no bronchial breathing because in these cases, the bronchus is also blocked.

ADDITIONAL ABNORMAL BREATH SOUNDS

Creptitations

- Heart failure
- Pneumonia (usually fine or medium creptitations and mainly heard on breathing in)
- Bronchiectasis (usually coarse creptitations)
- Tuberculosis

Wheezing (+ creptitations)

Generalised:

- Bronchitis
- Asthma
- Chronic obstructive lung disease

In children under 1 year: • Bronchiolitis

Localised:

- Tuberculosis
- Inhaled foreign body
- Cancer

Pleural rub

- Pleurisy (inflammation of the pleura usually due to acute or chronic infection)

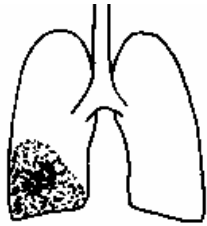
Examine other body systems:

Examine ears, nose and throat, look for signs of heart failure, and feel for enlarged cervical, supraclavicular and axillary lymph nodes. Look at the hands for finger clubbing. In children, look for signs of measles.

For the abnormal findings of common respiratory problems see figure 8-4.

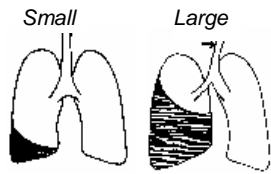
Pneumonia:

- Fast breathing and danger signs depending on severity
- Trachea central
- Dull percussion
- Bronchial breathing
- Creptitations



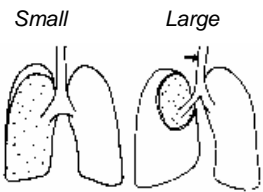
Pleural effusion:

- Trachea central or, if the effusion is large, away from effusion
- Reduced chest movements
- Stone dull percussion
- Reduced or absent breath sounds



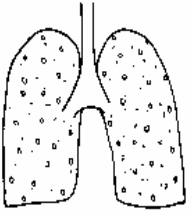
Pneumothorax:

- Trachea central or away from pneumothorax if it is large
- Reduced chest movements
- Hyperresonant percussion
- Absent breath sounds



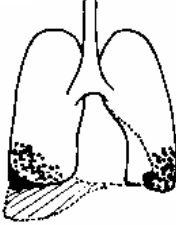
Acute asthma attack:

- Audible wheeze
- Fast breathing and danger signs depending on severity
- Trachea central
- Reduced chest movements on both sides
- Hyperresonant percussion
- Widespread wheeze and creptitations (absent breath sounds if very severe)



Heart failure:

- Trachea central
- Basal creptitations
- Deviated apex beat
- Fast pulse
- Often enlarged liver



Lung collapse:

- Trachea central or towards affected side
- Reduced chest movements
- Dull percussion
- Bronchial breathing

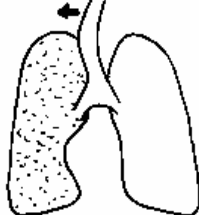


Figure 8-4 Clinical findings of chest examination in important respiratory diseases and heart failure.

Investigations

Sputum examination

1. Look at the sputum:

Sputum colour	Common diagnosis
Sputum white	Usually not sputum but saliva
Yellow-green	Asthma, COPD, bacterial infection or TB
Dark-green	Bacterial infection or TB
Brown (rust-coloured)	Pneumonia
Pink and frothy	Pulmonary oedema
Blood-stained	See page 82

2. If you suspect TB, examine the sputum for *acid-fast bacilli (AFB)* (see page 38).

Chest x-ray (see chapter Chest x-ray, pages 259-264)

Chest x-rays are expensive. They are easily interpreted incorrectly. Even experts often disagree over the interpretation of x-rays. Do not do a chest x-ray when the management of the patient is clear. Only do a chest x-ray if it will help your management. Chest x-rays are not recommended for diagnosing TB and are not a good way to follow up patients treated for TB. In the following situations, a chest x-ray may be helpful:

- Suspected complications of pneumonia
- Persistent pneumonia
- Chronic cough with signs of a serious underlying problem
- Suspected miliary TB
- Suspected heart problem

Cough

Coughing is a very common symptom, often due to viral infections. Usually no treatment is necessary. Coughing itself is not a sign of infection but a protective mechanism of the airways.

It is important to identify those patients who need further investigations or treatment. For practical purposes, differentiate between two groups of patients:

1. **Patients with acute cough** (less than 3 weeks duration)
2. **Patients with chronic cough** (more than 3 weeks duration)

1. Acute cough (less than 3 weeks duration)

For causes of acute cough see box. Most patients with acute cough will have a simple upper airway infection or acute bronchitis, which are not dangerous. The important question in a patient with acute cough is whether he suffers from pneumonia or not. The distinction between pneumonia and viral infection is easy in young children by counting respiratory rate and looking for chest indrawing. In adults and older children, listening for chest signs becomes more important.

Finding the answers to the following questions helps you to reach a diagnosis. The questions are different for children under 5 years and for older children and adults:

Questions in children under 5 years:

1. Fast breathing?
2. Chest indrawing?
3. Other danger signs? (● Lethargy ● central cyanosis ● inability to drink ● persistent vomiting or ● convulsions)

<p>Causes of acute cough</p> <p><i>COMMON</i></p> <ul style="list-style-type: none"> • Acute viral upper airway infections • Viral bronchitis <p><i>LESS COMMON</i></p> <ul style="list-style-type: none"> • Pneumonia • Asthma • Measles • Typhoid fever <p><i>RARE</i></p> <ul style="list-style-type: none"> • Inhaled foreign body • Amoebic liver abscess • Loeffler's syndrome
--

NOTE: research has shown that in children younger than 5 years, the answers to these three questions are better for diagnosing pneumonia than chest auscultation.

Clinical features	Likely diagnosis
No signs of pneumonia or very severe disease: <ul style="list-style-type: none"> • Normal breathing rate • No chest indrawing • No danger signs 	No pneumonia. Usually harmless viral upper airway infection (common cold) or bronchitis
<ul style="list-style-type: none"> • Fast breathing • No chest indrawing • No danger signs 	Pneumonia
<ul style="list-style-type: none"> • Chest indrawing • +/- Fast breathing • +/- Danger signs 	Severe or life-threatening pneumonia or (rarely) another very severe disease (for example sepsis)

Questions in adults and children over 5 years:

1. Is the patient ill or well?
2. What are the patient's main symptoms?
 - Signs of upper airway infection? (Runny nose, sore throat, sore eyes, aching muscles and possibly fever)
 - Dyspnoea and fast breathing?
3. Did you find any abnormal chest signs?

History and clinical features	Likely diagnosis
<ul style="list-style-type: none"> • Patient is not ill • Signs of upper airway infection • <i>Examination:</i> no abnormal chest signs 	Viral upper airway infection
<ul style="list-style-type: none"> • Patient is not ill • Signs of upper airway infection + soreness behind sternum but no pain on breathing in and no dyspnoea • <i>Examination:</i> scattered wheeze and few crepitations 	Acute viral bronchitis

<ul style="list-style-type: none"> • Patient is ill • Fever, chest pain on breathing in, green or rust-coloured sputum, possibly dyspnoea • <i>Examination</i>: localised crepitations 	Bacterial chest infection, pneumonia
<ul style="list-style-type: none"> • Patient can be ill or well • Night-time cough with or without wheeze. Tight chest, especially in the early morning, possibly dyspnoea, no fever • <i>Examination</i>: normal, or generalised wheeze 	Asthma
<ul style="list-style-type: none"> • Patient is ill • Cough started after general anaesthetic or epileptic fit. • Signs as under pneumonia 	Aspiration pneumonia

NOTE: if a patient does not fit any of these categories, consider other causes of acute cough.

VIRAL UPPER AIRWAY INFECTION

Clinical features

- Patient is not very ill
- Cough, runny nose, sore throat, aching muscles and body pains, mild fever
- Often other household members are also affected

Management

1. Viral upper airway infections are self-limiting. Antibiotics are not effective.
2. **Give clear advice to families of young children** (see box).

NOTE: in a very few cases, pneumonia may develop. Suspect pneumonia if a patient with a viral upper airway infection becomes more ill after a few days and develops chest signs and green sputum. Prophylactic antibiotics for viral upper airway infections cannot prevent the development of pneumonia. Many patients with viral upper airway infection will continue to cough for 2-4 weeks.

Advice for families of a child with acute respiratory infection (ARI)

1. **Feed the child** during the illness and increase feeding afterwards.
2. **Increase fluids.** Offer the child extra to drink and increase breastfeeding.
3. **Soothe the throat and relieve the cough** with a safe remedy.
4. **Watch for the following danger signs and return quickly to the next health facility if any of them occurs:**
 - Breathing becomes difficult
 - Breathing becomes fast
 - Child is not able to drink
 - Child becomes sicker

About cough medicines

Many mucolytics, expectorants or cough-suppressors are available in pharmacies. They are prescribed by doctors worldwide although there is no clear scientific proof of their effectiveness. Despite this lack of evidence, many people make a lot of money from producing and selling them and therefore, cough medicines will remain available. For managing a patient with an acute cough, they are not useful. Some medicines are even dangerous.

ACUTE BRONCHITIS

Clinical features

- Patient is not very ill, no danger signs
- Cough (at first dry, later with sputum) and soreness behind the sternum
- Often signs of upper airway infection and fever
- Wheeze and scattered crepitations

Management

Most cases of bronchitis are caused by viruses. Therefore, antibiotics are not effective. Give antibiotics only if the sputum turns green and the patient shows signs of pneumonia. If wheeze and cough persists, consider treating for asthma.

PNEUMONIA

Pneumonia is one of the main killers, especially amongst young children. Particularly at risk of dying are children younger than 1 year, malnourished children, children in whom pneumonia is a complication of measles or whooping cough and very old patients. For how to reduce mortality from pneumonia see box on the next page.

Clinical features

Children under 5 years:

- Acute cough
- Fast breathing
- ✗ *If severe*: chest indrawing
- ✗ *If very severe*: chest indrawing + danger signs (lethargy, central cyanosis, inability to drink, persistent vomiting or convulsions)

Adults and children over 5 years:

- High fever
- Acute cough, later with green or rust-coloured sputum; sometimes chest pain on breathing in
- On examination: crepitations and decreased breathing sounds over a localized area
- ✗ *If severe*: difficult and fast breathing
- ✗ *If very severe*: intercostal indrawing, cyanosis and confusion

How to reduce mortality from pneumonia

1. Immunise all children against measles and whooping cough.
2. Encourage breastfeeding.
3. Encourage good feeding habits to reduce malnutrition.
4. Spread the knowledge about danger signs of pneumonia in your community.
5. Treat all cases of pneumonia according to recommended standard guidelines as described in this chapter.
6. Advise people to stop smoking.

Investigations

Diagnosis is based on clinical features. Therefore, a chest x-ray is usually not indicated because it will not change the management.

Management

The classical division into lobar pneumonia or bronchopneumonia is of no practical importance. For management of patients with wheeze or stridor see pages 78-82.

If you suspect pneumonia, treatment depends on the following two factors:

1. Patient's age:

- Less than 2 months
- 2 months - 5 years
- Adults and children over 5 years

2. Severity:

- Non-severe pneumonia
- Severe pneumonia
- Very severe pneumonia

	Children younger than 5 years	Adults and children over 5 years
Non-severe pneumonia	<ul style="list-style-type: none"> • Fast breathing • No chest indrawing • No danger signs 	<ul style="list-style-type: none"> • Clinical signs of pneumonia • No breathing difficulties
Severe pneumonia	<ul style="list-style-type: none"> • Fast breathing • Chest indrawing • No signs of very severe disease 	<ul style="list-style-type: none"> • Clinical signs of pneumonia • Breathing difficulties • No signs of very severe disease
Very severe pneumonia	<ul style="list-style-type: none"> • Chest indrawing • +/- Fast breathing ✘ <i>Danger signs of very severe disease:</i> lethargy, central cyanosis, inability to drink, persistent vomiting, convulsions 	<ul style="list-style-type: none"> • Clinical signs of pneumonia • Breathing difficulties ✘ <i>Danger signs of very severe disease:</i> central cyanosis, lethargy, confusion, severe dyspnoea

Management of non-severe pneumonia

Treat as outpatients.

1. Give an antibiotic for 5 days (for dosages see box):

- Children younger than 2 months: always treat as

Dosages of antibiotics for pneumonia

- **Amoxicillin** orally 25–50 mg/kg/day divided into 3 doses.

2–12 months	62.5–125 mg	3 times daily
1–5 years	125–250 mg	3 times daily
6–12 years	250–500 mg	3 times daily
Adults	500 mg–1 g	3 times daily
- **Ampicillin** IV or IM. Give to children under 2 months 50–100 mg/kg/day divided into 2-3 doses (= under 1 week 200 mg 2 times daily; 1 week–2 months 200 mg 3 times daily). Give to children over 2 months 100–200 mg/kg/day divided into 3-4 doses.

2–12 months	250–500 mg	every 6-8 hours
1–5 years	500 mg–1 g	every 6-8 hours
6–12 years	1–2 g	every 6-8 hours
Adults	2–4 g	every 6-8 hours
- **Benzylpenicillin** IV or IM. Give to children under 1 week 50,000–100,000 IU/kg/day divided into 2 doses (= 150,000–200,000 IU every 12 hours); children over 1 week 100,000–200,000 IU/kg/day divided into 4 doses.

1 week–2 months	200,000 IU	every 6 hours
2–12 months	200,000–400,000 IU	every 6 hours
1–5 years	400,000–750,000 IU	every 6 hours
6–12 years	750,000 IU–1.5 M IU	every 6 hours
Adults	1–4 M IU	every 6 hours
- **Ceftriaxone** IM. If you give more than 1g IM, inject it at more than one site. Give to children 40-80 mg/day.

Under 2 months	100–200 mg	one single daily dose
2–12 months	200–500 mg	one single daily dose
1–5 years	500 mg–1 g	one single daily dose
6–12 years	1–2 g	one single daily dose
Adults	2–4 g	one single daily dose
- **Chloramphenicol** IV or IM or orally 100 mg/kg/day divided into 3-4 doses, reduce after 2 days to 50 mg/kg/day and give orally.

2–12 months	62.5–125 mg	every 8 hours
1–5 years	125–250 mg	every 8 hours
6–12 years	500 mg	every 8 hours
Adults	750 mg	every 8 hours
- **Cloxacillin** IV or IM or orally 100 mg/kg/day divided into 3-4 doses.

2–12 months	125–250 mg	every 8 hours
1–5 years	250–500 mg	every 8 hours
6–12 years	500 mg	every 8 hours
Adults	500 mg–1 g	every 8 hours
- **Co-trimoxazole** orally.

0–1 month	120 mg	2 times daily
2–12 months	240 mg	2 times daily
1–5 years	480 mg	2 times daily
6–12 years	480 mg	2 times daily
Adults	960 mg	2 times daily
- **Gentamicin** IM or IV. Give to children under 1 week 5 mg/kg once daily (= about 15 mg once daily); children 1 week-2 months 7.5 mg/kg once daily (= about 20 mg once daily).

severe pneumonia.

- *Adults and children older than 2 months:* give oral **co-trimoxazole** (or oral amoxicillin or procaine penicillin IM).

2. If high fever, give paracetamol.

3. Reassess the patient after 2 days, or earlier if he develops difficulty breathing. Signs of improvement are slower breathing, less fever and better appetite.

If the patient is not improving after two days of full treatment, reassess severity and change to an alternative antibiotic.

Management of severe or very severe pneumonia

Severe or very severe pneumonia is best treated at hospital. If you refer the patient, give the first antibiotic dose before referral.

1. Give antibiotics (for dosages see box on previous page).

Antibiotics for severe pneumonia

Give **ceftriaxone** for at least 5 days. It has the advantage that it is given IM/IV once daily. Ceftriaxone is expensive but if you count the costs of the whole course of treatment, it is often not more expensive than, for example, buying ampicillin and gentamicin ampoules.

Alternatives:

- **Children younger than 2 months:** **ampicillin + gentamicin** (or **benzylpenicillin + gentamicin**) IV/IM for 10-14 days.

*If injections are not possible, give oral **co-trimoxazole**.*

NOTE: do not use chloramphenicol because of the risk of 'grey baby syndrome'.

- **Children 2 months - 5 years:** **ampicillin** (or benzylpenicillin) IV/IM for at least 3 days. When the child has improved, continue with oral amoxicillin for 5 days.

*If no improvement within 48 hours, change to **chloramphenicol** IV/IM. When the child has improved, continue with oral chloramphenicol until a total of 10 days of treatment are completed.*

- **Adults and children older than 5 years:** **ampicillin** IV/IM for 2-3 days. When the patient has improved, continue with oral amoxicillin until a total of 7-10 days of treatment are completed.

*If it is difficult to give the patient more than one injection daily, give **procaine benzylpenicillin** IM for 5 days.*

*If injections are not possible, give oral **chloramphenicol**.*

Antibiotics for very severe, life-threatening pneumonia

Give **ceftriaxone** IV/IM for at least 5 days.

Alternatives:

- **Children younger than 2 months:** **ampicillin + gentamicin** (or benzylpenicillin + gentamicin) IV/IM for 10-14 days.

- **Children 2 months - 5 years:** **chloramphenicol** IV/IM. When the child has improved, change to oral chloramphenicol (alternatives to chloramphenicol are ampicillin + gentamicin or benzylpenicillin + gentamicin for 10-14 days).

*If no improvement within 48 hours, suspect staphylococcal pneumonia and change to **cloxacillin + gentamicin** IV/IM. When the child improves, continue oral cloxacillin until a total treatment of 3 weeks is completed.*

- **Adults and children older than 5 years:** **chloramphenicol** IV for 2-3 days. When the patient has improved, continue with oral chloramphenicol until a total treatment of 8-10 days is completed (alternatives to chloramphenicol are ampicillin + gentamicin or benzylpenicillin + gentamicin IM/IV for 10-14 days).

*If no improvement within 48 hours, suspect staphylococcal pneumonia and change to **cloxacillin + gentamicin**. When the patient has improved, continue oral cloxacillin until a total treatment of 3 weeks is completed.*

2. Supportive care

1. **Bedrest** in sitting position.
2. Give **oxygen** to the following patients:
 - Every child younger than 2 months with grunting (short noise at start of breathing out)
 - Every child younger than 5 years with chest indrawing or a breathing rate of more than 70 breaths/minute
 - Every adult and child older than 5 years with severe breathing difficulties
3. *If wheezing*, give a rapid acting bronchodilator (see page 79).
4. *If high fever*, give paracetamol.
5. **Monitor the patient.** Record his temperature and breathing rate every 6 hours. *Signs of improvement* are slower breathing, less chest indrawing, less fever and in children improved ability to drink.

What to do if a patient with pneumonia does not improve

Most patients with pneumonia improve after 48 hours of correct treatment. Sometimes a patient remains ill. Then ask yourself the following questions:

1. **Has he taken the correct antibiotic in the correct dosage for the correct time?** If not, give another course of a correct antibiotic.
2. **Has he developed a complication of pneumonia** (for example pleural effusion or lung abscess)? Get a chest x-ray.
3. **Could the pneumonia be caused by a pathogen not covered by standard treatment?**
 - **Tuberculosis** (TB) can present with similar symptoms and signs as bacterial pneumonia. If the patient is desperately ill and not improving with standard treatment, treat for TB as well.
 - **Mycoplasma** usually causes a mild illness. *Mycoplasma pneumoniae* cannot be distinguished from other causes of pneumonia. Suspect it if a patient who is not very ill, also develops joint pains, haemolytic anaemia, or sometimes a skin rash. Give oral erythromycin or doxycycline (contra-indicated in children and pregnancy) for 7-10 days.
4. **Can you find signs of airway obstruction** (for example wheezing)? If yes, treat for asthma.

5. **Is your diagnosis wrong?** Consider other causes of acute cough.

What to do if a patient improves but continues to have respiratory symptoms

It is normal for a patient to cough for 2-3 weeks after recovery from pneumonia. However, if the patient continues to have respiratory symptoms, for example chronic cough, sputum or wheeze, ask yourself the following questions:

1. Could the patient have **underlying damage to his lungs?** (For example bronchiectasis, chronic obstructive pulmonary disease or smoker's cough)
2. Could the symptoms be caused by **asthma?**
3. If a child: could the symptoms be from **whooping cough?**

What to do if a patient suffers from recurrent pneumonia

Recurrent pneumonia is defined by more than two episodes of pneumonia. Make sure that the patient suffers from recurrent pneumonia and not from repeated viral upper airway infections or attacks of asthma. Treat the underlying problem.

Recurrent pneumonia may be caused by:

1. Weak body defences (for example malnutrition)
2. Chronic damage to the lungs:
 - Bronchiectasis
 - Chronic obstructive pulmonary disease
 - Bronchial cancer (in older smokers)
 - Inhaled foreign body (rare in adults)

Staphylococcal pneumonia

Clinical features

Staphylococcal pneumonia is always severe. It occurs mainly in patients with weak immunity, for example malnutrition. Patients are very ill with high fever and often cyanosis. Their condition deteriorates rapidly. Common complications are multiple lung abscesses, pleural effusion or spontaneous pneumothorax.

Investigation

Chest x-ray shows multiple ring lesions and pleural effusion, see pages 262-263.

Management

1. See above under management of very severe pneumonia.
2. If there is a large pleural effusion, consider drainage.

Aspiration pneumonia

Sometimes a person inhales food or vomit into his lungs. Particularly at risk are unconscious people whose cough and swallowing reflexes are reduced. The aspi-

rate causes inflammation of the lungs and pulmonary oedema.

Clinical features

Cough, wheezing, fever and fast breathing occur usually within 1 hour of aspiration. Acute complication is lung failure.

Management

1. Clean the upper and lower airways thoroughly by suction.
2. Give oxygen.
3. Give ampicillin + gentamicin IV/IM.
4. Give dexamethasone IV/IM.

Prevention

Put every unconscious patient, including those who are waking up after general anaesthesia, in the coma position (see page 240).

PLEURAL EFFUSION

Pleural effusion is a collection of fluid between the chest wall and the lung in the pleural space (see figure 8-4). A small effusion is common in children with pneumonia. It resolves quickly when the infection is treated. However, if treatment is started late, the clear fluid may also become infected. This leads to a collection of pus in the chest cavity (empyema). In pulmonary tuberculosis (TB) an effusion develops when the primary complex or a cavity rupture into the pleural space. For other causes of pleural effusion see box on the next page.

Clinical features

Patients often complain about chest pain and difficult breathing only if a pleural effusion has become massive. Such huge effusions are especially common in young adults with TB.

Typical finding on physical examination are:

- Reduced chest movements, stony dullness on percussion and absent breathing sounds over the affected site.
- If large effusion, the trachea is pushed to the opposite side of the chest.

Investigations

1. **Chest x-ray** to confirm the suspicion of effusion (see page 261).
2. **Examination of effusion fluid** (see box on the next page and page 256). If possible, measure protein and glucose content, total and differential cell count. Ideally, get gram- and AFB staining and bacterial culture. Where resources are limited, let the sample of pleural fluid stand for half an hour. If a web appears (sign of high protein content), the fluid is likely to be caused by an infection (exudate).

Causes of pleural effusion**COMMON**

- Tuberculosis (often large effusion with few symptoms)
- Complication of pneumonia

LESS COMMON

- Heart failure
- Liver failure
- Lung cancer, metastatic cancer
- Renal failure
- Nephrotic syndrome

RARE

- Rheumatoid arthritis
- Lymphoma
- Pancreatitis

Causes of pleural effusion according to the type of fluid**EXUDATE** (high protein content: more than 30 g/l)

- Pneumonia
- Tuberculosis

Rare:

- Metastatic cancer
- Rheumatoid arthritis
- Lymphoma

TRANSUDATE (low protein content: less than 30 g/l)

- Heart failure
- Liver failure
- Renal failure
- Nephrotic syndrome

Management

1. **Pleural effusions should be drained**, unless they are very small. If effusions are present on both sides of the chest, drain both. In adults, do not remove more than 2 litres within 24 hours. If you remove more, the lung will expand rapidly. This may cause coughing, breathlessness and sometimes pulmonary oedema. It may be necessary to repeat drainage if fluid reaccumulates. Further management depends on the character of the pleural fluid. If it is pus, a permanent drainage or surgery may be necessary.
2. Give **chloramphenicol** IV until the patient has improved. Then continue oral chloramphenicol for a total of 2-4 weeks.
3. If *infection with staphylococcus* is suspected or proven, treat as for staphylococcal pneumonia (see above).
4. If *fever and other signs of illness continue* despite adequate chest drainage and antibiotics, consider TB. A trial of anti-TB treatment may be required. Effusion caused by TB will usually resolve with treatment.

Empyema

Empyema is a collection of pus in the pleural space. It can occur as a complication of pneumonia. A patient

will remain ill with a persistent fever after treatment for pneumonia. Consider also TB.

Treat with ampicillin + metronidazole. The patient may need surgical removal of the pus.

LOEFFLER'S SYNDROME (ASCARIS PNEUMONIA)

In ascaris infection, a larval stage of the worm migrates through the lungs (see figure 10-8 on page 102). The same thing happens during hookworm and strongyloides infection, but symptoms are usually not so marked.

Clinical features

The migration through the lungs is sometimes accompanied by cough, fever and wheeze. This pneumonia-like illness lasts about three weeks. It may present like a severe asthma attack.

Investigations

Differential WBC: eosinophilia.

Management

1. Give oral **prednisolone**, which will cause a rapid improvement.
2. Give **mebendazole** 2 weeks after the lung involvement. If you give it at the same time, it will not eradicate ascaris because the pneumonia is caused by the larval stage (for which mebendazole is not effective) but not by the adult worm.

Chronic cough (more than 3 weeks duration)

Tuberculosis (TB) is a very common cause of chronic cough, but not everyone with a chronic cough is suffering from TB. Many people with a chronic cough are unnecessarily treated with anti-TB drugs because another diagnosis has not been carefully sought. In particular asthma, bronchiectasis and left heart failure are commonly overlooked.

How to differentiate between common causes of chronic cough

Asking the patient for details about his cough helps to differentiate between the common causes (see box on the next page). According to the kind of cough, presence of sputum, wheeze or other characteristics, differentiate between 6 groups of patients:

1. Patients with *chronic cough and green sputum* (this indicates active inflammation).
2. Patients with *dry cough* (this indicates irritation of the airways).
3. Patients with *cough and wheeze* (this indicates obstruction of the airways inside the chest).

Causes of chronic cough**CHRONIC COUGH AND GREEN SPUTUM**

- Bronchiectasis
- Tuberculosis
- Chronic obstructive pulmonary disease (COPD)

DRY COUGH

- Cigarette smoking
- Post-viral cough following acute respiratory infection
- Chronic sinusitis with postnasal drip
- Pleural effusion
- Tuberculosis
- Hydatid disease of the lungs
- Left heart failure

Rare:

- Lung cancer
- Side effect of drugs (ACE inhibitors, for example enalapril)

COUGH AND WHEEZE

- Asthma
- Chronic obstructive pulmonary disease (COPD)
- Tuberculosis

COUGH, FEVER AND WEIGHT LOSS

- Tuberculosis

Rare: • Lung cancer

In children: COUGHING ATTACKS AND VOMITING

- Whooping cough

COUGH WORSE AFTER MEALS AND ON LYING DOWN

- Oesophageal reflux

4. Patients with *cough, fever and weight loss* (this indicates TB).
5. *Children with coughing attacks and vomiting afterwards* (this indicates whooping cough).
6. Patients with a *cough that is worse after meals and on lying down* (this indicates oesophageal reflux of stomach contents).

WHOOPING COUGH (PERTUSSIS)

Whooping cough is characterised by a bronchitis that takes a very long time to resolve. In China, whooping cough is called '100 days cough' because a child coughs for several months. Unlike measles, whooping cough can develop soon after birth because children are not protected by maternal antibodies. Early immunisation is therefore important. The first of three vaccinations should be given when a child is 6 weeks old.

Clinical features

The typical whooping cough patient is a young child (2-6 years) old who is very thin and presents with coughing attacks. He cannot stop coughing, makes a whooping noise afterwards, and may vomit. This typical cough develops in the third week of the illness. Children younger than one year may stop breathing after

coughing fits, instead of the whoop (apnoea attacks). The child has no fever and you do not find abnormal chest signs between the coughing attacks. Often, there is bleeding in the white of the eyes (subconjunctival haemorrhages).

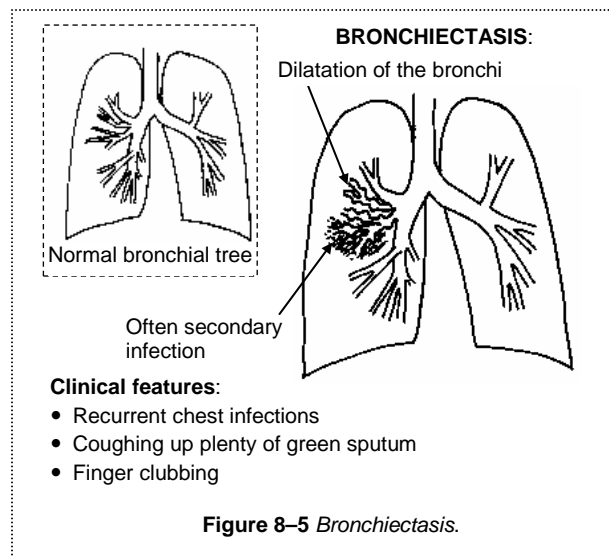
Management

1. **Prevent malnutrition**, which is one of the main dangers of whooping cough:
 - Explain to the family that the cough may last for up to 3 months.
 - Make sure that the family understands the risk of malnutrition and that they give the child good protein- and energy-rich food (see pages 45-46).
2. **Antibiotics** (oral *erythromycin* or co-trimoxazole) are only helpful if given during the first 10 days of the illness when the child has not yet developed the typical cough. Later, antibiotics are not effective.
3. **Treat complications:**
 - **Convulsions.** Children may have a convulsion after the coughing fit because of hypoxia. If the convulsion does not stop spontaneously after 1 minute, treat as described on page 163.
 - **Secondary pneumonia** is rare. Suspect it if the child is unwell between the coughing attacks, has fast breathing, chest indrawing or fever. Treat with chloramphenicol.
4. **Refer to hospital** (1) all children younger than 6 months (2) children who have apnoea attacks or frequent convulsions after the coughing fits and (3) children with signs of severe pneumonia.

NOTE: do not prescribe cough medicines or anti-emetics because these cannot stop the cough or the vomiting.

BRONCHIECTASIS

Pneumonia, whooping cough or tuberculosis may permanently damage the airways and cause bronchiectasis. This is a permanent dilatation of the small airways (bronchioles) with chronic inflammation (see figure 8-5). The airways are normally sterile. In bronchiectasis,



the dilated part of the airways has become chronically infected with bacteria. The patient usually coughs and produces sputum every day. He suffers recurrent chest infections. Many of these patients are wrongly treated for TB despite a normal sputum smear examination.

Clinical features

- Plenty of green sputum, especially in the morning
- Recurrent exacerbations of the chronic infection with cough, chest pain, green sputum, haemoptysis and dyspnoea
- If severe, finger clubbing

Investigations

Sputum smear for acid-fast bacilli (AFB) to exclude TB.

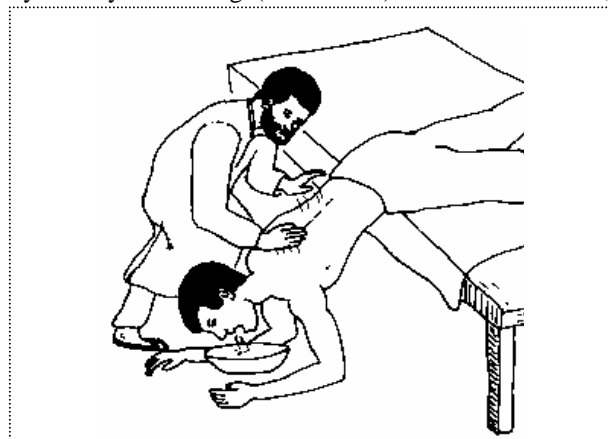
Management

1. **Explain to the patient** that part of his airway has been permanently damaged. In this part, called bronchiectasis, sputum will collect and may become infected if it is not coughed up. To control his symptoms, advise the patient:
 - 'Stop smoking.'
 - 'Drink plenty.'
 - 'Do postural drainage exercises every day.' (See figure 8-6)
2. **Treat wheeze** with asthma drugs.
3. **Treat any acute exacerbation** with oral *amoxicillin* for 2-4 weeks.

If an infection does not respond to amoxicillin and the sputum has a very sweet smell, give ciprofloxacin for possible infection with pseudomonas bacteria. Treat for 4 weeks.

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

This is a disease of smokers. Smoking has permanently damaged their airways. The main symptoms are caused by airway narrowing (obstruction). Unlike in asthma,



Tell the patient to breathe in the steam of hot salt water. Then have him lie partly on a bed with his head and chest hanging over the edge. Pound him lightly on the back. This will help to bring out the mucus.

Figure 8-6 Postural drainage.

the obstruction is only partly reversible with bronchodilating drugs. The lung function deteriorates gradually.

Clinical features

Typically, a patient who smokes or has smoked cigarettes complains about a chronic cough with sputum that has lasted for months or years. There are times when the cough gets worse, the sputum turns green and the person develops a fever because of secondary bacterial infection. Wheeze and dyspnoea increase while the disease progresses and lung function deteriorates.

Management

1. **Strongly advise the patient to stop smoking.** This is the most important step to slow the deterioration of lung function.
2. Treat with *salbutamol* and *aminophylline* as for asthma. *Prednisolone* is often not very effective. Give it only as a trial for two weeks. If the patient does not improve, stop it.
3. *If the patient has difficulties with coughing up the sputum, teach him postural drainage* (see figure 8-6).
4. *Whenever the patient develops fever and increased respiratory symptoms, treat him with oral co-trimoxazole (or amoxicillin or doxycycline).* If severe, treat as severe pneumonia.

LUNG CANCER

Bronchial carcinoma is almost entirely related to cigarette smoking. It will become a more common diagnosis in the future because smoking has become so widespread.

Suspect lung cancer if an older smoker complains about a chronic cough without signs of infection. Commonly associated features are weight loss, coughing up blood, chest pain and gradually increasing dyspnoea. Lung cancer is treated by radiotherapy or chemotherapy but has a poor prognosis.

About the risks of cigarette smoking

Tobacco smoking is increasing in many countries. Therefore, the number of smoking-related diseases and deaths will increase in future. This has been called an 'approaching catastrophe'. If people could see with their own eyes how every cigarette they smoke harms them, it would be easier to decide not to smoke. However, smoking-related diseases take 10 or more years to develop.

Facts about tobacco smoking

- Tobacco smoke contains more than 4000 chemicals. Many of them are harmful and can cause cancer, heart disease, lung damage and many other health problems.
- Tobacco use kills up to half of all smokers who use it.

- Tobacco damages the lungs of people who breathe in the smoke from other people's cigarettes. For example, children who are exposed to cigarette smoke suffer more airway infections than other children do.
- Tobacco is addictive, which means that it is difficult to stop using it, even when one wants to stop it.
- People who smoke and are addicted to tobacco do not want to believe that smoking is dangerous. The tobacco industry uses advertisements to encourage this wrong thinking.

What you can do

1. Be a good example and do not smoke.
2. Inform your patients about the risks of smoking to their own health and to the health of their families.
3. Encourage young people not to start smoking.
4. Try to ban smoking from health centres and hospitals.

HYDATID CYST

Hydatid cysts in the lungs may increase in size and compress the lung. Sometimes a cyst may rupture into a bronchus and cause haemoptysis, chest pain and dyspnoea (see page 111).

Wheeze

Wheeze is a soft whistling sound when a patient breathes out. Sometimes it can be heard without a stethoscope. It is a sign of narrowing of the airways inside the thorax. Sometimes the narrowing can cause life-threatening breathing difficulties (for causes see box).

1. Assess severity: is the patient's life at risk?
2. Find the answers to the following questions:
 - How old is the patient?
 - Is it the first time he had a wheeze or did he have wheezing attacks before?

Causes of wheeze

COMMON

- Asthma

LESS COMMON

- Pneumonia
- Pulmonary oedema
- Tuberculosis
- Chronic obstructive pulmonary disease (COPD)

Children under 1 year:

- Bronchiolitis

RARE

- Foreign body (wheeze is usually only over one lung area)
- Airway obstruction, for example due to tumour

NOTE: asthma, COPD and heart failure often cause recurrent wheeze.

- Chest auscultation: is the wheeze generalised or localised?

In children younger than 1 year wheeze is usually caused by **bronchiolitis** or **pneumonia**.

In adults and older children, the commonest cause of wheezing is **asthma** that typically presents with recurrent episodes of wheeze, cough and breathlessness. Suspect asthma in any patient who complains about chest symptoms that come and go and vary from day to day. Symptoms are typically worse at night and early in the morning. If you suspect asthma, give asthma treatment and observe the patient to see whether he improves or not. If he improves, a diagnosis of asthma is likely.

The diagnoses most commonly confused with asthma in adults are:

- **Chronic obstructive lung disease.** A patient has cough with sputum and wheeze every day. There is little change from day to day. The patient is or was a smoker.
- **Heart disease.** A patient has symptoms of chest tightness and breathlessness, which come on with exercise and are relieved by rest.
- **Hyperventilation syndrome.** A patient, often a young adult, has the feeling of breathlessness with numbness and tingling of hands. He is in a state of worry and panic. Hold a bag over his nose and mouth and let him re-breathe his air. Treat as anxiety (page 182).

ASTHMA

Asthma is not an infection but a chronic inflammatory reaction that causes reversible airway obstruction. Often other family members are also affected by asthma or allergies.

If asthma is not well controlled, it may lead to several complications:

- Asthma may become chronic with permanent limitation of airflow.
- Asthma may cause social and physical handicap because the patient's physical activity is limited.
- The patient may die during an acute asthma attack.

Clinical features

- Asthma is characterized by recurrent attacks of wheeze, often with cough, chest tightness and breathlessness. Some patients have symptoms every day, others only every week or a few times per year. Asthma symptoms can be mild, moderate or severe. Sometimes the attacks recur over several years, sometimes throughout the whole life of a patient. Symptoms are usually worse at night or after exertion.
- Attacks are brought on by certain factors (see box on the next page).
- There may be no clinical signs between attacks. Therefore, a normal chest examination does not exclude asthma.

Factors causing asthma

- Viral infections (common in children)
- Exertion
- Smoke
- Allergies
- Dust
- Cold air
- Acetylsalicylic acid (Aspirin) and beta-blockers

Management of acute asthma**1. Determine the severity of the attack and treat accordingly:**

Classification	Clinical features
Mild asthma	<ul style="list-style-type: none"> • Wheeze and cough • No breathlessness
Moderate asthma	<ul style="list-style-type: none"> • Wheeze and cough + some breathlessness • No signs of severe asthma
Severe asthma	<ul style="list-style-type: none"> • Wheeze and cough + some breathlessness • Chest indrawing <p><i>Signs of severe asthma:</i></p> <ul style="list-style-type: none"> * Severe breathlessness: the patient cannot complete a sentence in one breath * Fast breathing * Fast pulse: adults over 110/minute; children 5-12 years over 120/minute * <i>Life-threatening:</i> cyanosis, low blood pressure, exhaustion, bradycardia, silent chest

2. Treatment consists of giving a strong bronchodilator (salbutamol) to open the obstructed airways, and a steroid (for example prednisolone) to reduce inflammation (see box). The most effective way to give salbutamol is by inhalation (see figure 8-7).
3. After the patient has improved, **decide about long-term management**, see below.

Non-severe acute asthma attack:

Give **inhaled salbutamol** every 6-8 hours + **oral prednisolone** for 4 days.

If inhaled salbutamol is not available, give oral salbutamol (or oral aminophylline) + prednisolone for 4 days.

Severe acute asthma:

Give **salbutamol inhaled up to 20 puffs** (if a nebulizer is available, give 2.5-5 mg) + **oral prednisolone for 7 days** (or, at first, dexamethasone or hydrocortisone IV) + **oxygen**.

If no improvement, give aminophylline IV (or adrenaline subcutaneously)

If inhaled salbutamol is not available, give aminophylline IV + oral prednisolone (or adrenaline subcutaneously + oral prednisolone - or salbutamol IM/subcutaneously + oral prednisolone).

Drugs used in asthma

- **Salbutamol** inhaled, orally, IM or subcutaneously (SC).
 - **Inhalation by spray:** give 1-2 puffs when needed; in an emergency, give up to 20 puffs at one time. Children or patients who cannot co-ordinate the use of an inhaler and breathing in should use a spacer.
 - **Inhalation by nebulizer.** Give to children under 18 months 1.25-2.5 mg every 4-6 hours; children over 18 months and adults 2.5-5 mg every 4-6 hours.
 - **Oral** (less effective than inhalation)

2-5 years	1-2 mg	3 times daily
6-12 years	2 mg	3 times daily
Adults	2-4 mg	3 times daily
 - **IM or SC**, give adults 0.5 mg once. If necessary, repeat every 4 hours.
- **Steroids** (prednisolone, dexamethasone or hydrocortisone). Steroids reduce inflammation of the airways. They are very effective and safe when given in a high dose for 5 days.
 - **Prednisolone** orally. For emergency treatment:

2-5 years	10-20 mg	once daily
6-12 years	30-40 mg	once daily
Adults	40 mg	once daily

For long-term treatment, give a dose as low as possible.
 - **Dexamethasone** IV 0.2-0.5 mg/kg per day.

2-5 years	2-4 mg	one single dose
6-12 years	4-8 mg	one single dose
Adults	4-12 mg	one single dose
 - **Beclomethasone** or **Budesonide** for inhalation. Inhaled steroids are indicated when a patient needs more than 4 times inhaled salbutamol per week. Inhaled steroids are not used to treat acute asthma but to prevent recurrent attacks. They are only effective if they are taken regularly every day in the morning and evening. In case of viral upper airway infection, double the dose for one week. Treatment should be at least for 1-2 months.

Children	50-200 micrograms	2 times daily
Adults	100-400 micrograms	2 times daily
- **Aminophylline** orally or IV. Aminophylline has many side effects. Arrhythmias, convulsions and death can occur when given IV or in a dose too high. During treatment watch for signs of toxicity because the margin between therapeutic and toxic levels is very small.

Early toxic signs are vomiting, restlessness, sleeplessness, tachycardia, fever. Reduce or stop aminophylline at these early signs. *Late toxic signs* are convulsions and the patient stops breathing

 - **Oral** 12-15 mg/kg/day divided into 3 doses.

2-5 years	25-50 mg	3 times daily
6-12 years	50-150 mg	3 times daily
Adults	100-300 mg	3 times daily
 - **IV:** If the patient has taken aminophylline or theophylline in the last 24 hours, give half the dose recommended below.

Children: give 5 mg/kg in 5% glucose very slowly over 20 minutes followed by 0.9 mg/kg/hour continuous infusion.

Adults: 250-500 mg very slowly over 20 minutes followed by 0.5 mg/kg/hour continued infusion.

If continuous infusion is not possible, repeat the initial dose after 8 hours.
- **Adrenaline** subcutaneously. Adrenaline opens the airways rapidly. It may have serious side effects. Calculate the dose carefully and dilute for young children.

For children under 5 years dilute 1 ampoule adrenaline 1:1000 with 9 ml sodium chloride 0.9% or fluid for injection.

2-5 years	0.2-0.4 mg = 2-4 ml diluted solution
6-12 years	0.5 mg
Adults	0.5-1 mg

HOW TO USE AN INHALER CORRECTLY:

1. Shake the inhaler.
2. Breathe out.
3. Put the inhaler to the mouth, press it and take a deep breath to inhale the medicine into the lungs. Do not swallow the medicine!
4. Keep the mouth closed and hold the breath for 15 seconds.
5. If more than 1 puff is required, repeat after 5 seconds.

If children or adults have difficulties in coordinating spraying and inhaling the medicine, then make the following **inhalation device**:

Take a half litre plastic bottle. Make a hole in the bottom and attach the inhaler. Put the opening of the bottle into your mouth and use the inhaler as described above. After you have sprayed the medicine into the bottle, breathe through it for one minute.



Figure 8–7 How to inhale asthma medicines.

Long-term management of asthma

The treatment aim is complete freedom of symptoms and a normal quality of life.

1. **Explain to the patient** that he has asthma. This means that his airways are over-reacting to certain factors by narrowing the airways and producing secretions. His symptoms are a result of this over-reaction but are usually not a sign of infection. Therefore, he needs asthma medication but not antibiotics. The symptoms will come and go. The asthma drugs will improve and control his symptoms. However, his airways will continue to over-react to certain factors because asthma is a chronic problem that cannot be cured. In children, asthma often gets better when a child gets older.

Advise the patient:

- He should avoid those factors that start the asthma. He should not smoke cigarettes. He should ask everyone in the household to stop smoking.
- He should not take acetylsalicylic acid (Aspirin) because it may cause an asthma attack.
- He should take prescribed medication regularly

and seek help early when symptoms increase (depending on a patient's understanding, you may explain to him the principle of stepwise treatment and leave him a prescription for prednisolone tablets in case of sudden worsening).

3. *If the patient gets attacks with exertion*, he should take salbutamol spray before exertion to prevent asthma symptoms.
4. Do not prescribe acetylsalicylic acid (Aspirin) or beta-blockers (for example atenolol) for patients with asthma.
5. Prescribe medication according to frequency and severity of symptoms (see box). Because asthma symptoms are of different severity at different times, treatment needs to be adjusted accordingly. This means, when symptoms increase and asthma worsens, step up the treatment. When the asthma is under control, step down the treatment again. This increasing and decreasing of treatment is like walking up and down a ladder and is therefore called stepwise treatment. Whenever asthma worsens acutely, give oral prednisolone for 4 days.

ACUTE BRONCHIOLITIS

Acute bronchiolitis is a common viral infection in children between 1-12 months. The wheeze is caused by mucous and swelling of the airways.

Clinical features

Typically, a child younger than 1 year who has had a common cold for a few days develops fast breathing, wheezing and often chest indrawing. The breathing difficulty gets worse for 2-3 days before the child recovers spontaneously over about 2 weeks.

Usually the illness is only mild but some children develop dangerous problems:

- A child may become malnourished and dehydrated because he is too breathless to drink.
- A child may become exhausted from the fast breathing and dies of respiratory failure.

Management

The illness is caused by viruses. However, it is usually not possible to exclude bacterial pneumonia. Therefore, treat as pneumonia according to severity (see page 72).

Stepwise treatment of chronic asthma

Step 1 <i>If salbutamol is needed more than 4 times per week, move to step 2:</i>	Inhaled salbutamol when needed (Alternatives: oral salbutamol or oral aminophylline for 5 days)
Step 2 <i>If not controlled with step 2, move to step 3:</i>	Inhaled salbutamol every 6-8 hours + Inhaled beclomethasone (or budesonide) 2 times a day for 1 month (Alternative: daily oral aminophylline + salbutamol for 1 month)
Step 3	Add oral prednisolone for 4-7 days

Stridor

Stridor is a harsh noise that can be heard when a patient is breathing in. It is a sign of the narrowing of the airway at the level of the larynx, epiglottis or trachea. Stridor is commonest in young children because their airways are small and even little swelling can rapidly lead to obstruction. Stridor at rest is always a danger sign because of the risk of total airway obstruction. Commonest causes of stridor in children are viral infections. Stridor is rare in adults and then it is usually caused by a severe allergic reaction, foreign body or tumour. For other causes see box.

The first step is to find out whether the patient has difficult breathing or not. Stridor with difficult breathing is very dangerous.

A history of an inhaled foreign body or signs of a severe allergic reaction (angioedema - see page 245) with swelling of the lips, mouth and mucosa inside the mouth will be obvious.

In children differentiate between **infectious croup** and **epiglottitis**:

Infectious croup	Epiglottitis
Common	Rare
Age 3 months to 3 years	Age 2-6 years
Onset over several days	Onset over several hours
Child not very ill	Child very ill
Mild fever	High fever
Hoarse voice	Very sore throat

Causes of stridor

CHILDREN

- Infectious croup (common)
- Measles croup
- Acute epiglottitis (rare)

ADULTS AND CHILDREN

- Diphtheria laryngitis
- Inhaled laryngeal foreign body
- Angioedema (allergy)

INFECTIOUS CROUP (acute laryngotracheobronchitis)

Different viruses cause inflammation of the larynx, trachea and bronchi and obstruction at the level of the larynx. Infectious croup is usually a mild illness.

Clinical features

After a few days of common cold, a child develops a barking cough, hoarseness of voice and mild stridor. Symptoms are usually worse at night. The stridor improves after 2-3 days. Recurrence with future viral upper airway infections is common.

Management

1. Humidify the air.
2. Give oral prednisolone for 3 days.
3. If severe breathlessness or chest indrawing, refer to hospital.

NOTE: it is a viral infection and antibiotics are not effective.

ACUTE EPIGLOTTITIS

This dangerous bacterial infection causes acute swelling of the epiglottis with severe upper airway obstruction.

Clinical features

A child develops high fever and difficulty swallowing within a few hours. The throat is painful and saliva drools out of the child's mouth. The child is very ill, with difficult breathing and stridor. The child is at risk of airway obstruction. Because of this risk, do not examine the throat of children with suspected epiglottitis because this may cause a sudden complete obstruction of the airway.

Management

1. Refer to hospital.
2. Disturb the child as little as possible.
3. Give chloramphenicol IV + dexamethasone IV.
4. Give oxygen.

INHALED FOREIGN BODY

Small children younger than 4 years who put things into their mouths are at greatest risk of inhaling a foreign body. However, it can also happen in adults. An inhaled foreign body can cause complications in two ways:

1. The foreign body is stuck in the trachea and completely blocks the airway.
2. The foreign body blocks the bronchi. It causes chronic pneumonia and possibly lung collapse.

Clinical features

- Sudden onset of choking, coughing or wheezing
- Pneumonia that does not respond to antibiotics or that reoccurs at the same place

Investigations

Arrange a chest x-ray at full expiration to detect an area of hyperinflation or collapse, mediastinal shift (away from the affected side) or a foreign body if it is radio-opaque. Foreign bodies are usually inhaled into the right lung.

Management

1. For first aid in choking see figure 8-8.
2. If the foreign body is inhaled into the lungs, treat for pneumonia and refer to hospital for removal.

FIRST AID IN CHOKING:

1. Give five sharp back slaps with the flat of your hand between the shoulder blades. Look into the mouth and check for any obvious obstruction that you can remove with your fingers.



2. If this fails, give five abdominal thrusts. Stand behind the patient and place your fist over the upper abdomen just below the ribs. Grasp your fist and pull inwards and upwards up to five times.

Position of your hands:



NOTE: do not use abdominal thrusts in small children.



Figure 8-8 First aid in choking.

Coughing blood (haemoptysis)

In a patient who says he coughs up blood, find the answers to the following questions:

1. **Is it really haemoptysis, or has the patient vomited blood (haematemesis)?** In haemoptysis, the blood is usually bright red; in haematemesis, it is usually brown.
2. **Is the bleeding coming from the chest or is it coming from the nose, throat or gums?** For example in a nosebleed, blood often also appears in the mouth - examine nose and throat carefully for a possible source of bleeding.

If it is true haemoptysis, it is helpful to differentiate whether it started acutely or gradually (see box). Treat the cause but be aware that you will not always be able to find it.

Causes of haemoptysis (coughing up blood)

ACUTE HAEMOPTYSIS (SUDDEN ONSET)

- Pneumonia or bronchitis

Rare:

- Ruptured hydatid cyst
- Pulmonary embolism
- Congo-Crimean haemorrhagic fever

CHRONIC HAEMOPTYSIS (GRADUAL ONSET)

- Tuberculosis
- Bronchiectasis
- Lung cancer
- Hydatid cyst of the lungs
- Mitral stenosis

Dyspnoea (breathlessness)

In dyspnoea, a patient finds it difficult to breathe. Ask the patient whether the breathlessness has started acutely or gradually over several days or weeks (see box). Further history and clinical examination will usually determine the cause of dyspnoea.

If the dyspnoea has started acutely, treatment is very urgent. Commonest causes are acute severe respiratory infections, asthma or heart problems. Sit up a patient with dyspnoea. Treat dyspnoea according to its cause.

Causes of breathlessness (dyspnoea)

ACUTE ONSET

- Asthma
- Pneumonia
- Left heart failure
- Pulmonary oedema
- Pneumothorax
- Pulmonary embolism
- Exacerbation of chronic obstructive pulmonary disease

GRADUAL ONSET

- Pleural effusion
- Chronic obstructive pulmonary disease (COPD)
- Anaemia
- Diseases of the chest wall
- Ascites
- Hydatid cyst of the lungs
- Lung cancer

NOTE: asthma, COPD and left heart failure often cause intermittent attacks of dyspnoea.

PNEUMOTHORAX

In pneumothorax, air enters the pleural space and the lung of the affected site will collapse (see figure 8-4). This collapse may cause respiratory failure. A pneumothorax may be caused by chest injury or spontaneous rupture of an alveolar bulla. These bulla are often found in chronic obstructive pulmonary disease (COPD). Pneumothorax is also a complication of staphylococcal pneumonia.

Dangerous **tension pneumothorax** may develop after a penetrating chest injury. In this case, air enters the pleural space during inspiration but cannot get out during expiration. This quickly results in lung compression.

Clinical features

- Sudden pain on breathing in
- Dyspnoea of varying severity, depending on size of pneumothorax
- Reduced breathing sounds and hyperresonance on percussion (in a sitting patient, do not forget to percuss the parts of the lungs above the clavicles. Compare both sides)

- ✱ Deviated trachea and increasing severe dyspnoea in tension pneumothorax

Investigations

A chest x-ray determines the size of the pneumothorax (see figure B-6 on page 263).

Management

Aspiration of the air or a chest drain may be necessary. In tension pneumothorax, insert a large size needle into the affected side to prevent cardiopulmonary arrest from compression.

PULMONARY EMBOLISM

A blood clot may form in one of the deep veins of the pelvis or leg (*deep vein thrombosis*). This clot may dislodge and be carried through the right heart into the lungs. There it blocks (embolizes) the pulmonary arteries. The part of the lung that receives blood through these arteries will no longer take part in oxygen exchange. Depending on how much of the lung is affected, symptoms range from mild dyspnoea and chest pain to sudden death.

At risk of pulmonary embolism are all immobile patients, for example those on prolonged bedrest, especially after abdominal or pelvic surgery, leg fractures and stroke. Another risk factor is pregnancy.

Suspect pulmonary embolism if a patient from one of the above risk groups becomes suddenly breathless with a fast pulse and complains about chest pain. Other symptoms include haemoptysis and dizziness. Diagnosis without special equipment (ventilation perfusion scan) is difficult. Chest x-ray and ECG are often normal unless it was a massive embolism.

Treatment is with compression bandages of the legs, oxygen and heparin.

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9. Diarrhoea

Diarrhoea is defined as passing abnormally loose or liquid stools more frequently than normal. In many regions, diarrhoea is defined as 3 or more loose or watery stools in a 24-hour period. Adults suffer from diarrhoea but they rarely die from it. In children, diarrhoea is the second commonest cause of death. Diarrhoea kills children by draining fluid from their bodies (dehydration). Diarrhoea also often leads to malnutrition. 80% of all deaths from diarrhoea occur in children under the age of 2 years, especially at the time when children are introduced to solid feeds. The reason is that these solid feeds are often contaminated by pathogens.

Diarrhoea is transmitted when children or adults swallow pathogens (see figure 9-1). This happens when faeces that contain these pathogens comes in contact with drinking water, food, hands or food utensils. Sometimes pathogens are transmitted by flies.

Diarrhoea is preventable. If it occurs, effective treatment is simple.

How to assess a patient with diarrhoea

Take a history

Ask about:

- Duration (more or less than 2 weeks)
- Frequency (how often)
- Blood in the stools
- Associated features (for example fever, vomiting or convulsions)

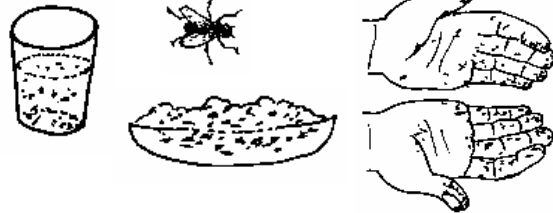
Examine the patient

The most important point in the assessment is to determine the degree of dehydration. Find out the following information and use it to classify the degree of dehydration (see figure 9-2). For assessment for dehydration in severe malnutrition see page 49.

- General condition:**
 - Normal
 - Irritable/restless
 - Lethargic/unconscious
- In children: the reaction of the child when offered a drink:**
 - Not thirsty, drinking normally
 - Being thirsty and drinking eagerly
 - Not able to drink or drinking poorly
- Sunken eyes or not?**

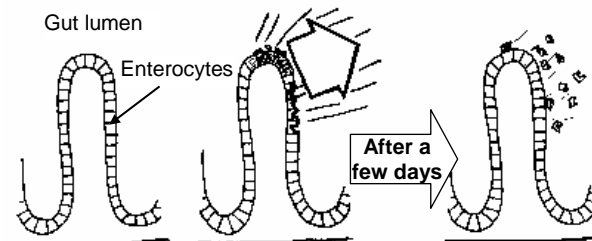
HOW TO GET DIARRHOEA:

Commonest, a person swallows pathogens (viruses, bacteria, cysts or eggs of parasites) by eating contaminated food or unclean drinking water.



PATHOPHYSIOLOGY OF DIARRHOEA (simplified):

Normal small intestine	Diarrhoea	Self-cure
	Pathogens have damaged the enterocytes that secrete large amounts of fluid into the gut lumen	The damaged cells are replaced by healthy cells



DANGERS OF DIARRHOEA:

The pathogens damage the mucosa. This results in:

- ✖ Increased secretion of fluid
Danger of fluid loss resulting in **dehydration**
- ✖ Decreased absorption of fluids and food
Danger of **dehydration** and **malnutrition**
- ✖ Sometimes bacteria enter the wall of the gut (blood in stool):
Danger of bacteria entering the blood stream and causing **sepsis**

HOW DIARRHOEA GETS BETTER:

Whatever the pathogens or cause, diarrhoea gets better when the body repairs the damaged mucosal cells by new healthy cells. This repair mechanism usually takes 2-4 days.

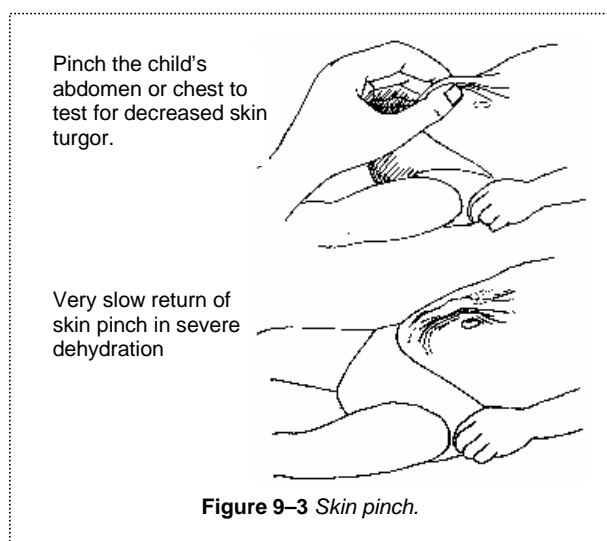
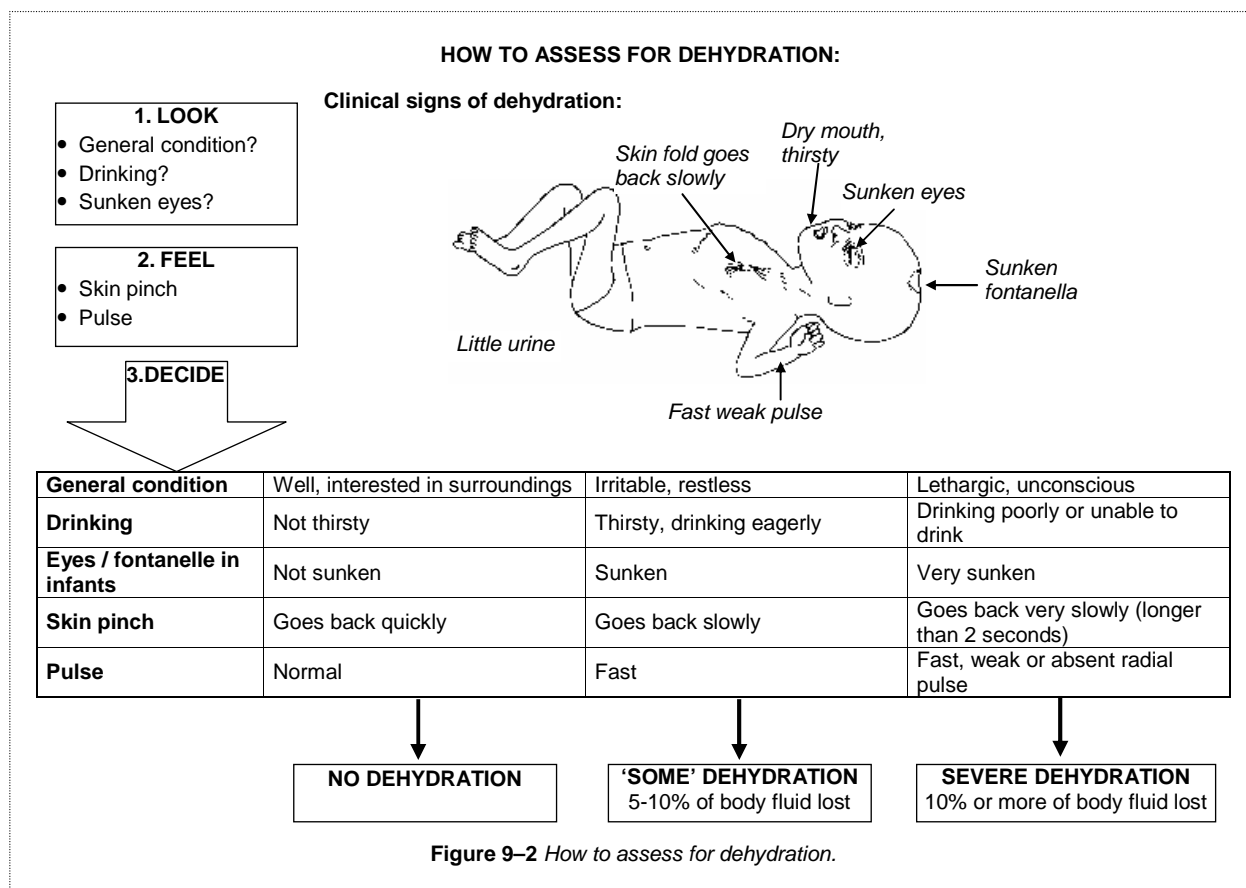
Repair is delayed and diarrhoea becomes prolonged if:

- Malnutrition
- Poor feeding while suffering diarrhoea
- Antibiotics are used inappropriately

The main treatment of diarrhoea consists of oral rehydration + continuous good feeding!

Figure 9-1 Mechanisms and dangers of diarrhoea.

- Elasticity of skin?** (Pinch the skin of the abdomen, see figure 9-3)
 - Skin pinch goes back quickly (= normal)
 - Skin pinch goes back slowly
 - Skin pinch goes back very slowly (longer than 2 seconds)



In adults and older children, feel also for the radial pulse, count the pulse rate and take the blood pressure to look for signs of shock:

- Radial pulse: normal, weak or not palpable?
- Blood pressure: normal, low or not measurable?

How to reach a working diagnosis

Classify patients with diarrhoea (1) according to the severity of dehydration and (2) according to one of three types of diarrhoea. Find the answers to the following questions:

1. What is the **degree of dehydration**?

- No dehydration
- 'Some' dehydration
- Severe dehydration

2. Which **type of diarrhoea** is it?

- Acute watery diarrhoea
- Acute diarrhoea with blood (dysentery)
- Persistent diarrhoea (longer than 1 week with or without blood)

How to manage a patient with diarrhoea

How successfully you treat patients with diarrhoea depends on how well you manage dehydration. *The principles of dehydration management* are (1) to replace fluid the patient has already lost (2) to replace ongoing fluid losses and (3) to make sure the patient receives his usual amount of daily fluids (maintenance fluid).

These three points are the basic and most important part of diarrhoea management. These points are the same for all three all types of diarrhoea. For management of dehydration in severe malnutrition see page 50.

Dehydration management

As mentioned above, for practical reasons divide patients with diarrhoea into three groups:

1. Diarrhoea **without** dehydration
2. Diarrhoea with '**some**' dehydration
3. Diarrhoea with **severe** dehydration

1. Diarrhoea without dehydration

Clinical features

- The patient is well; he is not thirsty and drinks normally.
- No clinical signs of dehydration.

Management

The patient can be treated at home.

1. **Give extra good fluid** (see box). Fluid loss starts long before any of the clinical signs of dehydration appear. Clinical signs appear when 5% or more of the body fluid has already been lost. Therefore, prevention of dehydration must start when fluid loss starts. This means with the first diarrhoeal stool, by constantly replacing the fluid and electrolytes that are lost with each diarrhoeal stool or vomit.

Explain that the patient has to drink more fluid than usual to prevent dehydration (see figure 9-4):

- *If a child is breastfed*, tell the mother to breast-feed more frequently and for longer at each feed. Give ORS, or other good fluids in addition to breastmilk. It is especially important to give ORS or a food-based rehydration solution at home when it is difficult for a child to return to a clinic if the diarrhoea gets worse.
- *Teach how to mix ORS* or a home-based rehydration solution. If available, give 2 packets of ORS to use at home (for ORS preparation for severely malnourished children see page 50).
- *Show how much fluid to give* in addition to the usual fluid intake:

Younger than 2 years	¼–½ glass for each stool
2–10 years	½–1 glass for each stool
Adults and children over 10 years	1–2 glass for each stool

- Tell a mother to give frequent small sips from a clean cup. If a child vomits, wait for 10 minutes. Then begin again more slowly. A feeding bottle must not be used.
 - Continue giving extra fluid until the diarrhoea stops.
2. **Continue feeding.** Diarrhoea has disastrous effects on nutrition, because when a child has diarrhoea (1) he eats less (2) the food that he eats is not well absorbed and (3) the body's nutritional needs are increased. These three factors explain why diarrhoea often causes weight loss and failure to grow. If a child was already malnourished, the malnutrition will become worse. In turn, existing malnutrition also worsens the diarrhoea because nutrients are needed for the gut to recover from diarrhoea. Wrong beliefs about feeding and diarrhoea worsen further this dangerous situation

Good fluids for diarrhoea

For suitable oral rehydration fluids in severe malnutrition see page 50.

VERY GOOD FLUIDS

• Food-based rehydration solutions

Food-based rehydration solutions are better than ORS because they provide up to three times more calories than ORS and have been shown to reduce the volume of stools by up to 40%. It is no extra work for the families to prepare them because the foods will often already be available.

- Rice water (from berenje nak) or shola
- Yakhni shorwa
- Potato soup
- Any other good weaning food to which more water than usual is added. Tell the mothers that this is not given instead of food but as an additional special drink to treat the diarrhoea.

NOTE: Wheat salt solution is no longer recommended because too much salt is easily added, which may lead to hypernatraemia. This worsens dehydration and may cause convulsions. If a family has become used to wheat salt solution, advise strongly not to make it too salty.

• Oral rehydration solution (ORS)

Dissolve the contents of one package in 4 glasses (around 1 litre) of boiled water. It can also be dissolved in weak, unsweetened green tea.

POSSIBLE FLUIDS

- Clean water
- Tea without sugar

NOTE: do not use tea with sugar, soft drinks (for example fanta, pepsi or coke) or sweetened fruit juice. These may make dehydration worse.

(for example, sometimes a patient with diarrhoea may starve, is only given diluted food or a diet that is poor in helpful nutrients).

Prevent malnutrition and give a child nutrient-rich food during the diarrhoea and one additional meal for two weeks after the diarrhoea has stopped. Remember that the cure of diarrhoea depends on the repair of the damaged gut mucosa (see figure 9-1). For this repair, good nutrients are needed. A poor diet will delay this repair and may lead to chronic diarrhoea.

Sometimes a mother thinks that whenever she feeds her child he gets diarrhoea. However, this does not mean that feeding makes diarrhoea worse. It is a sign that the gut mucosa is still damaged and cannot absorb all nutrients. Those that were not absorbed are passed through the gut quickly. If feeding continues, more and more food will be absorbed and the diarrhoea will eventually stop.

For details about how to continue feeding see box 'Important health education in diarrhoea'.

3. **Explain danger signs** and when to return for reassessment (see box 'Important health education in diarrhoea').
4. **Do not prescribe unnecessary or dangerous drugs.** Do not use *antibiotics* routinely. Most cases of diarrhoea are caused by factors for which antibiotics are not effective. Antibiotics can sometimes prolong the duration of diarrhoea or lead to relapses. Antibiotics are only indicated in some children with

Important health education in diarrhoea

1. Show how to prepare and use food-based rehydration solution or ORS.



This child is dying from dehydration because no one has told the mother how to prepare and use a food-based rehydration solution or ORS.

Figure 9–4 Knowledge about rehydration saves lives.

2. Give extra good fluids.

- Give additional good fluids as much as the child will take.
- Whenever the child has diarrhoea, give extra fluids. Explain to the mother how much to give (see text).
- Continue giving extra fluids until the diarrhoea stops.

3. Continue feeding.

- Breastfeed more frequently and for longer at each feed.
- Give the normal food but make sure it is good nutrient-rich food (for example superflour).
- Offer the child more frequent feeds. The aim is to give the child as much nutrient-rich food as he will accept.
- After the diarrhoea stops, give the child one extra meal for 2 weeks.

4. Explain danger signs.

Tell a mother to return with her child immediately if:

- The child drinks or breastfeeds poorly.
- The child becomes sicker.
- The child has blood in the stool.
- The child develops a fever.
- The child is vomiting repeatedly.

diarrhoea with blood or suspected cholera with severe dehydration. Never give *anti-diarrhoeal drugs* or *anti-emetics* to children younger than 5 years. They do not prevent dehydration or improve nutritional status. In particular, anti-motility drugs (loperamide, diphenoxylate or codeine) have dangerous, sometimes fatal side effects.

2. Diarrhoea with 'some' dehydration

Clinical features

- The patient is restless or irritable and thirsty.
- Sunken eyes.
- Skin pinch goes back slowly.

Management

If possible, supervise the treatment. Do not let the patient go home until the fluid deficiency has been replaced and his condition is stable.

1. **Give the amount of ORS that is needed to replace fluids** that have already been lost over the next 4 hours.

- **Determine the amount of ORS that should be given during the next 4 hours.** If you know a patient's weight, give 75 ml/kg ORS over 4 hours. If the weight is unknown, give fluids according to age:

Age	Approximate amount of ORS to give during the first 4 hours
Less than 4 months	200–400 ml (1–2 glasses)
4–11 months	400–600 ml (2–3 glasses)
12–23 months	600–800 ml (3–4 glasses)
2–4 years	800–1200 ml (4–6 glasses)
5–14 years	1200–2200 ml (6–11 glasses)
Adults	2200–2400 ml (11–12 glasses)

- **Show how to prepare and how to give ORS** or a food-based rehydration solution:
 - Give one teaspoon ORS every minute to a child under 2 years. A bottle must never be used! Give older children or adults frequent sips from a cup.
 - *If someone vomits*, usually ORS was given too fast. Wait for 5–10 minutes. Then begin again more slowly (give one spoonful ORS every 2–3 minutes).
 - Advise the mother to interrupt giving ORS and to *breastfeed* instead, whenever the child wants. When the child has finished breastfeeding, continue giving the ORS solution.
 - **After 4 hours, reassess the patient:** classify the degree of dehydration and continue treatment accordingly. Rehydration is completed when (1) a patient has no thirst (2) when he has passed urine and (3) when the other signs of dehydration have disappeared.
 - **If the patient has to leave before completing the 4 hour treatment period:**
 - a. Show again how to prepare ORS or a food-based rehydration solution at home.
 - b. Show how much to give to finish the 4-hour rehydration period.
 - c. Give enough ORS packages to complete rehydration and give 2 packages extra.
2. **Explain the rules of home treatment** (for details see '1. Diarrhoea without dehydration'):
 - a. Give extra fluid.
 - b. Continue feeding.
 - c. Watch out for danger signs and know when to return.
 3. **Do not prescribe unnecessary or dangerous drugs.**

3. Diarrhoea with 'severe' dehydration

Clinical features

If any two of the following signs are present, diagnose severe dehydration:

- ✗ Lethargy or unconsciousness
- ✗ Patient is not able to drink or drinks poorly
- ✗ Very sunken eyes
- ✗ Skin pinch goes back very slowly (2 seconds or more)

- ✘ Signs of shock (fast pulse, weak or absent radial pulse, cold arms or legs and low blood pressure)

Management

Treat severe dehydration quickly because it is an emergency. If possible, treatment should be at a hospital. However, start treatment immediately while transporting the patient to hospital.

1. **Give Ringer-Lactate solution IV immediately.** If Ringer-Lactate solution is not available, use *sodium chloride 0.9%*. Do not use glucose 5% (dextrose) because it is not suitable for replacing fluid losses. *If a patient is able to drink, give him ORS while the drip is being set up.*

Give Ringer-Lactate solution 100 ml/kg IV divided as follows:

- **Children younger than 1 year:** 30 ml/kg in the first hour and then 70 ml/kg over 5 hours.
- **Adults and children over 1 year:** 30 ml/kg over 30 minutes, then 70 ml/kg over 2.5 hours.

If you cannot weigh a patient, estimate his weight and give accordingly. As a general rule, give the IV fluids fast until you can palpate the radial pulse. Then give the remaining fluid more slowly over 2.5 or 5 hours, depending on the patient's age (see above). An adult may need several litres of fluids to treat his dehydration.

If it is not possible to give IV fluids, give ORS through a nasogastric tube (see figure A-5 on page 255).

2. **Reassess the patient every 15-30 minutes until you can feel a strong radial pulse.** If hydration is not improving, give the drip more rapidly. Then assess the patient every 1-2 hours to make sure he continues to improve. Judge progress by assessing (1) level of consciousness (2) ability to drink and (3) skin pinch.
3. **Start oral fluids (ORS) as soon as the patient is able to drink without difficulties.** This is usually after 2-4 hours.
4. **After immediate treatment is completed, reassess the patient to decide how to continue.**
 - If there are no signs of dehydration, continue as under '1. Diarrhoea without dehydration'.
 - If there are still some signs of dehydration, continue rehydration with ORS as under 'Diarrhoea with some dehydration'.
 - If the radial pulse is still very weak or not palpable, continue IV fluids at once.
5. If possible, observe the patient for at least 6 hours after completing rehydration. You want to make sure that he continues taking enough ORS whenever he passes a diarrhoeal stool (or vomits) and that he does not become dehydrated again.

Acute watery diarrhoea

Acute watery diarrhoea does usually not require any treatment other than rehydration therapy. For causes of acute watery diarrhoea see box.

Causes of acute watery diarrhoea

COMMON

- Viral

LESS COMMON

- Food poisoning
- Bacterial
- Psychological (stress)
- Typhoid fever
- Any infection in children can be accompanied by diarrhoea (for example malaria, otitis media or viral illness)
- Side effect of drugs

CHOLERA

Cholera is different from other cases of watery diarrhoea in three aspects:

1. Large amounts of watery diarrhoea can lead to severe dehydration within a few hours (fluid loss can be up to 30 litres a day).
2. Cholera occurs in large epidemics that involve adults and children.
3. Certain antibiotics may shorten the duration of the illness.

Clinical features

Incubation period ranges from a few hours to 5 days. Suspect cholera in any *adult or child over 5 years* who develops severe dehydration from acute watery diarrhoea within a few hours. Typically, the diarrhoea is painless. Usually vomiting starts soon after the onset of the diarrhoea.

In younger children, suspect cholera in any child with acute watery diarrhoea when a cholera outbreak is known in your area.

Management

1. **Rehydrate aggressively,** replace all ongoing losses. If someone is losing more fluid than he is able to replace by drinking ORS, give IV Ringer-Lactate solution. The fluid loss is worse in the first 24 hours.
2. Give a single dose of *doxycycline* 300 mg (or tetracycline 250 mg 4 times daily for 5 days) to all adult patients who are severely dehydrated (contraindicated in children and pregnancy).
To children and pregnant women give co-trimoxazole or erythromycin for 3 days. These antibiotics will reduce the number and volume of cholera stools.
3. **Explain to the patient and his family** that cholera spreads rapidly through the patient's stools. Give them the following instructions:
 - Disinfect patient's clothing by putting them into boiling water for 5 minutes.
 - Dry out bedding in sunlight.
 - Bury stools.
 - Use safe water.
 - Wash hands thoroughly with soap before eating or handling food.

4. **Report suspected cases** of cholera to the regional health authority.

Acute diarrhoea with blood (dysentery)

Diarrhoea with visible blood in the stools is called dysentery. Acute dysentery is usually caused by shigella bacteria. Blood in stools usually indicates that pathogens have ulcerated the mucosal wall and may invade the blood stream. Although dysentery causes only 10% of all cases of diarrhoea in children, it is responsible for 15% of all deaths. Particularly at risk are children with malnutrition or recent measles. Compared with bacillary dysentery, amoebic dysentery is rare. Therefore, treat especially children first for bacillary dysentery before considering amoebic dysentery.

The following table shows the main clinical differences between bacillary and amoebic dysentery:

	Bacillary dysentery	Amoebic dysentery
	Common	Rare
Onset	Sudden onset	Slow onset
Body pains, and fever before dysentery starts	Yes	No
General condition	Ill, lethargic, poor appetite	Patient is well
Dehydration	Common	Uncommon
Vomiting	Common	Uncommon
Fever	High fever	Uncommon
Duration if untreated	Self-limiting after a few days to 10 days	Several weeks
Recurrence	No relapses	It reoccurs at variable intervals and the infection can persist for many years

A simple rule is:

Diarrhoea + blood + fever = bacillary dysentery

Diarrhoea + blood + no fever = amoebic dysentery.

Management of bacillary dysentery

Children younger than 2 months and malnourished children are best treated at hospital.

1. **Assess for dehydration** and manage dehydration accordingly to its severity as described on the previous pages.
2. **Continue feeding.**
3. Give **co-trimoxazole** for 5 days (see box). In patients who are severely ill, start with one of the second-line antibiotics.
4. **Reassess the patient after 2 days.** Assess again for dehydration and look for the following signs of improvement:
 - Disappearance of fever

Antibiotics in bacillary dysentery

Antibiotic resistance of shigella has become widespread. It is therefore important only to give one antibiotic at a time in order not to increase further the risk of bacterial resistance.

FIRST CHOICE IN ADULTS AND CHILDREN:

- **Co-trimoxazole** orally 48 mg/kg/day divided into 2 doses

6 weeks–12 months	120 mg	2 times daily
1–5 years	240 mg	2 times daily
6–12 years	480 mg	2 times daily
Adults	960 mg	2 times daily
- **Ampicillin** orally or IM/IV 50–100 mg/kg/day divided into 3 doses

2–12 months	125–250 mg	3 times daily
1–5 years	250–500 mg	3 times daily
6–12 years	500 mg	3 times daily
Adults	500 mg–1 g	3 times daily

SECOND LINE ANTIBIOTICS

- **Nalidixic acid** orally 50 mg/kg/day divided into 4 doses

2–12 months	62.5–125 mg	4 times daily
1–5 years	250 mg	4 times daily
6–12 years	500 mg	4 times daily
Adults	500 mg	4 times daily
- **Ciprofloxacin** orally (adults only)

Adults	250–500 mg	2 times daily
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NOTE: the following antibiotics are **not** effective in bacillary dysentery: amoxicillin, chloramphenicol, first and second generation cephalosporins (for example cephalexin or cephadrine), furazolidone, gentamicin, metronidazole, nitrofurantoin, streptomycin and tetracycline.

- Less blood in the stool
- Passing fewer stools
- Improved appetite and return to normal activity

If there is no improvement after two days, stop the first antibiotic. Give the second-line antibiotic. In children give oral nalidixic acid. In adults and children over 12 years, give oral nalidixic acid, ciprofloxacin or ofloxacin.

If there is also no improvement after taking the second-line antibiotic, check the patient thoroughly for other causes of diarrhoea with blood (see box). If you cannot find another condition, treat for possible amoebic dysentery with metronidazole for 5 days.

Management of amoebic dysentery

1. **Assess for dehydration** and manage according to its severity as described on the previous pages.
2. Give oral **metronidazole** (35–50 mg/kg/day divided into 3 doses) for 5–10 days (children 2–12 months 50–100 mg 3 times daily; 1–5 years 100–200 mg 3 times

Causes of diarrhoea with blood

COMMON

- Bacillary dysentery

LESS COMMON

- Amoebic dysentery

RARE

- Trichuriasis (whipworm)
- Inflammatory bowel disease
- Antibiotic-induced dysentery (colitis)

daily; 6-12 years 200–400 mg 3 times daily; adults 750–800 mg 3 times daily).

If a patient does not improve after 2 days, consider again the possibility of bacillary dysentery. Do **stool microscopy**. You can only make the diagnosis of amoebic dysentery if stool microscopy shows trophozoites of *E. histolytica* that contain red blood cells. Finding amoebic cysts does not prove that amoebae cause the dysentery. Many people are asymptomatic cyst carriers. This means you find amoebic cysts in their stool.

Few patients have *very severe amoebic dysentery*. To these give the maximum dose of metronidazole for 10 days. Add doxycycline (contra-indicated in children and pregnancy) if there is no response to the high dose of metronidazole.

NOTE: it does not make sense to give diloxanide for eradication of cysts if many people in the community are asymptomatic cyst carriers because re-infection soon occurs.

For amoebic liver abscess see pages 111-112.

Persistent diarrhoea

Diarrhoea, with or without blood, which lasts for 14 days or longer, is called persistent diarrhoea (see box). It is common in children with malnutrition.

Assess the patient for dehydration (for how to assess severely malnourished children, see page 49). Then decide to which of the two groups the patient belongs to:

1. Persistent diarrhoea **without** dehydration.
2. Persistent diarrhoea **with** dehydration. This is defined as *severe persistent diarrhoea*. Severe persistent diarrhoea is usually found in children with malnutrition. Often these children have serious non-intestinal infections like pneumonia. These children are best treated at hospital.

Causes of persistent diarrhoea

COMMON

In children commonest: • Malnutrition

LESS COMMON

- Amoebic dysentery
- Giardiasis
- Antibiotic-induced diarrhoea
- Lactose intolerance
- Psychological (stress)
- Tuberculosis
- Side effect of drugs
- Bowel cancer
- Inflammatory bowel disease
- Tropical sprue
- AIDS

Management of persistent diarrhoea in children

1. **Assess for signs of dehydration** and give fluids according to the degree of dehydration (see pages 84-88).
2. **Good feeding** is the most important part in the management of persistent diarrhoea. Besides giving the child energy and nutrition, feeding helps the gut to recover. This will usually stop the diarrhoea. The normal diet of a child with persistent diarrhoea is often inadequate. If you teach a mother how to improve her child's nutrition, you will not only cure the child now but also prevent disease in future:
 - *Continue breastfeeding*. Feed more often and for longer than usual, day and night.
 - *Give high-protein food* - teach the mother how to prepare superflour (see page 46).
 - *Give frequent small meals*, at least 6 times a day.

NOTE: if the child's diarrhoea increases when he drinks animal milk, he may have lactose intolerance (see below).

3. Treat with drugs if appropriate.

- Give *folate* and *multivitamins* + *minerals* for 2 weeks and one single dose *vitamin A*.
- *If there is blood in the stools*, treat for bacillary dysentery. Give treatment for amoebic dysentery only if it has been proven by stool microscopy or if two different antibiotics for bacillary dysentery have not improved the child's condition.
- Give oral metronidazole (20 mg/kg/day divided into 3 doses for 5 days) for *giardiasis* (1) if you find cysts or trophozoites of giardia lamblia on stool microscopy or (2) if stool microscopy is not available. Finding worm eggs on stool examination does not mean that worms are responsible for any symptoms. However, treat worms (for example with mebendazole) because they may worsen a child's nutritional status.
- *Do not treat persistent diarrhoea routinely with antibiotics*. However, examine every child for non-intestinal infections (for example pneumonia, sepsis or urinary tract infection) and treat accordingly.

4. **Reassess the child after 5 days**, or earlier if the diarrhoea worsens or other problems develop.

Management of persistent diarrhoea in adults

1. **Assess for dehydration**.
2. If possible, **examine a fresh stool sample** under a microscope. Diagnose amoebic dysentery only if you find trophozoites of *E. histolytica* containing red blood cells. If cysts or trophozoites of giardia lamblia are found, treat for giardiasis. If stool microscopy is not possible, give oral metronidazole for 7 days. If there is diarrhoea with blood, treat for bacillary dysentery.
3. *If no improvement*, consider other causes of persistent diarrhoea (see box).

INTESTINAL WORMS

Finding intestinal parasites on stool examination does not necessarily mean that they are responsible for any symptoms. A very heavy worm load of trichuris, hymenolepis nana or strongyloides may occasionally cause persistent diarrhoea.

GIARDIASIS

The gut parasites of giardia lamblia may cause acute onset diarrhoea. Symptoms may persist for several weeks. The stool is without blood. The patient complains about a lot of gas and mild intestinal swelling. There is no fever. Often the patient loses weight. If you suspect giardiasis, confirm it by stool examination. You may find either the cyst forms or the mobile trophozoites.

Treat with oral *metronidazole* once daily for 3 days (children 1-5 years 500 mg; 6-12 years 1g; adults 2g) or give metronidazole 20 mg/kg/day divided into 3 doses for 5 days. An alternative to metronidazole is tinidazole.

ANTIBIOTIC-INDUCED DIARRHOEA

Antibiotics may cause diarrhoea because they kill the good bacteria that the body needs in the gut to digest food and function normally. This is one of the reasons why you should not routinely give antibiotics for watery or persistent diarrhoea. If not improving by itself give metronidazole.

LACTOSE INTOLERANCE

Damage to the mucosal cells, either during acute or persistent diarrhoea, may result in a deficiency of the enzyme lactase that is needed for digesting animal milk.

Clinical features

Suspect lactose intolerance if a patient, usually a child, develops an increase in stool volume and worsening of the signs of dehydration when animal milk is given. Other clinical features are colicky abdominal pain, abdominal distension and flatus.

Management

Replace animal milk with increased breastfeeding or, if yoghurt is available, give this in place of the animal milk that the child usually takes. Yoghurt contains less lactose and is better tolerated. If yoghurt is not available, limit the animal milk intake to half of the usual amount (limit to about 50 ml/kg per day) and give it with nutrient-rich food (for example superflour). Do not dilute the milk. Breastmilk does not contain lactose and should be continued.

ABDOMINAL TUBERCULOSIS

If a patient with persistent diarrhoea does not respond to any of the above measures, consider tuberculosis. You

often find associated clinical features like fever, severe wasting or a poor appetite but not usually pulmonary symptoms.

TROPICAL SPRUE

Tropical sprue or post-infective malabsorption is a syndrome in which bacterial overgrowth of the normal gut bacteria leads to malabsorption and persistent light coloured, loose sticky stools (steatorrhoea). The diarrhoea continues for several months. The patient loses weight and may present with vitamin deficiencies and anaemia. Tropical sprue may follow giardiasis or amoebic dysentery.

Give *folic acid* 5 mg 3 times daily for 6 weeks + *doxycycline* 100 mg once daily (or tetracycline 250 mg 4 times daily) for at least 14 days to eliminate bacterial overgrowth. Doxycycline and tetracycline are contraindicated in children and pregnancy. The diarrhoea will improve within a few days of treatment.

BOWEL CANCER

Consider bowel cancer in old people with recurrent bouts of diarrhoea, sometimes with blood (see page 105).

Prevention of diarrhoea

Diarrhoea, including amoebae and giardia, is usually transmitted via the faecal-oral route. This means that a person acquires diarrhoea by drinking contaminated water or eating contaminated food. Children often get diarrhoea through the use of feeding bottles or dummies (pacifiers). Flies also carry pathogens from stool onto food. Shigellosis is also transmitted from person to person.

There are many ways in which diarrhoea can be prevented. The most important are:

1. **Encourage breastfeeding** because it protects from diarrhoea. Breastfeeding should start within 1 hour of delivery. Teach mothers to give only breastmilk for the first 6 months with no other additional drinks or foods unless for clear medical reasons.
2. **Teach principles of good food hygiene:**
 - *Wash your hands and especially the hands of your children with soap* (1) after having been to the toilet (2) before preparing food (3) before eating food. NOTE: handwashing with soap is very effective and reduces the incidence of diarrhoea by about 50%!
 - *Never use a feeding bottle* for babies. Use a spoon and cup instead. Feeding bottles are often dirty. Someone called them the 'living rooms of bacteria'. Fluids tend to be left in them and soon become spoiled or sour. Sucking on a bottle may interfere with a child's desire to breastfeed.

- *Keep the cooking area and the dishes clean.* Avoid contact between raw and cooked food.
 - *Cook food thoroughly.*
 - *Avoid storing cooked food.* Give young children food that has been freshly prepared. If it is necessary to store food, keep it in a cool place and protect it well from flies and other animals. Re-heat stored food thoroughly until it is too hot to touch.
 - *Wash fruits and vegetables with clean water.* Cook those that cannot be peeled.
3. **Use clean water.** Several methods are available for getting safe water:
- *Boiling water* has the disadvantage of being expensive. Bringing the water to a roaring boil for 3 minutes is sufficient to kill all pathogens causing diarrhoea.
 - *Solar disinfection.* For many years, it has been known that sunlight (solar light) will kill off the pathogens in contaminated water in a clear plastic bottle (see figure 9–5). Sunlight disinfects water (1) through radiation with UV-A rays and (2) through increased water temperature. Some people believe that sunlight harms water and causes vitiligo. Assure them that this is not true.
 - *Water chlorination.* A few drops of chlorine (amount depends on the size of the water container) disinfects water, and is a simple, cheap and effective way to provide safe drinking water for families. Bottles for chlorination of water are cheaply available at many places.
4. **Improve sanitary conditions.**
5. **Do not let flies land or crawl onto food.**
6. **Immunize all children against measles.**

References

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HOW TO USE SUNLIGHT FOR GETTING CLEAN WATER - THE SODIS METHOD:

1. Fill three quarters of a **clear** plastic bottle with water.



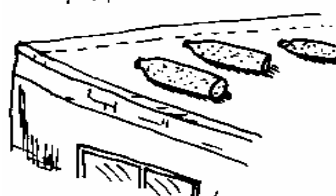
2. Shake the bottle for 20 seconds.



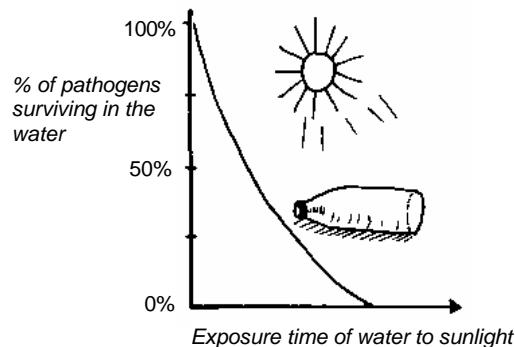
3. Fill the bottle fully and close it.



4. Lay the bottle in full sunlight (for example on the roof).



5. Leave the bottle in the sun for 6 hours. If cloudy weather, leave the bottle out for 2 days.



6. The water is now clean and ready for drinking.



Figure 9–5 How to get clean water through sunlight. (Source: EAWAG/ SANDEC, adapted with permission)

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10. Abdominal and liver problems

GASTRO-INTESTINAL PROBLEMS

Common presentations of abdominal problems are pain, vomiting, abdominal distension, constipation, diarrhoea, rectal bleeding or lumps in the abdomen. In all conditions, the first aim must be to identify those patients who need urgent surgery.

How to assess a patient with an abdominal problem

The basics of the assessment of the abdomen are explained on pages 13-14. Below is only a summary that focuses on the interpretation of abnormal findings. You should study this together with pages 13-14.

Take a history

Ask for details about the abdominal symptoms. Find out how each symptom began and how long it has been going on:

○ Abdominal pain?

- *Onset of pain:* 'Did the pain start suddenly or slowly?'
- *Duration:* 'When did the pain start?' ('How many hours ago?' 'More or less than 1 week ago?')
- *Progression:* 'Is the pain getting worse, remaining the same, or is it getting less?'
- *Character:* 'Is the pain there all the time (constant) or is it coming and going?' (Colicky pain)
- *Localisation and radiation:* 'Where does it hurt most?' 'Where did the pain start?' 'Does the pain radiate anywhere else?' (See figure 10-2)
- *Intensity:* 'Is the pain mild or severe?'

MAIN FUNCTIONS OF THE GASTROINTESTINAL SYSTEM:

In the gastrointestinal system, food that has been eaten is **digested** so that it can then be **absorbed** from the gut into the body. This provides nutrition and energy for the body.

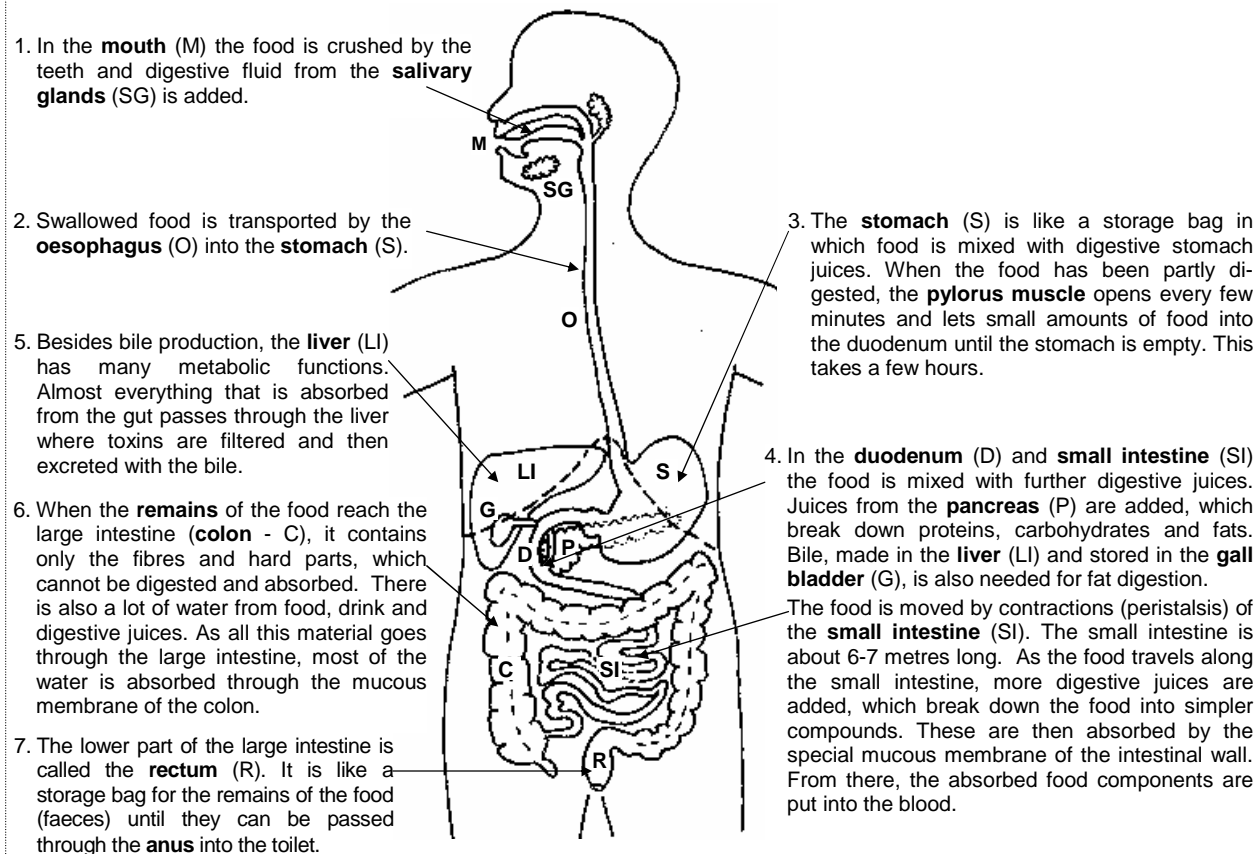


Figure 10-1 Basic anatomy and physiology of the gastrointestinal system.

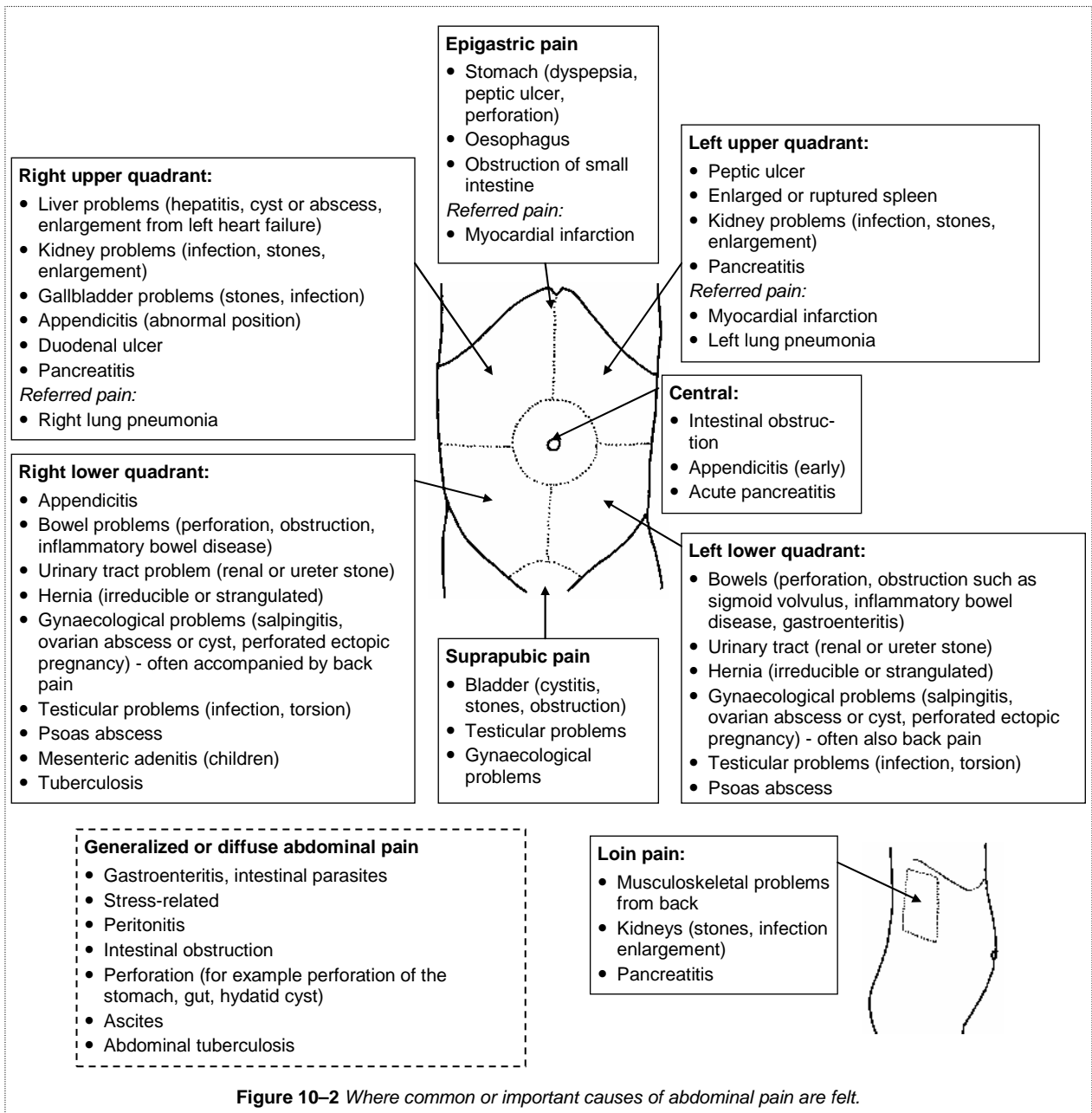


Figure 10-2 Where common or important causes of abdominal pain are felt.

- Vomiting?** If yes: 'Are you vomiting all the time?' 'Is the vomiting becoming more?' 'What does the vomit look like?'
- Diarrhoea or constipation?**
- Pregnancy?**

Examine the patient

- Very ill?
- Is the patient obviously in pain?
- Dehydration? Jaundice? Malnutrition? Fever?
- If acute abdominal problem: shock?
- Look at the abdomen:
 - Distended abdomen?
 - Is the abdomen moving when the patient is breathing? (If not, sign of peritonitis)
 - Scars?

- Feel:
 - Abdomen soft or rigid?
 - Tenderness? If yes: where? Rebound tenderness or guarding?
 - Enlarged organs?
 - Masses or lumps (including hernia)?
- Examine the rectum, if needed.
- Vaginal examination if you suspect a gynaecological problem.

Investigations

Investigations depend on your suspected diagnoses. Useful investigations in acute abdominal pain that is not clearly caused by peritonitis or organic rupture are for example:

- **Urine:**
 - Blood (urinary tract infection, renal colic)

- Protein and white blood cells (acute pyelonephritis)
- Glucose and ketones (diabetic ketoacidosis)
- Pregnancy test

NOTE: white blood cells are often found in appendicitis.

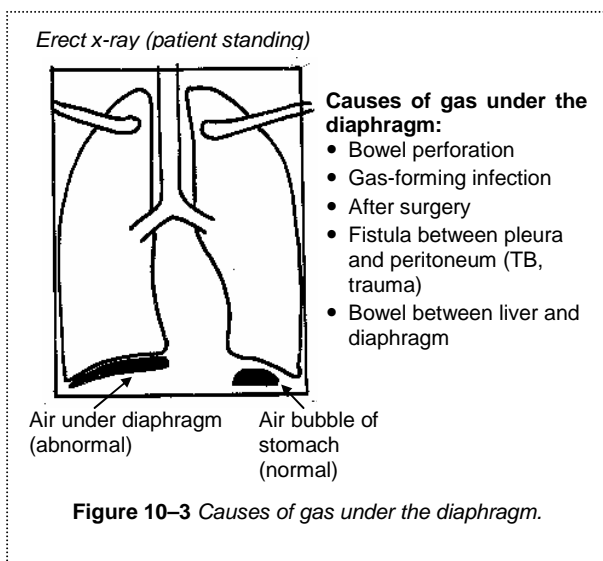
● **Blood:**

- Raised white blood cells (inflammation)
- Serum alpha-amylase more than 5 times normal value (acute pancreatitis)

● **Radiological and endoscopic investigations:**

If perforation of the bowels or stomach is suspected, an erect chest x-ray (the patient stands) will show air under the diaphragm as a sign of perforation (see figure 10–3).

Further radiological investigations are abdominal ultrasound (investigation of abdominal masses, liver pathology, suspected obstructive jaundice and unclear abdominal pain), barium meal (investigation of oesophageal or gastric pathology) or barium enema (investigation of large bowel pathology). Oesophago-gastroscopy helps to visualise the oesophagus, stomach and duodenum. Rectoscopy, sigmoidoscopy and colonoscopy are endoscopic investigations to examine part or the entire colon.



How to reach a working diagnosis and how to identify surgical emergencies

First, differentiate whether the abdominal problem is **acute or chronic** (duration less or more than 1 week)?

If the problem is acute, then ask yourself: does this patient need urgent surgery? A person who becomes acutely ill and in whom symptoms are mainly related to the abdomen has a so-called acute abdomen. Not all of these patients will suffer from a surgical problem (for example lower lobe pneumonia may cause upper ab-

Important causes of acute abdominal pain

SURGICAL EMERGENCIES

- Appendicitis
- Perforated peptic ulcer
- Intestinal obstruction (surgery is not always needed)
- Peritonitis (for example after perforating injury)
- Strangulated hernia
- Perforated typhoid ulcer
- Ectopic pregnancy
- Torsion of the testis

ABDOMINAL CAUSES THAT DO NOT NEED URGENT SURGICAL REFERRAL

- Diarrhoea (gastroenteritis)
- Dyspepsia (often chronic pain)
- Gallbladder disease
- Typhoid fever
- Hepatitis
- Urinary tract infection
- Side effects of drugs
- Bladder or renal stones
- Constipation
- Salpingitis
- Abdominal tuberculosis
- Period pains
- Poisoning
- Acute pancreatitis

PAIN REFERRED FROM A NON-ABDOMINAL PROBLEM

- Any illnesses with fever (especially in young children)
- Pneumonia
- Malaria
- Referred from a back problem (nerve root pain)
- Myocardial infarction
- Opiate withdrawal
- Diabetes mellitus

dominal pain) see the box above and the box on the next page. If you miss a patient with a surgical emergency, he may die.

The following considerations may help you towards making a working diagnosis and identifying surgical emergencies:

1. Decide **which kind of pain** the patient is suffering from:
 - **Colicky pain** is a squeezing kind of pain that comes and goes - sometimes it is very severe, sometimes much less or even disappearing. The patient may press his abdomen or walk about or bend over but nothing he does gives much relief. For common causes see box on the next page.
 - **The pain of inflammation** is leading on to peritonitis. It is a more continuous pain often felt in the midline to begin with, but later being felt in

Possible signs of a surgical emergency

- ✱ Patient appears to be very ill or lies very still (peritonitis)
- ✱ Continuous pain for more than 3 hours that is increasing in intensity (commonest cause: appendicitis)
- ✱ Persistent vomiting (bowel obstruction)
- ✱ Localised tenderness with guarding and rebound tenderness (localised inflammation of the peritoneum)
- ✱ Palpable mass in the groin or abdomen (for example strangulated hernia or ascaris bowel obstruction)
- ✱ Rigid abdomen (peritonitis)
- ✱ Pain that increases with coughing and movement (peritonitis)
- ✱ Sudden onset of severe pain (perforation of an organ)
- ✱ Abdominal distension

Important causes of colicky abdominal pain

GASTROINTESTINAL TRACT

- Very common: diarrhoea
- Intestinal obstruction
- Early appendicitis

GENITAL

- Labour pains
- Miscarriage
- Ectopic pregnancy
- Period pains

URINARY TRACT

- Renal, ureter or bladder stones

GALLBLADDER

- Ascaris infection of the biliary tract
- Stones in the biliary tract

OTHERS

- Rupture of a hydatid cyst in the liver

other places as the nerves to the peritoneum of the abdominal wall become involved (for example in inflammations around the diaphragm, referred pain may later be felt in the shoulder tip because the shoulder tip has the same nerve supply as the diaphragm). The patient finds that if he lies very still the pain is not so bad.

- **The pain of perforation** can be very sudden in onset. It rapidly spreads all over the abdomen. It is worse on moving and the patient likes to lie still.
2. Decide from **which kind of vomiting** the patient is suffering (see also pages 105-106):
 - **Reflex vomiting** is when the patient empties his stomach with one or two vomits and then stops vomiting. This can occur in many different medical and surgical conditions.
 - **Vomiting of intestinal obstruction.** The patient goes on and on vomiting. At first the stomach is emptied, then there is green material (bile) in the vomit. Later the vomit begins to smell more and more like faeces.
 3. *If you are uncertain about the diagnosis, reassess a patient after 2 hours.*

Acute abdominal pain (surgical emergencies)

The following two clinical syndromes require immediate laparotomy:

1. Organ rupture.
2. Peritonitis.

The immediate management of these patients consists of:

1. **Give nothing by mouth.**
2. **Treat shock and replace fluids.**
3. **Relieve pain.** It was said that a painkiller must not be given unless a diagnosis has been established or a surgical emergency excluded. A new study has shown that giving painkillers does not mask the diagnosis. Therefore give pain relief to a patient who has to be transported to a distant hospital so that he suffers less pain during transport.
4. **Insert a nasogastric tube.** Aspirate the gastric fluids with a syringe. Repeat every hour.
5. **Take blood** for blood grouping and arrange investigations as appropriate.
6. Give **ampicillin + gentamicin + metronidazole** if infection is suspected.

APPENDICITIS

Appendicitis is a common acute surgical condition (see figure 10–4). It is an acute inflammation of the appendix. If the appendix is not removed surgically, it may burst and cause a localised abscess or general peritonitis.

Clinical features

Adults usually complain about a vague central abdominal pain at first. After some hours, the pain moves to the right lower abdomen (right iliac fossa) and becomes constant. In children, atypical presentations are quite common. Therefore consider appendicitis in any child with acute abdominal pain.

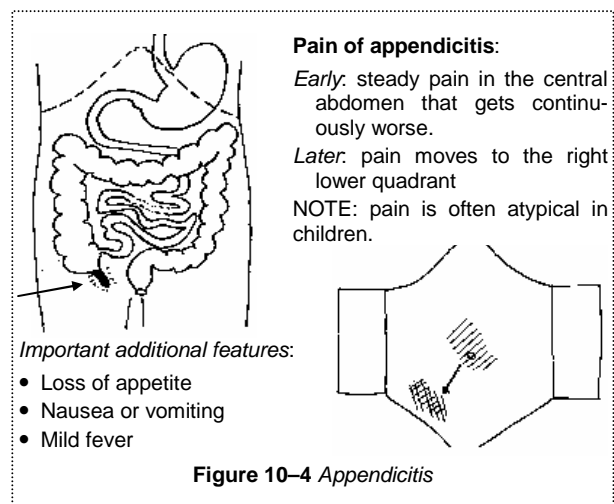


Figure 10–4 Appendicitis

Additional features:

- Loss of appetite
- Mild fever, pulse faster than normal
- Abdomen is not distended
- Tenderness with rebound and guarding in the right lower abdomen due to localized peritonitis
- More pain is felt in the right lower quadrant than in the left lower quadrant when you press the left lower quadrant.
- If the appendix has burst, you may feel an abscess with a tender mass in the right lower abdomen or find signs of generalized peritonitis.

Investigations

If you suspect appendicitis, do not rely on WBC count, which may be misleading and may cause a fatal delay in surgical intervention.

Management

Refer for urgent surgery to remove the inflamed appendix.

HERNIA

There are certain weak places in the abdominal wall that may allow a pouch of peritoneum and abdominal contents to protrude or bulge outwards (see figure 10–5). This bulge is called a hernia. The contents of the hernia may be gut or other intestinal contents. A hernia often causes discomfort, but the real danger is that of strangulation. *Strangulation* occurs when the edges of the opening in the abdominal wall compress the blood supply of the piece of bowel or omentum that is trapped in the hernial sac. This will eventually cause that piece to become necrotic. This is very serious in the case of gut as the organisms in the gut will invade the dead tissue. Gangrene results and perforation will occur.

Inguinal hernias, those in abdominal scars (incisional hernias) and those hernias in the midline between umbilicus and sternum (epigastric hernias) are particularly at risk of strangulation.

Clinical features

A patient usually complains of a swelling that comes and goes, especially when he is coughing or lifting something heavy. The commonest location is in the groin (inguinal hernia).

Examine the patient standing and ask him to cough while you palpate the groin. A hernia will become bigger when the patient coughs (for how to differentiate a hernia from a swollen lymph node see box).

Management of a hernia and its complications

Management depends on whether the hernia is complicated or not. Danger signs that a hernia has become strangulated are:

- ✘ The swelling has become painful and no longer goes back (irreducible hernia).

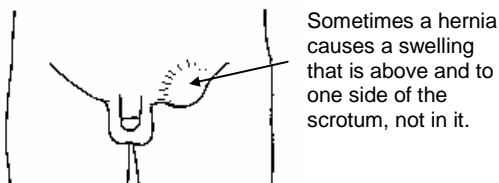
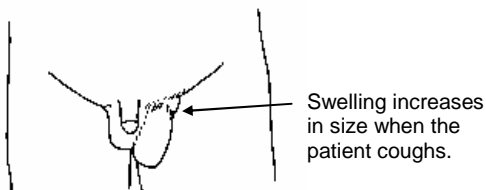
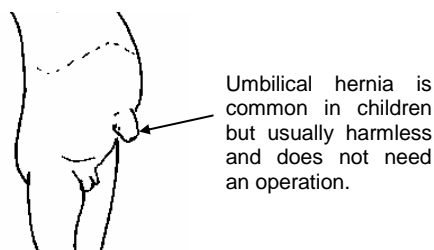
INGUINAL HERNIA:**UMBILICAL HERNIA:**

Figure 10–5 Inguinal and umbilical hernia.

Common causes of inguinal swelling

See also causes of scrotal swelling on pages 122–123.

- Inguinal hernia
- Enlarged lymph node
- Abscess

How to differentiate between a hernia and an inguinal lymph node swelling

- A swollen lymph node is hard, a hernia soft.
- If the swelling is tender, it can either be a strangulated hernia or lymphadenitis.
- A lymph node does not increase in size on coughing, a hernia does.
- In lymph node enlargement, you often find a septic lesion on the legs or buttock.

✘ The swelling is hard and tender.

✘ The swelling does not move when a patient coughs.

If you find any of the above danger signs, assume that the hernia has strangulated. The patient needs urgent surgery.

If the hernia does not go back by itself but there are no danger signs, try gently to push it back (reduction of hernia).

If a hernia does go back by itself, an operation is still indicated as soon as possible because strangulation may occur at any time (except an umbilical hernia).

INTESTINAL OBSTRUCTION

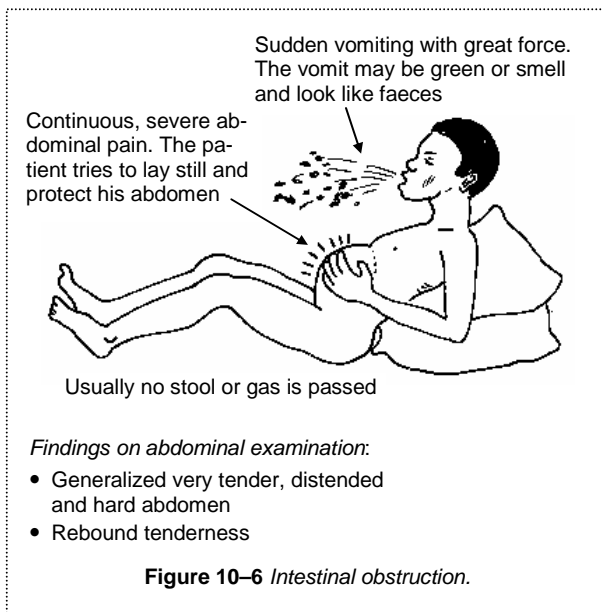
In intestinal obstruction due to blockage, food and fluids cannot pass the blocked part of the intestine (see

figure 10–6). The intestine above the blocked part contracts more than usual, secretes more fluids and then dilates (for causes see box).

Clinical features

- Severe colicky abdominal pain, usually central, which lasts for about half a minute. It then goes away, but comes back every few minutes.
- Repeated vomiting, which increasingly smells of faeces.
- Dehydration.
- The abdomen is distended. Sometimes the movement of the distended bowel is visible through the abdominal wall. The abdomen is often not very tender on palpation, unless the obstruction is caused by strangulation. The bowel sounds are increased.
- No or little stool and wind passed. In obstruction of the large bowel constipation comes on very early. However, in obstruction higher up, there may often be a little stool which had already formed below the obstruction, and which may continue to be passed for a day or two. This may confuse the clinical picture.
- If strangulation, signs of peritonitis.

NOTE: always examine the groin so that you do not miss a hernia.



Management

Your management depends on the answers to the three following questions:

1. **Is it a mechanical obstruction or paralytic ileus?**
In paralytic ileus, there is no pain and there are no bowel sounds.
2. **Is the bowel strangulated** (urgent indication for operation)? Suspect bowel strangulation if the patient is very ill with signs of peritonitis, fever and a raised WBC.
3. **Is it large or small bowel obstruction?**

Causes of intestinal obstruction

- Ascaris
- Strangulated hernia
- Twisted bowel (for example sigmoid volvulus)
- Previous abdominal infection or surgery that caused adhesions (scarring) inside the abdomen
- Bowel cancer

In children in addition to the above causes:

- Pyloric stenosis (age 3-8 weeks)
- Intussusception
- Malrotation and other congenital abnormalities

General management

1. Refer urgently to hospital.
2. Give nothing by mouth.
3. Insert a nasogastric tube and suck all the fluids out with a syringe immediately and then every hour.
4. Give IV fluids to maintain circulation and treat shock.
5. *If intestinal obstruction is caused by ascaris*, then do not give worm medicine because it will either paralyse or kill the worms and make it impossible for them to disentangle. If the obstruction is incomplete, you can try an enema with sodium chloride 0.9% (physiological saline). You can also try to milk the worms by intermittent palpation. If there is no relief after a few hours, surgery is necessary. Give anti-worm drugs after the obstruction has resolved.

NOTE: some people will get better without an operation but fever, worsening pain and raised WBC require laparotomy.

Intussusception

Intussusception occurs in children under 2 years. One part of the bowel, usually the ileum, is drawn into the next part, usually the colon. It is like an arm drawn into a sleeve. This causes severe, colicky abdominal pain, followed by signs of intestinal obstruction. Often, the child passes blood in the stools. Later, peritonitis may occur. Sometimes you can feel the affected parts of the bowel as a banana-shaped mass in the right upper abdomen. The child needs urgent surgery.

Pyloric stenosis

Pyloric stenosis is due to hypertrophy of the pyloric muscle that closes the exit of the stomach to the duodenum. Boys are more often affected than girls.

Pyloric stenosis presents in the first 3-8 weeks of life as projectile vomiting. Characteristically, the baby vomits after every feed. Soon he becomes dehydrated and malnourished. He is always hungry. Peristalsis of the stomach may be visible. Examine the baby while he is feeding; often you can then feel the pyloric thickening as a small rubbery tumour on deep palpation between the middle of the right rib border and the umbilicus.

Vomiting that starts later than 10 weeks of age is very unlikely to be from pyloric stenosis.

Management is by surgery after correcting electrolyte disturbances and dehydration.

PARALYTIC ILEUS

Sometimes the bowel does not function. This leads to paralytic ileus. It occurs temporarily after abdominal operations and peritonitis.

PERITONITIS

Peritonitis is a serious infection of the peritoneum. It is usually caused by acute bacterial infection with pus in the abdominal cavity. The commonest causes are perforated appendix and penetrating trauma. Peritonitis can occur after abdominal or pelvic surgery if it has not been performed under sterile conditions. Blood in the peritoneal cavity can cause similar symptoms and signs. Chronic peritonitis is usually caused by tuberculosis.

Clinical features

- Very ill patient with fever and fast pulse. Very sudden onset if due to perforation. If caused by inflammation, the onset is more gradual.
- Severe constant pain. The patient lies still and avoids all movements because every movement increases the pain.
- Often vomiting, dehydration and shock.
- Rigid, tender abdomen with rebound reflex and reduced or absent bowel sounds. The abdomen does not move during breathing.

Management

Treat as described on page 96.

Urgent surgery is indicated that aims at (1) cleaning the abdominal cavity (peritoneal lavage) and (2) specific treatment of the underlying condition.

PERFORATED PEPTIC ULCER

A peptic ulcer can occasionally perforate the stomach or duodenum allowing food and acid to enter the peritoneal cavity. This causes sudden severe abdominal pain, starting in the upper abdomen and then spreading to the lower abdomen. Peritonitis develops, see above.

PERFORATED TYPHOID ULCER

Perforated typhoid ulcer is a complication of typhoid fever. The patient has already been ill with fever and other symptoms of typhoid fever for about 2 weeks. Then, one of the ulcers in the small bowel perforates and causes generalised peritonitis. Because the patient already had a vaguely tender and distended abdomen, the perforation can easily be missed. Suspect it in a patient with typhoid fever whose abdominal pain and

tenderness worsen. His pulse rate is rising and his fever may drop suddenly. The order of symptoms is reversed in perforated appendicitis: pain and abdominal symptoms start first and then the patient becomes very ill with high fever.

Refer for surgery and add metronidazole to the antibiotics the patient takes for his typhoid fever.

RUPTURED ECTOPIC PREGNANCY

In ectopic pregnancy, the foetus does not develop in the uterus but in one of the fallopian tubes (see figure 10–7). Once the foetus has reached a certain size (usually at 6–9 weeks gestation) he will either be expelled (tubal abortion) or the tube will burst. When this happens there is a lot of bleeding into the peritoneal cavity. The blood irritates the peritoneum and causes peritonitis. The patient becomes rapidly shocked due to blood loss. If ectopic pregnancy is not diagnosed and operated on in time, the woman will die.

In the early stage of ectopic pregnancy it needs to be differentiated from threatened abortion (miscarriage; see page 191). In ectopic pregnancy, the pain (often colicky) comes first and then slight vaginal bleeding or brown discharge develops. In a miscarriage, the vaginal bleeding comes first, then the pain. Bleeding is often heavy.

Many women with ectopic pregnancy could be diagnosed early and treated in the non-emergency state.

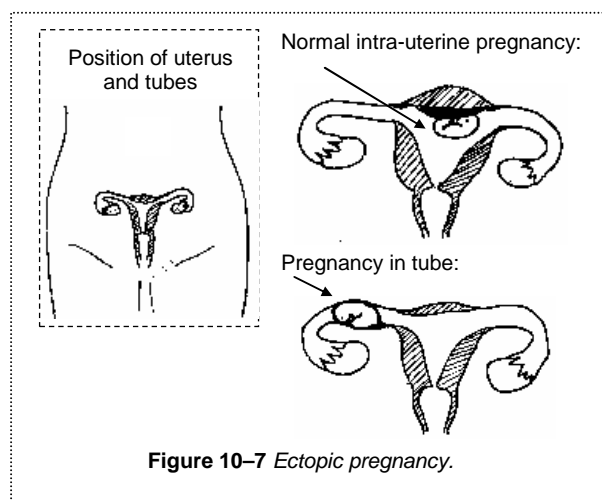
Investigation

Pelvic ultrasound to identify the location of the foetus (inside or outside the uterus).

Clinical features

Suspect ectopic pregnancy in any woman with the following symptoms:

- Menstrual bleeding is about 7 days late
- Feeling dizzy, fainting and breathless
- Pain in the lower abdomen, followed by slight vaginal bleeding



Late signs:

- Shock
- Distended rigid abdomen

Management

Emergency surgery

Abdominal pain (non-surgical emergencies)

Many patients with acute abdominal pain suffer from non-surgical causes. Colicky abdominal pain often accompanies diarrhoea. In young children, any infection (for example otitis media) may cause abdominal pain.

Chronic and recurrent abdominal pain is also very common. Most patients will suffer from stress-related functional dyspepsia. Worms or chronic amoebic dysentery can cause a similar vague chronic abdominal pain.

DYSPEPSIA (EPIGASTRIC PAIN)

Dyspepsia is pain or discomfort in the upper abdomen. This chronic epigastric pain, feeling of a bloated abdomen or 'burning of the stomach' with occasional vomiting is very common. It often persists over many months or years. Sometimes symptoms can be severe. Most of these patients suffer from so called from **functional dyspepsia**, which is often caused by underlying psychological stresses. Other possible causes are acid dysregulation or mucosal sensitivity and delayed gastric emptying. Functional dyspepsia is difficult to treat and is generally a relapsing, chronic condition.

Organic causes like **peptic ulcers** (duodenal or gastric ulcer) are rare compared with functional dyspepsia. The stomach produces acids to digest food. Sometimes, because of other factors, the acid will damage the wall of the stomach or duodenum and cause an ulcer. Common factors leading to the development of a peptic ulcer are infection with *Helicobacter pylori*, the use of non-steroidal-anti-inflammatory drugs (NSAIDs) or smoking.

Complications of peptic ulcers:

- Perforation of the ulcer (see page 99).
- Ulceration of a blood vessel with bleeding into the stomach or duodenum. The patient will either vomit blood (haematemesis) or pass digested, black blood in the stool (melaena). If the blood loss is slight and chronic, he will only become anaemic.
- Rare: penetration of the ulcer into the back wall of stomach or duodenum. This causes back pain that does not go away.

Many textbooks still state that certain symptoms can accurately identify a peptic ulcer. Research has shown that this is not true. It is not possible to differentiate between functional dyspepsia and peptic ulcer by his-

tory-taking or clinical examination. Therefore, management is according to additional alarm features and age, see below.

Gastric cancer is very rare in patients under 55 years. Consider it if an elderly patient presents with a new onset of dyspepsia, especially if he also loses weight loss and is anaemic.

In **reflux oesophagitis** (GORD = gastro-oesophageal reflux disease) gastric acids flow back into the oesophagus and cause inflammation and, if chronic, scarring of the oesophagus. The symptoms are typically a burning sensation in the epigastrium and behind the sternum. Symptoms get worse after meals, hot drinks and on bending forward or lying flat. Antacids relieve the symptoms transiently.

Management of dyspeptic symptoms

Examine the patient and exclude a specific cause (for example referred pain from heart, liver, bowel or gall-bladder or use of NSAIDs).

If you have not found any specific cause, then decide to which of the three groups your patient belongs to and treat him accordingly:

1. Patients **with** alarm symptoms (see box):

Refer for gastroscopy or barium meal.

Alarm symptoms in dyspepsia

- ✘ Difficulties swallowing (dysphagia)
- ✘ Unexplained weight loss
- ✘ Anaemia or other indicators of gastrointestinal bleeding
- ✘ Persistent vomiting
- ✘ Patients over 55 years if the dyspepsia is of new onset and the symptoms persist over 4 weeks
- ✘ Mass in the upper abdomen

2. Patients **mainly** with dyspeptic symptoms but **without** alarm symptoms:

- Tell the patient to minimize the factors that cause dyspepsia: ● 'Stop smoking' ● 'Do not take acetylsalicylic acid (Aspirin) or NSAIDs'.
- Give antacids (for example aluminium hydroxide). The patient should take them about 1 hour after each meal and at night for 3 weeks + ranitidine 300 mg at night for 8 weeks.
- Give treatment for worms (see below).
- If no relief after 3 weeks*, give *Helicobacter pylori* eradication therapy:
Give omeprazole 20 mg 2 times daily + amoxicillin 500 mg 3 times daily (or clarithromycin 500 mg 2 times daily) + metronidazole 400 mg 3 times daily for 1 week; followed by omeprazole 20 mg 1-2 times daily for 4 weeks (or ranitidine 300 mg at night for 8 weeks, or cimetidine).

NOTE: there is a concern that people taking H₂-blockers (ranitidine and cimetidine) or proton pump inhibitors (omeprazole) are at a higher risk of typhoid fever or diarrhoeal illnesses because there is no acid in the stomach to kill pathogens that are swallowed.

e. *If no improvement*: refer patients over 55 years for gastroscopy. Patients under 55 years treat as functional dyspepsia. There is no need to repeat the above treatment trial for Helicobacter if it did not improve the symptoms. Assure the patient that his symptoms are not caused by a serious disease but by psychological stress. Explain to him to take as few medications as possible. He may find boiled milk helpful.

NOTE: metoclopramide for 2 weeks or an antidepressive (amitryptiline or imipramine) for 6 weeks may be tried, but the success rate is usually not very high. Supportive psychological support has shown to be helpful.

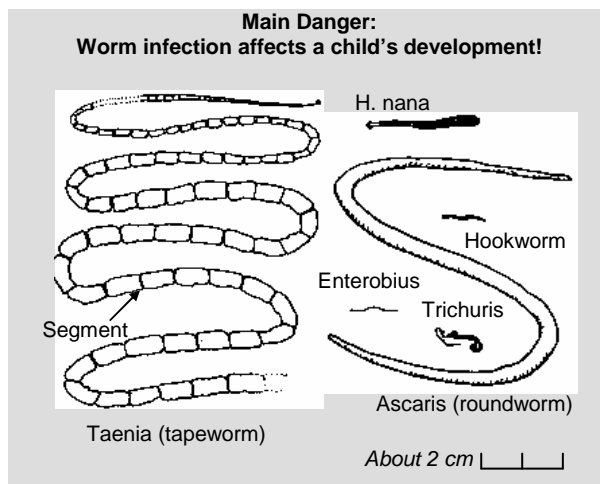
3. **Patients mainly with symptoms of reflux oesophagitis:**

- a. **Tell the patient** to minimize the factors that cause the reflux: • ‘Avoid big meals’ • ‘Stop smoking’ • ‘Sleep with the head and chest slightly raised at night’ and • ‘Always take tablets with plenty of water.’
- b. Give **antacids** (for example aluminium hydroxide), to be taken when needed or 30-60 minutes after each meal and at bedtime.
- c. *If severe*, give oral **ranitidine** 300 mg at night for 8-12 weeks; *if very severe* 150 mg 4 times daily (or cimetidine). More expensive alternative is oral omeprazole 20 mg once daily for 4 weeks; followed by 20 mg once daily for a further 4-8 weeks if not fully healed. If not improving on 20 mg, give 40 mg once daily for 8 weeks. Long-term treatment of healed oesophagitis is with ranitidine 150 mg 2 times daily.

WORMS (HELMINTHS)

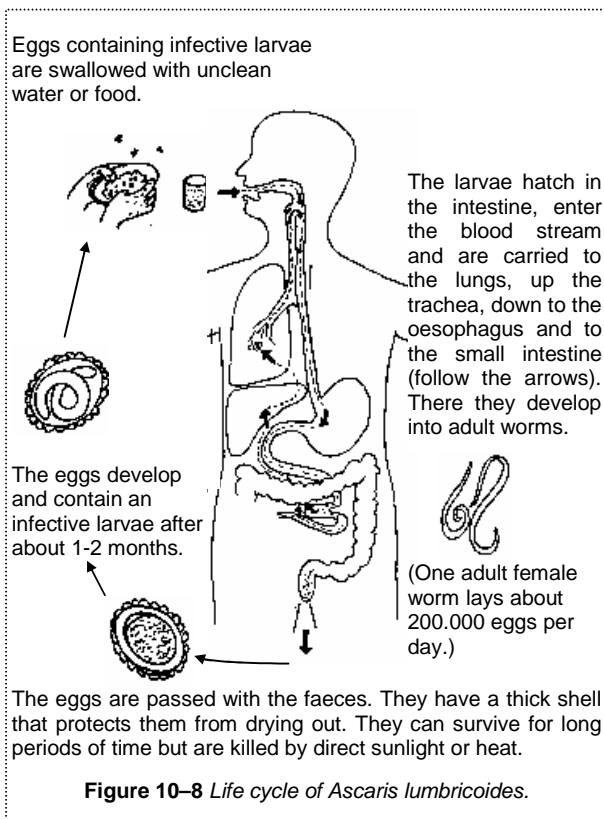
In situations where sanitation is poor, it is more common to be infected with worms than not to be infected. Children between 5-14 years are particularly at risk of disease from worm infection. Most worms live in the gut and lay eggs that can be found on stool microscopy. Finding eggs in the stool does not necessarily mean that the worm is responsible for causing symptoms. Whether the worms cause symptoms or not depends on the number of worms living in a person's gut (worm load). The commonest effect of worm infection is a subtle constraint on normal physical development. Children develop underlying nutritional deficiencies (for example iron deficiency or protein-energy malnutrition) and do not grow as well as they could. In addition, worm infection affects mental development and children learn more slowly. Sometimes children with worm infection complain about chronic abdominal discomfort with lack of appetite. However, most often worm infection is not obvious. For specific problems caused by the different worms see box.

Worms cannot multiply inside the body like bacteria. Part of their life is spent outside the human body. Each type of worm has its own specific life cycle, passing through an egg and a larval stage before becoming a mature worm. People who are infected with worms pass



	Clinical importance
Ascaris (roundworm)	Commonest worm infestation, usually no symptoms but a heavy worm load may cause: <ul style="list-style-type: none"> • Chronic abdominal pain, abdominal distension or a poor appetite • Partial or total intestinal obstruction because sometimes many roundworms form a big ball that obstructs the gut Rarely, roundworms may leave the small intestine and wander into the stomach, larynx or bile duct.
Hymenolepis nana (H. nana, dwarf tapeworm)	Second commonest worm infestation in Afghanistan. Heavy worm load may cause chronic abdominal discomfort in children.
Hookworm	Infection occurs when walking barefoot. Hookworm infestation can cause severe anaemia.
Trichuris (whipworm)	Whipworm infestation almost never cause symptoms in adults. In children, it can cause diarrhoea with blood and contribute to rectal prolapse.
Enterobius (pinworm, oxyuriasis)	The commonest symptom is night-time anal itching with sleep disturbance. Eradication of pinworm is difficult because the eggs are usually spread with dust throughout a household. Therefore, treat all household members, even those without symptoms, at the same time. The bedding should be washed at that time. Fingernails should be cut short.
Strongyloides	Strongyloides does not usually cause symptoms. However, in patients with severe weakness of their immune system, the worms may spread throughout the whole body and causes a severe, often fatal infection.
Hydatid disease (Echinococcus)	See page 111.

the eggs with their stools. Others become infected by eating food or dirt that has come into contact with infected stools (see figure 10-8). This can happen when stools are not passed into latrines and infect the soil, or when flies carry eggs from stools onto food. In hookworm and strongyloides, the larva develops in soil and will penetrate the skin when people walk without shoes over contaminated soil.



How to treat worm infection

Give **mebendazole** 500 mg one single dose (or 100 mg 2 times daily for 3 days). Alternatives: albendazole 400 mg one single dose (in strongyloides once daily for 3 days), levamisole 2.5 mg/kg as one single dose (in severe hookworm infection, give a second dose after 7 days) or pyrantel 10 mg/kg as one single dose (in severe hookworm infection once daily for 4 days). Do not use mebendazole or albendazole in children under 1 year. For hymenolepsis nana or other tapeworm infestations, give niclosamide. A special diet is not needed.

Regular deworming is recommended. Give mebendazole as a single dose to schoolchildren and children between 1-5 years every 6 months (children 1-2 years 250 mg; children over 2 years 500 mg).

How to prevent worm infection

The principles of prevention of worm infection are the same as for prevention of diarrhoea (see pages 91-92). Explain to people the life cycle of worms.

PERIOD PAINS (DYSMENORRHOEA)

Period pains sometimes respond better to acetylsalicylic acid (Aspirin) than to paracetamol. Alternatively give a family planning pill to regulate the menstrual cycle and so reduce period pains.

NOTE: do not give ergometrine, which is only for post-partum bleeding but has no effect on menstruation.

PELVIC INFLAMMATORY DISEASE (PID)

Assess all sexually active women who complain about lower abdominal pain for **salpingitis** or **endometritis** (pelvic inflammatory disease (PID)). PID is most commonly caused by gonorrhoea or chlamydia infection.

PID is likely if there is ● adnexal tenderness on vaginal examination ● signs of a lower genital tract infection (for example cervical discharge) or ● cervical motion tenderness. Sometimes you feel a tender pelvic mass. Not all women have a fever.

Important differential diagnoses are ectopic pregnancy and appendicitis.

Management

Treat *mild cases* with one of the **antibiotics for gonorrhoea** (see page 123) + **doxycycline** 100 mg orally 2 times daily for 14 days (or tetracycline 500 mg orally 4 times daily) + **metronidazole** 400 mg 2 times daily for 14 days.

For *severe cases* give **ceftriaxone** 250 mg IM once daily + **doxycycline** 100 mg orally 2 times daily + **metronidazole** 400 mg orally 2 times daily and continue for at least 2 more days after the patient has improved. Then give doxycycline or tetracycline for 2 more weeks.

Alternatives: ciprofloxacin 500 mg orally 2 times daily + doxycycline + metronidazole. Duration and follow up with doxycycline as above;

or

clindamycin 900 mg IV every 8 hours + gentamicin 1.5 mg/kg every 8 hours. Duration and follow up with doxycycline as above.

GALLBLADDER PROBLEMS

Gallstones are common in Afghanistan. They may cause chronic inflammation or obstruction of the biliary tract with colic and acute cholecystitis. *Ascaris* occasionally enters the biliary system and causes biliary colic, acute cholecystitis or acute pancreatitis.

Abdominal ultrasound is helpful to investigate gallbladder problems.

- **Biliary colic** occurs when a worm or a gallstone blocks the outlet of the gallbladder. This causes colicky or constant abdominal pain in the right upper abdomen, vomiting and sometimes jaundice. Treatment for pain consists of diclofenac 75 mg IM and hyoscine butylbromide 20 mg IM. Refer for surgery.
- **Acute cholecystitis** causes pain with guarding and rebound in the right upper abdomen, vomiting, fever and sometimes jaundice. The gallbladder may rupture and cause peritonitis or an abscess. Treat as for peritonitis.
- **Acute pancreatitis** causes gradual or acute onset epigastric or central pain. The pain radiates into the back. Vomiting is common. Serum amylase is high (more than 5 times normal).

Abdominal swelling

Abdominal swelling can be caused by fluid, air, an enlarged organ or an abnormal mass (see box). Through clinical examination you will be able to define what is causing the abdominal enlargement. History and general condition gives you further information about the likely cause of the swelling. An acute swelling that develops over a few hours or days is usually serious and indicates a surgical emergency, especially if accompanied by vomiting and abdominal pain.

Air. Percussion is hyperresonant. The sound is like beating a drum. Commonest cause is gastro-enteritis, when the abdomen becomes distended because of increased bowel gases. It is always important to exclude intestinal obstruction.

Enlarged organs (see figure 10-9). Percussion over enlarged organs and masses is dull.

Masses. In a pelvic mass you cannot get your hand below the mass.

Ascites (see figure 10-10). Ascites is a collection of fluid inside the abdominal cavity. It may be the result of peritoneal inflammation (exudate) or the result of fluid loss from the vascular system into the abdominal cavity (transudate) (see boxes). The cause of ascites is usually obvious from history and clinical findings:

- Acute onset of ascites with signs of peritonitis in abdominal perforation. The patient is very ill.
- Slow onset over several days or weeks in tuberculosis. The patient has often weight loss and fever.
- Swelling of face and high protein content in the urine in nephrotic syndrome.
- History of jaundice and other signs of liver disease in liver failure.
- Other signs of heart disease in heart failure.

If you are uncertain about the diagnosis, examine ascites fluid for protein and cells to see whether the fluid is exudate or transudate. Further investigations and management depend on the most likely diagnosis. If the patient is in severe discomfort, aspirate about 500 ml-1 litre ascites fluid (see page 256).

Weak abdominal muscles. This is the commonest cause in malnourished children whose abdomen appears large because malnutrition has weakened their abdominal wall muscles so that the gut comes forward. A heavy worm load often contributes to this condition.

Important causes of abdominal swelling

- Abdomen filled with air (gastroenteritis, intestinal obstruction, paralytic ileus)
- Enlarged organs (liver, spleen, kidneys, bladder, lymph glands, uterus - including pregnancy)
- Abdomen filled with fluid (ascites)
- Mass (hydatid cyst, tumour, abscess)
- Abdomen filled with worms (heavy ascaris worm load)
- Abdominal wall swelling (*generalized*: fat; *localized*: hernia, lipoma, infection)
- Children: weak abdominal wall in malnutrition

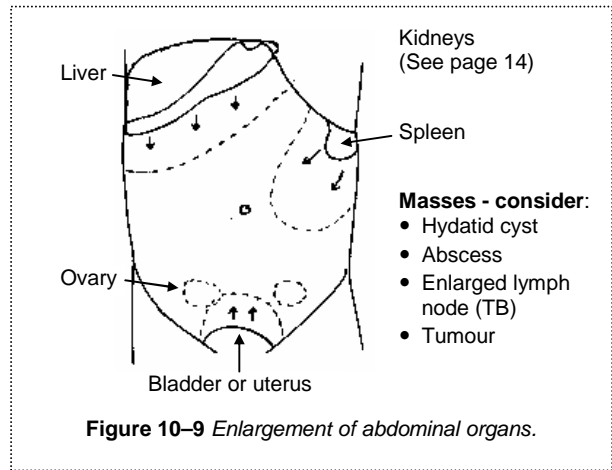


Figure 10-9 Enlargement of abdominal organs.

HOW TO ASSESS FOR ASCITES:

1. **Inspection:**
Bulging flanks
2. **Percussion:**
Start centrally and percuss to the periphery
3. **Fluid wave:**
Other person's hand gently pressing on the central abdomen
4. **Shifting dullness:**
Lie the patient on his side and percuss the abdomen. Mark the point where the sound becomes dull. Then turn the patient on his other side. In ascites, the point where the sound becomes dull has changed.

Left side → Turn patient → Right side

Figure 10-10 How to examine for ascites.

Causes of ascites

COMMON

- Tuberculosis
- Intestinal perforation - peritonitis

LESS COMMON

- Nephrotic syndrome
- Liver disease
- Heart failure

RARE

- Tumours

Differences between exudate and transudate

	Exudate	Transudate
Protein	High (more than 30 g/l)	Low (less than 30 g/l)
Cells	Many WBCs, often some red blood cells	Few cells
Blood	Sometimes visible blood	No blood
Causes	<ul style="list-style-type: none"> • Tuberculosis (TB) • Peritonitis • Less common: cancer 	<ul style="list-style-type: none"> • Nephrotic syndrome • End-stage liver disease • Heart failure

NOTE: staining the ascites fluid for AFB to check for TB is often negative even if the ascites is caused by abdominal TB. Therefore it is not a helpful investigation.

ABDOMINAL TUBERCULOSIS

TB can spread into the abdomen through intestinal lymph nodes or when a patient with pulmonary TB swallows his own infected sputum. Infection through milk is rare (bovine TB).

Clinical features

Consider abdominal TB in any patient with fever who is losing weight and complains about vague abdominal pain. TB is even more likely if there is ascites or if you feel an abdominal mass (intestinal lymph nodes).

Clinical features help to differentiate whether ascites is caused by TB or by liver failure:

	Tuberculosis	Liver failure
Abdominal tenderness?	Yes	No
Abdominal mass?	Sometimes	No
Leg oedema?	Little or none	Yes
Is ascites improving with spironolactone?	No	Yes

Management

Treat as category 1 according to treatment guidelines (see page 41).

Constipation

A patient is constipated when he does not pass faeces as often as is normal for him. Constipation is a common symptom in ill patients who are not eating and drinking enough. For differential diagnoses see box. Decide to which of the two groups the patient belongs to:

1. Patients with **incomplete constipation** (not dangerous). The patient has less frequent bowel movements than usual but is able to pass stool.
2. Patients with **complete constipation** (dangerous). The patient does not pass any faeces or gas. It is a sign of bowel obstruction, see above.

How to manage incomplete constipation

1. **Identify the cause.**

Causes of constipation*INCOMPLETE CONSTIPATION*

Commonest: • Not eating or drinking much

- Passing stools is painful (for example anal fissure or postoperative pain)
- Incomplete bowel obstruction
- Side effect of drugs (for example amitriptyline, ferrous sulphate, codeine or morphine)
- Opium abuse
- Stress-related (irritable bowel syndrome)
- Hypothyroidism
- Hypokalaemia

COMPLETE CONSTIPATION

- Intestinal obstruction
- Paralytic ileus

Children: • Congenital malformations

Rare: • Advanced colon cancer

2. **Advise a high fluid intake and physical exertion.**

Laxatives are not routinely indicated, especially not in children. If needed, only use a laxative for a few days (for example bisacodyl 5–10 mg at night or magnesium hydroxide).

3. **Assure the patient** that it is not harmful if he does not pass a stool every day.

Blood in stools

Find out whether the blood is on the outside of the stool or mixed with the stool (see box). Examine the rectum. Black smelly stools (like tar) are a sign of upper gastrointestinal bleeding (for example from the stomach). Treat the underlying problem.

ANAL FISSURE AND HAEMORRHOIDS

The anus is lined by vascular tissue. These anal tissues can become loose and form a ball that is prone to

Causes of blood in stool*RED BLOOD ON THE OUTSIDE OF STOOL*

- Haemorrhoids (usually painless, often dribbling of blood)
- Anal fissure (painful)
- Rectal cancer (older patient - changes of bowel habit, discharge)

RED BLOOD MIXED WITH DIARRHOEAL STOOL

- Bacillary or amoebic dysentery

RED BLOOD MIXED WITH DIARRHOEAL OR NORMAL STOOL

- Inflammatory bowel disease
- Colon cancer (older patient)

BLACK STOOLS

- Blood from upper gastrointestinal bleeding

bleeding. An anal fissure can occur through straining by passing a hard stool. Treatment for both conditions is similar:

1. Advise the patient to maintain a high fluid intake and take physical exertion to avoid constipation.
2. If the patient is constipated, give a laxative for 5 days.
3. Advise the patient to sit down for passing stools instead of squatting (for example to sit on a bucket).
4. A soothing haemorrhoidal cream or suppository containing lidocaine may reduce the pain if used before passing stools.
5. If haemorrhoidal bleeding is severe, surgery may be indicated.

INFLAMMATORY BOWEL DISEASE

Inflammatory bowel disease (Crohn's disease and ulcerative colitis) is rare. Suspect it if an adult or older child presents with chronic recurrent bloody diarrhoea, weight loss, joint pains, iritis and mouth ulcers. Some patients develop anal fistulas or abscesses. Inflammatory bowel disease is diagnosed by colonoscopy or sigmoidoscopy with biopsy, or by barium enema.

The patient with acute symptoms is treated with oral or rectal steroids. Long-term treatment is with *sulphasalazine* (acute symptoms 3–4 g/day; long-term prophylaxis 2–3 g/day). Sometimes immunosuppressants are given if the steroids and sulphasalazine do not control symptoms. Some complicated cases may need surgery.

BOWEL CANCER

Bowel cancer occurs in older patients. Early signs are recurrent attacks of constipation or diarrhoea, sometimes with blood in the stool. Later the tumour will cause intestinal obstruction, weight loss and anaemia. You may feel an abdominal mass. Through rectal examination you will detect about one third of bowel cancers, the other two thirds will be beyond the reach of your finger.

Diagnosis is by barium enema or coloscopy. Treatment is surgical. Often bowel cancer is diagnosed late and the prognosis is poor.

Difficulty swallowing (dysphagia)

Painful swallowing is common in throat infections. Some patients with dissociation complain about problems swallowing. In these cases, the patient can actually eat and drink normally but has the feeling he cannot swallow.

Take a drug history and examine the patient carefully for goitre and signs of systemic disease of which dys-

phagia may be a part. Pay special attention to the throat and the neck.

A barium meal or oesophago-gastroscopy will demonstrate the need for oesophageal surgery. If lung pathology is suspected, arrange a chest x-ray.

True dysphagia without a throat infection is often a serious symptom (see box). When assessing a patient with dysphagia, find the answers to the following questions:

1. **Did the dysphagia start acutely or gradually?**
 - Acute onset: foreign body
 - Gradual onset: tumour or benign stricture (scarring)
2. When the problem started; did the patient have **more difficulties with swallowing fluids or solid foods?**
 - At first, fluids only: pharyngeal cause
 - At first, solid foods only: oesophageal cause
 - Difficulty with both, fluids and solid foods: neurological cause
3. Is swallowing **painful?** (Oesophagitis, tumour)
4. Did the patient swallow a **foreign body?**

Causes of dysphagia

- Throat infection (tonsillitis, diphtheria)
- Foreign body in the oesophagus
- Oesophagitis
- Cancer of the oesophagus
- Benign stricture in the oesophagus
- Neurological (for example tetanus, stroke, rabies)
- Psychological expression of unrelieved stress (dissociation)
- Enlarged mediastinal lymph nodes or large retrosternal goitre

Vomiting

Vomiting is a very common, unspecific symptom (see box on the next page). It is usually not serious. Many acute infections start with initial vomiting that does not require any specific therapy. Vomiting often accompanies diarrhoeal disease.

Look for an underlying serious cause of the vomiting and treat accordingly. The following symptoms point to a serious cause of the vomiting:

- ✗ Persistent vomiting (acute abdomen)
- ✗ Vomiting and abdominal distension (intestinal obstruction)
- ✗ Abnormal sleepiness or drowsiness (brain infection)

How to manage vomiting

1. Prevent and treat dehydration.
2. Treat the underlying cause.

Important causes of vomiting*INFECTIONS*

- Gastroenteritis, food poisoning
- Viral infections (including hepatitis)
- Urinary tract infections
- Septicaemia
- Brain infections (meningitis, encephalitis)
- Malaria

NON-INFECTIOUS CAUSES

- Intestinal obstruction
- Functional dyspepsia or peptic ulcer
- Travel sickness
- Side effect of drugs (for example antibiotics, chloroquine, digoxin, opiates, NSAIDs, theophylline, anti-epileptic drugs)
- Psychological stress (for example underlying fear, unhappiness, post-traumatic stress)
- Acute appendicitis
- Pregnancy
- Poisoning
- Head injury, raised intra-cranial pressure
- Renal failure

NOTE: anti-emetic drugs are usually not needed if you can treat the underlying condition. They are rarely indicated in children. Vomiting in early pregnancy does usually not require any drug treatment.

If an anti-emetic drug is needed, the first choice depends on the underlying condition:

- *First choice* for most conditions: anti-histamine (for example promethazine).
- *Vomiting with gastrointestinal or liver problems:* metoclopramide (do not give to young children). Usually not needed in gastroenteritis.
- *Severe vomiting in terminal cancer:* chlorpromazine or haloperidol.
- *Vomiting after operations:* metoclopramide, if not effective, combine with anti-histamine.
- *Travel sickness:* anti-histamine (chlorpromazine or metoclopramide are not effective).

Vomiting blood (haematemesis)

Commonest cause of haematemesis is an oesophageal tear after heavy vomiting (Mallory-Weiss). This is usually not dangerous.

In a patient who vomits blood, find the answers to the following questions:

1. **Did the patient vomit blood from the stomach?** Or has he vomited blood back that he swallowed for example after a nosebleed? Or has he coughed up blood? In *haemoptysis* (coughing up blood), the blood is usually bright red; in *haematemesis* it is usually brown. However, if the patient vomits a lot of blood this will also be bright red.

Causes of vomiting blood (haematemesis)*COMMON*

- Oesophageal tear (Mallory-Weiss) after vomiting from any cause

LESS COMMON

- Peptic ulcer or stomach bleeding (often caused by NSAIDs)
- Bleeding from oesophageal varicose in liver cirrhosis

RARE

- Stomach cancer
- Blood disorders

2. Does the patient show signs of shock?
3. How many times has he vomited blood?
4. How much blood has he vomited?
5. What is the likely cause of the bleeding? (See box)

Danger signs. A patient's life is at risk if:

- ✘ He has vomited more than 300 ml (1.5 glasses) blood.
- ✘ He has vomited blood several times.
- ✘ He is shocked or anaemic from blood loss.

Management

If a patient has any of the above danger signs:

1. Start IV fluids (Ringer-Lactate solution or sodium chloride 0.9%) immediately.
2. Insert a nasogastric tube and aspirate until the stomach is empty.
3. Refer urgently to hospital.

LIVER DISEASE

Liver disease is common because the liver filters the blood coming from the portal vein circulation. Therefore, the liver is exposed to many viruses, bacteria, parasites and toxins. For the different functions of the liver see figure 10–11.

Patients with acute liver disease may be asymptomatic or may complain about tiredness, loss of appetite, fever or vomiting. Jaundice and hepatomegaly develop when the disease progresses. These symptomatic patients will often suffer from viral hepatitis.

Some patients with chronic liver disease are asymptomatic. Others show one or more of the following symptoms:

- Abdominal pain in the right upper quadrant from liver enlargement
- Abdominal swelling from ascites
- Ankle swelling from fluid retention
- Generalised itching

MAIN FUNCTIONS OF THE LIVER:

- Production of proteins and most of the factors for blood coagulation
- Maintenance of the blood glucose level
- Production of bilirubin from breakdown of red blood cells
- Removing and inactivating many drugs and toxins
- Immune defence against infections, especially against those bacteria or viruses that enter through the gastrointestinal tract

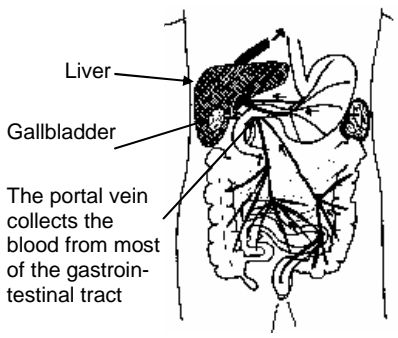


Figure 10–11 *The liver and its main functions.*

- Women: amenorrhoea; men: breast swelling (gynaecomastia) and loss of body hair
- Confusion and drowsiness
- Vomiting blood from gastrointestinal bleeding

How to assess a patient with suspected liver disease

When you assess a patient with suspected liver problem, look for other signs of liver disease (see figure 10–12):

- Confusion?
- Jaundice?
- Ascites?
- Abdomen:
 - Enlarged liver? Is the liver tender? Is its texture soft, firm or hard? Can you feel a mass in the liver?
 - Palpable mass in the abdomen? (This makes TB more likely than liver disease)
 - Enlarged spleen?
- Gynaecomastia? Loss of body hair? Finger clubbing? (= Signs of liver cirrhosis)
- Leg oedema?

Investigations

Investigations depend on the liver problem:

- Repeated liver function tests (GPT/ALT, alkaline phosphatase, bilirubin) to check the function of the liver and to measure disease progress. For normal values see box.
- Total and differential white blood cell count (WBC): high WBC as sign of infection; normal or low WBC often in viral hepatitis.
- Hepatitis A, B and C serology.

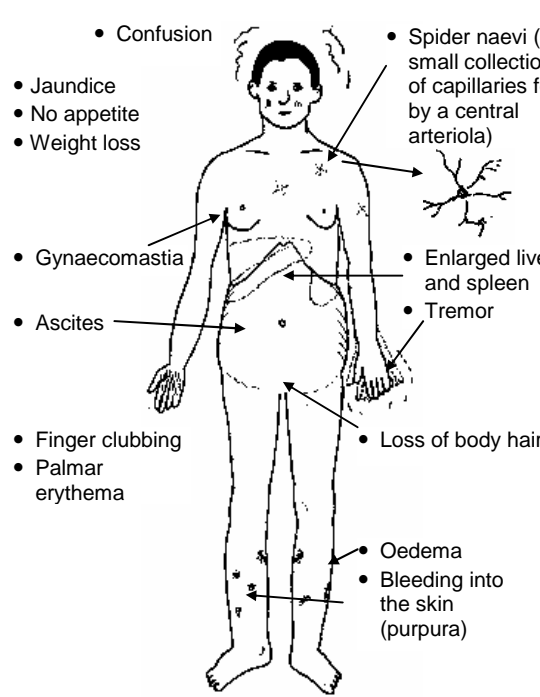


Figure 10–12 *Signs of liver disease.*

NOTE: Many of these clinical signs occur only in chronic or decompensated liver disease.

Normal values of basic liver tests

Alkaline phosphatase	Children	130–600 U/l
	Adults	30–300 U/l
Bilirubin	Adults and children over 5 days: Less than 1.0 mg/dl (17 micromol/l)	
GPT (ALT)	Children under 1 month: up to 70 U/l Adults and children over 1 month: 5–35 U/l	

- Blood sugar, albumin.
- Ultrasound, which will be able to show (1) structural abnormality of the liver (2) a mass or cyst and (3) a dilated bile duct in extra-hepatic jaundice.

Enlarged liver (hepatomegaly)

Many different conditions cause hepatomegaly (see box on the next page). It is often a transient finding in acute infections such as viral hepatitis, typhoid fever or septicaemia. In these cases, the enlargement will resolve after about 4–8 weeks.

Differentiate between the common causes of hepatomegaly by considering the clinical features and whether the liver is tender or not (see box on next page).

Jaundice (icterus)

Bilirubin is a yellow waste product of old red blood cells. The liver metabolises the bilirubin (conjugation) and excretes it through the bile duct into the gut.

Causes of an enlarged liver (hepatomegaly)**INFECTIONS**

- Viral hepatitis
- Many unspecific viral diseases
- Typhoid fever
- Malaria
- Septicaemia
- Tuberculosis

LIVER

- Chronic hepatitis
- Amoebic liver abscess

HEART DISEASES

- Heart failure

BLOOD DISEASES

- Leukaemia
- Lymphoma

OTHERS

- Kwashiorkor
- Hydatid disease
- Rare: inherited metabolic storage disorders

Bilirubin is responsible for the brown colour of normal stools. To assess for jaundice, look at the white of the eyes in good light. Clinical signs of jaundice can be found when the bilirubin is above 3 mg/dl.

There are three types of jaundice (see figure 10–13):

1. **Haemolytic jaundice (pre-hepatic jaundice).** It is caused by an increased destruction of red blood cells leading to an increase in bilirubin. Haemolytic jaundice is usually mild.
2. **Liver cell jaundice (hepatocellular jaundice).** The liver is diseased and cannot metabolise and excrete the bilirubin normally.
3. **Obstructive jaundice (extra-hepatic jaundice).** The extra hepatic bile duct is obstructed and bilirubin cannot be excreted into the gut.

Causes of hepatomegaly according to associated clinical features**Hepatomegaly + usually jaundice****COMMON**

- Liver disease: viral hepatitis, liver cirrhosis, drug reaction

LESS COMMON

- Malaria, septicaemia

RARE

- Lymphoma, leukaemia, liver cell cancer

Hepatomegaly + no jaundice

- Unspecific viral illness, sepsis, heart failure, tuberculosis, typhoid fever, amoebic liver abscess, hydatid disease

RARE

- Liver cell cancer

Hepatomegaly + splenomegaly (large spleen)

- Malaria, brucellosis, some viral illnesses, tuberculosis, typhoid fever; rare: leukaemia or lymphoma

Hepatomegaly + severe malnutrition

- Malnutrition

Tender liver

- Viral hepatitis
- Systemic bacterial infection
- Amoebic liver abscess
- Brucellosis

Non-tender liver

- Liver cirrhosis
- Hydatid disease
- Malnutrition
- Liver cancer

It is usually not difficult to differentiate haemolytic jaundice from the other two groups by simply asking for the colour of stools and urine (see box on the next page). The spleen is often enlarged in haemolytic anaemia. Post-hepatic obstruction is generally less common than haemolytic or liver cell jaundice.

If you are not sure about the type of jaundice (1) examine urine for bilirubin and urobilinogen (2) arrange

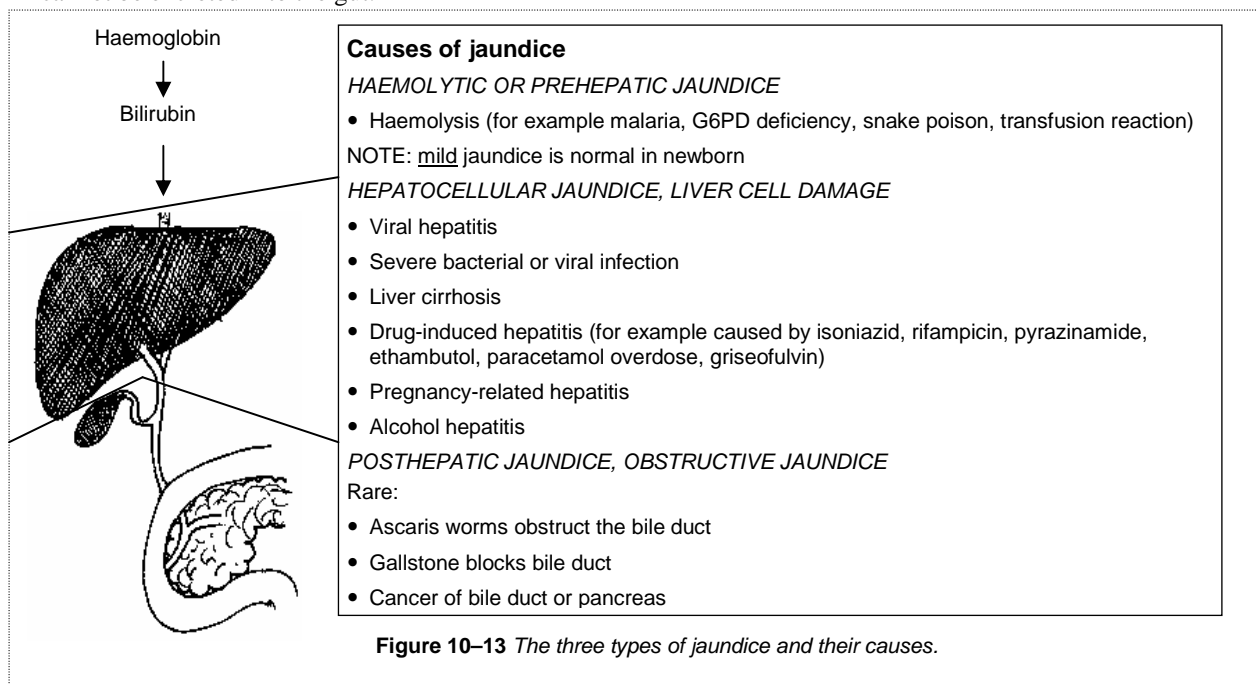


Figure 10–13 The three types of jaundice and their causes.

Practical points on how to differentiate between the different causes of jaundice

Clinical examination	Haemolytic jaundice	Liver cell damage and obstructive jaundice
Stool colour	Dark	Clay-white
Urine colour	Normal	Dark-brown like black tea
Palpation of abdomen	Enlarged spleen	Enlarged liver
Laboratory investigations		
URINE		
• Bilirubin	0	++++
• Urobilinogen	++++	0
BLOOD		
• Liver function tests	Normal	Abnormal (GPT, GOT and alkaline phosphatase are raised)

for liver function tests and haemoglobin, and (3) arrange for ultrasound to look for bile duct dilatation, a sign of obstruction of bile duct.

Specific liver diseases

VIRAL HEPATITIS

Viral hepatitis is an important cause of morbidity and mortality. Several different types of hepatitis viruses have been described. Their clinical features are similar. The main differences between them are the transmission route and the severity. Some viruses can cause a severe hepatitis with acute liver failure. Some patients are not able to eradicate the virus, even when they become well. They develop chronic hepatitis that may later lead to liver cirrhosis and liver failure. The following hepatitis viruses are of clinical importance:

- **Hepatitis A (HAV)**. It is also called infectious hepatitis and is transmitted via the faecal-oral route. It is usually an infection of children and rarely causes complications or chronic hepatitis. Most adults have had HAV infection and are immune. The incubation period for HAV is about 4 weeks.
- **Hepatitis B virus (HBV)** spreads mainly (1) through blood - for example from use of unsterile needles, blood transfusions or direct contact with blood (2) from a mother who is a chronic carrier of the virus to her newborn baby or (3) through sexual intercourse. Hepatitis B can progress to acute or chronic liver failure and cirrhosis. It is the commonest cause of liver failure. The incubation period for HBV is 1-6 months.
- **Hepatitis C virus (HCV)** spreads like HBV. 80% of patients with HCV will develop chronic hepatitis.

- **Hepatitis E virus (HEV)** spreads like HAV. It is comparatively rare, but may cause severe acute hepatitis, especially in pregnancy.

Clinical features

The early signs of hepatitis are unspecific and it is usually not diagnosed until the patient becomes jaundiced (see figure 10-14). **During the first week:**

- Tiredness, loss of appetite, nausea and vomiting
- Mild fever
- Mild pain over the liver
- No jaundice

About 1-2 weeks later:

- Jaundice appears and usually increases for about 2 weeks. It then resolves spontaneously over several weeks. The patient begins to feel better when the jaundice appears. He often feels very weak for several months.
- The urine turns dark and the stools pale, the fever subsides.

NOTE: jaundice together with fever is usually not caused by hepatitis.

- Slightly enlarged and tender liver.

NOTE: children often show only very mild symptoms.

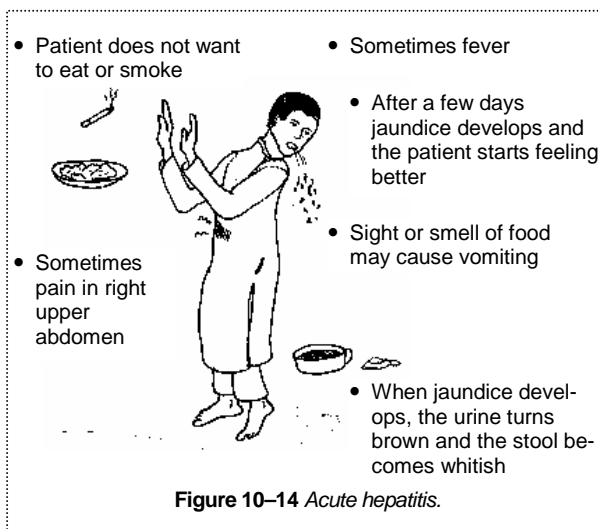


Figure 10-14 Acute hepatitis.

Complications

Acute liver failure (it occurs in HBV but also in HCV and HEV):

- Confusion
- Ascites
- Risk of severe infection
- Spontaneous bruising and bleeding
- Liver function tests (GPT) very high
- Low blood sugar

Chronic liver disease

There is often a tender enlarged liver but no other symptoms or signs. If chronic hepatitis is progressing and more and more liver cells are destroyed, you find very high liver function tests (GPT more than 10 times

normal) and jaundice. The patient will feel very tired and may have symptoms or signs of chronic liver disease as explained above.

Management

Acute hepatitis

1. There is no specific treatment for acute hepatitis. Bed rest is sometimes recommended while jaundice is obvious but will probably not make any difference to the course of the illness. There is no need for restriction of food. The patient should eat a normal, nutritious diet. Vitamins are useless.
2. For management of acute liver failure, see below under 'Liver cirrhosis'.

Chronic hepatitis

Diet or vitamins are not helpful in the management of chronic hepatitis B or C. Interferon α treatment has shown to stop multiplication of viruses, or even lead to remission of disease. However, the treatment (1) is very expensive (2) is associated with significant side effects and (3) is only effective in about 50% of all patients. Even if patients respond to interferon therapy, many relapse and need re-treatment.

Prevention

- Encourage good food hygiene.
- Stop spread through blood in hospitals and health centres:
 - Sterilise all surgical instruments.
 - Only use sterile needles for injections.
 - Do not give unsafe blood transfusions.
 - Protect yourself from hepatitis by avoiding direct contact with blood (wear gloves whenever possible).
 - Have sexual intercourse only in marriage.
- Immunisation against hepatitis B may become part of the immunisation programmes in the future.

NOTE: isolation of the patient does not help, for example a patient with HAV is infectious before the jaundice appears but for less than 1 week after it appears.

LIVER CIRRHOSIS (CHRONIC LIVER DISEASE)

In liver cirrhosis, liver cells are destroyed and replaced by scar tissue. Depending on the speed of destruction, but usually after many years, there are so many liver cells destroyed that the liver can no longer function properly. Commonest causes of liver cirrhosis are chronic hepatitis B or C infection and alcohol abuse.

Clinical features

Clinical features vary. Some patients are asymptomatic, others have only abnormal liver function tests, others present with end-stage liver failure. The following are possible features and complications of liver cirrhosis:

- Tiredness and weakness

- Confusion, tremor, unconsciousness (the blood bypasses the liver and toxic waste products, especially from protein metabolism, pass directly to the brain)
- Easy bruising (the liver does not make enough blood clotting factors)
- Oedema and ascites (the liver does not make enough albumin)
- Changes in sexual characteristics, such as breast development in men (gynaecomastia) and loss of body hair
- Enlarged spleen
- Gastrointestinal bleeding from varicose veins in the oesophagus (developed because of high pressure in the portal vein) or lack of clotting proteins

NOTE: the liver may not be enlarged because scar tissue makes it shrink. Jaundice is not common until late in the disease, unless the patient suffers from acute liver failure without cirrhosis.

Investigations

- **GOT/GPT (AST/ALT)** may be normal depending on the activity of the cirrhosis; usually they are slightly raised. In decompensated liver cirrhosis, all liver blood tests are abnormal.
- **Albumin** is the best indicator of liver function. If it is below 25 g/l, then the liver function is markedly impaired and the prognosis is poor.
- **Ultrasound** can demonstrate changes in size and tissue structure of the liver and it is used to diagnose primary liver cancer.

Management of uncomplicated liver cirrhosis

Reversal and cure of liver cirrhosis is not possible. Treat symptoms and complications when they occur to make the patient feel better.

1. Advise the patient that he should eat protein-rich food but no added salt. He should drink no alcohol.
2. Tell the patient to avoid unnecessary drugs because some drugs can cause liver failure.
3. Treat factors that may cause deterioration of the liver function (for example infection or bleeding).

Management of liver failure

1. Restrict protein intake and give a laxative to make the patient pass stool 2-3 times every day.
2. Avoid drugs that worsen liver function (for example sedatives or paracetamol). Treat any factors that worsen liver function (for example infection).
3. Monitor weight, liver function tests, glucose, albumin, clotting (INR), creatinine (or urea) and electrolytes. Look for signs of infection.
4. *If ascites and oedema:*
 - a. Advise bedrest and restrict the fluids to less than 1.5 litre/day.
 - b. Give oral spironolactone 100 mg once daily (children 2-3 mg/kg/day divided into 3 doses). If this is not effective, increase every 2 days by 100 mg

to up to 400 mg. If the effect is still poor, add oral furosemide 20–120 mg once daily.

- c. Measure the effect of the treatment regularly:
- weigh the patient. Aim is a weight reduction of 0.5kg every day until the patient has reached his normal weight (an increase in weight indicates more ascites or oedema)
 - measure the abdominal circumference at the level of the umbilicus.

After some months or years, even increased doses of diuretics will no longer be effective in reducing oedema or ascites.

- If *confusion* (encephalopathy), give oral neomycin; or streptomycin powder for injection 1g orally or via nasogastric tube every 6 hours until the patient improves. Give streptomycin orally but not by injection!
- If *hypoglycaemia*, treat as described on page 211. Consider giving glucose 10% 1 litre every 12 hours.
- If *easy bruising and spontaneous bleeding*, give vitamin K 10 mg IV once daily for 2-3 days. Do not give IM because of the risk of haematoma.
- If *gastrointestinal bleeding*: the patient will usually die of blood loss and shock unless specific hospital treatment is available.
- If *renal failure*, see pages 119-121.

HYDATID DISEASE (echinococcosis)

Hydatid disease is caused by the larval stage of the dog tapeworm (echinococcus). People become infected through dog faeces containing the echinococcus eggs. This may happen either through contact with an infected dog or contact with contaminated soil. A pre-larval stage hatches in the gut, penetrates the gut wall and in most cases reaches the liver. However, it may also reach lungs, brain or other sites. Fluid-filled cysts develop that contain many larvae. The cysts increase slowly in size (1-5 cm per year). In most patients (80-90%) only one organ is involved.

Clinical features

The infection is always asymptomatic in the early phase. It may take many months or years for symptoms to develop. Clinical symptoms occur (1) if the growing cyst causes pain or dysfunction from compression of surrounding tissues. (Symptoms depend on the site. The liver is the organ that is most commonly affected, see figure 10-15) (2) if the cyst ruptures, which may either occur spontaneously or during operation. Rupture may cause a severe allergic reaction or spread of larvae to many more sites in the body where they will develop in many new cysts (3) a biliary colic in case of liver involvement or (4) bacterial superinfection of the cyst.

Investigations

Ultrasound is used to confirm the diagnosis. About 30% of patients have eosinophilia in the differential WBC count.

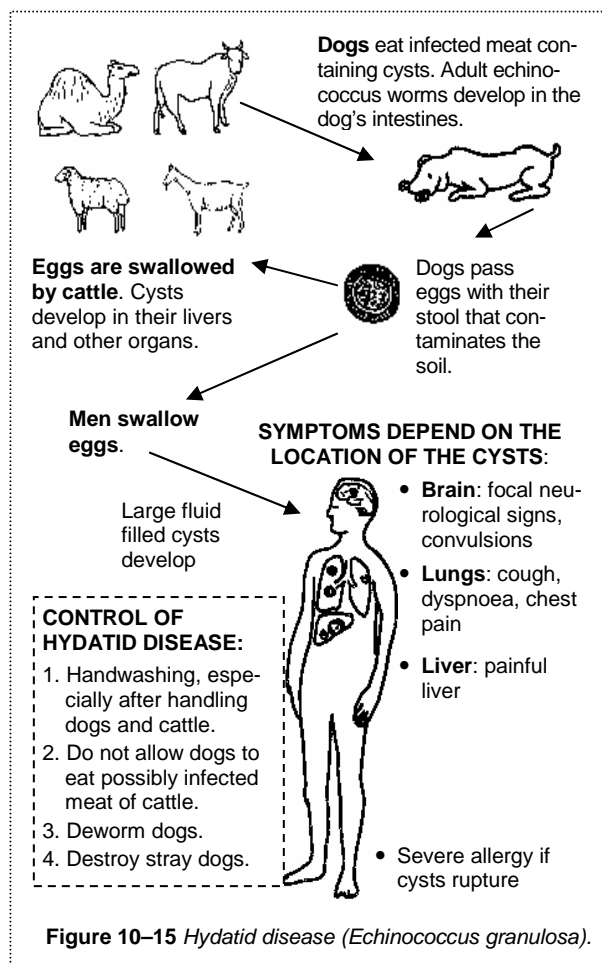


Figure 10-15 Hydatid disease (*Echinococcus granulosus*).

Management

Never aspirate a cyst because this may cause the same complications as the rupture of a cyst.

Treatment of hydatid liver cysts is by surgery but only in the hands of an experienced surgeon. **Albendazole** improves the prognosis for hydatid disease, including for cysts that are not accessible to surgery:

- *Before surgery*, give albendazole for 4 weeks followed by 14 tablet-free days. Repeat the cycle once, and then operate.
- *If a patient did not have albendazole before surgery*, give albendazole for 4 weeks followed by 14 tablet-free days, repeat the cycle once.
- *If surgery is not possible*, give albendazole for 4 weeks followed by 14 tablet-free days; repeat the cycle 2 times, then repeat cycles if needed.

The dosage is albendazole 10–15 mg/kg/day divided into 2 doses (children 2-5 years 50–100 mg 2 times daily; 6-12 years 100–200 mg 2 times daily; adults 200–400 mg 2 times daily).

AMOEBIC LIVER ABSCESS

The liver is the commonest site of amoebic disease outside the gut. Active amoebic forms (trophozoites) are carried through the venous system from the gut into

the liver where they form an abscess. Complications arise from local compression of the liver tissue or perforation of the abscess. Amoebic liver abscess is more common in adults than in children.

Clinical features

- Usually acute onset of symptoms
- Tender right upper abdomen with painful enlarged liver. The pain is often severe and constant, and sometimes radiates to the right shoulder. Often, the spaces between the lower ribs of the right chest are tender (intercostal tenderness)
- Fever and weakness
- Often crepitations in the right lower lung
- Usually no jaundice
- Usually no symptoms of amoebic dysentery

Investigations

- WBC count, alkaline phosphatase and GPT are often raised.
- Ultrasound examination will confirm the diagnosis.
- Stool examination shows amoebic cysts in less than half of all patients and does not help with diagnosis.

Management

1. Give oral **metronidazole** 20–30 mg/kg/day divided into 3 doses for 10 days (children 1-5 years 100 mg 3 times daily; 6-12 years 200 mg 3 times daily; adults 400 mg 3 times daily).
2. When metronidazole treatment is completed, give oral **diloxanide** 20 mg/kg/day divided into 3 doses for 10 days (children 6-12 years 250 mg 3 times daily; adults 500 mg 3 times daily).
3. Aspiration of the abscess is only indicated (1) if the abscess does not respond to metronidazole after 72 hours, or (2) if the abscess is very large and about to perforate.

BACTERIAL LIVER ABSCESS

Bacteria occasionally cause acute liver abscesses. The patient is very ill with fever, fast pulse, anaemia and weight loss. Jaundice is not common. A right pleural

effusion or right-sided pneumonia may develop. Diagnosis is by ultrasound. Without surgery and antibiotic treatment, the patient usually dies.

LIVER CANCER

A patient with liver cirrhosis may develop primary liver cancer (hepatoma) after many years. Many cancers spread to the liver and cause satellite lesions (metastases).

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11. Urinary tract and genital problems

Suspect a urinary tract problem if a patient complains about symptoms on passing urine (micturition), a change in colour of urine, abdominal or loin pain. Some patients present with general symptoms like fever, high blood pressure or oedema. In these patients consider also the possibility of a renal problem.

How to assess a patient with a possible urinary tract problem

The basics of the assessment of the urinary tract system are explained on pages 13-14. Given below is only a summary of the main points of assessment when you suspect a possible urinary tract problem: you should study this page together with pages 13-14.

Take a history

If you suspect a urinary problem ask the patient:

- 'Is passing urine painful?'
- 'Are you passing urine more frequently?' 'How often at night?'
- 'What is the colour of the urine? Have you noticed any blood in it?'
- 'Have you noticed discharge from the urethra?'
- 'Do you feel pain in the abdomen or the back?'

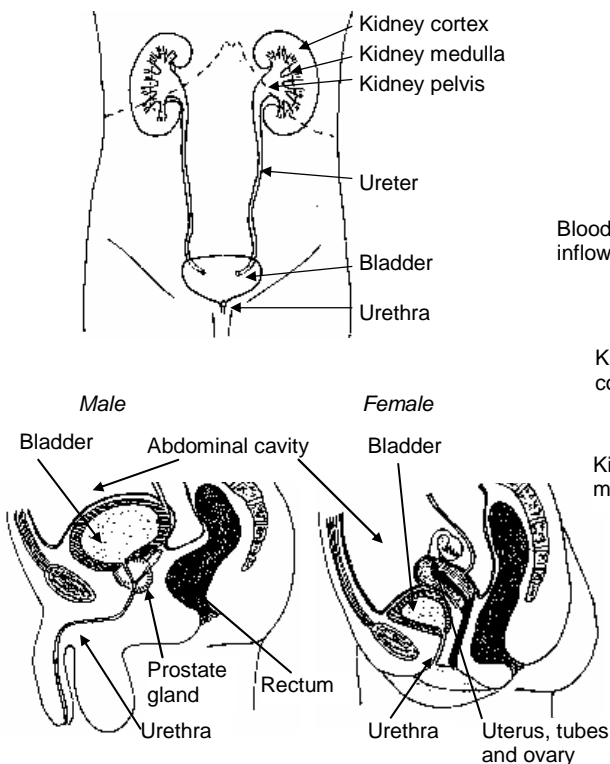
Examine the patient

- Ill or well?
- Swelling around the eyes? Oedema?
- Examine the abdomen and loins for kidney tender-

MAIN FUNCTION OF THE URINARY TRACT:

Removal of waste products. Body cells produce waste products. Most of these are removed from the blood by the kidneys. Urea is the main waste product and can be measured in the blood. The blood is filtered in the glomerulus and waste products are dissolved in water, which is called urine. The urine also contains salt or water that the body does not need. There is normally no sugar or protein in the urine. In order to remove the normal amount of waste products, the body needs about 800ml of water in the urine every day.

ANATOMY OF THE URINARY TRACT:

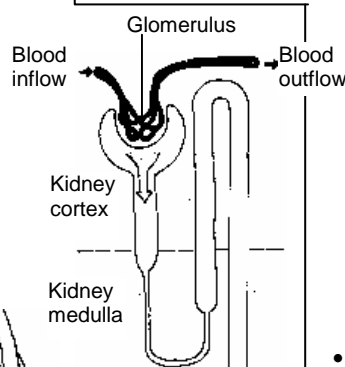


EXAMPLES OF PROBLEMS OF THE URINARY TRACT

- **Effect of dehydration:** if the body is *dehydrated* there is not enough water to remove the waste products. Therefore the waste products are dissolved in only a little water. The urine is concentrated and dark. In some people, the waste products are not all dissolved and make stones in the kidney or bladder.

If the body is *very dehydrated*, it will make little urine. Then the body cannot remove the waste products and salt. Their concentration rises in the blood. This is called renal failure. Renal failure can also be caused by conditions that damage the kidneys so severely that it cannot work properly.

- **Glomerular damage:** the glomeruli are the parts that are most commonly damaged by disease. The changes are called glomerulonephritis. The filter function will not work properly and proteins or red blood cells may leak into the urine. Clinically, glomerulonephritis can present as proteinuria, nephrotic syndrome, haematuria, acute inflammation (nephritic syndrome) and acute or chronic renal failure.



Damaged glomerulus in glomerulonephritis:



- Leakage of RBCs and protein (haematuria and proteinuria)
- Decreased glomerular filtration rate
 - High blood urea (nausea and vomiting, confusion, coma)
 - Water and salt retention (oedema, oliguria, heart failure)
- High blood pressure (headache, confusion)

Figure 11-1 Basic anatomy, physiology and pathophysiology of the urinary tract.

ness, renal masses and enlarged bladder. In men, examine the genitalia and the prostate.

- Take the blood pressure.

Investigations

● **URINE EXAMINATION.** To avoid false results, make sure the sample is taken in a clean way (see figure 11–2) and that it is examined within one hour.

1. **Look at urine transparency** (cloudy urine may be caused by blood, infection or crystals).
2. **Look at the colour of the urine:**

Urine colour	Interpretation
Clear yellow	Normal
Brown-yellow	Concentrated urine (dehydration)
Cloudy urine	<ul style="list-style-type: none"> • Pus (infection) • Phosphate crystals, this means no disease
Brown-black	Bile (see jaundice on pages 107-109)
Red	<ul style="list-style-type: none"> • Blood (haematuria), • Rifampicin
Black	Metronidazole

2. **Examine the urine with the test strips** (hot conditions or use beyond expiry date may give false results):

Test	Interpretation of abnormal results
Protein	Proteinuria (see box on next page)
Blood	Haematuria
Nitrites	Urinary tract infection. 90% of urinary tract infections show positive nitrate.
Urobilinogen	Haemolytic anaemia (pre-hepatic jaundice)
Bilirubin	Obstructive jaundice (extra-hepatic jaundice)
Sugar	Diabetes mellitus or decreased ability of the kidneys to reabsorb glucose (for example chronic renal failure or sepsis). Measure blood glucose to look for diabetes.
Ketones	Sign of acidosis, dehydration or starvation that shows that the body is using its reserves to produce energy.
pH	Not important

HOW TO TAKE A CLEAN URINE SAMPLE:


1. Get a clean bottle with a wide mouth.
 2. Clean the opening of the urethra.
 3. Catch the middle portion of the urine (mid-stream urine):
- 
- first middle last portion
4. Keep the urine sample cool and examine it within 1 hour.

Figure 11–2 How to take a clean urine sample.

3. Arrange urine microscopy (figure 11–3):

Finding	Normal values	Interpretation of abnormal results
WBC (pus cells)	Less than 5-10 per field	<i>If higher number:</i> inflammation, urinary tract infection or contamination from vaginal discharge
RBC (red blood cells)	Less than 3-5 per field	<i>If higher number:</i> haematuria
Bacteria	None	<i>If bacteria:</i> urinary tract infection or contamination of the sample
Epithelial cells	Few	No importance
Crystals	Variable number	No importance. They do not indicate renal stones! Often found in cold or old urine.
CASTS		<i>If found:</i>
Hyaline casts	Variable	No importance, often with fever or after exercise
Red blood cell casts	None	Glomerulonephritis, malignant hypertension
White blood cell casts	None	Pyelonephritis
Granular casts	None	Renal problem, especially glomerulonephritis or tubular necrosis

4. **Urine culture** is indicated (1) if a patient suffers recurrent urinary tract infections, or (2) if urinary tract infections do not respond to treatment with antibiotics. Urine culture can confirm infection, identify pathogens and determine which antibiotics are effective. Quality and reporting are often not satisfactory. A good report must include the name of the pathogen, sensitivities to common antibiotics and the number of bacteria per ml. More than 10⁵ bacteria/ml prove an infection.

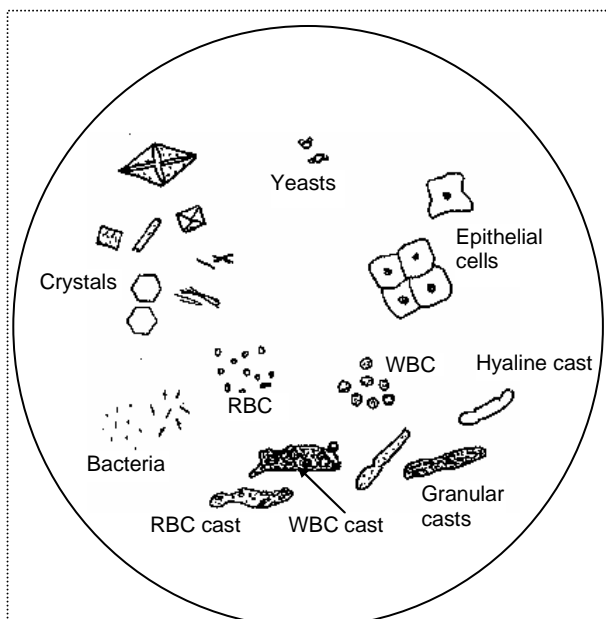


Figure 11–3 Findings on urine microscopy.

Causes of proteinuria

PLENTY OF PROTEIN (++)/++++)

- Renal disease (glomerulonephritis, nephrotic syndrome)
- Severe eclampsia

SOME PROTEIN (+)

Renal causes

- Urinary tract infection
- Haematuria
- Chronic renal failure

Non-renal causes

- After exercise (for example long walking)
- Burns
- Vaginal mucous
- Fever
- Pregnancy: pre-eclampsia
- Sexually transmitted infection
- Heart failure
- High blood pressure
- Diabetes mellitus

● **BLOOD TESTS:**

- **Creatinine** and **urea** are indicated if you suspect impairment of renal function because then creatinine and urea will rise. The higher they are, the worse the renal impairment. Be aware that they do not rise until the renal function is reduced to 40-50% of normal. Urea is also raised when a patient is starving or has eaten a lot of protein rich food.
Normal values: creatinine 0.7-1.5 mg/dl (70-118 μmol/l); urea 15-40 mg/dl (2.5-6.7 mmol/l)
- **Electrolytes** (potassium and sodium) are indicated in renal failure. If the laboratory cannot measure them, you can arrange an ECG that will show typical changes if potassium is very high (see figure 11-4). However, changes occur at a stage when the patient is already in danger of arrhythmias.

Serum potassium (mmol/l)	Major ECG changes
3.5-5.0 (normal)	
5.5-6.5	
6.5-7.5	
7.0-8.0	
Over 8.0	Ventricular arrhythmias, asystolie

Figure 11-4 ECG changes in hyperkalaemia.

● **X-RAYS:**

- **Plain abdominal x-ray** is indicated for confirmation of urinary tract stones. Depending on quality, you may determine kidney size and see abnormal calcifications that may indicate renal tuberculosis.
- **Urography (IVU, IVP)** is a series of x-rays with injection of contrast medium. IVU shows anatomical structures and is helpful in suspected renal tuberculosis, urinary tract stones and renal anatomical abnormalities.
- **ULTRASOUND** is indicated in renal failure, to look for urinary obstruction (demonstrated by dilated ureter) as a reversible cause of renal failure. It is also useful in further investigation of haematuria.

How to reach a working diagnosis

Different symptoms point to different groups of diseases. First decide which group your patient belongs to, and then consider the possible differential diagnosis in more detail.

1. **Irritative symptoms** indicate a possible irritation or inflammation of the urinary tract. The symptoms are *dysuria* (pain or a burning sensation when passing urine) and *frequency and nocturia* (frequent passing of urine and getting up at night to pass urine). For causes see boxes.

Not everyone who complains about these symptoms is suffering from an infection. For example only 25-50% of patients with dysuria have a urinary tract in-

Causes of dysuria

- Urinary tract infection
- Women: urethral syndrome (stress or cold related)
- Bladder stone or tumour
- Pinworm
- Irritation and soreness of genital area
- Sexually transmitted infection
- Psychological (stress)

Causes of frequency and nocturia

FREQUENT PASSING OF SMALL AMOUNTS OF URINE

- Urinary tract infection
- Older men: enlarged prostate
- Acute renal failure
- Bladder stone or tumour
- Normal: in pregnancy
- Psychological

FREQUENT PASSING OF LARGE AMOUNTS OF URINE (increased urine production)

- Heart failure
- Diabetes mellitus
- Diuretics
- Chronic renal failure

fection. Dysuria is suggestive of a urinary tract infection when there are other symptoms of irritation of the bladder, like frequency, the urgent desire to pass urine (urgency) and fever.

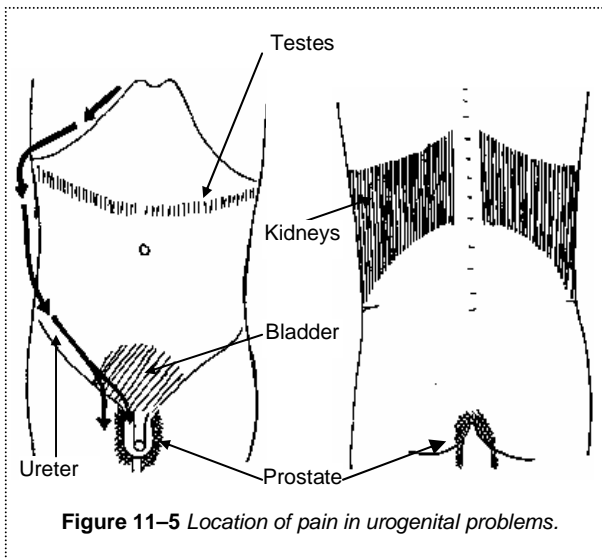
Many people complain about dysuria when they are ill, drink less and then pass concentrated urine. Any soreness in the genital area can cause pain or burning during passing urine. This is the reason why children with pinworm infestation may complain about dysuria. Some women complain about urgency, frequency and dysuria but have a normal urine examination. Their symptoms are probably caused by stress or cold.

Nocturia may be a sign of heart failure. To determine the cause of frequency and nocturia, find out whether the patient is frequently passing large or small amounts of urine (see box on previous page).

NOTE: do not treat irritative symptoms with antibiotics unless there is clear evidence of a urinary tract infection.

2. **Pain symptoms** (see figure 11-5 and box). Pain due to kidney disease is usually felt in the loins. Acute, very severe, colicky pain that may radiate into the groin is caused by obstruction - usually due to a stone in the ureter. The pain of acute pyelonephritis is also severe but constant and the patient has fever.

Chronic obstruction causes less discomfort, often none. Chronic renal failure does not cause any pain. Very often, loin pain is not caused by kidney disease



Causes of loin pain

- Musculo-skeletal, often referred from the spine
- Renal stones
- Hydronephrosis
- Pyelonephritis
- Renal tuberculosis

RARE

- Bleeding disorder
- Renal tumour

but it is referred pain from a musculo-skeletal or back problem. Many infections cause muscle pains that are also felt in the loins. If loin pain is caused by a kidney problem, percussion of the loins is very painful.

In men, perineal or rectal pain suggests prostatitis.

3. **Haematuria** can originate from any part of the urinary tract. The commonest causes of haematuria are infection and urinary tract stones. Knowing the answers to the following questions helps you to find the likely cause (see box):
- Is it true haematuria?** (Confirm blood in urine by using dipsticks or by microscopy)
 - When the patient passes urine, is the urine red all the time or only in the beginning or in the end?**
 - *In the beginning of micturition only:* urethral or genital bleeding
 - *Throughout micturition:* bleeding from ureter or kidney
 - *At the end of micturition only:* bleeding from bladder
 - Is passing urine painful?
 - Did the patient have any haematuria in the past?
4. **Obstructive symptoms** are hesitancy (delay before urine flow begins), poor flow when passing urine, and desire to pass urine again shortly after finishing. These symptoms indicate obstruction of the bladder outflow. A common cause in older men is a prostate problem, another possibility - especially in children - are bladder stones.
5. **Symptoms of sexual transmitted infections** are dysuria, urethral discharge, genital ulcer or swellings in the groin (see pages 123-124).
6. **Incontinence** in men is usually caused by enlargement of the prostate. The bladder cannot be emptied completely and urine dribbles out. Exclude infection. For causes of incontinence in women see page 206.

Causes of haematuria

PAINFUL HAEMATURIA

- Urinary tract infection
- Stone in the urinary tract

PAINLESS HAEMATURIA

- Glomerulonephritis
- Tuberculosis
- Kidney or bladder tumour
- Haemolytic anaemia and bleeding disorder
- Trauma
- Renal hydatid cysts
- Menstrual blood in the urine

NOTE: any cause of haematuria may be painful if associated with obstruction, for example due to a blood clot.

Specific urinary and genital diseases

URINARY TRACT INFECTION (UTI)

Cystitis (bladder infection) is very common in women. Cystitis may ascend the ureter and cause *pyelonephritis* (kidney infection). Signs of ascending infection are fever and loin pain. Normally, men do not get urinary tract infection (UTI). A man who suffers a UTI has usually got an underlying abnormality (stone, obstruction or enlarged prostate), tuberculosis or a sexually transmitted infection.

Clinical features

Clinical symptoms depend on the location of infection:

In adults:

- **Cystitis:** dysuria, frequency, urgency, lower abdominal pain. Urine is cloudy and shows blood or pus (white blood cells).
- **Pyelonephritis:** cystitis symptoms + fever, feeling ill, loin pain, nausea and vomiting.
- **Prostatitis:** cystitis symptoms + severe perineal or rectal pain and very tender prostate gland on rectal palpation.

In children:

Symptoms are often unspecific. Consider a UTI in any young child with fever, especially if the child is irritable and vomits. Sometimes malnourished children suffer from a chronic UTI.

Investigations

Urine examination. As a general rule: if the urine looks clear, it probably is clear.

Management

1. Give a suitable antibiotic:

- *Cystitis in non-pregnant women.* Give oral **co-trimoxazole** 1920 mg (= 4 tablets 480 mg) or oral amoxicillin 3 g as one single dose (to be repeated once after 12 hours).
- *Cystitis in pregnancy.* Give oral **amoxicillin** 500 mg 3 times daily for 7 days (or oral cephalixin or cephadrine). *If infection reoccurs,* treat again and consider prophylaxis with oral nitrofurantoin 50 mg at night until delivery.
- *Pyelonephritis and any UTI in men or children over 1 year.* Give oral **co-trimoxazole** for 10 days (or ceftriaxone).
- *Ill patients (including pregnant women) or children under 1 year.* Give **gentamicin** IM/IV once daily on its own or together with **ampicillin** IM/IV for 7 days (or ceftriaxone or cefotaxime).
- *Prostatitis.* Give oral **doxycycline** 100 mg 2 times daily for 2-4 weeks (or oral co-trimoxazole). *If not improving,* give oral ciprofloxacin 250 mg 3 times daily for 2 weeks.

2. Give general advice:

- 'Drink plenty of water.'
- 'After passing urine, urinate a second time 5 minutes later.' (Double voiding)

3. *If a patient has not improved after 48 hours of treatment,* change the antibiotic. Drug-resistance in UTI is common because of the widespread misuse of antibiotics. **Second choice antibiotics** for *adults* are oral ciprofloxacin or ofloxacin; for *children,* oral nalidixic acid; for *severely ill patients,* ceftriaxone IM/IV.

4. **Arrange investigations:** (1) a plain abdominal x-ray to look for renal or bladder stones (2) renal ultrasound to exclude obstruction and (3) a urine culture in the following patients:

- All men and children under 5 years
- Women who do not improve with the second antibiotic (do not arrange an x-ray if pregnant).

If investigations are normal, consider the possibility of renal TB (see below).

In children with recurrent UTIs give prophylactic oral co-trimoxazole (or nitrofurantoin) at half the normal dose every evening until the child is 5 years old. This shall prevent renal scarring.

URINARY TRACT TUBERCULOSIS

Tuberculosis (TB) of the urinary tract is a late presentation of TB that is usually seen in adults. TB bacilli reach the kidney via the blood stream. Infection develops at the outside of the kidneys (cortex). Later the infection is carried through the ureter into the bladder, which may also become diseased.

Clinical features

Suspect urinary tract TB in any patient with chronic bladder or renal symptoms that look like infection or stones but do not respond to antibiotics.

- **Renal TB:** usually only few symptoms. Sometimes loin pain, renal colic or painless haematuria.
- **Bladder TB:** gradual onset of frequency and dysuria. Often patients are treated with antibiotics for cystitis but symptoms do not improve.
- Sometimes you feel a craggy mass of the epididymis or prostate.

Investigations

- Urine examination: pus (white blood cells) but no growth on culture. Nitrite negative
- Blood urea or creatinine to check whether the kidneys are functioning normally
- IVU
- Chest x-ray is often normal

NOTE: urine examination for acid-fast bacilli (AFB) is not helpful because the urine usually contains many harmless AFB bacilli that are not TB.

Management

Classify as category 1 and treat accordingly (see page 41). Symptoms will usually start improving within 10 days.

URINARY TRACT STONES

Urinary tract stones are common. They develop in kidney or bladder because of repeated episodes of diarrhoea with dehydration or through insufficient fluid intake during the hot season. Stones never dissolve by themselves but if they are small they may pass with urine.

Clinical features

● Pain:

- **Kidney stones** cause loin pain. Sometimes even large kidney stones do not cause any pain.
- **Renal colic** occurs when a *stone obstructs the ureter*. The pain is very severe and is usually felt in one flank, radiating down to the groin or testicle of that side. Typically the pain comes in waves and the patient is moving around to try and find some relief. Most ureter stones pass spontaneously.
- **Bladder stones** cause a distressing desire to pass urine that will not pass. Bladder stones are common in children.

● Haematuria

● Recurrent urinary tract infections

Investigations

Plain abdominal x-ray will show 90% of all stones.

NOTE: if the x-ray department uses old plates, you may see artefacts that can be mistaken for stones! Look at other x-rays taken with the same plate because artefacts are always at the same place of an x-ray taken with the same plate.

Management

1. **Increase fluid intake** to 3-4 litres per day.
2. If **renal colic**, give **diclofenac** 75 mg IM + **hyoscine butylbromide** 10 mg IM (or atropine) for pain relief. Indication for surgery is obstruction of the kidney outflow.
3. If **bladder stones**, refer for surgery.
4. **Long-term management** of kidney stones consists of treating pain and infections when they occur. Advise the patient to drink plenty, especially during the hot season.

Prevention

1. **Advise a high fluid intake during the hot season.** A person should drink enough to pass about 2 litres of urine per day.
2. **Prevent dehydration** in diarrhoea by starting oral rehydration with the first diarrhoeal stool.

ACUTE NEPHRITIC SYNDROME

Nephritic syndrome is caused by acute inflammation of the glomeruli. It is one of the clinical presentations of *glomerulonephritis*. Nephritic syndrome is not caused by infection but by an abnormal immune reaction. For example, this reaction may occur 2-3 weeks after streptococcal throat or skin infection (**post-streptococcal glomerulonephritis**) or hepatitis B. The reaction damages the glomeruli. The body loses proteins and blood because these leak through the damaged glomeruli filter into the urine. If many glomeruli are damaged, the kidney fails to work. Chronic renal failure occurs when progressively more and more glomeruli are damaged. Acute nephritic syndrome usually affects children older than 3 years and young adults.

Clinical features

The classical symptoms of the acute nephritic syndrome are (see figure 11-6):

- Haematuria
- Proteinuria that leads to hypoproteinaemia and oedema, especially of the face
- High blood pressure
- Renal failure with oliguria (only small amounts of urine are passed), nausea and vomiting

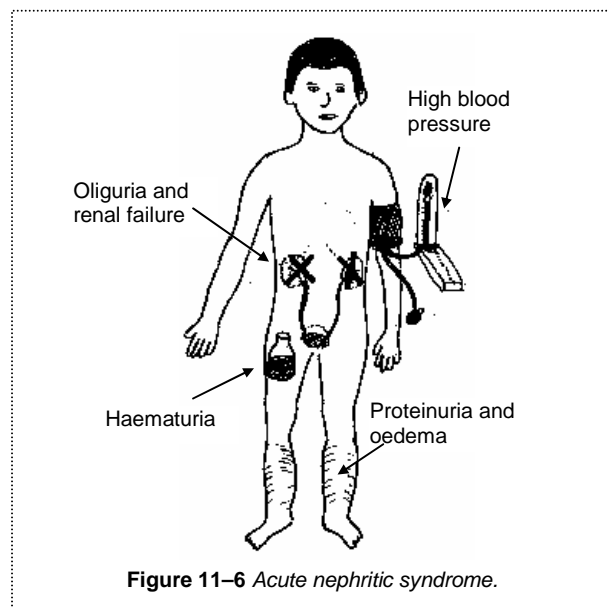


Figure 11-6 Acute nephritic syndrome.

Investigations

- Urine examination with dipsticks: blood +++++, protein ++
- Urine microscopy: red blood cells, granular and red blood cell casts
- Serum urea or creatinine: raised
- Potassium and sodium
- If possible, antibodies to streptococcal antigen (ASOT-titre) and HBsAg to determine the cause

Management

1. Give oral **penicillin V** for 10 days to eradicate any remaining streptococci in the throat or on the skin.
2. **Keep the blood pressure below 140/90 mmHg** to prevent further damage to the kidneys.

3. **Treat other complications** as described under 'Acute renal failure'.

Prognosis

In adults, the prognosis varies and there is often progressive worsening of renal function and persistently high blood pressure. In children with post-streptococcal glomerulonephritis, the prognosis is good and the glomerulonephritis usually resolves after a few weeks.

NEPHROTIC SYNDROME

Nephrotic syndrome is less common than acute nephritic syndrome. In nephrotic syndrome, large amounts of protein leak through damaged glomeruli into the urine. This results in oedema, proteinuria and reduced protein-level in the blood. The exact cause of nephrotic syndrome is not known. There are two types of nephrotic syndromes:

1. **Primary glomerular disease** that usually affects children. 90% of these cases respond to treatment with steroids (prednisolone). Although relapses occur, prognosis is good.
2. **Secondary nephrotic syndrome** does not respond to steroids. The patients are often adults and prognosis is poor because they develop progressive renal failure.

Clinical features

- Oedema, first around the eyes, then generalised oedema. If severe, ascites and pleural effusions
- Oliguria
- Proteinuria

Complications:

- Increased risk of infections.
- **Shock** from hypovolaemia. Proteins bind fluid and regulate the blood volume. When proteins are lost, the blood volume becomes less. This can result in acute renal failure or hypovolaemia and shock. Treat with haemaccel IV followed by furosemide.
- **Renal vein thrombosis.** Suspect if a patient complains about abdominal pain and develops acute renal failure and haematuria.

Investigations

- Urine examination to differentiate between the causes of oedema (see box)
- Blood examination: low albumin (less than 2.5 g/dl = 25 g/l; normal value 3.5-5.0 g/dl).

Management

1. In **adults**, give a trial of **prednisolone** 20 mg 2 times daily for 2 weeks. If proteinuria does not become less and oedema is not improving, the nephrotic syndrome is so-called prednisolone-resistant. Stop prednisolone gradually and treat symptoms only.

In **children** give **prednisolone** 2 mg/kg/day divided into 3 doses (1-5 years 5-10 mg 3 times daily; 6-12

Causes of oedema

Urine examination	Causes
Protein +++/++++	<ul style="list-style-type: none"> ● Nephrotic syndrome ● Pregnancy: severe eclampsia
Protein ++ Blood ++/++++	<ul style="list-style-type: none"> ● Glomerulonephritis
Protein negative / +	No renal problem: <ul style="list-style-type: none"> ● Severe anaemia ● Malnutrition ● Heart failure ● Liver failure

years 10-20 mg 3 times daily). Do not give more than 80 mg/day. Give this dose daily for 4 weeks. Usually proteinuria and oedema become less within 5-10 days.

Reassess after 4 weeks:

- *If improved*, give the same dose every second day for another 4 weeks (total treatment duration 8 weeks).
- *If no response after 4 weeks*, stop prednisolone gradually because then the nephrotic syndrome is prednisolone-resistant. Treat symptoms only.

2. **Treat and prevent infections.** Give oral **penicillin V** as long as ascites persists to prevent pneumococcal peritonitis.

3. **Give diuretics to control symptoms.** Diuretics reduce oedema but do not cure the underlying glomerular damage.

- In **adults**, give oral **spironolactone** 25-100 mg once daily but only if there is no renal failure because of the risk of hyperkalaemia. Add oral furosemide 20-80 mg once daily if not improving.
- In **children**, use diuretics very carefully because the blood volume is already reduced. Diuretics cause further fluid loss with the risk of shock. Give diuretics only if oedema is increasing despite steroid treatment or if the oedema causes severe discomfort. Then give oral spironolactone 2 mg/kg/day divided into 2 doses. If necessary, add oral furosemide 0.5-1 mg/kg/day once daily.

4. **Advise the patient** to eat protein-rich food with no added salt and to drink little (fluid restriction).

5. **Monitor the patient's progress:** (1) weigh a patient every week (2) measure the blood pressure and (3) examine the urine for protein. Write down the results to monitor the patient's progress.

Relapses of nephrotic syndrome are common. Treat them in the same way as the first attack.

Acute renal failure

In renal failure, the kidneys are no longer able to regulate the body's fluid and electrolyte balance. The commonest and most obvious sign is oliguria. Oliguria means that only very little urine is passed (in adults less than 400 ml in 24 hours, in children less than 1 ml/kg/hour

- for causes see box). Laboratory findings are high creatinine or urea and often electrolyte disturbances (low or high sodium and high potassium).

If a person does not pass enough urine, this means the body is not excreting the waste products and the patient will develop urine poisoning (uraemia). Signs of uraemia are:

- Confusion
- Nausea and vomiting
- The breath smells like urine
- Swollen feet and face
- High blood pressure

How to find the cause of acute renal failure

If a person does not pass enough urine, first find out whether the patient has a **pre-renal** or **post-renal problem** because these are often readily treatable and curable. If the patient has signs of renal disease it is likely to be renal failure, which is not easily treatable.

1. Find the answers to the following questions:

- Any recent dehydration, blood loss or severe infection?
- Does the patient have pain?
- Does the patient look ill or well?
- Does the patient pass little urine (oliguria) or no urine at all (anuria)?
- Is the bladder palpable?
- Has the patient got a known renal disease? Or has he any signs of renal disease? (For example proteinuria or haematuria - if so, then a renal problem is likely)

2. Then decide:

Pre-renal problem (Kidneys do not produce urine)	Post-renal problem (Urine is made but cannot be passed because of obstruction)
History of dehydration, blood loss or severe infection	
Patient usually looks very ill	Patient often in pain
No enlarged bladder	Enlarged bladder
Little urine is passed (oliguria)	No urine is passed (anuria)

If the cause of renal failure is unclear, pass a urine catheter (see page 258). If no or little urine is drained, it is most likely not a problem of obstruction.

Management of pre-renal failure

If the urine output does not increase after the fluid deficiency has been corrected, give furosemide 40 mg slowly IV (children 1–2 mg/kg). In most cases, this will cause marked increase in urine output within 2 hours. If not, treat as renal failure, see below.

Management of post-renal obstruction

1. **Release the obstruction** by catheterisation, suprapubic puncture or nephrostomy. If a man cannot urinate because of an *enlarged prostate*, ask him to sit in a

Causes of oliguria or anuria

PRE-RENAL

- Dehydration
- Shock
- Sepsis
- Severe heart failure

RENAL

- Acute pyelonephritis
- Glomerulonephritis
- Nephrotic syndrome
- Chronic renal failure
- Renal tuberculosis
- Side effects of drugs (gentamicin, streptomycin, rifampicin, pain killers)

POST-RENAL

- Outflow obstruction: bladder stone, enlarged prostate, blood clot
- Neurological (damage to nerves responsible for bladder opening, for example after spinal injury)

tub with hot water and try to urinate. If this does not help or is not possible, catheterise him.

2. If there are signs of a urinary tract infection, treat it.

Management of renal failure

If the kidneys are damaged, specific treatment is usually not available. Treatment should be at hospital and consists of (1) maintaining fluid and electrolyte balance and (2) treating complications while you hope for the renal function to recover. The prognosis depends on the underlying cause.

1. **Monitor fluid input and output.** Restrict the fluid intake according to the urine output over the previous 24 hours. Measure the urine output over 24 hours. Give this amount + replacement of all fluid losses (for example from diarrhoea, vomiting) + 500 ml (children 12 ml/kg) for the next 24 hours.

2. **Monitor electrolytes.** A common complication is hyperkalaemia, which may cause cardiac arrhythmias. If blood tests are not available, you can diagnose severe hyperkalaemia by ECG (see figure 11–4). If potassium is over 6.5 mmol/dl or if the ECG shows typical changes, give calcium gluconate 10% 10 ml slowly IV over 5 minutes (children 0.5 ml/kg). This does not reduce potassium concentration but reduces the risk of dangerous cardiac arrhythmias.

To reduce potassium quickly by putting potassium back into the cells, give glucose 40% or 50% solution 100 ml with 10 units of rapid acting insulin added and give slowly IV. Monitor for hypoglycaemia, especially in children.

Cation exchange resin (calcium resonium) removes potassium from the body. If available, give 15–30 g orally or rectally 2–3 times daily.

3. **Avoid drugs that could further damage the kidneys** (gentamicin, streptomycin, tetracycline, ibuprofen or other NSAIDs, ACE inhibitors such as captopril).

4. **Treat complications** (for example infections, high blood pressure or gastric ulcer).
5. **Check the patient's weight and creatinine** (or urea) frequently to monitor renal function. If the renal function recovers, be aware that the oliguric stage (during which the patient passed very little urine) is followed by a polyuric stage (during which he passes large amounts of urine). Therefore keep monitoring fluid input and output until the urine output is stable.
6. *If the renal function does not recover*, dialysis is necessary to prevent and treat uraemia.

Chronic renal failure

If kidneys are permanently damaged, they cannot put all the waste products that are made in the body into the urine. When the amount of waste products in the body increase, the patient develops clinical symptoms.

Clinical features

Suspect chronic renal failure if a patient has any of the signs shown in figure 11-7.

Investigations

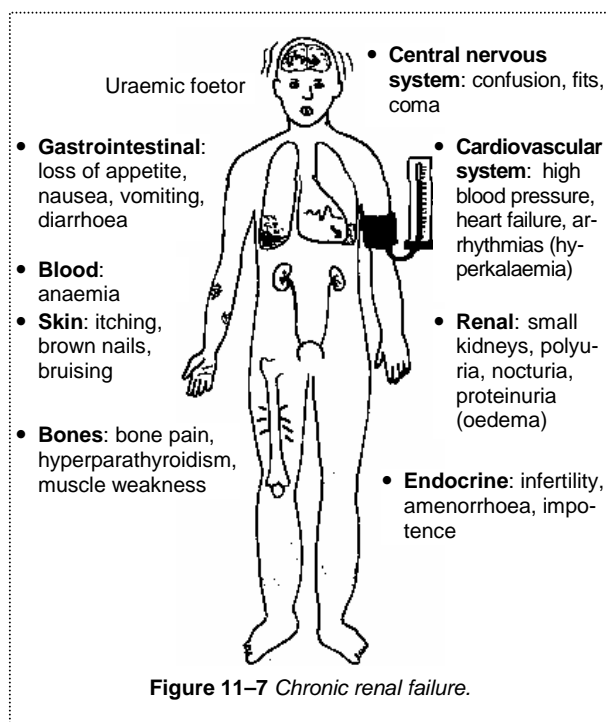
Investigations may help to find the cause of chronic renal failure, to monitor renal function and to look for complications.

- **Urine examination:**
 - *Blood* suggests glomerulonephritis
 - *Protein* suggests glomerulonephritis, little protein also in infection
 - *Glucose* is often positive but only raised blood glucose can be used to diagnose diabetes
 - *Raised WBC:* infection, tuberculosis

- **Blood examination:**
 - Urea or creatinine to measure renal function
 - WBC, haemoglobin, glucose, calcium, uric acid
- **Ultrasound** shows renal size and helps to diagnose hydronephrosis
- **Abdominal x-ray** to exclude renal stones that may not be obvious on ultrasound

Management

1. **Look for treatable causes** that affect renal function (for example UTI, high blood pressure, diabetes mellitus, tuberculosis, obstruction, nephrotoxic drugs). Blood pressure should be below 130/80 mmHg.
2. **Advise about diet.** The patient should eat electrolyte rich food (for example potatoes) but restrict salt intake if the blood pressure is high. He should eat less protein-rich foods because protein is the main source of toxic metabolites. He should drink plenty.
3. *If anaemic*, give a trial of ferrous sulphate. Stop it if the haemoglobin does not rise after 2 weeks.
4. **Weigh the patient regularly** and record his weight. If his weight increases, this may indicate fluid retention.
5. **Treat hyperuricaemia**, which may cause joint pains, with allopurinol.
6. *If calcium is low*, give calcium supplements.



Infertility

About 1 in 10 couples have difficulties getting pregnant. Sometimes only one partner has a problem; often both partners have an abnormality that makes it more difficult for the woman to become pregnant. This causes great distress and worry to families. Infertility has many causes: some can be treated, others not. Examples of causes are:

Man	Woman
<ul style="list-style-type: none"> ● Not enough sperm ● Blocked spermatic cord after TB or sexually transmitted infection ● Varicocele of scrotum ● Genetic factors ● Smoking 	<ul style="list-style-type: none"> ● No ovulation ● Blocked tubes (often due to tuberculosis) ● General severe chronic illness ● Genetic factors

When men feel under pressure to become a father, they often arrange for a **sperm count**. A sperm count should be collected after 3 days of abstinence and should be examined within 2 hours. The following information from a sperm count are important: (1) volume at least 2 ml (2) number of sperms at least 20 million/ml (3) at least 75% motile sperms and (4) at least 75% normal morphology.

Management

It is beyond the purpose of this book to discuss all issues. However, the following explanation will help

many couples to succeed in becoming pregnant because many who come to see you will not be totally infertile.

1. **Advise to have intercourse at the woman's fertile time.** A man produces millions of sperms but a woman releases only one egg per month. Therefore they should try for a child during the time when the woman releases the egg. This is called the fertile time. Count 10 days from the first day of the menstruation. Between this day 10 and day 16 is the fertile period. Advise having intercourse during this period. A woman can also recognise this fertile period by checking the mucous her cervix produces. During the fertile period, the mucous is very clear, wet and can be stretched between her fingers. After intercourse, the woman should remain lying down for about 15 minutes so that the sperms have time to swim into the womb and find the egg.
2. **Take care of any other health problems,** especially anaemia and infection in the woman.
3. Advise the man to **stop smoking.**
4. **Reassure the couple** that even in entirely normal couples it often takes about 8-12 months before the woman becomes pregnant.

NOTE: hormones, vitamins and other commonly prescribed drugs for men or women who have difficulties having a baby almost never do any good and have no scientific basis.

Scrotal swelling

In cases of scrotal swelling, do not miss torsion of the testis, because delayed surgical treatment will result in loss of the testis from necrosis.

Find the answers to the following three questions (see figure 11-8):

1. Is the swelling painful?
2. Can you get your fingers above the swelling?
3. Does the swelling illuminate when you shine a torch through the swelling?

TORSION OF THE TESTIS

Twisting of the testis interrupts the blood supply and will lead to necrosis and loss of the testicle if surgery is not performed immediately. Torsion of testes presents

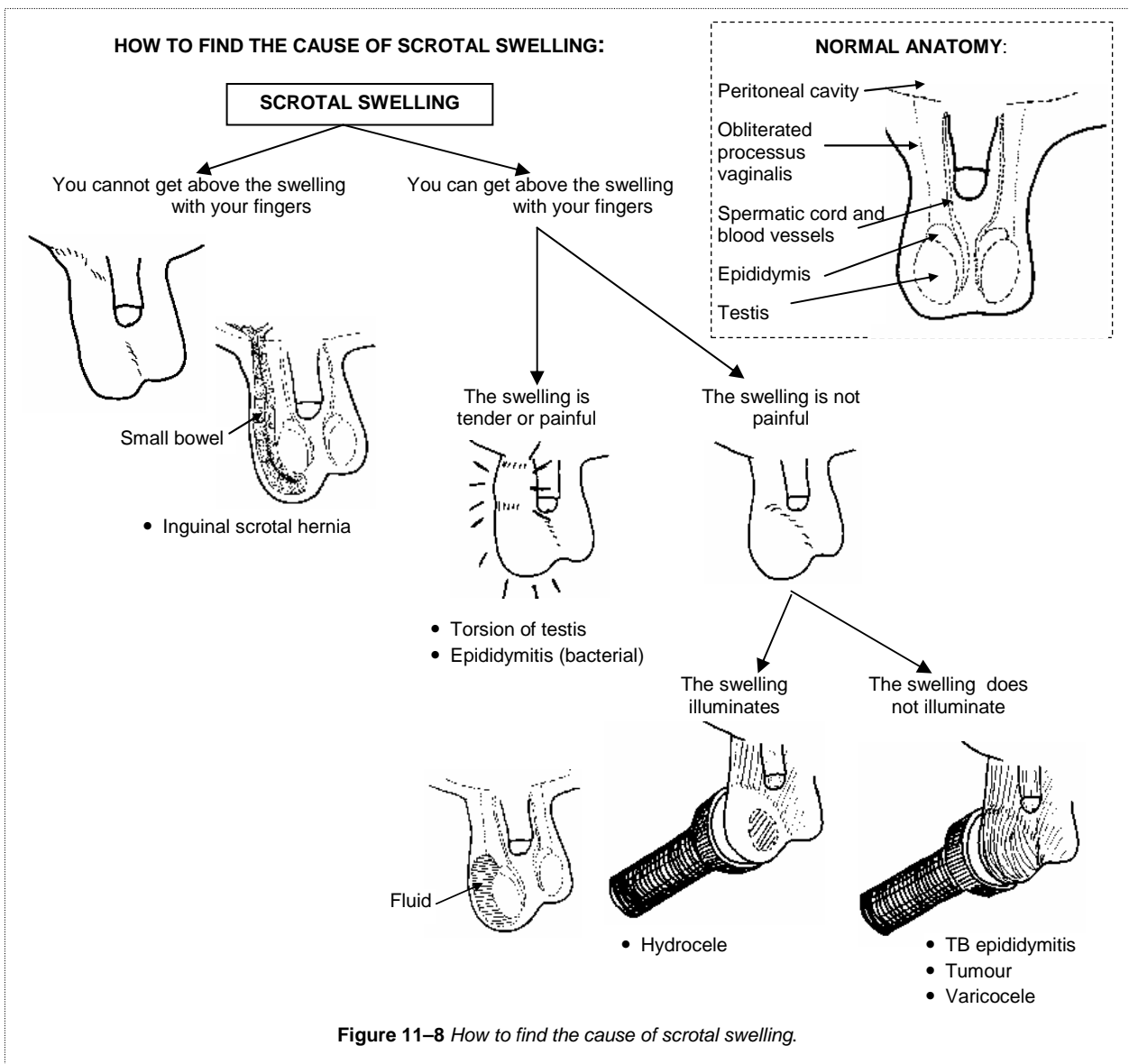


Figure 11-8 How to find the cause of scrotal swelling.

as a sudden painful scrotal swelling. It usually occurs between the ages of 9-25 years. If you suspect torsion of the testis do not wait and observe the patient but send him for surgery immediately.

INGUINAL HERNIA

See page 97

HYDROCELE

A hydrocele is typically not painful and illuminates. It is not dangerous. It is caused by a fluid filled pouch of peritoneum within the scrotum. If the hydrocele has been present since birth and does not change size, it will usually resolve within 4-6 months. If it appears at a later age and varies in size it is unlikely to disappear spontaneously and surgery is indicated.

EPIDIDYMITIS

Epididymitis has two main causes that are easy to distinguish:

Non-tuberculosis epididymitis in sexually active men is usually caused by chlamydia or gonorrhoea bacteria, sometimes by bacteria that also cause urinary tract infections. The swelling is very tender and hot. The patient may have fever.

Examine for urethral discharge and examine a urine sample.

1. If you suspect a sexually transmitted infected (gonorrhoea or chlamydia), treat as described below under 'Urethral discharge'.
2. Treatment for epididymitis not caused by a sexually transmitted infection is with the same antibiotics as for urinary tract infection.

Tuberculous epididymitis. The epididymis enlarges and becomes hard and craggy. It is only slightly tender. The mass breaks down into an abscess that drains through the skin. When you examine the prostate, this may also feel craggy. 40% of patients will also have signs of urinary tract TB.

NOTE: always consider torsion of testis, especially in boys between 9-12 years, because clinical features may be similar to epididymitis.

CANCER

If you find a hard, non-tender lump in the testis, suspect testicular cancer. This can also affect young men. Lumps that you can feel above the testis in the spermatic cord are usually not cancer.

Sexually transmitted infections (STIs)

Sexually transmitted infections spread from one person to another through sexual activity. If STIs are not treated, they can cause serious health problems, for ex-

ample infertility. STIs are indicators of unsafe sexual practices and some STIs (genital ulcers) make the infected person more susceptible to HIV. However, not all infections of the genital tract are sexually transmitted. Sometimes men complain about discharge or 'passing semen' while urinating. This is usually concentrated urine with many crystals but not a true urethral discharge.

An important part of the treatment of sexual transmitted infections is the treatment of the sexual partner, even if he is asymptomatic. This can be socially difficult.

Prevention of STIs and AIDS

The best way to prevent STIs (including HIV/AIDS) is to have sexual activity only within the bond of marriage. Using a condom properly and consistently also protects from STIs.

Syndromic management of sexual transmitted infections

Because facilities for accurate diagnosis are usually not available, treatment is syndromic. This means if someone presents, for example, with urethral discharge, you treat for all possible pathogens that may cause urethral discharge.

URETHRAL DISCHARGE

Examine the patient for urethral discharge, genital ulcers and swollen inguinal lymph nodes. Milk the urethra to confirm discharge. Treat for **gonorrhoea** and **chlamydia**. For each of them chose one of the recommended antibiotics:

Treatment options for gonorrhoea	Treatment options for chlamydia
Ciprofloxacin 500 mg orally one single dose	Doxycycline 100 mg orally 2 times daily for 7 days
or azithromycin 2 g orally one single dose	or azithromycin 1 g orally one single dose
or ceftriaxone 125 mg IM one single dose	or amoxicillin 500 mg orally 3 times daily for 7 days
or if single dose treatment is not available, co-trimoxazole 480 mg 10 tablets once a day for 3 days	or erythromycin 500 mg orally 3 times daily for 7 days

NOTE: ciprofloxacin and doxycycline are contra-indicated in pregnancy; the safety of azithromycin in pregnancy is not proven.

GENITAL ULCER

Examine the patient for genital ulcers, swollen inguinal lymph nodes and urethral discharge. If you find an ulcer, treat for the following: **syphilis**, **chancroid**, **lymphgranuloma venerum** and **granuloma inguinale**:

Treatment options for syphilis	Treatment options for chancroid	Treatment options for granuloma inguinale	Treatment options for lymphgranuloma venerum
<p>Benzathine benzylpenicillin 2.4 million IU (1.44 g) one single dose IM as 2 injections given at two different sites</p> <p>or procaine benzylpenicillin 1.2 million IU IM once daily for 10 days</p> <p>or doxycycline 100 mg orally 2 times daily for 15 days</p> <p>or tetracycline 500 mg orally 4 times daily for 15 days</p>	<p>Ciprofloxacin 500 mg orally 2 times daily for 3 days</p> <p>or azithromycin 1 g orally one single dose</p> <p>or erythromycin 500 mg orally 4 times daily for 7 days</p>	<p>Continue treatment until all lesions have completely healed.</p> <p>Azithromycin 1 g orally on day 1, then 500 mg once daily</p> <p>or doxycycline 100 mg orally 2 times daily</p> <p>or erythromycin 500 mg orally 4 times daily</p> <p>or tetracycline 500 mg orally 4 times daily</p> <p>or co-trimoxazole 960 mg orally 2 times daily</p>	<p>Doxycycline 100 mg orally 2 times daily for 14 days</p> <p>or erythromycin 500 mg orally 4 times for 14 days</p> <p>or tetracycline 500 mg orally 4 times daily for 14 days</p>

NOTE: ciprofloxacin, doxycycline and tetracycline are contra-indicated in pregnancy; the safety of azithromycin in pregnancy is not proven.

- Yellow or green discharge, sometimes fever and pelvic pain (or no signs at all): gonorrhoea and chlamydia.

VAGINAL DISCHARGE

Vaginal thrush (candidiasis) and **bacterial vaginosis** are *not* sexually transmitted. In these two, the simultaneous treatment of the partner is not necessary. Only vaginal discharge due to trichomoniasis is a sexually transmitted disease. Therefore, most women with vaginal discharge will not suffer from a sexual transmitted disease!

If there is a risk of sexually transmitted disease, or if discharge comes from the cervix (cervicitis) and not only from the vagina (vaginitis), treat for gonorrhoea and chlamydia, see 'Urethral discharge'.

If the discharge does not come from the cervix, and gonorrhoea or chlamydia are unlikely, treat for:

1. **Vaginal thrush** (not sexually transmitted).
2. **Bacterial vaginosis** (not sexually transmitted) and **trichomonas** (sexually transmitted). Both are treated with metronidazole 2g one single dose.

A small amount of discharge from the vagina is normal. This discharge changes during the cycle and becomes more during pregnancy. A change in colour, smell or itching indicates that the vaginal discharge is not normal. This may mean that the woman has an infection.

From the type of discharge it is difficult to tell which infection is causing it. The following gives some indication:

Not sexually transmitted:

- White discharge associated with itching and soreness: vaginal thrush. Prescribe nystatin vaginal tablets.
- More discharge than usual, fishy smell and mild itching: bacterial vaginosis. Give metronidazole 2g one single dose.

Sexually transmitted, often not causing symptoms but sometimes:

- Gray or yellow bubbly discharge, bad-smelling and itching: trichomonas. Give metronidazole 2g one single dose.

HIV and AIDS

Infection with human immunodeficiency virus (HIV) is mainly acquired through sexual activity, unclean needles and through blood transfusions. In many countries, for example in Africa or East Asia, AIDS is becoming the number one health priority. For Afghanistan, reliable data are not available but according to WHO, there were 10 confirmed cases of AIDS in Afghanistan in 2002. 'Afghanistan is considered to be a country of low HIV prevalence but at high risk for spread of HIV infection' (Ministry of Health).

When a person becomes infected with HIV, the virus kills certain cells of the immune system until the body cannot defend itself any longer against infections. Many people with HIV feel well for 5-10 years or longer after getting HIV. During this time they are infectious to others. Eventually, however, the immune system will no longer have enough cells to fight infections and the person develops AIDS.

Clinical features

The signs of AIDS are different in different people. Often people suffer a common illness that lasts a very long time. Suspect HIV infection in a person with the following features:

- Weight loss
- A common illness that does not get better or is unusually severe
- Generalised lymphadenopathy (lymph nodes of more than 1 cm diameter at more than 2 sites for more than 3 months)

Other features of AIDS in a person with a positive HIV test are:

- Severe weight loss
- Chronic diarrhoea
- Persistent fever

- Lymphomas
- Tuberculosis
- Pneumonia
- Oesophageal thrush
- Encephalopathy or other brain infections
- Retinitis

Investigation

Blood test for anti-HIV antibodies. After a person has become infected with HIV, it takes up to 12 weeks before the test turns positive.

Management

Management concentrates on (1) treating symptoms (2) supporting and counselling the patient and his family, and (3) preventing further spread of AIDS in the community through health education. The new powerful and expensive drugs (anti-retrovirals) that can prolong the life of many people infected with HIV are usually not available.

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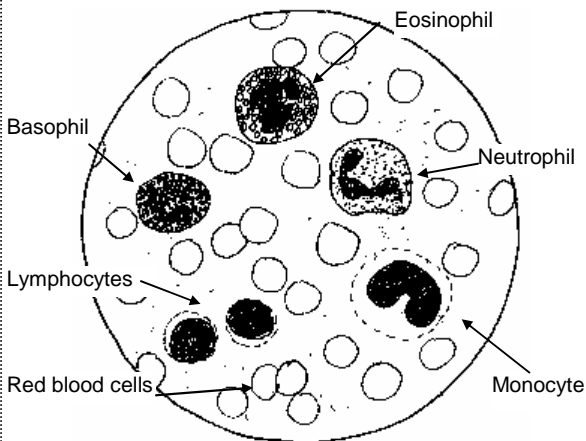
12. Problems of the blood and spleen

THE BLOOD:

Blood consists of blood cells, platelets and a liquid, called plasma. The plasma carries the blood cells and many other substances, for example proteins, sugar, hormones or salts. Salts regulate the blood volume.

Most blood cells and platelets are produced in the bone marrow. Other places of blood production are spleen and liver. The spleen also destroys worn out blood cells.

You can measure the amount of blood cells and other substances (for example sugar) in the blood. You can also look at the blood cells in a blood film:



Red blood cells (RBC) contain haemoglobin and transport oxygen. *If too few RBC: anaemia*

White blood cells (WBC) fight infection. WBC consist of granulocytes or polymorph leucocytes (neutrophils, eosinophiles and basophils) and agranulocytes (lymphocytes and monocytes). *If too few WBC: infection.*

Platelets stick together and form a plug to stop bleeding. *If too few platelets: abnormal bleeding (the other two mechanisms by which the body stops bleeding is by constriction of the blood vessel and by the complex process of coagulation).*

Figure 12-1 Basics about the blood.

Causes of anaemia

COMMON

- Iron deficiency
- Frequent pregnancies

LESS COMMON

- Malaria
- Folate deficiency
- Chronic or acute bleeding
- Hookworm and other gastro-intestinal parasites

RARE

- Thalassaemia
- Chronic renal failure
- G6PD deficiency
- Drug-induced aplastic anaemia
- Leukaemia

Anaemia is not a disease but a clinical sign. It is therefore not enough to say that a patient has anaemia, you must find out why someone has become anaemic and then treat both the anaemia and its cause or causes (see above box).

Understanding the following three mechanisms that lead to anaemia will help to find the cause of anaemia. Often more than one factor is responsible.

1. Decreased production of Hb or red blood cells (RBC):

- *Lack of nutrients to make Hb:* the commonest is iron deficiency; less common are folate (folic acid) and vitamin B₁₂ deficiencies. Iron deficiency is commonly caused by more than one factor (for example by a diet poor in iron, chronic blood loss or hookworm infestation).
- *Failure of the bone marrow to make RBC* because of chronic infections (for example tuberculosis), chronic liver or renal disease, toxic drug effects (for example metamizol) or congenitally abnormal bone marrow (for example thalassaemia).

2. Blood loss

caused by gastrointestinal bleeding, injury or heavy menstrual bleeding.

3. Early destruction of RBC (haemolysis)

caused by malaria, congenital enzyme defects (G6PD deficiency) or immune mechanisms. A very large spleen will also destroy red blood cells.

Anaemia

Anaemia is one of the commonest health problems, especially in children and pregnant women. Anaemia is a Latin word and means 'no blood'. In anaemia, there are not enough red blood cells, or the red blood cells lack the oxygen-carrying haemoglobin (Hb). Anaemia has many consequences: it makes people more susceptible to infections. In young children, even mild anaemia can impair physical and mental development. Anaemia in pregnancy is very dangerous because already a small amount of blood loss during delivery may cause shock and maternal death.

When a person is anaemic, his heart has to work harder to increase its output so that the body cells can be supplied with oxygen even with limited Hb. If anaemia is severe, heart failure may develop.

How to assess a patient with anaemia

Patients may come to you with symptoms that are the result of anaemia (for example tiredness or breathlessness), or you may notice anaemia while you examine a

patient for another problem. Always look for signs of anaemia, especially in every child and every woman of childbearing age.

Suspect anaemia if a patient presents with any of the following:

- Dizziness or tiredness
- Poor appetite
- Eating dirt ('pica')
- Breathlessness when doing physical activity
- Pallor (paleness)
- Oedema

Signs of severe anaemia:

- ✘ Breathlessness at rest
- ✘ Other signs of heart failure (oedema, fast pulse or enlarged soft liver)

Take a history

If clinical examination confirms anaemia, ask about:

- History of frank blood loss?
- Breathlessness?
- Gastrointestinal symptoms (dyspepsia, abdominal pain or passing worms)
- Previous drugs?
- Diet - what does the patient eat?
- In women: pregnant or recent delivery? Heavy or frequent menstruation?

Examine the patient

- Clinical signs of anaemia? (See figure 12-2)
- Signs of *severe* anaemia? (See box)
- Clinical signs that indicate a specific cause? (Malnutrition, enlarged spleen, jaundice, signs of infection, spoon-shaped nails, broad frontal and facial bones)


Investigations


1. **Haemoglobin (Hb)** is helpful for three reasons:


- a. It confirms the diagnosis of anaemia.
- b. It demonstrates the severity of anaemia.
- c. It gives a starting point to measure the success of treatment.

	Hb values
Normal Hb	Greater than 12.0 g/dl (in pregnancy greater than 11.0 g/dl) NOTE: Hb is greater than 13.5 g/dl at birth and normally about 1 g/dl higher in men than in women.
Non-severe anaemia	7.0-12.0 g/dl
Severe anaemia	Less than 7.0 g/dl
Very severe anaemia	Less than 5.0 g/dl

PALMAR PALLOR IS A VERY RELIABLE SIGN OF ANAEMIA:


normal
(no anaemia)


pale
(anaemia)


very pale
(severe anaemia)

Compare the colour of the patient's palm with the colour of your palm.

Compare the colour of the patient's lips and gums with the colour of your fingernail (nail bed)

NOTE: looking for paleness of the conjunctiva is a not a reliable sign of anaemia. The colour of the conjunctiva is affected by many factors other than anaemia.

Figure 12-2 How to examine for anaemia.

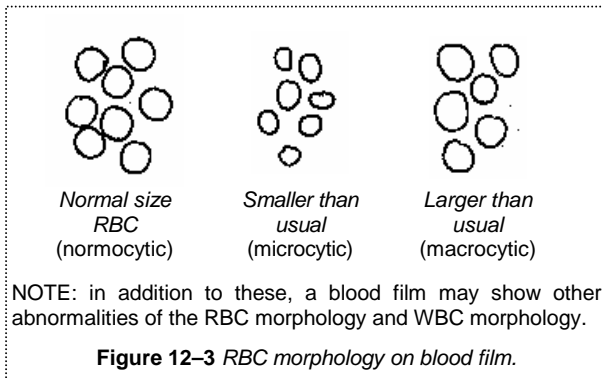
Signs of severe anaemia

- ✘ Severe pallor of the palms and inner side of the lips
- ✘ Breathless at rest
- ✘ Enlarged heart (later heart failure)
- ✘ Haemoglobin below 7.0 g/dl

2. Measuring **mean cell volume (MCV)** or looking at a blood film helps to classify the type of anaemia (see figure 12-3).

Low MCV (Less than 80 fl)	Normal MCV (80-100 fl)	High MCV (Above 100 fl)
Microcytic anaemia	Normocytic anaemia	Macrocytic anaemia
Causes: ● Iron deficiency ● Thalassemia ● Chronic disease	Causes: ● Acute blood loss ● Chronic disease ● Infection ● Cancer ● Haemolysis	Causes: ● Vitamin B12 deficiency ● Folate deficiency ● Alcohol ● Severe haemolysis

3. Total and differential **white blood cell count (WBC)** to detect abnormal cells (leukaemia) and to find out whether anaemia is an isolated blood problem. If WBC is very low (less than 1500/L) it indicates that the bone marrow does not generally produce blood cells.



How to manage a patient with anaemia

Management always consists of two parts:

1. **Treat the anaemia.**
2. **Find and treat the cause or causes of anaemia.** If you do not treat the cause, the anaemia may not get better; or the patient may get better but becomes anaemic again as soon as he stops the treatment.

To decide about appropriate management, find the answers to the following three questions:

1. **Is the anaemia severe or not?** Anaemia is severe if you have found any of the signs of severe anaemia (see box on previous page) or if Hb is less than 7.0 g/dl.
2. **Is the patient pregnant?**
3. **What is the likely cause of the anaemia?**

History and examination often point to the likely cause. Blood tests provide further guidance. Be aware that there are often several causes of anaemia in the same patient.

History and clinical features	Likely diagnosis
Malnutrition	Malnutrition, especially iron and folate deficiency
Women with recent delivery or several children born less than 2 years apart or heavy menstrual bleeding	Iron deficiency anaemia
Splenomegaly	Malaria, thalassaemia or haematological malignancy (rare)
Jaundice often with splenomegaly	Haemolytic anaemia
Spoon-shaped finger nails	Chronic iron deficiency anaemia
Broad frontal and facial bones	Thalassaemia

Management of non-severe anaemia

1. **Treat the specific cause.** If you cannot find a cause that needs specific treatment, treat for iron deficiency anaemia as explained below.

2. **Give oral elemental iron** (children 3-6 mg/kg/24 hours, adults 120-180 mg per 24 hours) for at least 3 months. Most commonly used is **ferrous sulphate** (60 mg elemental iron = 200 mg ferrous sulphate, for other preparations see box). Dosages for ferrous sulphate are: children 2-6 months 50 mg once daily; 7-12 months 50 mg 2 times daily; 1-5 years 100 mg 2 times daily; 6-12 years 100-200 mg 2 times daily; adults 200 mg 2-3 times daily).

Tell the patient to take the tablets 1 hour before a meal.

Also, give **folic acid** (6 months-12 years 1-5 mg; adults 4-5 mg). If available, use tablets containing both elemental iron (65 mg) + folic acid (0.25 mg or 0.4 mg).

Iron preparations

- **Ferrous sulphate**
One tablet 200 mg contains 60 mg elemental iron
- **Ferrous fumarate**
One tablet 200 mg contains 66 mg elemental iron
- **Ferrous gluconate**
One tablet 300 mg contains 36 mg elemental iron

3. **If the patient is not pregnant, give mebendazole** 100 mg 2 times daily for 3 days to treat for hookworm and other worms.
4. **Consider treating for malaria.**
5. **Teach the patient** about a healthy diet with iron-rich foods (see below 'Prevention of anaemia'). Advise women about antenatal care and the risks of anaemia in pregnancy.
6. **Monitor the patient's progress** and review him after 4 weeks. Ideally, measure his Hb before you start treatment, then treat for 4 weeks and repeat the Hb. With treatment, Hb should rise about 0.5-1.0 g/dl every week. Therefore, Hb should have gone up by at least 2.0 g/dl or more after 4 weeks of treatment.

If it is not possible to measure Hb, treat and then review the patients after 4 weeks. Look for clinical signs of improvement. If treatment is effective, the patient will be less tired and more active.

Although you can see signs of improvement after a few weeks, continue treatment for at least 3 further months to fill the patient's body iron stores. Pregnant women should continue taking ferrous sulphate and folic acid throughout pregnancy and then for 3 months after delivery.

What to do if a patient does not improve

If a patient does not improve, check for the following:

- a. **Has the patient taken the iron tablets?** Non-compliance is a common cause of treatment failure. When ferrous sulphate causes epigastric pain or nausea, patients often stop it. If that has been the case, reduce the dose and advise taking it with food.

- b. **Consider a chronic infection** (for example tuberculosis) and investigate accordingly.
- c. **RARE: consider thalassaemia** and look for typical clinical features. In thalassaemia, iron is contraindicated.

Only if the patient has taken the tablets in a correct dose and there is no suggestion of any underlying infection or other problem, assume *malabsorption* and treat as follows:

- a. *Measure Hb.*
- b. Give iron by deep intra-muscular injection of **iron dextran** (one ampoule contains 50 mg/ml). Do not use in children. The injection is expensive and painful. Be aware of the risk of a serious anaphylactic reaction. Do not give iron dextran if a patient is very sick or has fever. Give a test dose at least one hour before the therapeutic dose. Keep adrenaline ready in case of a severe allergic reaction.
 - If an adult patient weighs less than 40 kg, give 5 ml daily for 6 days.
 - If an adult patient weighs more than 40 kg, give 5 ml daily for 10 days.
 - If the patient is pregnant, give it for 2 extra days.
- c. *Re-check Hb after 3 weeks.* Hb should by then be almost normal.

Management of severe anaemia

Find the answers to the following two questions:

1. **Has the patient signs of heart failure?** (Dyspnoea at rest, fast pulse, oedema and enlarged soft liver)
2. **Is the patient pregnant?**

Management of severe anaemia without heart failure and no pregnancy

If someone is severely anaemic without signs of heart failure and the patient is not pregnant, treat with oral iron and folic acid as described above.

Management of severe anaemia with heart failure or in pregnancy

1. **Treat the symptoms** of heart failure.
2. **Consider a blood transfusion.** Give a blood transfusion only on very strict, life-saving indications, because a blood transfusion carries considerable risks (see box). Blood transfusions are sometimes given unnecessarily in chronic severe anaemia. The indications for a blood transfusion are:
 - Hb below 5.0 g/dl + heart failure or other severe illness

In pregnancy:

- Hb below 5.0 g/dl at any time of pregnancy
- Hb below 7.5 g/dl in late pregnancy (more than 36 weeks)

Problems and risks of blood transfusions

- Risk of mismatched or contaminated blood if laboratory facilities are poor.
- Transmission of hepatitis (especially B and C), malaria, HIV and others.
- Risk of bacterial growth and destruction of the blood cells if the storage facilities are poor (blood can be stored in a refrigerator at 4-10°C for a maximum of 10 days).
- Blood transfusions are expensive.

Rules for safe blood transfusion:

1. **Calculate the amount needed.** One unit of blood usually raises the Hb in an adult by 1-1.5 g/dl:

$$\text{Whole blood needed (in ml)} = \text{Patient's weight (in kg)} \times 5 \times \text{desired rise of Hb (g/dl)}$$

NOTE: 1 ml of whole blood = 20 drops.

Transfuse until Hb is above 5.0 g/dl (or above 7.5 g/dl in late pregnancy). Then continue treatment with oral ferrous sulphate and folic acid as described above.

2. **Only use blood that has been properly grouped and cross-matched.** Never transfuse blood that has been out of the refrigerator for more than 6 hours. Ideally, the blood should be tested for hepatitis B and C, malaria and HIV before being used.
3. **Watch out for transfusion reactions:** record temperature, pulse rate, respiratory rate and blood pressure before the transfusion is started, 15 minutes later and then every hour.

Stop the blood transfusion immediately if the patient develops low blood pressure, fast pulse, dyspnoea, back pain, restlessness, fever or a skin rash. Give chlorphenamine 8 mg IV (or promethazin 50 mg IV). Treat for shock or severe allergic reaction if necessary.

Prevention of anaemia

1. **Encourage breastfeeding and advise a good diet** with enough iron, folic acid and protein. There are two groups of iron-rich foods:
 - *Not well absorbed:* cereals, dark green leafy vegetables, egg yolk (egg-white reduces iron absorption). Because iron of these foods is poorly absorbed, they should be eaten with vitamin C rich foods (fruits and vegetables) to increase absorption. Tea should be avoided because it also reduces absorption.
 - *Well absorbed:* breastmilk. Expensive and usually not affordable for the most needy people are meat, liver, kidney, chicken and fish.
2. **Advise spacing of pregnancies.** Iron stores need at least two years before they are refilled after a pregnancy. Child spacing will also improve the health of the babies.
3. **Give iron tablets routinely to all married women of childbearing age.** Explain to the family that these

will improve a woman's health; multivitamins will not!

4. **Reduce post-partum haemorrhage** by advising early breastfeeding and giving ergometrine (or oxytocin) immediately after delivery.
5. **Treat malaria early.**
6. **Advise against walking barefoot and encourage safe stool disposal** to prevent hookworm infection.

IRON DEFICIENCY ANAEMIA

Iron deficiency is the commonest cause of anaemia. Reasons are a low iron intake, empty iron stores in women because of frequent pregnancies and chronic blood loss (for example hookworm infestation or heavy menstrual bleeding). Chronic blood loss may occur in cancer. If you measure Hb after acute blood loss, be aware that it may take 1-2 days before the Hb drops and you get the true Hb value.

Hookworms live attached to the duodenal mucosa where they suck blood and cause chronic gastrointestinal blood loss. Heavy whipworm infestation may also cause anaemia.

Clinical features

- Tiredness, weakness, poor appetite, eating dirt and other general symptoms of anaemia as described above
- Some patients: spoon-shaped nails or sore tongue and painful swallowing (if iron deficiency is very chronic)

Investigations

- Low MCV
- Blood film: microcytosis, anisocytosis, hypochromia, poikilocytosis (especially 'pencil cells')

Management

As described above

THALASSAEMIA

Thalassaemia is an inherited disease in which the bone marrow cannot make enough Hb and the patient becomes anaemic. Thalassaemia can present in mild or severe forms: the heterozygous and homozygous forms.

Clinical features

Mild thalassaemia (the heterozygous form or the 'trait') causes no symptoms. There is very mild anaemia as in iron deficiency anaemia but it does not improve with iron treatment. It may be necessary to exclude co-existent iron deficiency by a short trial of oral iron. However, do not give prolonged courses of iron.

Children with **severe (homozygous) thalassaemia** usually die before age 30 years because their organs become overloaded with iron (haemosiderosis) from multiple blood transfusions. They have severe anaemia

that does not improve with iron treatment. Their spleen becomes large and eventually very large. Skull and facial bones also enlarge.

Investigations

- Low MCV
- Blood film: microcytosis, hypochromia, target cells. Abnormal Hb electrophoresis

Management

1. Do not give iron because patients with thalassaemia are already iron overloaded. Giving iron will further damage the heart and other organs and hasten death.
2. Give regular prophylactic treatment for malaria if the patient lives in a malarious area.
3. Give folic acid 5 mg once daily for life.
4. Patients with severe thalassaemia need regular blood transfusions to be kept alive. Adult patients need about 2-3 units of blood every 4 weeks. If they need blood transfusions every 2 weeks or more often, then consider splenectomy, although this also is associated with risks (for example sepsis). See below under 'Hypersplenism'.

ANAEMIA OF CHRONIC DISEASE

When an inflammatory condition lasts for a long time, the production of red blood cells in the bone marrow becomes depressed. Anaemia of chronic disease can be caused by chronic infections (for example chronic osteomyelitis, tuberculosis), chronic inflammation (for example rheumatoid arthritis) or cancer.

Clinical features

As above

Investigations

- Hb is usually about 9-10 g/dl.
- MCV is usually normal, sometimes low.

Management

Treat the cause. This type of anaemia does not respond to iron supplements. It may be worth giving iron and folic acid for 2 weeks to exclude co-existing deficiencies of these.

APLASTIC ANAEMIA

Aplastic anaemia means that the bone marrow is empty and not producing blood cells. This may not only affect the red blood cells but also white blood cells and thrombocytes. Recognised causes are (1) certain drugs (for example chloramphenicol, sulphonamides such as co-trimoxazole and barbiturates such as phenobarbital) and (2) some infections (for example hepatitis). Aplastic anaemia can be fatal, but sometimes there is a spontaneous recovery. Fatal aplastic anaemia may occur in patients treated with *chloramphenicol* and this is the reason why chloramphenicol should only be used for

severe infections and always in the correct dose. Whenever anaemia develops during treatment with chloramphenicol or any of the other drugs, the drug must be stopped immediately. Aplastic anaemia is also a common complication of *metamizol* (Analgin, Dipyron, Novalgin) and one of the reasons why the drug is banned in several countries. However, the cause of aplastic anaemia often remains unknown.

MACROCYTIC ANAEMIA

Macrocytic anaemia is usually caused by folate deficiency and (much less commonly) by vitamin B₁₂ deficiency or liver disease. Recurrent haemolysis (for example thalassaemia) or prolonged treatment with phenobarbital are other causes of folate deficiency. Macrocytic anaemia often accompanies iron deficiency anaemia, especially in malnourished children. Folate is found in green leafy vegetables, liver and kidney. Vitamin B₁₂ is found in all animal products (for example meat, milk or eggs). Drinking alcohol regularly may cause a macrocytosis with or without anaemia.

Clinical features

Many patients are asymptomatic. In addition to the general symptoms of anaemia:

- Weight loss
- Mild jaundice
- Sore tongue
- Neuropathy (usually vitamin B₁₂ deficiency)

Investigations

- High MCV
- Blood film: oval macrocytosis, hypersegmented nuclei in white blood cells

Management

Distinguishing between vitamin B₁₂ and folate deficiency is difficult without access to measurement of serum levels. However, in the absence of neurological symptoms or signs it is reasonable to treat with folate first, as this is much more commonly the deficient vitamin.

Folate deficiency: give folic acid 5 mg once a day for 4 months.

Vitamin B₁₂ deficiency: give hydroxocobalamin 1 mg IM (children 0.25–1 mg) every second day for 8 days, and then once every 3 months for life.

HAEMOLYTIC ANAEMIA

The normal life span of red blood cells of 120 days is shortened. This is shortened in haemolytic anaemia for several possible reasons:

- Infection (malaria: the parasites burst the red blood cells, and sepsis)
- Inherited (G6PD deficiency and thalassaemia)

- Adverse blood transfusion reaction
- Burns
- Drug reactions

Investigations

Hb, blood film, bilirubin

Clinical features

In addition to the general symptoms of anaemia:

- Jaundice
- Splenomegaly (if chronic or congenital haemolysis)

Management

Treat the underlying cause.

G6PD deficiency anaemia

G6PD deficiency is an inherited enzyme deficiency. It has been estimated that about 7-10% of the population of Afghanistan has inherited this defect. Most of the time, these people have completely normal blood counts. However, when they take certain drugs, they develop haemolytic anaemia with jaundice and haemoglobinuria (red-coloured urine) about 1-3 days later. The anaemia resolves spontaneously 3-10 days after stopping the causative drug. Blood transfusion is sometimes necessary. Babies born with G6PD deficiency often have prolonged neonatal jaundice.

In G6PD deficiency, avoid the following drugs: acetylsalicylic acid (Aspirin) in large doses, co-trimoxazole, sulfadoxine + pyrimethamine (Fansidar), nalidixic acid, nitrofurantoin, probenecid, quinolones (for example ciprofloxacin), dapsone, primaquine and vitamin K.

Leukaemia and lymphoma

Leukaemia is cancer of the bone marrow. The bone marrow produces abnormal blood cells. Important for diagnosing leukaemia is the finding of abnormal cells in a blood film, not the total number of white blood cells. The production of red blood cells and platelets (important for stopping bleeding) by the bone marrow is also affected. The abnormal white blood cells are ineffective in fighting infections and a patient may present with frequent severe infections. He is anaemic and has a tendency to bleed spontaneously.

Leukaemia is treated with cytotoxic drugs. These are very expensive but can produce good cure rates. It is therefore important to diagnose leukaemia early and to refer a patient with leukaemia to a hospital where he can be further investigated and treated.

Lymphoma is cancer of the lymph nodes. Clinical features are one or more large and painless lymph nodes. Sometimes liver and spleen are also enlarged and the patient may complain about weight loss, itching and night sweats. Diagnosis is by lymph node biopsy. Treatment is by chemotherapy in a specialized centre.

Abnormal bleeding

Often people are worried that they bleed abnormally but a true bleeding abnormality is rare. Signs of truly abnormal bleeding are spontaneous bleeding from the gums or into the skin (purpura) or excessive bruising after minor trauma. Special tests are necessary to confirm the cause of abnormal bleeding and to define which part of the systems that stop bleeding is affected. Abnormal bleeding can come from lack of platelets or abnormalities of the clotting proteins. If it is associated with liver disease, give vitamin K.

Some patients develop an acute coagulation problem (disseminated intravascular coagulation) from sepsis (for example meningococcal infection or viral haemorrhagic fever) or severe trauma. This is an intensive care problem. Management is by treating the underlying problem and, if severe bleeding occurs, with blood transfusions.

Enlarged spleen (splenomegaly)

The spleen (1) removes worn out RBCs from the blood, (2) shares the production of lymphocytes and antibodies with other lymphoid tissues and (3) may produce red and white blood cells.

Splenomegaly is a common clinical sign because enlargement of the spleen accompanies many infectious diseases and blood disorders. A patient may present with abdominal discomfort due to his large spleen or with complications from hypersplenism.

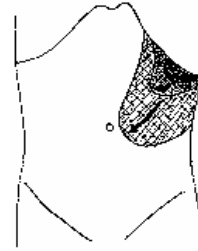
It helps you to find the cause of splenomegaly if you determine the degree of splenomegaly (see box).

HYPERSPLENISM

If the spleen is very large, it will destroy not only worn-out but also healthy red blood cells, white blood cells and platelets. This is known as hypersplenism and can result in anaemia, infections and bleeding. The spleen is also at a greater risk of rupture.

Treat complications, find and treat the underlying cause and consider **splenectomy**. A person without a spleen is at increased risk of severe infections, especially from pneumococcus bacteria and malaria. He should take oral

Causes of large spleen (splenomegaly)



MILD SPLENOMEGALY (in adults less than 5 cm below the costal margin)

- **Infections:** malaria, sepsis, hepatitis, viral illnesses, typhoid fever, brucellosis, tuberculosis
- **Others:** rheumatoid arthritis, malnutrition

MODERATE SPLENOMEGALY (in adults 5-10 cm below the costal margin)

- **Haemolysis:** recurrent malaria, G6PD deficiency
- Portal hypertension from **liver cirrhosis**
- **Leukaemia, lymphoma**

MASSIVE SPLENOMEGALY (in adults more than 10 cm below the costal margin)

- Thalassaemia
- Tumours

penicillin V 250 mg 2 times daily (or erythromycin 250 mg 2 times daily) as prophylaxis until age 20 years and take preventative measures against malaria. If available, immunize him with pneumococcal, haemophilus influenza b and meningococcal vaccine.

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13. Heart problems

MAIN FUNCTIONS OF THE CARDIOVASCULAR SYSTEM:

The cardiovascular system consists of the heart and blood vessels. The **heart** (H) contracts and pumps blood into the main artery (**aorta** = AO), which divides into smaller arteries (A). Each small artery divides into tiny **capillaries** (C) where oxygen, nutrients, hormones and waste products are exchanged between blood and body cells. **Veins** (V) take the blood, which is now darker because it contains less oxygen, back to the heart. The heart pumps the blood to the **lungs** (L), where carbon dioxide is lost and fresh oxygen taken up (gas exchange). Refreshed with oxygen, the cycle continues. Blood constantly circulates through the body.

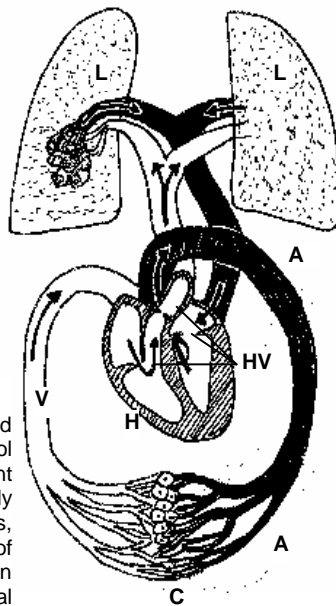
EXAMPLES OF PROBLEMS:

If the blood does not circulate, body cells cannot work properly:

- **Heart failure:** the heart cannot pump enough blood round the body quickly enough.
- **Shock:** there is not enough blood in the blood vessels for the heart to pump around the body, either because of blood or fluid loss or because of dilatation of the blood vessels.
- **Lung disease:** not enough oxygen is taken up from the lungs.
- **Anaemia:** not enough blood cells or haemoglobin are available to transport oxygen.

DANGERS TO BLOOD VESSELS:

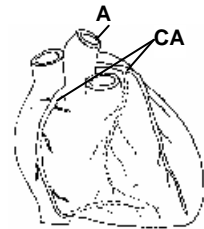
Blood vessels are damaged by high blood pressure, cigarette smoking, high cholesterol or diabetes. These lead to the development of atheromatous plaques. The plaques partly obstruct the blood vessel. If a plaque bursts, this may lead to a thrombus and blockage of a blood vessel. This causes a sudden cardiovascular event, for example myocardial infarction or stroke.



CORONARY ARTERIES:

One special set of arteries are the **coronary arteries** (CA), which come out of the aorta just above the heart. They supply the heart muscle with oxygen.

If **obstructed**: angina or myocardial infarction.



HEART VALVES:

The **heart valves** (HV) prevent the blood from flowing backwards.

Examples of problems:

- If a **valve is narrowed**, the part of the heart before that valve has to work harder to overcome the resistance.
- If a **valve does not close properly**, some blood may flow back and increase the blood volume in the heart. Abnormal blood flow puts the patient at risk of endocarditis.

A person may be born with abnormal heart valves, or valves become damaged later, most commonly by rheumatic fever.

Figure 13–1 Cardiovascular system: basic anatomy, physiology and pathophysiology.

Mortality from cardiovascular disease is increasing. Cardiovascular diseases (for example heart attack or stroke) are the main cause of death in Western countries. Widespread *cigarette smoking* is one of the reasons why cardiovascular diseases are also becoming an important health problem in resource-poor countries like Afghanistan. Therefore, you should know both how to recognise and manage heart problems, and how to reduce a person's risk of developing cardiovascular disease.

Symptoms of heart problems include breathlessness, oedema, chest pain, and palpitations (see figure 13–2). However, these symptoms can also be caused by many non-cardiac causes. Cardiovascular disease does not usually cause any symptoms until complications have occurred.

- Anxiety and difficulty breathing after exertion
- Rapid, weak or irregular pulse
- Sudden pain in the chest and left shoulder that occur on exertion. The pain goes away after resting for a few minutes (angina pectoris) or does not go away with rest (myocardial infarction)
- Swelling of the feet
- Breathing difficulties when the person lies down

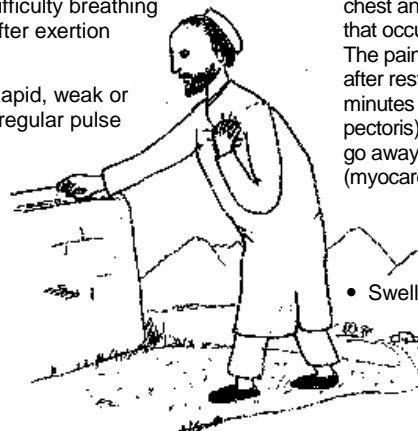


Figure 13–2 Symptoms of heart disease.

How to assess a patient with a heart problem

The assessment of the cardiovascular system is explained on page 11. Study that page together with this one. Below you find a summary concentrating on interpretation of abnormal findings (see figure 13–3). If you suspect a heart problem, always do a complete examination, especially of the chest.

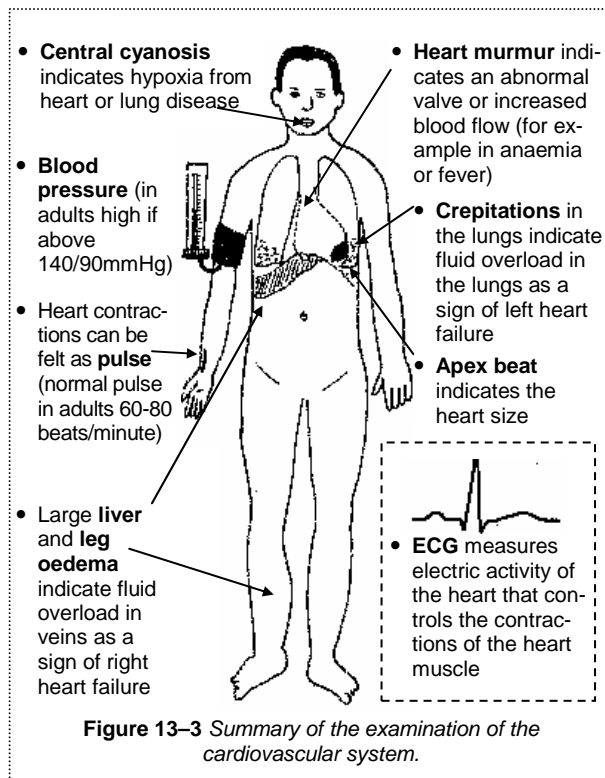
Take a history

- Ask for details about the problem.
- Age?
- If chest pain: central or non-central?
- How does the problem affect the patient's life? Is he breathless during walking? How far can he walk? (This indicates severity)
- Smoking? Diabetes? (Both are risk factors of cardiovascular disease)
- Has the patient already received any treatment? Which?

Examine the patient

Look:

- Ill or well?
- Breathless?
- Central cyanosis?
- Anaemia?
- Fast breathing? (Count the respiratory rate)



Feel:

- Feel the pulse (see box):
 - *Volume*: strong or weak?
 - *Rate*: normal, slow or fast?
 - *Rhythm*: regular or irregular?
- Apex beat deviated? (See page 11)
- Liver enlarged and tender?
- Ankle or sacral oedema?
- Measure the blood pressure (see box).

Listen:

- Heart murmur?
- Listen to the lungs: crepitations?

Causes of abnormal pulse

SLOW PULSE (BRADYCARDIA): LESS THAN 50/MINUTE

- Normal: sleep
- Side effect of drugs (for example beta-blockers)
- Hypothermia
- Heart block
- Myxoedema
- Vasovagal attacks

FAST PULSE (TACHYCARDIA): MORE THAN 100/MINUTE

- Normal: exertion, stress, anxiety, pain
- Dehydration
- Blood loss, shock
- Fever
- Sepsis
- Heart failure
- Severe lung disease
- Severe anaemia
- Side effect of drugs (for example aminophylline)

IRREGULAR PULSE

- Extra beats or atrial fibrillation

WEAK PULSE

- Low blood pressure, shock

Causes of abnormal blood pressure

HIGH BLOOD PRESSURE

- Hypertension (for causes see page 138)
- Anxiety or pain
- Following stroke

LOW BLOOD PRESSURE

- Shock
- Heart failure
- Side effect of drugs

Investigations

Investigations depend on your working diagnosis and are explained in the appropriate section of this chapter.

ECG and specialised cardiological investigations: ECG helps in the diagnosis, for example, of myocardial infarction, cardiac arrhythmias, thickened heart muscle or hyperkalaemia. It may be normal in heart failure. It is beyond the purpose of this book to explain the details of ECG interpretation. Other specialised tests are ECG exercise testing (for diagnosis of ischaemic heart disease), 24-hour ECG monitoring (to detect arrhythmias), echocardiography (to detect structural abnormalities of heart valves and heart muscle and to diagnose heart failure), cardiac catheterisation and myocardial scintigram.

Dyspnoea (breathlessness)

The commonest cause of dyspnoea is lung disease. Dyspnoea caused by heart failure is first noticed on exertion (for example while walking). If heart failure progresses, dyspnoea occurs even at rest. It is worse when lying flat (orthopnoea). Typically a patient may wake up at night gasping for breath (paroxysmal nocturnal dyspnoea). A patient with pulmonary oedema may wake up at night being very breathless and coughing up pink, frothy sputum. He is forced to sit or stand up for relief. For differential diagnosis of dyspnoea see page 82.

Chest pain

Find out whether the pain is central (behind the sternum) or non-central (see box):

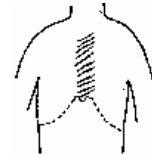
- **Central chest pain.** The most important cardiovascular cause of central chest pain is *cardiac ischaemia* (insufficient oxygen supply to heart muscle). Ischaemic pain occurs typically during exertion and is felt in the *centre of the chest behind the sternum*. The patient will often describe it as 'crushing'. The pain may radiate into the left arm or jaw. In angina, it lasts for up to 15 minutes and is rapidly relieved by rest or by glyceryl trinitrate. In myocardial infarction, the crushing pain lasts longer than 30 minutes and is not relieved by rest or nitrates. *Pericarditis* can produce similar pain. Typically pain from pericarditis is made worse by breathing and lying flat. It is relieved by sitting up and leaning forward. If caused by *oesophagitis*, central chest pain is typically made worse by lying down, hot drinks or food.
- **Non-central chest pain.** Ischaemic pain is commonly confused with unspecific chest pain that is usually caused by *anxiety* or *emotional stress*. This pain is well localised in the left side of the chest and it is not closely related to exertion.

Pain that is made worse by breathing in is usually caused by *inflammation* of the pleura like pneumonia or pleural effusion.

Causes of chest pain

CENTRAL CHEST PAIN

- Ischaemic heart disease
- Oesophagitis
- Rare: Pericarditis



NON-CENTRAL CHEST PAIN

- Unspecific chest pain (from anxiety or emotional tension)
- Pleuritic pain (for example pneumonia, pleural effusion or pulmonary embolism - rare)
- Bone and muscle pain (for example, rib fracture, muscle strain)
- Nerve root pain
- Herpes zoster
- Uncommon: ischaemic heart disease
- Rare: gallbladder disease or pancreatic disease



Very often, chest pain is referred pain from muscles or the spine. This *musculoskeletal pain* is typically made worse by movements. On palpation, you find localised tenderness of muscles.

Less common cause is *herpes zoster*. The skin is painful and sore a few days before the typical rash appears.

Oedema

Oedema may be caused by (1) increased venous pressure as in right heart failure or deep vein thrombosis (2) reduced serum proteins as in liver cirrhosis or glomerulonephritis. In oedema caused by heart failure you usually find other signs of heart disease. Urine examination for protein provides a quick guide to differential diagnoses (see page 115).

Palpitations

Palpitations mean that someone is aware of his heart beat. It is often a sign of anxiety. However, sometimes a person is aware of his heart beating too fast, too slowly or irregularly. This may happen either all the time or paroxysmal, which means for short intervals from time to time (for causes see box). Ask about which drugs a patient takes. Some patients need an ECG and should be investigated for thyrotoxicosis.

Causes of palpitations

- Anxiety and stress
- Irregular or fast pulse (for causes see box on the previous page)
- Awareness of normal heart beat
- Hyperthyroidism

Specific disease

HEART FAILURE

Heart failure occurs when the heart cannot pump the blood around the body fast enough to provide enough oxygen for the body cells and organs. Heart failure may be acute or chronic. There are different mechanisms for how heart failure can develop (see box). Always find out why a patient has developed heart failure. It is a mistake not to look for the cause of heart failure but only to treat the symptoms.

Mechanisms and causes of heart failure

ABNORMAL HEART (UNABLE TO PUMP ENOUGH BLOOD)

- Damaged heart muscle: ischaemic heart disease, myocardial infarction, cardiomegaly
- Acute rheumatic fever
- A patient with heart failure stops his treatment
- Arrhythmias (pulse rate is very slow, very irregular or very fast)

TOO MUCH WORK FOR A NORMAL HEART

- Severe anaemia
- Fluid overload after giving too much IV fluids
- Severe infections (septicaemia, typhoid fever)
- Thyrotoxicosis
- The heart has to pump against a too high pressure:
 - Left heart: high blood pressure, aortic stenosis
 - Right heart: acute or chronic lung disease

Clinical features

The clinical features depend on whether the right or left ventricle is failing. However, usually both parts of the heart fail and you find symptoms of both right and left heart failure. To make the clinical distinction whether the right or the left heart is failing is not important for the symptomatic treatment of heart failure but is helpful when you consider the cause. Right heart failure is caused by lung disease or as a result of left heart failure. Left heart failure is most commonly caused by rheumatic heart disease, ischaemic heart disease, high blood pressure or congenital heart disease.

In **right heart failure** blood returns to the right side of the heart from the body more quickly than the right ventricle can pump it out again. The veins behind the heart become over-loaded and fluid leaks out into the tissue and causes oedema:

- Fatigue, nausea and abdominal discomfort
- Peripheral oedema, tender enlargement of the liver; if severe: ascites

In **left heart failure** the blood returns to the left side of the heart more quickly than the left ventricle can pump it out. The veins in the lungs, behind the left side of the

heart, become over-loaded. Some fluid will leak out into the lungs and cause lung oedema, which presents with dyspnoea:

- Fatigue
- Breathlessness on exertion (if severe, dyspnoea at rest), orthopnoea, cough, sometimes wheeze
- Fast pulse, fast breathing, basal crepitations, enlarged heart (displaced apex beat), cyanosis, pleural effusion
- In babies: sweating and becoming breathless during feeding

NOTE: blood pressure may be high, normal or very low. Murmur is not a sign of heart failure.

Investigations

- Haemoglobin to exclude anaemia as a cause or factor worsening heart failure.
- Creatinine and electrolytes to provide a basis for treatment with diuretics and possibly ACE inhibitors.
- Chest x-ray shows an enlarged heart and possible signs of pulmonary oedema (see figure B-4 on page 261).

NOTE: an ECG cannot be used to diagnose heart failure but can be useful to find the cause (for example myocardial infarction). Best investigation would be echocardiography.

Management

1. Treat acute left ventricular failure (pulmonary oedema) immediately (doses stated are for adults):

- *Bed rest* in sitting position.
- Give *oxygen* 2-4 litres/minute.
- Give *furosemide* 40 mg IV immediately (children 0.5-1 mg/kg, maximum 20 mg).
If necessary, repeat after 30 minutes and increase to 80 mg if needed. Then continue with oral furosemide 20-40 mg until stable.
- Give *glyceryl trinitrate* 0.5-1 mg (= 1 tablet or 1-2 puffs) sublingually (under tongue) or isosorbide dinitrate 5-10 mg. Do not give it if the systolic blood pressure is below 90 mmHg.
- Give *morphine* 5-10 mg slowly IV together with *metoclopramide* 10 mg IV.

NOTE: it is sometimes difficult to differentiate between pulmonary oedema, asthma and pneumonia by clinical examination alone. If in doubt, treat for all three at the same time. This means adding to the above inhaled salbutamol (or aminophylline slowly IV) + oral amoxicillin (or ampicillin IV).

2. If possible, treat the cause of heart failure (see box). Especially consider anaemia, high blood pressure and infection.

NOTE: heart failure may be caused by fluid overload when a patient has been given too much IV fluids or if these have been given too fast. This occurs commonly if IV fluids or a blood transfusion are given to malnourished or young children. The extra work of pumping this extra fluid makes the heart fail. Stop the fluids immediately and give furosemide IM/IV.

3. Treat the symptoms of heart failure:

Non-drug treatment:

- Bed rest in sitting position* if heart failure is poorly controlled.
- Restrict salt intake.* The patient should not eat salty foods and he should not add additional salt when eating a meal.
- Avoid NSAIDs* (for example ibuprofen) because these drugs cause fluid retention.

Drug treatment. If the cause of heart failure cannot be cured, the patient has to take life-long medication. Therefore, choose drugs that he can afford and that are always available.

- Diuretics* are the most important drugs for symptomatic relief. Give **hydrochlorothiazide** 25–50 mg (up to 100 mg) every morning (or bendrofluazide 5–10 mg).

If poorly controlled, give furosemide 20–80 mg in the morning (sometimes up to 160 mg are needed). Increase if necessary (children 0.5–2 mg/kg, maximum 40 mg daily).

In severe heart failure or if hypokalaemia, add spironolactone 25–50 mg once daily.

- Give **digoxin** (see box).

NOTE: *ACE inhibitors* give significant benefit to patients with heart failure. However, before you prescribe them, consider:

- ACE inhibitors are expensive.* A patient must take them long-term. If a patient is unable to afford them, give him only the cheaper medicines (diuretics and digoxin), which already give a good result.

- ACE inhibitors can cause renal failure.* Do not prescribe them without checking renal function (urea or creatinine) before treatment and 7–10 days after starting it.
- ACE inhibitors can cause severe hypotension* (low blood pressure) after the first or second dose, especially in patients on diuretics. Therefore, all diuretics should be stopped or reduced a few days before. The ACE inhibitor should always be started in a low dose that is increased after a few days.

Captopril: start with 6.25–12.5 mg 2 times daily; usual maintenance dose is 25 mg 2 times daily (maximum 50 mg 3 times daily). **Enalapril:** start with 2.5–5 mg once daily; usual maintenance dose is 10–20 mg once daily. **Lisinopril:** start with 2.5 mg once daily; usual maintenance dose is 5–20 mg once daily.

NOTE: *potassium chloride.* Do not give it routinely to all patients on diuretics. Advise a diet rich in potassium (for example potatoes). Consider giving 2–4 g (25–50 mmol = 1–2 tablets) once daily to those patients who take both furosemide and digoxin. This will reduce the risk of arrhythmia with digoxin and low potassium levels. However it may be better to add a potassium-sparing diuretic (spironolactone 25 mg once daily) for prevention of hypokalaemia. Do not use in renal failure.

NOTE: cardiologists may also sometimes use beta-blockers to treat severe heart failure.

- Monitor the patient.** Weigh him regularly and write down the date and the weight. If the weight increases, this may indicate fluid retention. Then increase the dose of the diuretics.

Ideally measure urea or creatinine, potassium and sodium whenever you change the dose of diuretics or ACE inhibitors.

How to give digoxin (Digitalisation)

When you give digoxin, remember:

- The dose of digoxin must be adjusted to the individual patient.
- The therapeutic dose is very close to the toxic dose.
- The risk of toxicity is increased in hypokalaemia (low potassium).
- Look out for signs of overdose. Stop digoxin if signs of toxicity occur.

Early toxic signs:

Nausea, vomiting, loss of appetite

Late toxic signs:

Visual problems, confusion, arrhythmia or a heart block with a low pulse rate (AV-block)

Digitalisation

• Normal digitalisation

Give 0.125–0.5 mg (125–500 microgram) oral once daily. Divide into 2 doses if the daily dose is greater than 0.25 mg (= 250 microgram).

• Fast digitalisation

If faster response is necessary and the patient has not taken digoxin during the last week, give 0.5 mg (500 microgram) every 8 hours for one day, then continue as for "Normal digitalisation".

NOTE: very rapid digitalisation with IV injections is almost never indicated.

CONGENITAL HEART DISEASE

Some children are born with an abnormal heart. There may either be (1) an abnormal communication between the right and left heart, or between the heart and the large blood vessels, (2) an abnormal narrowing of the blood flow from the heart, or (3) a combination of both. Children with these problems will often fail to grow or suffer from repeated respiratory infections. Some are cyanosed and you hear a loud murmur. Dangers of congenital heart abnormalities are heart failure and endocarditis. An operation is often not possible because of lack of facilities.

Management

- Prevent and treat any condition that will increase the work of the heart and therefore increases the risk of heart failure (for example anaemia, high fever or malaria).
- Make sure the child is fully immunized.
- Give prophylaxis against bacterial endocarditis.
- Treat heart failure if it occurs.

HIGH BLOOD PRESSURE (ARTERIAL HYPERTENSION)

The normal blood pressure (BP) is 100-140 mmHg systolic and 60-85 mmHg diastolic. However, many people, especially from rural areas, have a normal BP lower than 100/60 mmHg. If they feel well, their pulse is normal and they pass urine normally, there is no health problem.

High blood pressure is defined by a measurement of 140 mmHg systolic or higher and/or 90 mmHg diastolic or higher (see figure 13-4). Treat high blood pressure because it can damage small blood vessels - as damage would happen to a tube which had a pressure in it greater than it was made for. Hypertension is a risk factor for developing a stroke or heart attack. It makes the heart work harder and can cause heart failure. It may damage the kidneys and eyes. If someone has more than one cardiovascular risk factor, it is even more important to treat high blood pressure (see below). Important causes of high blood pressure include kidney disease but in about 70% of patients you will not find a specific cause (see box).

Clinical features

Most patients with high blood pressure have no symptoms until complications occur. Others complain about the following unspecific symptoms that are also caused by many other diseases:

- Weakness and dizziness
- Frequent headaches
- Palpitations
- Occasional pain in the chest radiating to the arm

Investigations

These help (1) to find the cause of high blood pressure (2) to assess for other cardiovascular risk factors (3) to choose the best drug for the individual patient and (4) to monitor for side-effects.

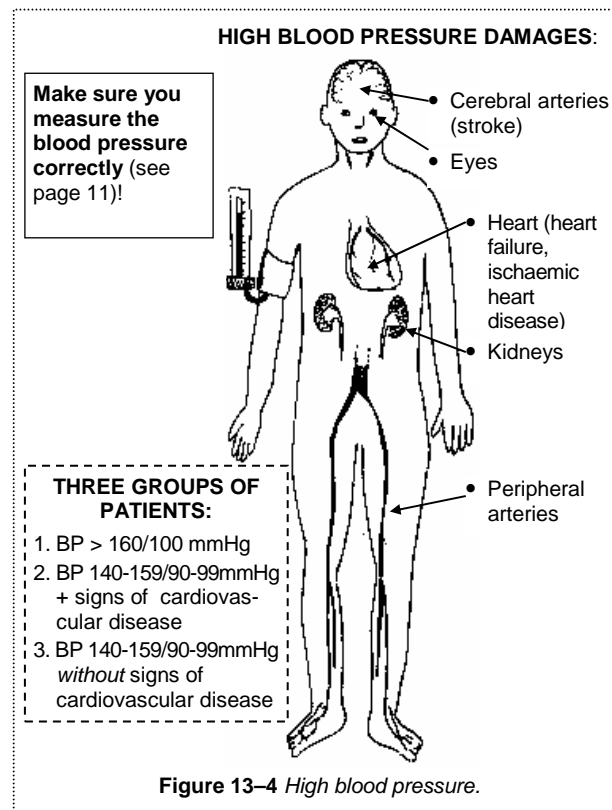
- **Blood:**
 - Glucose (diabetes mellitus is another cardiovascular risk factor)
 - Creatinine or urea (renal failure is a cause of hypertension) and electrolytes
- **Urine** for protein and blood (glomerulonephritis)
- **ECG** to see whether the blood pressure is causing strain for the heart.

In situations where resources are not limited, blood *cholesterol* is measured. If it is above 200 mg/dl, this is regarded as an additional cardiovascular risk factor.

Management

There are two common mistakes in the management of blood pressure:

Mistake 1: over-diagnosis. High blood pressure is diagnosed and treated too often because medication is prescribed after one high measurement only. Sometimes health professionals are unclear about the defi-



Causes of high blood pressure

COMMON

- Unknown cause

LESS COMMON

- Renal disease
- Pre-eclampsia
- Cushing's syndrome

nition of high blood pressure. However, you should only diagnose high blood pressure when three separate blood pressure measurements with the patient at rest have shown a high blood pressure of systolic above 140 mmHg, or diastolic above 90 mmHg. Ideally these measurements should be spread over a few weeks.

Mistake 2: under-treatment. High blood pressure is correctly diagnosed but not treated properly. The patient has not understood that he has to take the medication life-long, or the doctor has prescribed expensive medicine that the patient cannot afford or that is not always available. Therefore the patient takes medicine only irregularly, often in an insufficient dose and sees many different doctors who prescribe different medications.

There are **three groups of patients**. Management depends to which group a patient belongs:

- **Group 1:** BP systolic 160 mmHg or higher, or diastolic 100 mmHg or higher (measured on three occasions during a 1-2 weeks period).
- **Group 2:** BP systolic 140-159 mmHg, or diastolic 90-99 mmHg + signs of existing cardiovascular damage (previous heart attack or stroke) or diabetes.

- **Group 3:** BP systolic 140-159 mmHg, or diastolic 90-99 mmHg *without* signs of cardiovascular damage or other risk factors.

Treat those belonging to groups 1 + 2 with drugs. Aim for a blood pressure systolic below 140 mmHg and diastolic below 90 mmHg. In patients with established cardiovascular disease, diabetes or chronic renal failure aim for a blood pressure below 130/80 mmHg.

Give educational advice (see below) to those belonging to group 3 and review them after 3-6 months. If they then belong to group 1 or 2, manage accordingly. If they continue to remain in group 3, follow up and reassess once a year.

NOTE: acute hypertensive crisis (high blood pressure with dangerous clinical symptoms - for example heart failure or convulsions, see below) and high blood pressure in pregnancy (see pages 190-191) are not included in these three groups. This guideline only applies to chronically high blood pressure.

The aim of treatment is a blood pressure of systolic below 140 mmHg, and diastolic below 90 mmHg.

1. Education. The patient must know:

- Although he has no symptoms, he is at risk of complications if the blood pressure is not treated.
- High blood pressure is a chronic condition, which is controlled by treatment but will not usually go away. Therefore, treatment is life-long.
- The patient can do something himself. If he follows your advice (see box), his blood pressure is likely to fall and his risk of a heart attack or stroke will be reduced.

2. Drug treatment. Use the cheapest once daily treatment available (see box). The WHO recommends a thiazide diuretic. Start with a low dose. Tell the patient the blood pressure will fall gradually.

3. Review the patient after 4 weeks and take the blood pressure:

- *If the blood pressure is still high,* increase the dose slowly and review the patient every 4 weeks. *If you cannot control BP with one drug,* then add a second drug. Many patients with hypertension

How to reduce the risk of heart attack or stroke

ADVICE FOR PATIENTS

1. Stop smoking!
2. Do not eat salty foods or add salt when you eat food!
3. Do not eat a lot of animal fat but cereals, vegetables and fruit every day!
4. Get physical exercise! Walk fast 20 minutes at least four times a week!
5. If overweight, lose weight!
6. Take your medicines as prescribed by your doctor!

THERAPEUTIC CONSIDERATIONS FOR DOCTORS

1. Give acetylsalicylic acid (aspirin) 75-100 mg daily to all patients with ischaemic heart disease or a previous stroke.
2. Treat high blood pressure properly.
3. Treat diabetes mellitus properly.

Drugs to treat high blood pressure (BP)

Recent studies have shown that newer, more expensive drugs are usually not more effective than older and cheaper ones. Thiazide diuretics and beta-blockers are the first choice for treating high BP.

THE FOLLOWING ARE CHEAP DRUGS:

- **Hydrochlorothiazide** 12.5–25 mg (to up to 50 mg) once daily (or another thiazide diuretic).
- **Atenolol** 25–50 mg once daily (or **propranolol** 80 mg 2 times daily). Beta-blockers are first choice in patients with ischaemic heart disease. All beta-blockers are contra-indicated in asthma and heart block. Newer and more expensive beta-blockers are misoprolol and bisoprolol. They are not better for controlling blood pressure than atenolol.
- **Methyldopa** 250 mg 2 or 3 times daily. Increase the dose every 2 days if necessary up to maximum 3g daily, in elderly patients up to 2g.

MORE EXPENSIVE DRUGS ARE:

- **ACE blocker** (for example **captopril** and **enalapril**) are useful in hypertension with diabetes or heart failure, and in younger patients. Contra-indicated in renal failure and pregnancy.
- **Calcium channel blocker of dihydropyridine group** (for example **nifedipine**). Nifedipine should only be used as long-acting once daily preparations. Short acting preparations are associated with great variations in blood pressure and can be harmful.
- **Calcium channel blocker of rate limiting group** (for example **verapamil**). Never combine with beta-blockers and do not give to patients with heart failure.
- **Alpha-blocker** (for example **doxazosin**). They are useful in male patients with prostatism.

need more than one drug to control their high blood pressure. Give a *diuretic + beta-blocker*. Another good but more expensive combination is a thiazide diuretic + ACE inhibitor. A good combination of 3 drugs is *beta-blocker* (or ACE blocker) + *thiazide diuretic + nifedipine*.

- *If the blood pressure is controlled,* tell the patient to continue his medication. He should come back to you for review every 6 months.

Special situations:

- **High blood pressure and stroke.** High blood pressure is often discovered when a patient has a stroke. In the past it was common practice to treat this high blood pressure. However, recent evidence has shown that immediate treatment is harmful because it further reduces the blood supply to the brain. Often the high blood pressure is a response of the body to the stroke itself. Treatment should not be started until after one week if the blood pressure remains high.
- **Hypertensive crisis (malignant hypertension).** This presents with acute heart failure, very severe headache, convulsions and a very high blood pressure. It is sometimes difficult to differentiate from stroke.
 - a. *Bedrest* in sitting position.
 - b. Give **furosemide** 40–80 mg IV. Nifedipine is no longer recommended because it can cause an uncontrollable drop of BP.

- c. Start **atenolol** 50 mg once daily (except in asthma, in this case start a diuretic or another antihypertensive drug).

NOTE: IV anti-hypertensive treatment is only needed in cases of encephalopathy. Otherwise a slow drop of BP over 2-3 days is preferred. If the blood pressure drops suddenly there is the risk of organ damage and stroke.

ISCHAEMIC HEART DISEASE (IHD)

Ischaemic heart disease (IHD) is also called coronary heart disease (see figure 13-5). The arteries that transport oxygen to the heart muscle (coronary arteries) are partly blocked and less blood reaches the heart muscle. When the heart does not have a lot of work to do there is no problem. However, if the person does heavy physical work or is walking, then the heart muscle does not receive enough blood. This lack of blood (ischaemia) causes pain, which is called **angina pectoris**. The pain starts in the centre of the chest and may radiate to the left arm. The pain goes away when the person rests but comes back when the same level of exertion is done again.

If a coronary artery becomes completely blocked, the heart muscle that this artery has supplied with blood dies. This is called **myocardial infarction**. The patient will have pain like angina, except that it will last for hours and will not go away. The patient is at risk of dying from arrhythmia, heart failure or shock. Myocardial infarction is not very common in rural people. At risk are middle aged or older people who smoke or have cardiovascular risk factors.

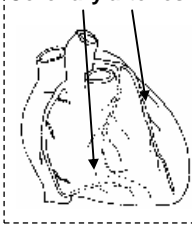
The following table shows how to differentiate between angina pectoris and myocardial infarction:

Angina pectoris	Myocardial infarction
Pain lasts usually only a few minutes and is relieved by rest or nitrates.	Pain lasts for more than 30 minutes and is not relieved by nitrates. NOTE: in old people and those with diabetes, a myocardial infarction may be painless.
	Often nausea and vomiting, sweating, pallor or dyspnoea
ECG is often normal in between angina pectoris attacks.	Typical ECG changes, and raised cardiac enzymes.

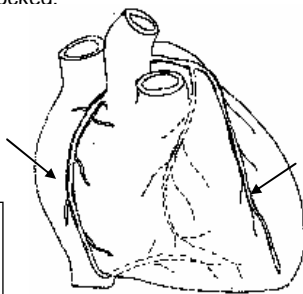
Management of angina pectoris

1. **Reduce risk factors**, see below under prevention.
2. **Look for and treat any other conditions that cause the heart to work harder:**
 - Anaemia
 - Heart failure
 - Cardiac arrhythmia (refer to cardiologist if pulse is irregular)
3. **Drug treatment:**
 - Give long-term **acetylsalicylic acid** (Aspirin) 75-

Coronary arteries



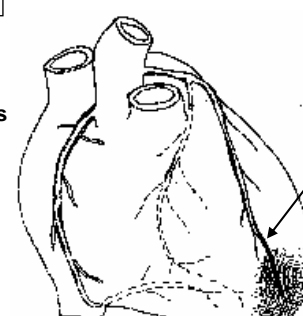
ANGINA PECTORIS:
The coronary arteries are partly blocked:



RISK FACTORS FOR ISCHAEMIC HEART DISEASE:

- Smoking
- High blood pressure
- High cholesterol
- Diabetes mellitus
- Lack of exertion


MYOCARDIAL INFARCTION:
Coronary arteries are completely blocked, necrosis of heart muscle develops



Important and dangerous complications of myocardial infarction:

- Cardiac arrhythmias
- Heart failure

How to diagnose myocardial infarction:
ECG changes of myocardial infarction develop after a few hours. If you want to exclude it, you need to take two ECGs 24 hours apart:



Cardiac enzymes:

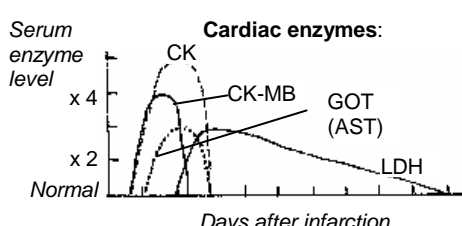


Figure 13-5 Ischaemic heart disease.

100 mg once daily (it stops the formation of blood clots in the arteries).

- If **angina pain occurs**, the patient should take **glyceryl trinitrate** (0.5 mg sublingual tablets or 1-2 puffs spray) dissolved under the tongue. He should also take glyceryl trinitrate before he does things of which he knows that they usually causes angina. The dose can be repeated if necessary. Common, harmless side effect is headache.
- If **attacks occur more often than two times a week**, give a beta-blocker (for example **atenolol** 100 mg once daily - contra-indicated in asthma).
- If **still not controlled**, add **isosorbide dinitrate** 15-60 mg 2 times daily (or long-acting nifedipine 20-40 mg 2 times daily).

NOTE: cholesterol lowering drugs (statins) and surgical interventions may be indicated but are often not available.

Immediate management of myocardial infarction

1. **Make the patient rest** and sit or lie down.
2. Give **oxygen**.
3. Give oral **acetylsalicylic acid** (Aspirin) 300 mg immediately.
4. Give **glyceryl trinitrate** 0.5–1 mg (or isosorbide dinitrate 5–10 mg) sublingually (under the tongue) and let it dissolve slowly. If the pain is still present after 15 minutes and the systolic blood pressure is above 90 mmHg, give a further dose. Common, harmless side effect is headache.
5. *If the pain is severe, give morphine* 5–10 mg slowly IV + **metoclopramide** 10 mg (to prevent vomiting). Repeat if necessary.
6. Give a **beta-blocker** (for example atenolol 10 mg IV and then 50 mg daily).
7. **Treat complications:**
 - **Arrhythmia:**
If the pulse is below 45/min, give atropine 0.5 mg IV. If necessary repeat after 5 minutes. You can repeat it after 1 hour and then every few hours up to a maximum of 3 mg/day. Aim is to keep the heart rate above 60/minute.
If the pulse is irregular and fast (over 140/minute), start digoxin.
 - **Heart failure** (see above). Starting the patient on an ACE-inhibitor 24 hours after the acute infarction reduces mortality.

NOTE: thrombolysis, stenting etc. are usually not available.

Long-term management after myocardial infarction

Most deaths occur within a few hours after the myocardial infarction. Therefore, if the patient survives the first day there is a good chance that he will slowly get better. Depending on his condition, he should start mobilizing about 2 weeks after the infarction and can consider returning to work after about 2-3 months. He remains at risk of further myocardial infarction in the future. To reduce this risk:

1. **Advise about reducing cardiovascular risk factors** (see box on page 139).
2. Give **atenolol** 50 mg once daily for at least 3 years.
3. Give oral **acetylsalicylic acid** (Aspirin) 75–100 mg once daily for life.

RHEUMATIC FEVER

Rheumatic heart disease is an important heart problem. It disables and kills many children and young adults. Besides good management of the acute attack, a particular weakness of its management is often the prevention of recurrence (see figure 13–6).

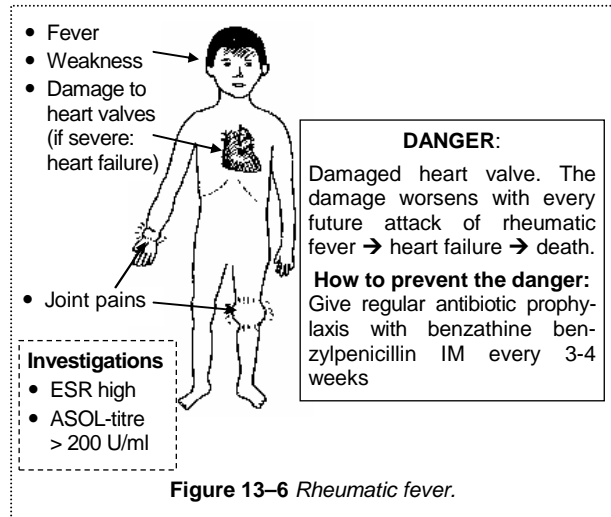


Figure 13–6 Rheumatic fever.

Clinical features

The first attack of rheumatic fever usually occurs in children between the ages of 5-15 years. It often follows 2-6 weeks after a throat infection with streptococcus bacteria. However, about 30% of cases occur without any obvious previous infection. The streptococcus bacteria start a specific immune reaction that causes inflammation mainly of the heart and joints. While the joint inflammation does not leave permanent damage, the heart involvement causes acute inflammation of the heart and permanent damage to the heart valves. Commonly the opening of the valves becomes narrow and causes obstruction of the blood flow through the heart. Rheumatic fever tends to recur, especially within the first 3 years after the first attack. These recurrences can be prevented by antibiotic prophylaxis. Every future attack of rheumatic fever will worsen the valve damage.

Main clinical features of the acute attack are:

- **Fever and weakness.**
- **Joint symptoms.** Typically a larger joint (often knee, ankle, wrist, shoulder or hip joint) becomes painful and swollen. After one week the pain and swelling resolves and another joint swells and becomes painful. This is called migratory (travelling) arthritis.
- **Heart symptoms.** In severe cases, you find acute heart failure; in less severe cases mainly a fast pulse. In some patients you will only hear a *new heart murmur* as a sign of damage to the heart valves and disturbed blood flow. It is important to differentiate a murmur indicating an abnormal heart from a so-called innocent murmur that does not indicate any heart disease. An innocent murmur is common in patients with fever or anaemia, probably due to increased blood flow through the heart. Characteristics of an *innocent murmur* are:
 - No thrill palpable
 - Soft, short
 - Not transmitted to neck, axilla or apex
 - The sound of the murmur changes when you listen for a while or on repeated examination.

NOTE: neurological and skin signs of rheumatic fever are rare.

Investigations

- High ESR
- ASOT-titre above 200 U/ml
- Arrange for chest x-ray and ECG if the heart is involved

Management

1. *If signs of heart involvement* (tachycardia, new murmur or heart failure) advise bedrest until the ESR, which indicates ongoing inflammation, has been normal for at least two weeks. This may take up to three months.

If severe heart failure, give oral **prednisolone** for 2 weeks.

2. **Give anti-inflammatory drugs for pain.** It is unclear whether this will change the course of the illness. Give **acetylsalicylic acid** (Aspirin) 100 mg/kg/day divided into 4 doses for 2 days, and then 70 mg/kg/day divided into 3-4 doses for 6 weeks. Watch out for salicylic overdose. The first signs are tinnitus and hyperventilation.
3. Give **penicillin** to eradicate all remaining streptococcus bacteria. Give benzathine benzylpenicillin IM one single dose (children 6-12 years 600,000 IU = 0.36 g; adults 1.2 million IU = 0.72 g) or oral penicillin V for a total of 10 days. *If penicillin allergy*, give oral erythromycin for 10 days.
4. **Treat symptoms of heart failure.**

How to prevent further damage

After completing the treatment with penicillin, start prophylaxis. This will prevent the worsening of damage that has already occurred. Failure to start or continue prophylaxis is the reason why many patients suffer recurrent attacks of rheumatic fever. These cause further damage to the heart function and result in the high morbidity and mortality of rheumatic heart disease.

It is recommended to continue prophylaxis for 5 years after the last attack or until the patient reaches the age of 18 years, whichever is later. However, attacks also occur after 5 years and it is safer to continue prophylaxis for 10 years after the last attack. In patients with an established heart problem, prophylaxis should be continued until the age of 45 years.

Give one injection of **benzathine benzylpenicillin** IM every 3-4 weeks (dose as above). *If penicillin allergy*, give oral erythromycin (5-12 years 250 mg 2 times daily; adults 500 mg 2 times daily) or oral sulfadiazine (5-12 years 500 mg once daily; adults 1g once daily). Continue during pregnancy (except sulfadiazine, which is contra-indicated in pregnancy and should be replaced by another drug).

BACTERIAL ENDOCARDITIS

Bacterial endocarditis is an acute or subacute infection of an abnormal heart valve. The infection usually occurs when a patient with a damaged heart valve undergoes a surgical procedure, dental extraction or urinary

catheterisation without receiving appropriate antibiotic endocarditis prophylaxis.

Clinical features

- Main features: fever + new heart murmur.
- Others: weakness, anaemia, haematuria, hepatomegaly and sometimes signs of heart failure.

Management

If you suspect bacterial endocarditis, take blood cultures. Give benzylpenicillin + gentamicin IV for 2 weeks, then oral amoxicillin for 2-4 weeks. In acute endocarditis, add cloxacillin.

Prevention - endocarditis prophylaxis

Any patient with known rheumatic or congenital heart disease or a heart murmur should be given endocarditis prophylaxis when he undergoes dental, genito-urinary, gastro-intestinal or upper respiratory tract procedures (for example tooth extraction or tonsillectomy):

- *For dental procedures with local anaesthesia or without anaesthesia*, give amoxicillin 1 hour before the procedure (children 6-12 years 1.5 g; adults 3 g).
- *For procedures under general anaesthesia*, give ampicillin IV/IM just before the procedure (children 6-12 years 500 mg; adults 1 g), and then oral amoxicillin 6 hours after the procedure (6-12 years 250 mg; adults 500 mg).

If penicillin allergy, or *if the patient took penicillin within the last month*, give oral clindamycin (children 6-12 years 300 mg; adults 600 mg) instead of amoxicillin or ampicillin.

- *To patients with a history of previous endocarditis* give ampicillin 1 g IV and gentamicin 120 mg IV at induction, followed by oral amoxicillin 500 mg 6 hours later.

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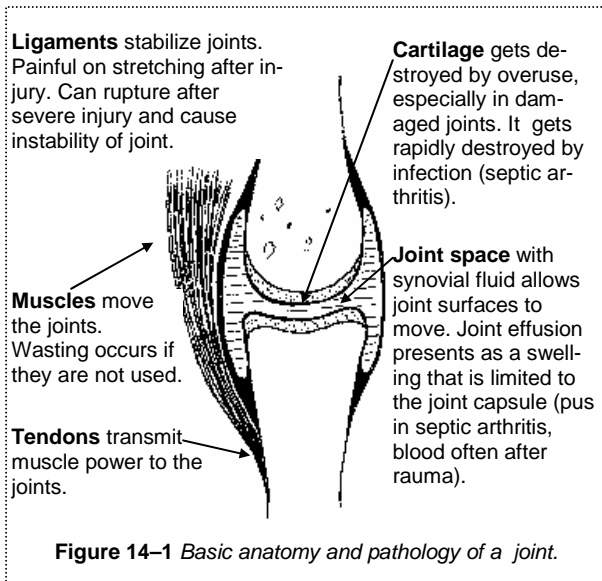
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14. Bone and joint problems

Normal functions of the musculoskeletal system are necessary for movement and work. One of the dangers of disease of bones or joints is that it may cause permanent disability. Therefore, always consider how to prevent disability as part of the management of the disease.

The three main presentations of joint or bone problems are (1) pain (2) swelling and (3) loss of function (the patient cannot move or use his joint).



How to assess a joint or bone problem

Take a history

- **Gradual or sudden onset?** (Acute or chronic problem)
- **One or more joints affected?** Symmetrical or asymmetrical joint involvement?
- **Pain?** If yes:
 - *Where?* (Ask the patient to point to the exact place where it hurts)
 - *When* does it hurt? (Constant pain at rest indicates inflammation. Intermittent pain mainly on weight-bearing or physical activity indicates mechanical pain)
- **Morning stiffness?** (If the stiffness lasts for longer than 1 hour, it may indicate inflammation)
- **Numbness?** (This indicates nerve pain)
- **Recent injury?** (If an injury was more than a week ago and did not cause problems at that time, it is unlikely to be responsible for the presenting problem)

Examine the patient

- Ill or well?
- Fever?

Examination of joints consist of the following steps: look, feel, move and assess function. Always compare the opposite limbs with each other to detect swelling, muscle wasting or deformities. If there is a joint problem, always examine the joint above and below the affected joint as well.

Look:

- How does the patient walk? Limp? (For causes of limp see box)
- Deformity or swelling of limbs, joints or spine?
- Muscle wasting?

Causes of limp

- One leg is shorter than the other
- Disease of back, hip, knee or ankle joint
- Muscle weakness (for example paralysis)
- Artificial leg

Feel:

- *Pain or tenderness?* (Find the point of greatest tenderness)
- *Swelling?* (Define whether the swelling is inside or around a joint)
- *Warmth?* (Feel the temperature of the affected area with the back of your hand and compare with the healthy side)

Move and assess function:

- *Painful or limited movements?* Move the joint passively (you do it) and actively (the patient moves it). This must be done gently: how far can the patient move his joint? What stops him moving it (for example pain or stiffness)? Always compare the range of movements with the opposite leg or arm. If there is a joint problem, range of movements will be less than normal.

Moving all joints is an essential part of the examination of a child with unclear fever. While you are doing this, watch the child's face to see whether it hurts. If it does, suspect a joint or bone infection.

Noises made by moving joints are usually without clinical significance. Many people can produce a harmless click. Other noises are produced by tendons slipping over bony prominences.

- *Assess function.* This is perhaps the most important part of the examination because to prevent or improve disability is one of the main aims in the management of joint problems. Ask the patient what he

cannot do with the affected limb. Ask him to try to do it and then observe what stops him from doing it (for example pain or stiffness).

Investigations

- **X-rays.** Remember that x-rays are normal in early osteomyelitis and early septic or tuberculous arthritis. However, it can be helpful to take an x-ray early and then after 2 weeks to look for changes that have developed. An x-ray is also indicated to rule out a fracture if trauma is suspected.
- **Joint aspiration** to determine whether an effusion contains pus (see page 257).
- **ESR** to show the degree of inflammation.

The painful joint or bone

A great variety of problems cause painful joints. Arthritis can be a disease on its own or can be an additional symptom in many non-joint problems. Many chronic joint disorders (and also healed fractures) are worse in cold or wet conditions. The reason for this is not clear.

Many joint/body pains are harmless pains of muscles and soft tissues, which are caused by overuse or anxiety and exhaustion. Suspect these if the patient is pointing to several places where it hurts, and if you find tenderness in several muscles in a patient who is not ill and without fever. Typically such patients complain about many symptoms but you can find no clinical signs.

Pain is not always felt where the problem is, but can be referred. For example pain in the shoulder tip can originate from basal pneumonia or liver abscess. Hip problems often present with knee pain. Hip pain is also usually felt in or around the groin and the front of the thigh. Pain in the buttock is usually caused by a lower back problem (see figure 14–2).

Whenever pain in a single joint has started acutely and the joint is red and tender, suspect septic arthritis.

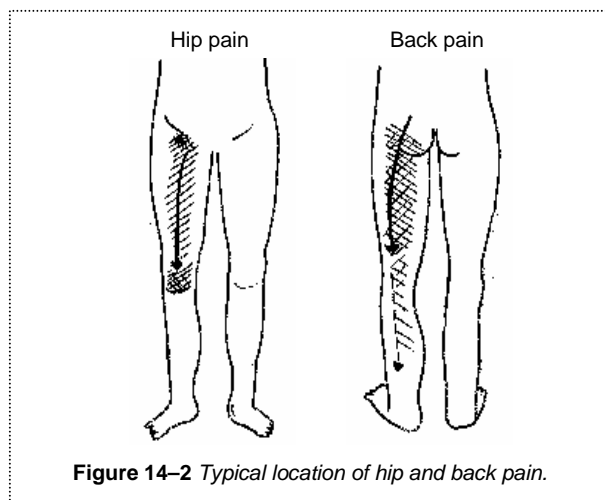


Figure 14–2 Typical location of hip and back pain.

Finding the answers to the following three questions will help to determine the cause of joint pains (see boxes on this and on the next page):

1. **What is the patient's age?** (Many problems occur at a certain age)
2. **Is the problem acute or chronic?**
3. **Is one, or are many joints affected?**

Causes of painful joints or bones

ACUTE PAIN OF ONE JOINT

- Septic arthritis
- Osteomyelitis near a joint
- Trauma
- Rheumatic fever (usually 1-2 joints are affected)
- Gout (usually the metacarpal joint of the big toe is affected)

ACUTE PAIN OF MANY JOINTS

- Joint pain accompanying infections (malaria, hepatitis B, many viruses, dysentery)
- Brucellosis
- Side effect of drugs (for example pyrazinamide)
- Allergy
- Vitamin C deficiency (scurvy)

CHRONIC PAIN OF ONE (OR VERY FEW) JOINTS

- TB arthritis
- Osteoarthritis (usually hip or knee joints)
- Bone tumour or metastasis

CHRONIC PAIN OF MANY JOINTS

- Rheumatoid arthritis
- Psoriasis arthritis

NON-JOINT CAUSES TO CONSIDER

- Pain in muscles
- Cellulitis
- Pyomyositis
- Tendonitis
- Carpal tunnel syndrome
- Psychological (expression of stress)

How to treat painful joints

In arthritis, movement of the joints causes pain. The muscles go into spasm so that the joint cannot be moved normally. Later, these muscles become thin and weak (muscle wasting) because they are not used. If the patient does not start exercises or physiotherapy at this stage, muscles, tendons and joint capsule shorten and change into bands of scar-like tissue. These bands cannot be stretched and hold the joint in abnormal positions. These muscle and tendon changes are called *contractures*. They severely disable a person because he cannot use that joint.

You can prevent these changes. Although joint pain is caused by many different problems that may require specific treatment, the following general principles apply to most patients:

Common joint problems in relation to age

This is a rough guide. For example: although osteomyelitis is more common in children and young adults, it may still occur in older people.

CHILDREN

- Acute rheumatic fever
- Rickets
- Acute osteomyelitis
- Septic arthritis

YOUNG ADULTS

- Rheumatoid arthritis (mainly women)
- Osteomalacia (mainly women)
- Acute osteomyelitis
- Tuberculosis
- Tendonitis
- Rare: Bone tumours

OLDER PEOPLE

- Osteoarthritis
- Osteomalacia (mainly women)
- Gout (mainly men)
- Bone metastasis

1. **Rest painful joints.** The more painful a joint, the more rest it needs. If joints are swollen, it helps to keep them lifted up.
2. **Apply heat or cold** for 10-15 minutes several times daily. This often reduces pain and makes movements easier; try out whether the patient finds heat or cold more helpful.
3. **Give pain relief.** If there is inflammation (redness and heat), give a painkiller that also reduces inflammation (for example acetylsalicylic acid or ibuprofen). If there is no inflammation, for example in osteoarthritis, use paracetamol, which has fewer side effects (see box).

NOTE: steroids have very limited indications because long-term treatment is associated with many serious side effects.

4. **Teach the patient the following exercises.** Start them after signs of acute inflammation have subsided. In chronic conditions start them immediately:
 - *Exercises to prevent stiffness* (range-of-movement exercises) (see figure 14-3). It is important to move the joints through their full range of possible movements to prevent contractures and stiffness. Move each joint slowly at least 2 times daily.
 - *Exercises to prevent muscle weakness* (see figure 14-4). Even without bending a joint, a patient can tighten his muscles. During this exercise, he should keep his muscles tight until they get tired or begin to tremble. He should do these exercises 20-40 times daily. These exercises will strengthen his muscles.

Drugs for pain relief in joint pain

NO INFLAMMATION

Give **paracetamol**: adults 500 mg–1 g 3-4 times daily.

INFLAMMATION

Give one of the **NSAIDs** (non-steroidal anti-inflammatory drugs):

1. Individual patients show different responses to the various NSAIDs. Try each NSAID for 1-2 weeks before changing to another.
2. Start with **ibuprofen**, which has the least side effects.
3. Do not combine different NSAIDs.
4. Main side effects are gastrointestinal problems.
5. Advise the patient:
 - a. If he develops abdominal pain he should stop the drug and come for further advice.
 - b. Black stools can indicate gastrointestinal bleeding. The patient should stop the NSAIDs at once and seek medical help.

How to reduce the risk of gastrointestinal complications

At risk of serious complications are people with a previous peptic ulcer or previous gastrointestinal bleeding, elderly people and those with a history of cardiovascular disease.

Avoid the use of NSAIDs in these people. If you must give a NSAID, prescribe it together with a drug that protects from gastrointestinal complications from the start of the treatment. Be aware that no gastro-protective drug can guarantee that there will not be a complication!

- If there is a high risk of ulcer and the patient must take the drug, give together with **omeprazole** 20 mg once daily.
- **Ranitidine** at a standard dose (150 mg 2 times daily) only reduces the risk of duodenal ulcers. In a high dose (300 mg 2 times daily), it reduces both gastric and duodenal ulcers.
- Sometimes **misoprostol** is available, which also reduces - at a dose of 200 microgram 4 times a day - the risk of gastrointestinal complications by 40%.

NOTE: **antacids** (for example aluminium hydroxide) given together with NSAIDs do **not** reduce the risk of gastrointestinal complications.

Adult oral doses of common NSAIDs

Usually fewer side effects:

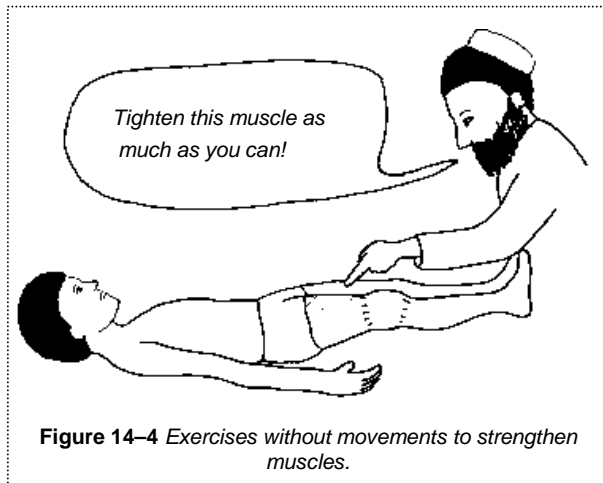
- **Ibuprofen** 400–600 mg 3-4 times daily
- **Diclofenac** 50 mg 3 times daily or 75 mg 2 times daily
- **Naproxen** 500 mg 1-2 times daily

Frequent side effects:

- **Acetylsalicylic acid** (aspirin) 300–900 mg 3-4 times daily
- **Ketoprofen** 50 mg 3 times daily or 100 mg 2 times daily
- **Piroxicam** 10–30 mg once daily
- **Indometacin** 25–50 mg 3 times daily



Figure 14-3 Range-of-motion exercises to prevent stiffness.



OSTEOMYELITIS

Osteomyelitis is a bacterial infection of the bone (see figure 14-5). The infection usually starts where the shaft merges into the growing end of the bone (metaphysis). Bacteria reach the bone through the blood stream or through an open injury (for example mine injury or open fracture).

Chronic osteomyelitis develops from poorly treated acute osteomyelitis. An important differential diagnosis to chronic osteomyelitis is tuberculosis.

Clinical features

Diagnosis of acute osteomyelitis is often missed.

➤ Suspect acute osteomyelitis in any patient with acute onset of pain in a limb and tenderness over a bone with fever.

Other suggestive features are:

- Severe pain and tenderness on percussion at the site of the bone infection. The pain gets worse quickly.
- Limp and inability to use the affected limb.
- Young children may only present with fever and irritability and show pain on joint assessment.
- Often, a recent skin infection or recent injury to bone.

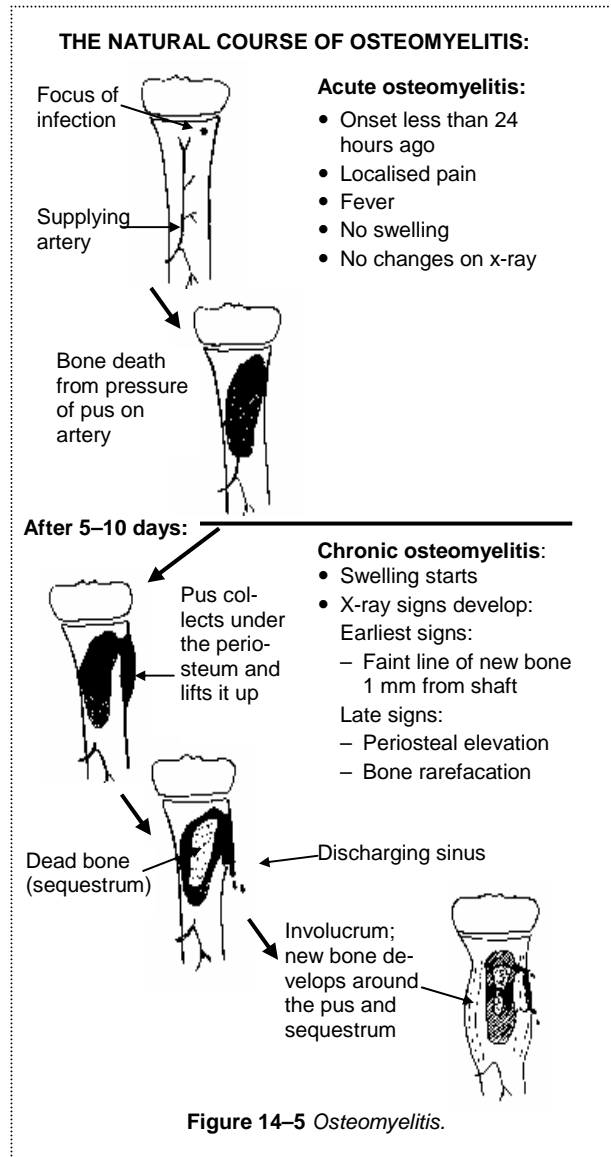
Late signs are:

- Tender swelling, heat and redness at the site of the bone infection.
- Sinuses draining pus through the skin.

Investigations

- Aspiration of the subperiosteal abscess, see under management.
- X-ray changes do not appear earlier than 1-2 weeks after the beginning of the illness. X-rays may be useful in excluding a fracture but are useless in diagnosing early osteomyelitis. Once you find x-ray changes and an abscess or discharge through the skin, chronic osteomyelitis has already developed.

NOTE: blood tests are not helpful.



Management of acute osteomyelitis

Antibiotics alone may only be effective if the duration of symptoms is less than 24 hours. You will very rarely see patients who come to you that early! Antibiotics are only able to kill bacteria at the edge of pus and therefore cannot stop the infection once pus has built up. If pus is not released quickly, its pressure will compress the blood supply of the bone and the bone will die. Once this has happened, healing takes a long time.

1. **Refer for surgery.** A hole must be drilled in the bone over the point of the greatest tenderness to release the pus before bone dies. This is also a useful diagnostic procedure if you suspect osteomyelitis.
2. **Start antibiotics** that must cover staphylococcus bacteria that are responsible for 90% of bone infections. Give the antibiotics at first IV until fever and acute signs have disappeared, and then continue orally.
 - Under 5 years, give **cloxacillin + ampicillin** for 4-6 weeks. Add **gentamicin** during the first week.
 - Adults and children over 5 years, give **cloxacillin** for 4-6 weeks. Add **gentamicin** during the first week.

- *Alternative for both age groups* are benzylpenicillin + chloramphenicol (or benzylpenicillin + cloxacillin), or clindamycin.
3. **Rest the affected limb** in a splint until acute signs have disappeared, which usually takes 1-2 weeks, then start mobilisation.
 4. **Review the patient** after 3 months. Take an x-ray to look for signs of sequestration that would indicate that chronic osteomyelitis has developed.

Management of chronic osteomyelitis

Once bone has died and pus drains through sinuses, chronic osteomyelitis has developed. Many patients present like this. Antibiotics may sometimes reduce the amount of pus for a while but cannot provide a cure. The only effective treatment for chronic osteomyelitis is the removal of the dead bone (sequestrum) that is surrounded by pus. This operation has to wait until enough new bone, called involucrum, has formed. If the operation is done too early, a gap may develop between the two ends of bone. Formation of involucrum can be encouraged by mobilisation of the limb.

1. Use antibiotics only when the patient has a fever or is ill. In this situation, the antibiotics will prevent the spread of infection to healthy bone and control the acute exacerbation of infection.
2. Follow up with x-rays to determine the right time for the operation.

SEPTIC ARTHRITIS

Septic arthritis is a bacterial infection of a joint. Bacteria reach a joint through the blood stream (for example from a skin lesion) or by joint aspiration under non-sterile conditions. Septic arthritis is less common than osteomyelitis. It is an emergency because pus can destroy a joint within 24 hours (see figure 14-6).

Clinical features

- Always suspect septic arthritis if a single joint becomes acutely very painful with swelling and redness.
- The patient is usually unwell with fever.
- Usually only one joint is involved (in adults most commonly knee joint).
- All movements of the infected joint are limited and extremely painful.

Complications:

- Septic arthritis can lead to sepsis, especially in young children. Long-term complications are destruction of the joint with permanent disability and early onset of osteoarthritis.

Investigations

- **Fluid aspirated from the joint** contains pus with a very high number of WBC. Determine the responsible bacteria by gram-stain or culture (usually staphylococcus).

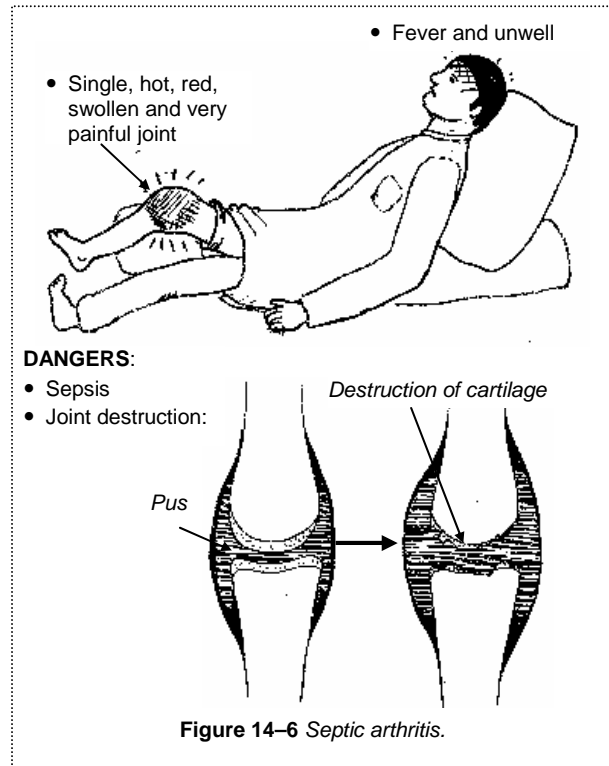


Figure 14-6 Septic arthritis.

- **Raised ESR.** It may help to monitor the course of the disease.

NOTE: WBC is unreliable and only raised in half of the patients at the onset of the illness.

Management

1. **Always aspirate the joint.** This must be done (1) to examine the fluid and (2) to release the pus and so lower the risk of permanent joint damage. Repeat the aspiration (once daily or more often) if fluid collects again.
2. **Antibiotics** are the same as for osteomyelitis (see above). Give them IV for at least 2 weeks (2-6 weeks), followed by oral treatment for 4-12 weeks. Do not stop the antibiotics until the symptoms have disappeared and ESR has returned to normal.
3. **Rest the joint** in a splint and elevate it until the acute signs have resolved, which will usually take 1-2 weeks. As soon as the acute symptoms have improved, start physiotherapy to prevent stiffness and disability. The patient should not weight-bear on the affected joint until acute inflammation has resolved.
4. **Treat pain** with acetylsalicylic acid (Aspirin) or ibuprofen.

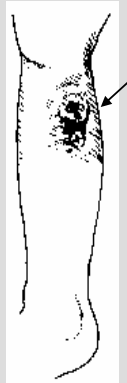
TUBERCULOSIS OF BONES AND JOINTS

Tuberculosis (TB) can spread from the primary lung focus to any bone or joint. Most bone or joint disease occurs within three years after the primary infection. Therefore, children and young adults are usually affected. TB can infect any bone but those bearing weight (spine, hip, knee and foot) are most commonly affected.

How to differentiate between bone TB and other conditions

TB and chronic osteomyelitis (discharging sinuses)

- **TB:** severe muscle wasting and progressive worsening of condition. **Osteomyelitis:** less muscle wasting and mainly chronic discharge but no worsening.
- **X-ray. TB:** very little new bone. **Osteomyelitis:** plenty of new bone (periosteal reaction)



TB and septic arthritis

- **TB:** gradual onset over several weeks, the patient is usually well, later muscle wasting. **Septic arthritis:** very acute onset, often young children are affected, patient is unwell.

TB and osteoarthritis

- **TB:** gradual worsening over several weeks or months, pain every day. **Osteoarthritis:** usually there are times when there is little or no pain and other times when the pain is worse.

Sometimes it is difficult to distinguish TB from other causes of joint or bone problems, for example chronic osteomyelitis (see the above box).

Clinical features

General features:

- Usually a child or young adult but can affect any age
- Slow onset of pain and swelling that gets gradually worse over several weeks. Pain is worst when the patient is tired but later becomes constant.
- Severe muscle wasting
- *Late:* discharging sinus

Specific joints:

- **Hip** (commonest): gradual development of a limp and pain in one hip. Pain is referred to the knee. Wasting of thigh and gluteal muscles.
- **Knee:** slow onset of swelling (fluid in the joint) followed by pain. The affected knee is often slightly warmer than the unaffected knee. Wasting of muscles above the knee.
- **Foot:** pain, swelling and limp. Wasting of calf muscles.
- **Arm and hand:** swelling and limitation of movements, later pain and muscle wasting.

Investigations

X-rays are often normal during the early stage of the illness. It is helpful to compare with the opposite side to look for changes of bone structure and narrowing of joint space. In advanced cases, the joint will be destroyed.

Management

1. Treat as category 1 according to standard guidelines (see page 41).
2. Follow the advice about general management of painful joints (see pages 145-146).

RHEUMATOID ARTHRITIS (RA)

Rheumatoid arthritis (RA) is a chronic inflammation that affects the whole body but especially the joints. It is not an infection (see figure 14-7).

Clinical features

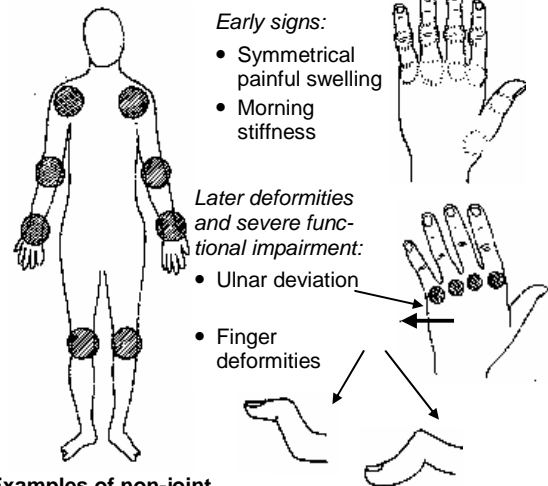
- Young or middle-aged women are most commonly affected but RA can start at any age.
- Symmetrical arthritis (same joints on both sides of body are affected), which starts in the small joints of hands (especially first joints of the fingers, called PIP joints) and feet. Later it spreads to larger joints (knee, wrist or elbow):
 - Swelling of soft tissues around the joints (early sign).
 - Pain and morning stiffness that lasts for more than 1 hour. Stiffness when the joints have not been used for a while.
 - Signs of advanced disease: joint destruction with deformity and disability.
- Often anaemia, possibly involvement of heart (pericarditis), lungs, blood vessels and eyes (scleritis).
- A small group of patients with RA progress to severely disabling disease with extensive joint destruction and deformity.

Investigations

Rheumatoid arthritis is diagnosed by clinical features. There is no test that can make the diagnosis.

Commonly affected joints

(symmetrical involvement):



Examples of non-joint manifestations:

- Anaemia
- Carpal tunnel syndrome, bursitis, tenosynovitis, nodules
- Pleural effusion
- Scleritis
- Pericarditis
- Leg ulcers, ankle oedema
- Polyneuropathy

Basics of management:

1. Exercise and physiotherapy
2. Symptomatic pain relief
3. Disease-modifying drugs

Figure 14-7 Rheumatoid arthritis.

- ESR indicates the degree of inflammation.
- X-rays are normal in early disease, later you find erosions of the joint surfaces.

NOTE: rheumatoid factor (RF) is only positive in 70% of cases. It is also positive in many people not suffering from RA. The rheumatoid factor is therefore not a specific diagnostic test for RA.

Management

The main aim of treatment is the prevention of disability.

1. Teach regular **exercises** and refer for **physiotherapy**.
2. **Drug therapy** consists of (1) drugs to relieve the symptoms and (2) drugs to stop or slow down disease progression (disease modifying drugs):

Drugs to relieve symptoms are so-called non-steroidal anti-inflammatory drugs (NSAIDs) (see box on page 146). Explain to the patient that these drugs are for the relief of symptoms. He does not need to take them on good days.

NOTE: give *steroids* (prednisolone) only if symptoms have acutely become very severe. Do not use steroids long-term because serious side effects will certainly occur. Steroids do not produce a sustained clinical or functional benefit.

Drugs that modify the disease and prevent joint damage. They may have dangerous side effects. Where good health facilities exist, they may be started as soon as the diagnosis of RA has been confirmed. In a resource poor situation, consider starting them (1) if the patient has tried three different NSAIDs without any improvement or (2) if swelling, pain and morning stiffness have persisted for more than 6 months.

Try only one of them at the same time. Explain to the patient that it takes 6 weeks before you can decide whether the drug has improved the arthritis. Treatment is long-term.

- **Methotrexate.** Give 7.5 mg orally once a week (not daily!). Increase the dose to 15 mg once a week after 4 weeks if no response. Give folic acid 5 mg once a week but on a different day than methotrexate. Main side effects are gastrointestinal problems, raised liver function tests, renal insufficiency and leucopenia. Therefore, check the WBC and liver function tests during the first month once a week and later once a month. Tell the patient to seek medical help if he develops bleeding, bruising or a sore throat and fever.
- **Sulfasalazine.** Give 500 mg orally once daily. The dose can be increased to 500 mg twice daily after 4 weeks if there is no response. Main side effects are headaches, skin rashes, raised liver function tests, leucopenia and thrombocytopenia. The blood abnormalities occur usually within the first 3-6 months of treatment. Therefore, check WBC and liver function tests every month. Tell the patient to seek medical help if he develops bleeding, bruising or a sore throat and fever.

- **Chloroquine** can be used in a dose of chloroquine base 2.5 mg/kg/day (150 mg) orally. It is probably less effective than methotrexate or sulfasalazine. Gastrointestinal side effects are common. A rare complication is retinopathy. The patient should have his eyes checked once a year.
- **Penicillamine** is sometimes used in patients with troublesome non-joint features. Although the name sounds similar, penicillamine is not a penicillin!

NOTE: do not give penicillin injections. Rheumatoid arthritis is not an infectious disease and must not be confused with rheumatic fever. Iron therapy is not indicated in anaemia of rheumatoid arthritis, unless the patient has additional iron deficiency anaemia.

PYOMYOSITIS

Pyomyositis is a bacterial infection within the muscle, which often results in a deep muscle abscess. It may develop after a penetrating injury or crush injury but often it is spread through the blood stream (for example from septic arthritis). It is usually caused by staphylococcus bacteria.

Clinical features

- First sign is pain in the infected muscle at rest. Pain worsens when stretching that muscle. The muscles most commonly affected are the thigh muscles
NOTE: in arthritis, all movements are painful. In pyomyositis only the movement that stretches the infected muscle is painful.
- After a few days the patient becomes ill with fever.
- On palpation: firm, tender and painful muscle. You may not feel the fluctuation of abscess because the abscess is deep down in the muscle.
- If left untreated, a large muscle abscess will develop. The patient may develop septicaemia.

Investigations

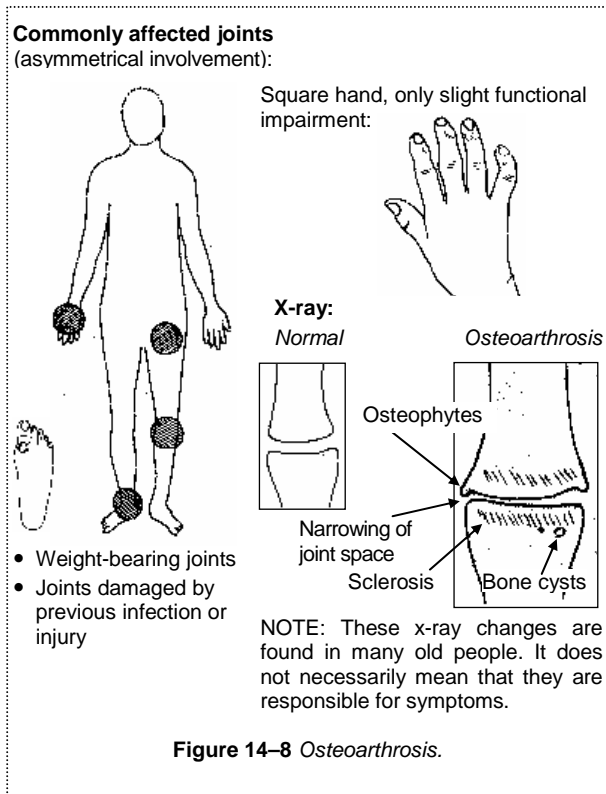
Pyomyositis is not always easy to diagnose because the collection of pus is very deep. If the diagnosis is not clear, put a large-bore needle in the affected muscle and try to aspirate pus. Pus can usually be aspirated from day 10 of the illness.

Management

1. *If early stage without abscess*, give **cloxacillin** IV/IM until improvement and then continue with oral cloxacillin.
2. *If an abscess has formed* refer to hospital for incision and drainage and further antibiotic treatment.

OSTEOARTHRISIS

In osteoarthritis the inner surface of the joints (cartilage) is damaged (see figure 14-8). This is not the result of infection or inflammation. Osteoarthritis occurs either in young people as the result of previous joint



damage or joint infection, or in older people because they have worn out their cartilage. Typically, osteoarthritis occurs in the hips, knees, spine or hands because these joints are used most or bear weight.

Clinical features

- Older patient or patient with pre-existing joint damage.
- Slow onset of symptoms over many months. Usually there are times when there is little or no pain and other times when the pain is worse.
- Pain in a joint during or after use. Pain improves with rest. On examination there is only mild tenderness.
- No fever or signs of a general illness.
- Sometimes joint effusion (clear-yellow fluid) if over-use of affected joint.

Investigations

- X-ray shows degenerative changes of the affected joint. However, this does not mean that these changes cause the symptoms, because you find changes of osteoarthritis in most x-rays of older people. Therefore x-ray is usually not needed and diagnosis is made by clinical features.
- Normal ESR and WBC.
- If joint effusion, the aspirated fluid is clear-yellow.

Management

1. Give a simple painkiller such as *paracetamol*.
2. **Tell the patient** to use the affected joint as little as possible. If hip or knee joints are affected, advise him to use a stick. He should hold the stick in the

opposite hand. Show him exercises to strengthen the muscles without putting weight on the joints (see page 146 and figure 14-4 on page 147).

3. *If the patient is overweight*, advise him to reduce weight.
4. *In very severe cases* surgery (osteotomy or joint replacement) may be indicated.

OSTEOMALACIA and RICKETS

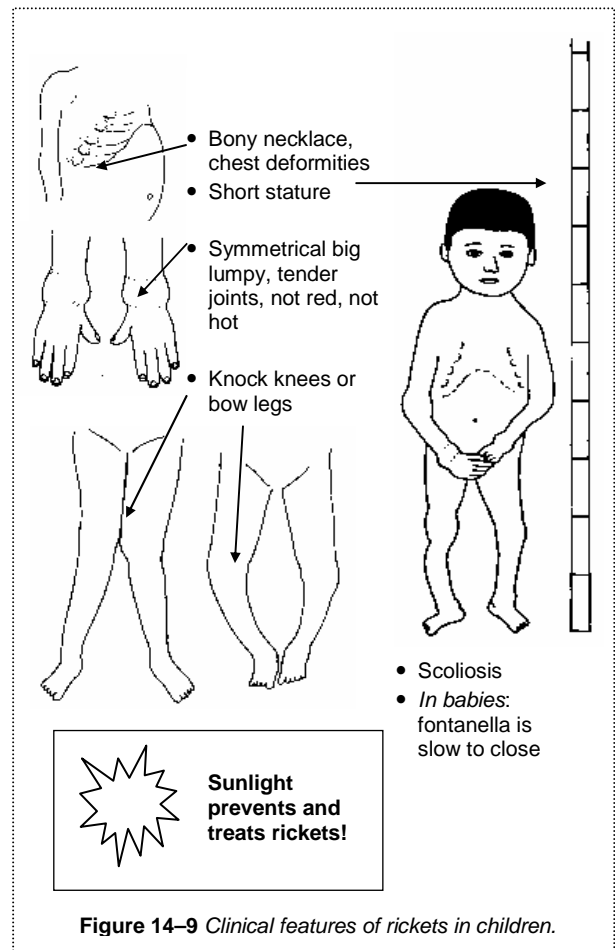
Vitamin D increases the absorption of calcium, which is needed for building strong bones. Vitamin D is produced in the skin with the help of sunlight. In children, vitamin D deficiency causes rickets. In adults, vitamin D deficiency causes osteomalacia. Despite an abundance of sunlight, many children and women suffer from rickets or osteomalacia.

Clinical features

Adults:

- Usually women wearing the veil and not getting exposed to sunlight in their yard
- Low back pain or hip pain
- Weakness of muscles in upper legs
- Waddling gait
- Rare: tetani (low calcium) or spontaneous fracture

Children, see figure 14-9.



Complications:

Rickets can cause deformities of bones, which may become a major problem. For example a young girl who suffers from rickets may develop pelvic deformity, which later makes the passage of a baby impossible.

Investigations

A high *alkaline phosphatase* (AP - in adults greater than 300 IU/l) suggests osteomalacia. Other causes of a raised alkaline phosphatase are liver disease or bone metastases. If possible, check serum calcium, which will be normal or low.

The clinical signs of rickets in children are usually typical and no investigations are needed.

Management

1. **Explain the need for sunlight exposure.** Sunlight is not harmful to sick children. For treatment, the patient's face and arms should be exposed to sunlight for about 30 minutes every day.
2. Give either oral **vitamin D** (colecalfiferol or ergocalciferol) 2000–5000 units once daily for 3–4 weeks or a single high oral dose or injection (children under 5 years 100,000 IU; older children and adults 300,000 IU). Repeat after 3 weeks, then continue with preventative dose.
3. **Advise a high calcium intake** (milk and cheese).

Prevention

Rickets and osteomalacia can be easily prevented by daily exposure to sunlight. 10–30 minutes per day of sunlight on the arms and face are sufficient. If high risk, give oral vitamin D (children under 5 years 100,000 units every 3 months; older children and adults 300,000 units every 6 months).

GOUT

Gout is caused by hyperuricaemia and the deposition of crystals in the joints. It is not common.

Clinical features

- Usually men
- Acute very painful, red and swollen joint, often the proximal joint of the big toe is affected
- If recurrent gout attacks: knobbly asymmetrical swellings of the fingers and feet, which may ulcerate and discharge white debris
- Late complication: joint destruction

Investigations

Uric acid level in the blood is often raised but may be normal even during an acute attack.

Management

1. Give high dose of **NSAIDs** during an acute attack. Colchicine is nowadays not often used because of frequent side effects.
2. *In a patient with recurrent attacks*, give prophylactically **allopurinol** 100–300 mg once a day. He should

not take acetylsalicylic acid (Aspirin) or thiazid diuretics because they may trigger a gout attack.

3. Advise a high fluid intake.

BODY PAIN

Diffuse body pains are very common. Worry, anxiety and exhaustion can cause muscle tensions and result in chronic neck, arm or leg pains. Prolonged working in certain positions (for example squatting) may also cause mechanical muscular symptoms like back pain.

Clinical features

- Diffuse neck, back, arm or leg pain, which is chronic and difficult to treat.
- On palpation, several places of muscular or soft tissues are tender.
- No signs of a serious illness and no fever or weight loss. No deformities, joint swellings or neurological signs.

Management

1. **Explain that anxiety and exhaustion can cause body pains.**
2. Treat with **paracetamol** or **acetylsalicylic acid** (Aspirin) when needed but explain that the pain will come back at times.
3. **Look for features of depression** and treat accordingly.

BONE TUMOURS

Bone tumours can either be a primary benign or malignant tumour that originates from bone, or can be a metastasis from cancer of another location (secondary tumours).

Clinical features

- Bone pain, which does not improve
- Hard swelling of bone
- Pathological fracture. This is a fracture that occurs without injury or with a minor injury because the tumour has replaced bone, and that part of the bone is weak and breaks easily.

Investigations

X-rays show the bone changes. Alkaline phosphatase is raised in bone metastases.

Management

1. Treat pain with regular NSAIDs.
2. Refer the patient for further diagnosis and management.

TENOSYNOVITIS

This is inflammation of one of the tendon sheaths of the tendons that either bend or stretch the fingers or hand. It

is often related to overuse. Movement is painful and the affected tendon sheath is tender and swollen.

Management

Treat by resting the hand in a splint and with anti-inflammatory drugs. Tenosynovitis is not an infection and therefore antibiotics are not indicated.

CARPAL TUNNEL SYNDROME

Carpal tunnel syndrome most commonly affects women. It is caused by the median nerve being squeezed by the carpal ligament at the wrist. It is a common cause of hand pain at night. The pain is associated with numbness of the fingers, which often gets better when shaking the hand.

Splint the hand at night. If fluid retention is likely, give a diuretic (for example hydrochlorothiazide 25–50 mg in the morning). If this does not help, a corticosteroid injection into the carpal tunnel (given by a specialist only) or surgery may be indicated.

Swollen legs

Leg swellings occur in many different conditions, which are often unrelated to bone or joint problems. The first step to reach a diagnosis is to differentiate whether (1) only one leg is swollen or (2) whether both legs are swollen (see box).

Causes of leg swelling

BOTH LEGS OR ANKLES ARE SWOLLEN

- Oedema (heart failure, pre-eclampsia, severe malnutrition, nephritic syndrome, nephrotic syndrome, liver failure)
- Immobility
- Side effect of drugs (for example nifedipine)

ONLY ONE LEG IS SWOLLEN

- Injury
- Infection of skin, muscle or bone
- Lymphoedema in chronic infection
- Deep vein thrombosis
- Rare: bone tumour

Hip problems

Hip pain is usually felt in or around the groin and the front of the thigh. Hip problems may present with a limp or as knee pain (for causes see box). Hip problems are commonly missed if the hip is not examined in patients with *knee pain*. For how to examine the hips see figure 14–10.

In adults, hip problems are usually caused by infection or, in older patients, osteoarthritis. In children, depending on the age, there are several specific problems in addition to infection:

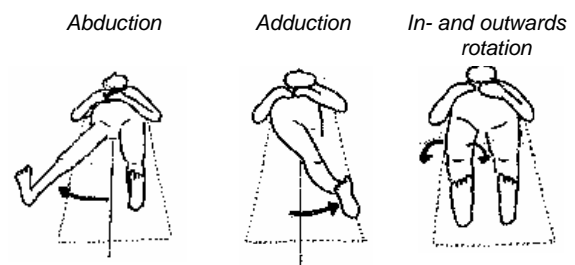
Causes of hip pain or limp

Any cause mentioned under joint pain can cause hip pain or a limp

- Bacterial infection (septic arthritis)
- Tuberculosis
- Trauma
- Referred pain from the spine
- Osteoarthritis
- Transient synovitis (2–10 year old children)
- Perthes disease (4–8 year old children)
- Slipped epiphysis (8–15 year old children)

HOW TO EXAMINE FOR HIP PROBLEMS:

1. **Ask about the symptoms.**
2. **Feel for tenderness.**
3. **Move the hip joint** (abduct, adduct, rotate in- and outwards). While you do this assess for pain and whether the movements are restricted. If a movement is restricted, find out whether it is because of pain or mechanical restriction.



4. **Examine the knee joint** for swelling, redness, tenderness and pain on movement.

Figure 14–10 How to examine a patient with a suspected hip problem.

- **Dislocation of the hip.** Some babies are born with a dislocated hip. This means the round head of the femoral bone is out of its hip socket (see figure 14–11). If the problem is not recognised, the child will later walk with a typical waddling gait and develop early osteoarthritis and hip pain.
- **Transient synovitis** most commonly affects 2–10 year-old children. It presents with an acute limp and pain after a viral upper airway infection. Transient synovitis is a self-limiting condition. Advise bedrest because the child should not bear any weight on the affected leg. Give painkiller (for example ibuprofen).
- **Perthes disease** affects 4–8 year-old children. It is a necrosis of the femoral head. Its cause is not known. The child will limp but may not always complain about pain. The hip movements are limited. The x-ray shows deformity of the femoral head. The dead bone will gradually be replaced by new bone over a period of 2–4 years. Sometimes the femoral head remains permanently deformed.

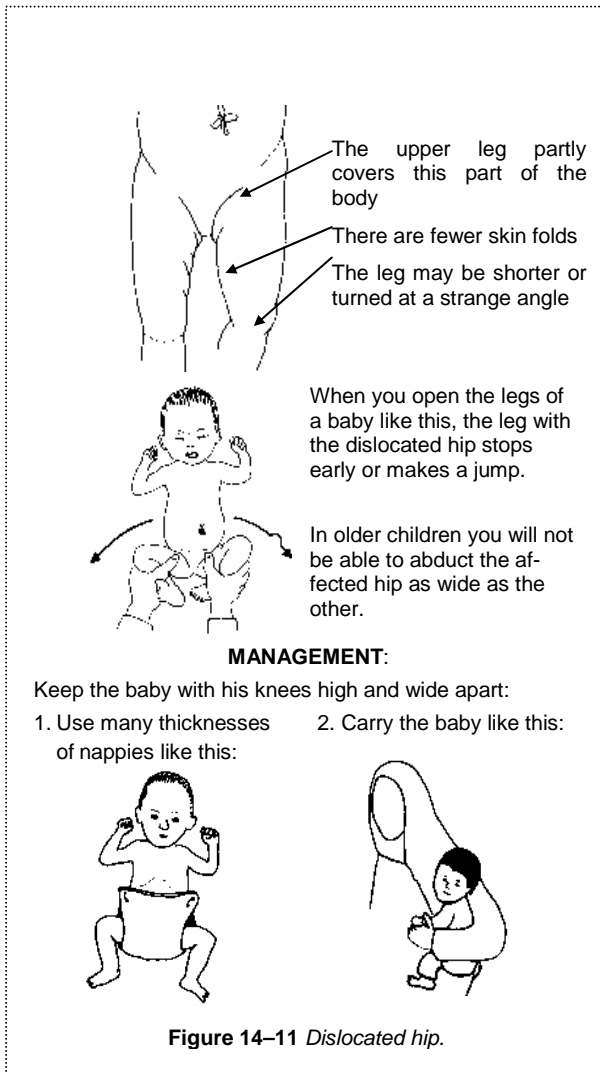


Figure 14-11 Dislocated hip.

Back problems

Patients with back problems may present with back pain, back deformity or weakness of arms or legs as a sign of damage to the spinal cord. For causes of back pain see box.

How to assess a patient with a back problem

Take a history

- **Take a general history.** Do not only ask questions about the back. Take a full history as explained in chapter 2 because back pain can be caused by many other problems like kidney problems, brucellosis, gynaecological problems, malaria or TB.
- **Ask the patient for details about his back problem:**
 - ‘When and how did the problem start?’ ‘What were the first symptoms?’

Causes of back pain

- Mechanical back pain (muscle strain, overuse)
- Back pain as a sign of stress
- Spinal TB
- Injury
- Osteoarthritis of spine
- Infection (including brucellosis)
- Osteomalacia
- Pyelonephritis
- Pelvic infection

- ‘When are the symptoms worst?’ (*Inflammation* is indicated if pain is worst in the morning or after rest and improves during the day with activity. A *mechanical problem* is indicated if pain is worst with movements and improves after rest)
- ‘Is the pain going down into one leg?’
- ‘Have you difficulties walking because your legs are weak?’ ‘Do you have difficulties passing urine or stool?’

Examine the patient

- Look at the shape of the spine.
- Always examine the back for a gibbus. If you cannot see it, feel with your finger along the spine for a bend.
- Examine the groin for any swelling (possible psoas abscess of spinal TB).
- Test muscle power and sensation.

Identify those patients who may suffer from a **severe disease**:

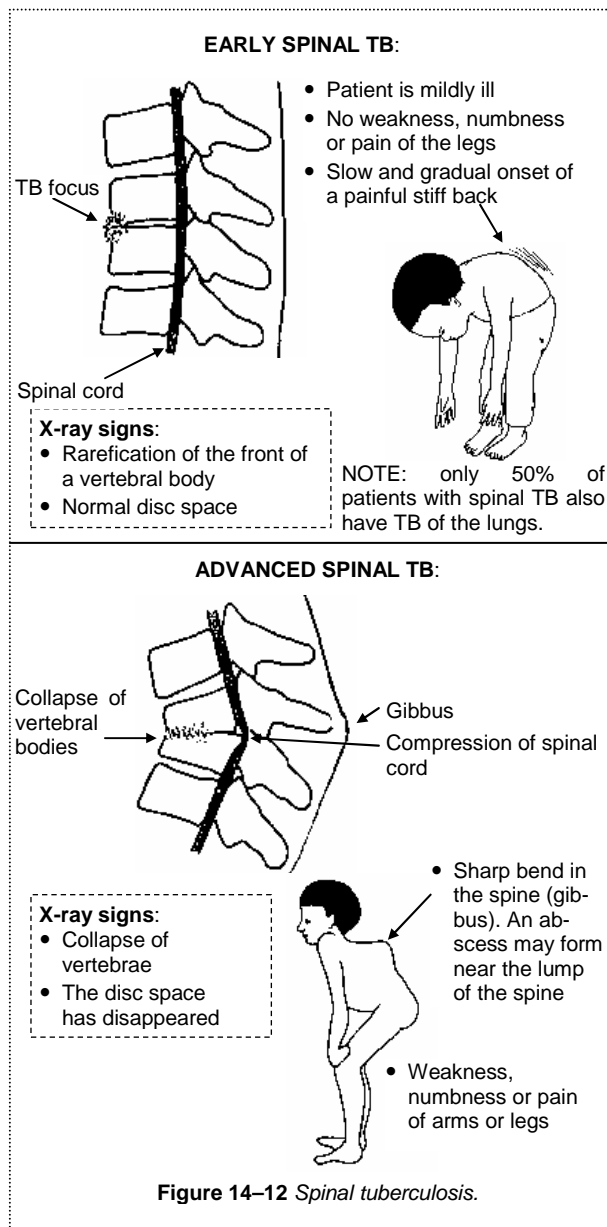
- ✗ Child or young adult with back pain, especially if the pain is becoming continuously more
- ✗ Palpable bend in the spine when you feel the spine down with your finger (spinal TB)
- ✗ Weakness of legs or arms
- ✗ Problems with passing urine or stool (incontinence or difficulties to pass urine or stool)

SPINAL TB

The spine is the commonest place for bone TB. Vertebral bodies become infected by TB through the blood stream. Usually 2 vertebral bodies are affected, sometimes more. Commonest is the lower thoracic spine (T10). The importance of diagnosing spinal TB early cannot be overemphasized. Examine carefully every patient with back pain, paralysis or a groin swelling, which may be a psoas abscess, for signs of spinal TB.

Clinical features (see figure 14-12)

- *First symptom* is back pain. The patient holds his back stiffly to reduce the pain. Clinical signs may be few in the early stage. Sometimes the affected spinal processes are tender when you feel them.



- *Later:* by palpating with your finger down the spine, you feel a bend. This later becomes visible as a gibbus.
- *An abscess may develop.* Because TB is a chronic infection, the abscess is not red and hot (cold abscess). In TB of the thoracic spine the abscess appears as a soft swelling of the chest wall. In TB of the lumbar spine, the abscess may travel down the sheath of the psoas muscles and appear as a soft swelling in the groin or even inside the thigh (psoas abscess). Occasionally the abscess is mistaken for a hernia.
- ✘ *In advanced disease,* there will be weakness of the lower limbs and paralysis due to pressure on the spinal cord.

Complications:

- *Paralysis of the legs* is the main complication. Loss of power can be very rapid. Neurological signs often improve if TB is treated quickly. If not, the abscess should be drained by a skilled surgeon to prevent further damage to the spinal cord.

Helpful investigations

X-rays (anterior-posterior and lateral view). When you look at the x-rays, first make sure that the radiographer has included the area where the problem is. In TB, typically 2 adjacent vertebral bodies and the disc are affected. Typical x-ray signs are loss of upper or lower anterior angle of the vertebral body and narrowing of joint space.

Management

Treat as category 1 with standard TB treatment (see page 41). The majority of patients, even those with neurological signs, will improve with correct drug treatment and do not need plaster jackets, bedrest or operations.

MECHANICAL LOWER BACK PAIN (LUMBAGO)

Mechanical lower back pain is common and harmless. It is caused by strain of muscles, spinal joints and nerves.

Clinical features

- Acute, sometimes severe pain that often occurs after a sudden movement or heavy lifting. The pain may radiate into the buttocks or legs but there are no danger signs. Some patients have chronic recurrent mechanical back pain.
- Pain is typically worse on certain movements.

Management

1. Give *paracetamol* for pain. If pain is severe, give paracetamol + ibuprofen. You may add oral diazepam 2 mg 3 times daily to relax muscles. Do not give diazepam for more than 10 days because of the risk of addiction.
2. **Tell the patient** to continue his normal activities as much as possible. However, he should not do anything that will increase his pain. Bed rest is no longer recommended.
3. **Teach the patient** how to pick up and carry things (see figure 14–13) to reduce back strain.

OSTEOARTHROSIS OF THE SPINE

Osteoarthritis of the spine is the same as osteoarthritis of other joints as discussed above. Sometimes nerves that go from the spinal cord to the body are squeezed and cause pain radiating to arms, trunk or legs. Paralysis is not a complication of osteoarthritis.

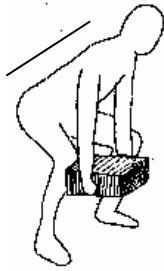
Treat with paracetamol. Advise about correct lifting and carrying things. If overweight, advise the patient to lose weight.

Club foot (talipes)

Sometimes babies are born with a deformity of their feet. Try to bend the babies' foot in a normal position.

CORRECT LIFTING:

1. Stand near to the object.
2. Bend your legs.
3. Bend forward with the back straight.
4. Grab the object.
5. Stabilize the back.
6. Lift the object by using mainly the leg muscles.

**PICKING THINGS UP:**

1. Stand over to the object.
2. Bend your legs.
3. Bend forward with the back straight.
4. Grab the object with one hand while you support your back by putting the other hand on your upper leg.

**SWEEPING THE FLOOR:**

Correct:
(The back is straight, the knees are bent)



Wrong:
(The back is bent, the knees are straight)



Figure 14–13 How to prevent back pain by correct lifting and working.

If you cannot do it, the baby has a club foot. Treatment is by correcting the deformity through strapping or casting (see figure 14–14). If no functional improvement, consider surgery.

Amputated limbs

Sadly, due to mines and other explosives, many people have lost limbs. Good care of an amputated limb is essential for the victim to regain his ability of taking fully part in family and social life. The main aim of good care of the amputated limb is that the stump is in good shape and in a good position. To achieve this take the following steps:

1. Wrap the stump to **prevent swelling** and keep a good shape for fitting an artificial limb (see figure 14–15). Tell the patient to keep his newly amputated limb high up most of the time so that it does not swell.
2. **Prevent contractures.** A patient with an amputated leg does not use it normally. He usually keeps it bent and this leads to contractures of hip and knee. Therefore, explain to the patient he should avoid positions in which joints are bent and keep the hip and knee in positions in which the joints are stretched (see figure 14–16).

HOW TO TREAT TALIPES:**Strapping method**

This method works well in a baby with mild or moderate clubbing, especially when the foot can be put in a nearly normal position. Severe club foot needs correction by plaster cast.

You need:

- Tincture of benzoin (to paint on the skin to help the adhesive stick firmly)
- Cotton wool
- Adhesive tape (sticking plaster) or zinc oxide strapping about 2.5 cm wide

1. Paint tincture benzoin on the skin areas to be covered by the tape.
2. Put pieces of cotton wool over his knee, behind his toes and on his outer ankle (malleolus).

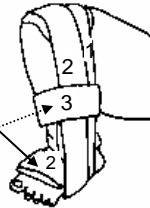


3. Hold the baby's foot like this and gently straighten it to a normal position as far as you can without forcing.

4. With the knee bent as far as possible, put first a long piece of strapping from under his heel and over the cotton wool on his outside ankle. Bring it up outside his leg and over the cotton wool on the top of the knee. When the strapping is on, the foot must be in its normal position.



5. Put a second piece of strapping round his foot near his toes up the outside of his leg and his knee.



Then put a third piece round his leg. This will keep the two long pieces in place.

6. Count all the toes and make sure they are pink and warm! If they are blue and cold you have stopped the blood flowing. This is very dangerous and the foot may become necrotic. Take the strapping off and put it on less tight.
7. Change the strapping 2 times a week for one month, then once a week until the baby is 4 months old. If the talipes is not corrected by that time, the child needs an operation.

Exercises during strapping

While the baby's foot is strapped, someone in the family should do stretching exercises of his foot at least 8 times a day: hold the baby's leg like this and turn his whole foot UP and OUT. Hold and count to 10. Repeat 10 times.

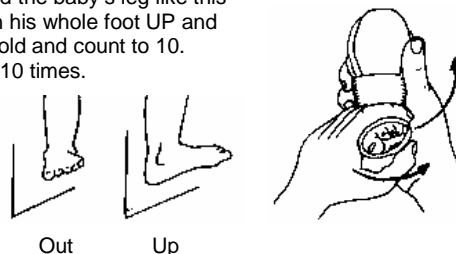


Figure 14–14 How to treat club foot (talipes).

3. **Strengthen the muscles.** Show the patient exercises so that those muscles that straighten the joints and those that are needed for walking are strengthened (see figure 14–17).

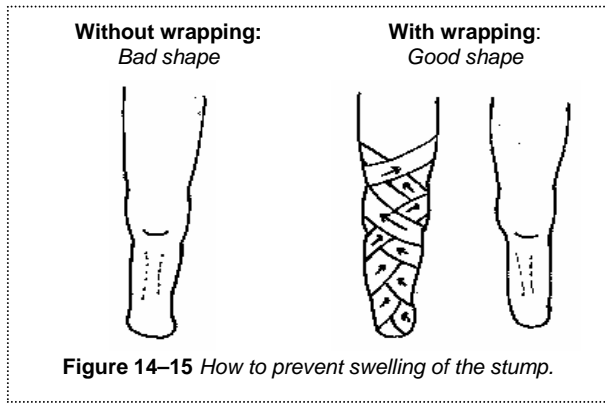


Figure 14-15 How to prevent swelling of the stump.

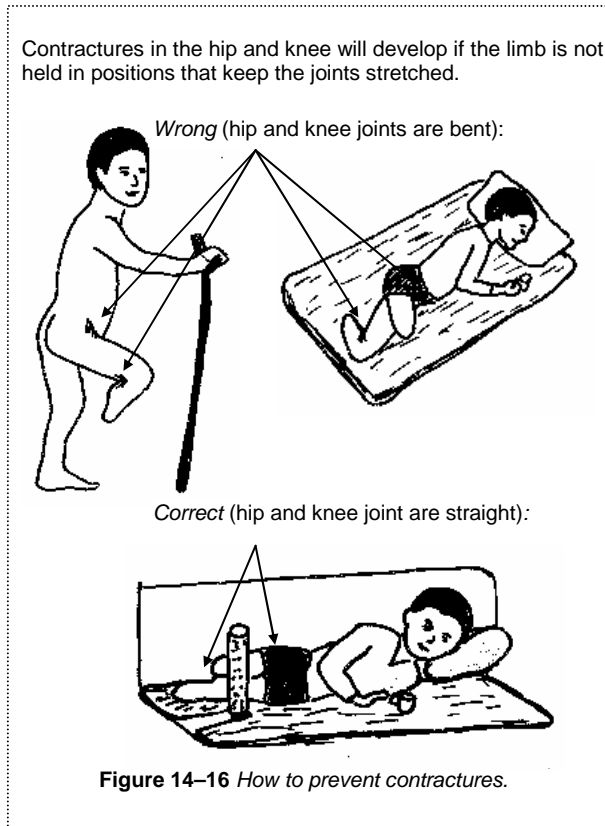


Figure 14-16 How to prevent contractures.

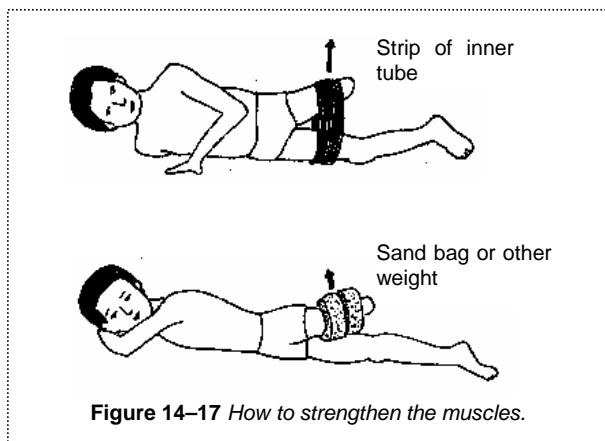


Figure 14-17 How to strengthen the muscles.

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15. Problems of the nervous system

Good management of neurological problems is important because they can lead to life-long disability and social stigmatisation. It is easier to prevent brain damage and disability than to treat it (see box).

The nervous system consists of many different structures. Symptoms and signs depend on which part of the nervous system is affected (see figure 15–1). When a patient comes with any of the following symptoms, find out whether this may be caused by a neurological problem: headache, fever, convulsions, confusion, loss of consciousness, blackouts or collapse, weakness of arms or legs and abnormal sensation.

How to prevent neurological problems

1. Follow the principles of safer pregnancy care and safe delivery.
2. Immunise all children.
3. Treat diseases that can result in brain damage early to prevent complications, especially meningitis, diarrhoea with dehydration, malnutrition, iron deficiency and pneumonia.
4. Tell epileptic patients to take their medicines every day and not to stop them without consulting a doctor.
5. Avoid marriage between close relatives especially in families where other members have epilepsy.

How to assess the nervous system

You will not examine the nervous system in detail in every patient. However, if you suspect a problem of the nervous system, do a neurological assessment as explained on pages 14-16. Study those pages carefully before you read this chapter. In this chapter, you find the key information for reaching a diagnosis under each presenting symptom. See also box 'Danger signs in neurological disease' on the next page.

Headache

Many conditions can cause headache (see box on next page). Most of them are harmless. The commonest cause is tension headache, which is caused by stress, anxiety or exhaustion. Fever and many infectious diseases are accompanied by headache. In these cases, the headache will usually go away when you treat the original problem. Always check for meningitis in a patient with fever and headache. Another serious neurological cause of headache is raised intra-cranial pressure. Acute glaucoma can also cause a severe headache.

Clinical features help you to find the cause of the headache. Key points in history-taking and physical examination are summarized below.

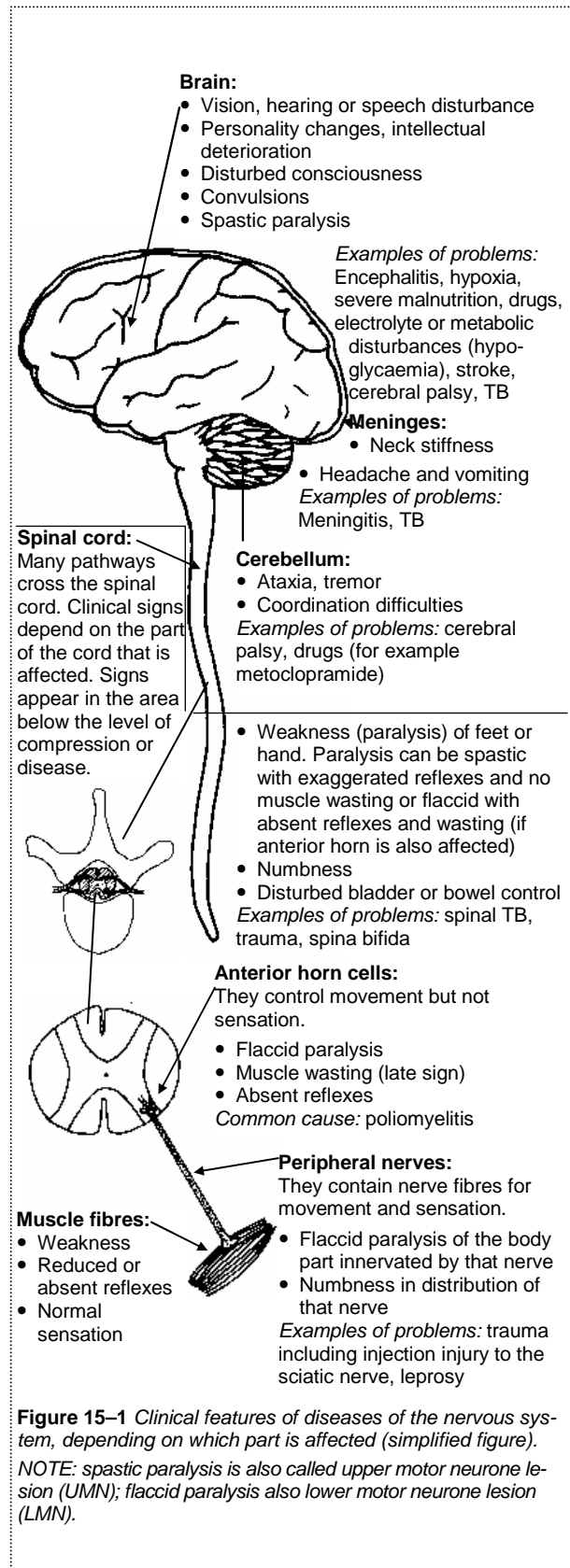


Figure 15–1 Clinical features of diseases of the nervous system, depending on which part is affected (simplified figure).
NOTE: spastic paralysis is also called upper motor neurone lesion (UMN); flaccid paralysis also lower motor neurone lesion (LMN).

Danger signs in neurological disease

The following signs indicate a serious neurological problem:

- ✘ Loss of consciousness
- ✘ Neck stiffness
- ✘ Focal signs
- ✘ Headache with vomiting in the morning after which the headache is better

Causes of headache

COMMON

- Tension headache
- Fever
- Sinusitis
- Infections (typhoid fever, malaria, pneumonia)
- Referred pain from neck
- Acute head injury

LESS COMMON

- Migraine
- High blood pressure
- Meningitis
- Drugs
- Acute glaucoma
- Post-traumatic headache
- Raised intracranial pressure (for example hydatid cyst or brain tumour)
- Bleeding (subarachnoid haemorrhage)

Causes of headache according to onset

ACUTE ONSET

	Pattern of pain	Other clinical features
Sinusitis	Often recurrent	Following common cold
Migraine	Recurrent	Vomiting, photophobia
Fever		
Infections (typhoid fever, malaria, pneumonia)		
Bacterial and viral meningitis		Fever, neck stiffness
Head injury		
Acute glaucoma	Often recurrent	Painful red eye
Bleeding (subarachnoid haemorrhage)		Neck stiffness

GRADUAL ONSET

Hydatid cyst or brain tumour	Recurrent	
TB meningitis		

CHRONIC

Tension headache	Recurrent	Anxiety, exhaustion
Referred pain from neck	Recurrent	
Post-traumatic headache	Recurrent	
Post herpetic neuralgia		Following facial herpes zoster
Atypical facial pain		Associated with depression
Trigeminal neuralgia	Recurrent	Attacks of severe short stabbing pain. Pain often set off by chewing or speaking (treat with amitriptyline or carbamazepine).

Take a history

Ask the patient:

- ‘Did the headache start suddenly or slowly?’ (Onset) ‘When did it start?’ (Duration: acute or chronic) ‘Did you have headaches like this one before?’ (Recurrent headaches). All this information helps to differentiate between the causes of headache (see box).
- ‘Where does it hurt?’
- ‘Is the pain worse in the morning or in the evening?’
- ‘Did you injure your head recently?’
- ‘Have you vomited?’ ‘Does the light hurt your eyes?’

Examine the patient

- **Disturbed consciousness?**
- **Fever? Signs of infection?** (Examine ears and throat)
- **Neck stiffness?** (Meningitis)
- **Focal signs** or localizing signs? Each part of the brain controls different body functions. Depending on which part of the brain is affected by disease, characteristic clinical signs develop. These are called focal signs because they indicate that the problem is

not caused by a generalised problem but by a focal problem, limited to one area of the brain. The characteristic clinical signs are also called localizing signs because they indicate where the focal problem is. It is beyond the purpose of this book to go into details. Examples are given in figure 15–1 on page 158.

- One painful red eye? (Glaucoma)
- Pain on turning the head and muscle tenderness? (Musculoskeletal problem)
- High blood pressure?

BACTERIAL MENINGITIS

Acute bacterial meningitis is an acute infection of the meninges and cerebrospinal fluid (CSF). This causes meningeal inflammation and swelling of the brain. Transmission is usually by direct contact with respiratory droplets. Then bacteria reach the meninges usually through the blood stream. 80% of all cases of bacterial meningitis occur in children. Viruses may also cause meningeal inflammation but this is usually less dangerous. If bacterial meningitis is not recognised and treated early, about one third of patients will die or only survive

Other diseases that may present like bacterial meningitis and their characteristics

- **Viral meningitis.** The onset is slower than in bacterial meningitis and the headache is less severe. The prognosis is usually very good with complete recovery. However, treat for bacterial meningitis unless you can exclude it with certainty.
- **Tuberculous meningitis.** The onset is gradual over several weeks. At first a patient, often a child, will complain about a headache. Then he starts vomiting and becomes increasingly drowsy while neck stiffness develops. Finally he becomes spastic, comatose, develops convulsions and dies.
- **Cerebral malaria** is caused by plasmodium falciparum. A patient presents with fever, becomes drowsy and has convulsions, often many times. Soon he will become comatose and may die within a few hours. Neck stiffness is usually only slight. The CSF is clear. There are often other signs of malaria.
- **Meningism.** Irritation of the meninges accompanies many infections (for example pneumonia, tonsillitis, malaria). Neck stiffness is mild and CSF is normal.
- **Encephalitis.** Confusion is the main presenting feature; there may be mild neck stiffness.
- **Subarachnoid haemorrhage.** Some people are born with weakness of blood vessels (aneurysma) on the base of the skull. If this aneurysma bursts, the patient will develop a sudden headache and neck stiffness. A lumbar puncture shows bloody CSF. The patient can only be saved by surgery.

with permanent brain damage, deafness or blindness. For other diseases that may present like bacterial meningitis see the above box.

Clinical features

- **Adults and children over 18 months** show the classical meningitis symptoms: acute onset of severe headache with photophobia, fever and often vomiting. The patient is ill and lethargic. On examination you find neck stiffness and positive Kernig's sign (see figure 15-2).

If severe: convulsions, disturbance of consciousness and coma and possibly bleeding into the skin (purpura - in meningococcal meningitis) and septic shock.

- **In children under 18 months,** the symptoms are atypical. There is usually no neck stiffness. Always consider the possibility of meningitis in a young child (1) who is ill, lethargic or drowsy (2) who has fever and convulsions or (3) who has a bulging fontanelle.

Investigations

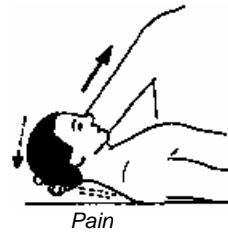
Lumbar puncture and examination of CSF to determine if acute meningitis is bacterial (see figure 15-3).

Management

1. Patients with meningitis should, wherever possible, be **treated at hospital**. The prognosis depends on how soon antibiotics are started. It is therefore advised to give one dose of **benzylpenicillin** IM as soon as you suspect meningitis, this means before transporting the patient to hospital (under 1 year

ADULTS and CHILDREN:

- Neck stiffness?



- Kernig's sign?

You can straighten a healthy person's leg without hurting him. You cannot do this if he has meningitis.



CHILDREN:

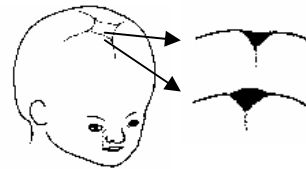
- Head between knees sign?

You can easily put a healthy child's head between his knees. You cannot do this if he has meningitis.



CHILDREN under 1 year:

- Bulging fontanelle (in child who is not crying)



Normal:
- Level, pulsating

Meningitis:
- Bulging (swollen), not pulsating

Figure 15-2 How to examine for meningitis.

HOW TO EXAMINE THE CSF:

1. Look at the colour of the CSF. Sometimes the needle cuts a small blood vessel so that there is some blood in the first portion of CSF. This does not harm the patient but spoils your examination. If there is blood continuously, suspect subarachnoid haemorrhage.
2. Ideally, arrange for microscopy, measurement of protein, and glucose, and CSF culture.



For how to perform a lumbar puncture (LP) see page 257.

INTERPRETATION OF CSF RESULTS:

	Normal	Bacterial meningitis	TB meningitis	Viral meningitis
Colour	Clear	Cloudy or pus	Clear or slightly clouded	Clear or slightly clouded
WBC/mm ³	Less than 5 lymphocytes, no polymorphs	Hundreds to thousands, mainly polymorphs	A few hundred, mainly lymphocytes	A few hundred, mainly lymphocytes
Protein	Less than 0.4g/l	High or very high	Very high	Normal or high but less than 1.0g/l
Sugar	More than 2.2 mmol/l	Low	Low or absent	Normal
% of blood sugar taken at same time as LP	50-60%	Less than 50%	Less than 50%	More than 50%

Figure 15-3 Examination of cerebrospinal fluid (CSF).

benzylpenicillin 0.5 million IU = 300 mg; 1-9 years 1 million IU = 600 mg; adults and children over 10 years 2 million IU = 1.2 g).

Further specific treatment with high dose antibiotics is then (for dosages see box):

- *Children under 2 months*, give **ampicillin + gentamicin** (or benzylpenicillin + gentamicin; or ceftriaxone) for 14-21 days.
- *Adults and children over 2 months: chloramphenicol* every 6 hours + ampicillin every 6 hours (or chloramphenicol + benzylpenicillin). At first give IV/IM for 3-5 days until the patient shows improvement, then orally for a total of 10 days.
Alternatives: ceftriaxone or cefotaxime for 7 days.
- *If injections are not possible*, give oral chloramphenicol. It is well absorbed and reaches a good concentration in the CSF.

NOTE: if you are not certain whether the patient is suffering from bacterial meningitis or cerebral malaria, treat for both at the same time.

2. Supportive care:

- Give the patient his daily fluid requirements but not more. Watch for signs of fluid overload (swelling of eyelids and face, raised pulse, raised respiratory rate and heart failure).
- Give paracetamol to reduce fever.
- *If a patient is unconscious* put him into the coma position to prevent aspiration of stomach contents into his lungs. Turn him from one side onto the other every 3 hours to prevent pressure sores.

3. **Monitor the patient:** record level of consciousness, pupil size (if becoming unequal, this is a sign of raised intracranial pressure), temperature, pulse, respiratory rate and blood pressure every 3 hours. Check for *low blood sugar*, a common complication of meningitis, especially in children. Treat convulsions with IV or rectal diazepam.

NOTE: do not use steroids (for example dexamethasone). Although used in Western countries, there is evidence that steroids may increase mortality of meningitis in countries with limited resources. The reason may be that in such countries, patients with meningitis tend to present late. Steroids would weaken the body defences and allow the disease to progress further before the antibiotics show their effect.

What to do if a patient with meningitis does not improve

After 3 days of full treatment, fever should have become less and the consciousness of the patient should have improved. If high fever persists and the patient is still drowsy, find the answers to the following questions and, if possible, repeat the lumbar puncture:

1. Has the patient taken the correct antibiotic in the correct dosage for the correct time? If not, give another course of antibiotics.

Antibiotics for bacterial meningitis

- **Ampicillin** IV. Give children 200 mg/kg/day divided into 3-4 doses.

2-12 months	250-500 mg	every 6-8 hours
1-5 years	500 mg-1 g	every 6-8 hours
6-12 years	1-2 g	every 6-8 hours
Adults	2-4 g	every 6-8 hours
- **Benzylpenicillin** IV as infusion over 20 minutes (300 mg = 500,000 IU). Give children under 1 week 100 mg/kg divided into 2 doses; children 1-4 weeks 150 mg/kg divided into 3 doses; children 1 month - 12 years 180-300 mg/kg divided into 4-6 doses.

2-12 months	300-360 mg	every 6 hours
1-5 years	360-675 mg	every 6 hours
6-12 years	675 mg-1.2 g	every 6 hours
Adults	2.4 g	every 6 hours
- **Cefotaxime** IV. Give children 200 mg/kg/day divided into 4 doses given as IV infusion.

2-12 months	200-500 mg	every 6 hours
1-5 years	500 mg	every 6 hours
6-12 years	1 g	every 6 hours
Adults	2 g	every 6 hours
- **Ceftriaxone** slowly IV or by infusion over 20 minutes. Give children under 1 month 50 mg/kg/day as infusion over 60 minutes; children older than 1 month 75-100 mg/kg/day divided into 2 doses (or IM as one single dose).

Under 2 months	200 mg	every 12 hours
2-12 months	200-500 mg	every 12 hours
1-5 years	500 mg	every 12 hours
6-12 years	1 g	every 12 hours
Adults	2 g	every 12 hours

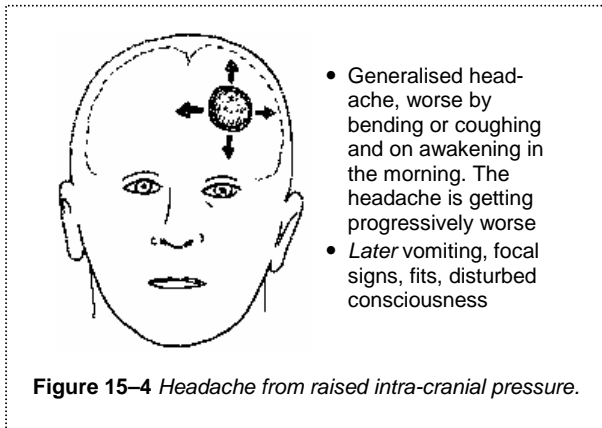
NOTE: give IM if IV access is not possible. Give the total daily dose once daily.
- **Chloramphenicol** IV or IM 100 mg/kg/day divided into 3-4 doses. Reduce to 50 mg/kg/day after 2 days and give orally as soon as the patient can swallow.

2-12 months	62.5-125 mg	every 6-8 hours
1-5 years	125-250 mg	every 6-8 hours
6-12 years	500 mg	every 6-8 hours
Adults	750 mg-1 g	every 6-8 hours
- **Gentamicin** IM or IV. Give children under 1 week 5 mg/kg once daily (= around 15 mg once daily); children 1 week to 2 months 7.5 mg/kg once daily (= around 20 mg once daily).

2. Has the patient developed a *subdural effusion* or *brain abscess* (rare)? Signs are persistent fever + focal neurological signs or reduced level of consciousness. Refer for specialist treatment.
3. Could the patient be suffering from *tuberculous meningitis*? This is likely, if:
 - Fever persists for 14 days.
 - Fever persists for more than 7 days and there is a family member with tuberculosis.
 - The patient remains unconscious.
 - CSF continues to have moderately high white blood cell count (typically less than 500 WBC/mm³, mostly lymphocytes), high protein (0.8-4 g/l) and low sugar (less than 1.5 mmol/l).
 - A chest x-ray suggests tuberculosis.
4. Could the patient suffer from another infection that is causing the ongoing symptoms (for example pneumonia, typhoid fever or sepsis)?

RAISED INTRACRANIAL PRESSURE

The skull cannot expand. Therefore anything that takes up space inside the skull such as (1) an expanding lesion - for example hydatid cyst or haematoma (2) increased brain fluid content - cerebral oedema or (3) increase in CSF - for example hydrocephalus will increase the pressure inside the skull (see figure 15-4 and box). This causes damage to the brain.



Causes of raised intra-cranial pressure

- Hydatid cyst
- Brain oedema after injury or cerebral malaria
- Brain tumour
- Brain abscess
- Blockage of CSF flow (for example hydrocephalus)
- Cerebral bleeding

Clinical features

Early signs:

- Headache is generalised. It is worse in the morning and sometimes wakes a patient from sleep. It is made worse by coughing and bending down. Vomiting relieves the headache. The severity of the headache increases gradually.
- In children under 18 months whose cranial sutures can still expand, the head circumference increases. You will feel wide sutures and a bulging fontanel.

Late signs:

- Change in consciousness (drowsiness, later coma) or personality.
- Convulsions and focal signs.
- Classically the blood pressure is high and the pulse slow, but not all patients show these signs.

Management

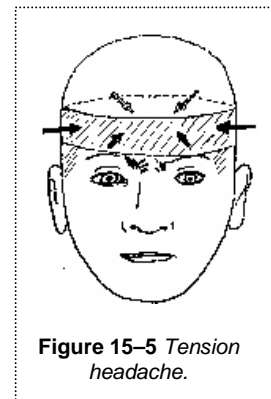
1. **Treat the underlying cause.** Often diagnosis and treatment depend on the availability of computer tomogram and neurosurgical services.
2. **Reduce cerebral oedema.** Give *mannitol* 20% 5 ml/kg (= 1 g/kg) over 15 min IV (or mannitol 10% 10 ml/kg); or give dexamethasone 10 mg IV followed by 4 mg IM every 6 hours for 2-10 days.

TENSION HEADACHE

Tension headache is the commonest form of headache. Most people experience it at some time of their lives. It is not serious and is caused by anxiety, depression, exhaustion or lack of sleep.

Clinical features

- Dull headache around the forehead and temples (see figure 15-5).
- Headache is getting worse towards the end of the day. It lasts many hours or days.
- No nausea or photophobia.



Management

1. Explain that the headache is caused by stress or exhaustion but not by anything serious.
2. Advise smokers to stop smoking,
3. Advise paracetamol or acetylsalicylic acid (Aspirin) for pain.
4. Try amitriptyline 25-50 mg once daily if the headache is a chronic problem.

MIGRAINE

Migraine is less common than tension headache. Its exact cause is not known. Like tension headache, migraine tends to get worse at times of stress.

Clinical features

- First attack occurs usually in a young adult.
- Acute throbbing headache attacks occur at intervals of about once every week to once a year but not every day. The pain is often only at one side (unilateral) and may be severe. It lasts from a few hours to 2-3 days.
- Typically the headache is associated with nausea, vomiting and photophobia. 20% of patients complain about visual disturbances like flashing lights before the onset of the headache.

Management

1. Treat the acute attack with *paracetamol* or ibuprofen for the pain together with *metoclopramide* for the vomiting. Tell the patient to start the medication whenever he feels that the headache is about to start. Only if these drugs are ineffective consider ergotamine (adults 1-2 mg at first sign of attack, maximum 4 mg in 24 hours. Do not repeat at intervals of less than 4 days, maximum 8 mg in one week. Do not use more than 2 times in any month). Even normal dosage can lead to drug dependence and to a withdrawal syndrome on discontinuing the ergometrine. A serious side effect is severe peripheral

vasoconstriction, which can lead to gangrene in the extremities.

- If the migraine attacks occur every week or more often, consider **prophylactic treatment**. The aim is to reduce severity and frequency of attacks. Give **propranolol** 10–80 mg 2 times daily for 4–6 months (start with a low dose and increase if needed) or amitriptyline 50 mg at night. The tablets have to be taken every day whether or not a patient complains about headache. If attacks occur, treat them as described above.

POST-TRAUMATIC HEADACHE

A tension-like headache may occur for several weeks or months after a head injury. Treatment is as for tension headache.

Convulsions

Convulsions are a common emergency. During convulsions, a person becomes unconscious and his arms and legs make jerking movements. His eyes move uncontrollably and he may pass urine or faeces, or bite his tongue. The person is at risk of injuring himself or suffering brain damage if a fit is prolonged. Convulsions are frightening for those who watch and people have many wrong beliefs about fits. These beliefs lead to social stigmatisation of the person.

Sometimes patients are brought to you and you are told they had become unconscious for a brief time. Convulsions are an important differential diagnosis of these blackouts (see page 169). Not all attacks of fainting and jerking movements are convulsions. Some people (often women) get attacks that look like convulsions. These attacks are hysterical fits caused by emotional problems (see page 182).

The management of a convulsion consist of three steps:

- Stop the convulsion.
- Find and treat the cause.
- Prevent recurrence (see under 'Epilepsy', pages 164–166).

1. Stop the convulsion

For convulsions in pregnancy due to eclampsia see pages 190–191.

- Turn the patient on his side** to prevent aspiration of secretions into his lungs. Do not put anything in his mouth.
- If the convulsions last for more than 5 minutes, give **oxygen**, and give **diazepam** rectally (0.4 mg/kg) or IV very slowly over 3 minutes (0.2 mg/kg). A simple rule to remember the paediatric dosage is to give a child 1 mg per year of age. Adult dose is 10–20 mg.

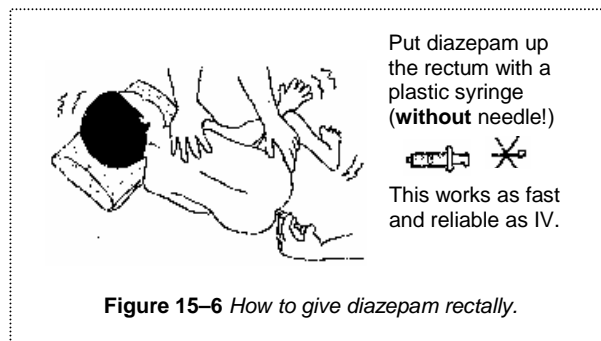


Figure 15-6 How to give diazepam rectally.

Rectal administration is as fast acting as IV. Give diazepam with a plastic syringe without needle into the rectum (see figure 15–6). Do not give diazepam IM because absorption is uncertain.

If an injection is not available, crush a diazepam or phenobarbital tablet, mix it with water and insert it into the rectum.

- Wait for 10 minutes. If convulsions continue, repeat the dose of diazepam.
- If convulsions still continue, or if diazepam is not available, give one of the alternative drugs:

phenobarbital 10 mg/kg slowly IV (maximum 1 g) over 10–15 minutes. Repeated doses of diazepam and phenobarbital can lead to respiratory depression but prolonged convulsions also cause harm;

or
phenytoin, which may cause cardiac arrhythmias, low blood pressure and collapse and also respiratory depression. Give 15 mg/kg slowly IV over 10–15 minutes. Monitor pulse and blood pressure.

or
paraldehyde 1 g/ml solution rectally (children 1–4 months 1 ml; 4–12 months 1.5 ml; 1–3 years 2 ml; 3–5 years 3–4 ml; 6–12 years 5–6 ml, adults 10–20 ml). There is only a small risk of respiratory depression if given rectally. It is therefore a good choice when facilities for resuscitation are limited.

- In children and patients with a severe illness (for example meningitis), consider hypoglycaemia. If you cannot test for blood sugar quickly, give glucose IV with the second dose of diazepam or phenobarbital.
- Reduce fever.**
- If status epilepticus and the convulsion recur after the effect of the short-acting diazepam has worn off, treat as before and then give regular phenobarbital IM every 4 hours until oral therapy has been established.

If a patient does not respond to these measures, consider again the possibility of a hysterical fit, especially if the convulsions look unusual.

2. Find the cause

A convulsion is not a disease but a symptom; you must find out what has caused the convulsion (see box on the next page). If the first convulsion occurs over the age of

30 years, an underlying brain disease is likely (for example hydatid cyst, brain tumour or bleeding). Also consider a space-occupying lesion if the fits are becoming progressively worse, or if you find focal signs.

For practical reasons, decide to which of the following three groups the patient belongs:

1. **Epilepsy.**
2. **Convulsions caused by an acute disease that affects the brain.**
3. **Febrile convulsions** in children between 6 months and 6 years.

Causes of convulsions

EPILEPSY (at least 2 convulsions)

- Unknown cause
- History of previous brain damage

ACUTE BRAIN PROBLEM

- Bacterial meningitis
- Eclampsia
- Hypoxia due to severe pneumonia or drowning
- Head injury
- Tuberculous meningitis
- Cerebral malaria
- Heat stroke
- Severe dehydration or disturbed electrolytes due to gastroenteritis
- Septicaemia
- Poisoning or drug overdose
- Hypoglycaemia (low blood sugar)
- Cerebral bleeding
- Any lesion that takes up space in the brain (for example hydatid cyst, brain tumour)

SIMPLE FEBRILE CONVULSION

- Simple febrile convulsions (only in children between 6 months to 6 years)

NOTE: hysterical fits can look like convulsions (page 182)

Take a history

A good history is the most important step in finding the cause of a seizure. Usually you have not watched the fit yourself. Therefore talk to the family or witnesses who have seen the fit. Do not rely only on information given by the patient.

- **Ask for details about the convulsion:**
 - ‘How long did the convulsion last?’
 - ‘Did the patient have any convulsions before?’ (Probably epilepsy)
 - ‘Did the whole body shake from the beginning or did the shaking start first in a leg or arm?’ (Generalised or partial seizure)
- **‘Is the patient pregnant?’** (Consider eclampsia and immediately check blood pressure and urine for protein)

- **‘Is the patient suffering from another illness?’**
- **‘Did the patient have a recent head injury?’**
- **‘Has the patient taken any medicines recently?’** (For commonly used drugs or poisons that may cause convulsions see box)

NOTE: if you suspect a hysterical fit, ask about the features that differentiate it from epilepsy (see page 182).

Examine the patient

- Ill or well?
- Fever?
- Signs of injury?
- Signs of serious disease: meningitis, pneumonia, severe dehydration, severe malnutrition with hypoglycaemia, sepsis or cerebral malaria?

Investigations

- Blood sugar
- Malaria blood film
- WBC and differential count
- Sodium and calcium
- Lumbar puncture (if you suspect meningitis)

Commonly used drugs and poisons that may cause convulsions

- Aminophylline
- Atropine
- Chloroquine (after injection)
- Iron
- Salicylates (aspirin)
- Insecticides (for example DDT)
- Kerosine
- Lead
- Plant poisons

EPILEPSY

Epilepsy is a common disorder of the brain in which a seizure occurs because of sudden abnormal activity of some brain cells (see figure 15–7). The fits are recurrent, but it varies how often they reoccur. Some patients with severe epilepsy have fits almost every day, others only once a year. In between the fits, the patients usually do not show any abnormal clinical symptoms or signs. Most people with epilepsy are mentally entirely normal. In most cases of epilepsy, the cause is not known. Sometimes, there is a history of previous head injury, meningitis or complications during birth. If a patient is tired, hungry or stressed, fits may occur more frequently. Epilepsy can start at any age but usually it starts in children or young adults.

Clinical features

Typically a patient suddenly falls down, becomes stiff for a very short while, turns blue and then starts violent rapid muscle movements of arms and legs (**tonic-clonic convulsion**). His eyes move uncontrollably. He may spontaneously pass urine or faeces or bite his tongue.

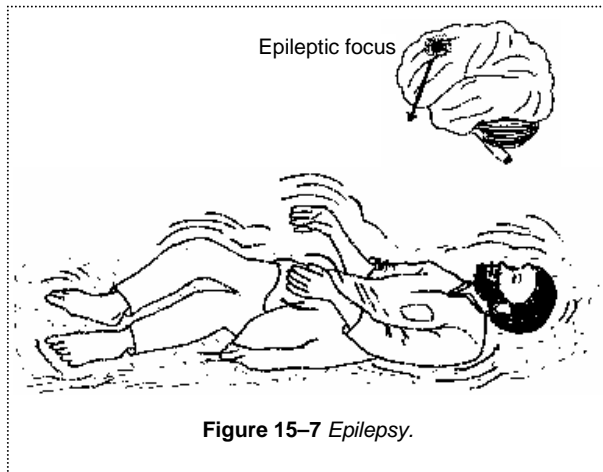


Figure 15-7 Epilepsy.

After some time, or sometimes only after treatment, the jerking stops. A phase of 1-2 hours of deep sleep follows (*postictal phase*). The patient does not remember the fit. Some patients experience warning signs (*aura*) before the fit. They may feel restless, shout or have visual disturbances.

There are several **other types of epilepsy** beside the generalised tonic-clonic convulsion. These other types are often not recognised as epilepsy. A patient may stop what he is doing for about 5-20 seconds and then continue what he was doing as though nothing had happened. There is no abnormal muscle movement (*simple absence seizures = 'petit mal'*). Sometimes these attacks last 1-2 minutes and are associated with involuntary muscle movements such as chewing (*complex absence seizures*). In both cases, the patient does not remember what happened. Other patients will suddenly be thrown down to the floor by a sudden shock-like muscle jerk (*myoclonic seizures*).

In **partial seizures**, one side of the face, one arm or leg will twitch and jerk for a few minutes. The patient is awake but cannot stop the jerking. Sometimes the jerking spreads to other parts of the body. Sometimes the patient's consciousness is disturbed. Sometimes the attack results in a generalised convulsion.

Dangers of convulsions

- ✘ A short convulsion is not dangerous in itself. Sometimes a patient develops so called **status epilepticus**. This is when a patient has frequent seizures without recovering consciousness between each seizure or a prolonged seizure (lasting for more than 30 minutes). Status epilepticus may lead to death or brain damage if the convulsion is not stopped.
- ✘ Each time a patient has a convulsion he may injure himself.
- ✘ Wrong beliefs about epilepsy may cause mistreatment, social isolation and stigmatisation.

How to diagnose epilepsy

Diagnosis is usually based on history and clinical features.

1. Take a detailed history from someone who has observed the convulsion.

2. Find out whether the patient has had convulsions in the past. You diagnose epilepsy only if a person has had at least two convulsions, because the majority of patients who had one convulsion will never have another.
3. Try to find out what caused the epilepsy in the first place (for example a previous head injury or meningitis).

Be aware that hysterical fits are often wrongly diagnosed as epilepsy.

NOTE: an EEG is not needed to decide about management. It is indicated in those few cases where you find abnormal clinical features (for example focal signs caused by a brain tumour) or if the epilepsy does not respond to drugs.

Management

Education and drugs are both essential for successful treatment of epilepsy. It is very worrying that only 1 in 4 patients with epilepsy receives treatment. When treatment fails or is interrupted, it is usually because the patient and his family did not understand the nature of epilepsy.

1. **Education.** Make sure that the patient and his family understand the following points:
 - *Epilepsy is an ordinary disease* like an ear infection or another illness. It is not caused by evil influences but by things like a scar on the brain (for example after head injury). Epilepsy is nothing to be ashamed of. Having epilepsy does not mean a person is mentally handicapped.
 - *Epilepsy will get better with oral treatment.* Treatment will take a long time. Medication must be taken for at least 2 years after the latest fit occurred.
 - *Tablets must be taken every day.* If the patient forgets to take a tablet or stops treatment suddenly, he may suffer a fit.
 - *In the beginning of the treatment, the patient may feel drowsy.* Do not worry. This drowsiness will get better.
 - *Each patient needs a different dose of medicine.* Explain that you will find the right dose for him. It is not a sign of treatment failure if a patient suffers another convulsion after he started the treatment.
 - *Until the fits are controlled,* the patient must not drive or go near water, fire or to high places.
 - *Teach the family* what to do if the patient has another convulsion (see box on the next page).
2. **Drug treatment.** Only a patient who has had at least two seizures in the last 6 months should be treated. Do not treat the first fit. Many patients will never have another. There are no drugs that can 'cure' epilepsy. Drugs are given to prevent fits. Sometimes preventing a fit for a long time helps to stop epilepsy permanently.

First aid in a convulsion

1. Clear the space around the patient so that he does not get hurt.
2. Do not hold him tightly.
3. Do not put anything in his mouth.
4. After the fit, turn the patient on his side so that he will not choke.
5. DANGER: if the convulsion does not stop after 5 minutes, take the patient immediately to the nearest health facility.

General principles of drug treatment for epilepsy:

- *Give one drug only.* 75% of all epileptic patients can be successfully treated by a single drug. It is a common mistake to treat a patient with several anti-epileptic drugs, all in a dose too low to be effective.
- *Different patients need different doses.* Adjust the dose for each patient. Always start with a low dose and increase it every 2 weeks, either until the convulsions are controlled or until the patient cannot tolerate a higher dose because of side effects.
- *Once the drug has been started, it must to be taken continuously.* If the patient stops it suddenly, he may suffer several severe fits.
- *If the patient has not had any convulsions for 2 years,* then gradually stop the drug. Do not stop the drug suddenly but reduce the dosage gradually every 2-4 weeks.

Specific drug treatment (for dosages see box):

- *Use phenobarbital as your first choice.* It is cheap, effective and widely available. The second choice drugs, depending on price and availability are carbamazepine or phenytoin. Always consider that a family has to be able to buy the medicine for at least 2 years, usually for longer.
- *Give the correct dosage.* Start with a low dose of phenobarbital (adults 60-90 mg, children 5 mg/kg once daily at night). Increase the dose every 1-2 weeks (adults by 30 mg, children by 1 mg/kg) until the convulsions are controlled or the maximum dose that a patient can tolerate is reached. Only then, if control is not achieved, add a second anti-epileptic drug.
- *Give the drug for the correct length of time.* If the patient has not had any convulsions for 2 years, then gradually stop the drug. About 60% of these patients will have no further fits. Do not stop the drug suddenly but reduce the dosage gradually by 10% every 4 weeks. This means it may be many months because the patient has completely stopped his medication. If a patient took two drugs for epilepsy, first he should withdraw one drug and then the other.
- *See the patient regularly.* Without follow up, epilepsy treatment will never succeed. Monitor a patient's progress. At first review him every 2 weeks and later every 1-3 months. Write down important advice for the family. If the patient is

Drugs for treating epilepsy

- **Phenobarbital** orally 5 mg/kg once daily at night. Increase the dose every 1-2 weeks (adults by 30 mg, children by 1 mg/kg, see text).

2-12 months	15-45 mg	at night
1-5 years	30-100 mg	at night
6-12 years	50-150 mg	at night
Adults	60-up to 300 mg	at night

Side effects: drowsiness, lethargy, behaviour changes, learning difficulties, restlessness, folate anaemia.

- **Phenytoin** 3-5 mg/kg/day divided into 2 doses.

2-12 months	12.5-50 mg	2 times daily
1-5 years	25-100 mg	2 times daily
6-12 years	50-150 mg	2 times daily
Adults	100-150mg	2 times daily

Side effects: drowsiness, mental confusion, dizziness, ataxia, vomiting, folate anaemia, acne, swelling of the gums, lymph node swellings, fever.

- **Carbamazepine** 3-8 mg/kg/day divided into 2 doses. Start with a low dose (children 25-50 mg 2 times daily, adults 100-200 mg 2 times daily). Then increase if necessary.

2-12 months	50-100 mg	2 times daily
1-5 years	100-200 mg	2 times daily
6-12 years	200-300 mg	2 times daily
Adults	300-600 mg	2 times daily

Side effects: drowsiness, mental confusion, dizziness, ataxia, vomiting, constipation or diarrhoea, blurring of vision, unsteadiness, liver or renal failure, blood disorders (agranulocytosis), jaundice.

unable to keep his follow up appointment, tell him he must still continue taking his medicine.

- *Treatment in pregnancy.* Untreated epilepsy may harm the foetus. Therefore do not stop treatment when a woman becomes pregnant. To reduce the risk of neural tube defect, give folic acid 5 mg once daily to the woman. Give vitamin K 1 mg IM to the newborn after delivery to reduce the risk of haemorrhagic disease of the newborn.

FEBRILE CONVULSIONS

Any illness with fever can cause seizures in young children. Febrile convulsions usually only last from a few seconds to a few minutes. They do not cause brain damage. About 30% of all children who have had a fit with high fever will have fits again when they have fever. These fits that only come with fever usually become less as a child grows up. The tendency to fit with fever usually stops by the time the child is 2 years (sometimes up to 6 years). A febrile convulsion does not mean that a child has epilepsy or will develop epilepsy later.

There is a high risk of brain damage (1) if a convulsion lasts for more than 20 minutes or (2) if a child is drowsy and sleepy for longer than one hour after the fit. Many of these children will be suffering from meningitis or another serious condition. Therefore, before you diagnose febrile convulsion you must have excluded dangerous infections (for example meningitis, cerebral malaria, pneumonia with hypoxia and severe dehydration).

Clinical features

- Typically a child between 6 months and 2 years (rarely up to 6 years) has a brief generalised convulsion during an illness with fever. The illness is often a harmless viral upper airway infection.
- No signs of serious disease. The child is not very ill.

Management

1. Stop the convulsion.
2. Reduce the fever with paracetamol.
3. Exclude a serious cause, especially meningitis.
4. Try to prevent further febrile convulsions. Tell the family to give paracetamol when the child develops fever. Only give phenobarbital for prophylaxis of fits if (1) a child has had three or more febrile fits during 6 months or (2) a child has an existing brain damage.
5. Teach the family about first aid in convulsion.

Confusion

A confused patient may not know where he is and often does not know what happened recently. He is easily distractible and does not concentrate on what you say.

To differentiate between **psychiatric** and **organic** causes of confusion decide:

- Is the patient drowsy or not?

In confused patients, *drowsiness is a danger sign*. Drowsiness may mean that the patient is likely to go into coma. Psychiatric causes of confusion (for example schizophrenia) do not present with drowsiness. Drowsiness is a sign that organic disease affects the brain. Most patients with confusion suffer from an infection, metabolic disorder or side effect of medicines or drugs. Only a few have a primary neurological problem like encephalitis (see box).

Causes of confusion

WITH DROWSINESS

- Brain infection (meningitis, encephalitis, cerebral malaria)
- Typhoid fever or other severe infections (pyelonephritis, sepsis, malaria)
- High fever
- Hypoxia
- Drugs, alcohol, poisoning
- Hypoglycaemia
- Liver or renal failure
- Head injury
- Stroke
- Epilepsy (postictal phase)

WITHOUT DROWSINESS

- Mental illness (schizophrenia)
- Drug or alcohol withdrawal

How to manage confusion

1. If possible, treat the cause.
2. Leave a light on at night.
3. Treat for hypoglycaemia if you suspect low blood sugar.
4. Treat very disturbed behaviour with *chlorpromazine* 25–50 mg IM or orally every 6 hours (or haloperidol).

ENCEPHALITIS

Encephalitis is a viral infection of the brain tissue. The patient has a high fever and headache. Confusion and changes of consciousness level are obvious. Some patients go into coma or develop convulsions. Sometimes you find mild neck stiffness or focal signs.

No specific treatment is available. Treat confusion and complications.

Loss of consciousness

Coma is a state of unconsciousness from which you cannot rouse a patient by stimulation (talking or pain). The same causes that lead to coma can also lead to altered consciousness like drowsiness or semicoma (stupor). Often a patient goes through different stages of altered consciousness before he becomes comatose.

Many patients with coma make a complete recovery. Bad prognostic signs are (1) pupils that are unresponsive to light after 24 hours or (2) a deep coma (unresponsive to pain or voice) for more than 72 hours.

Unconsciousness is an emergency; its management consists of three steps:

1. First aid

First aid shall prevent aspiration and make sure that the airways are open and the circulation normal. Everyone must know the first aid treatment of an unconscious patient (see box on the next page).

If the patient is transported to hospital, make sure he remains in the recovery position throughout transport.

2. Find the cause of unconsciousness

For common causes of unconsciousness see box on the next page. Clinical features help to identify the likely cause of coma (see box on the next page).

Take a history

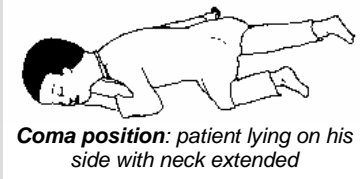
Ask family or witnesses whether anyone has seen how the patient became unconscious. Ask them:

- 'Did he become unconscious suddenly or gradually?'

First aid of an unconscious patient

Follow the so called ABC of first aid. Details are described and illustrated in chapter 21. Never forget to put an unconscious patient in the coma position. This includes patients who are waking up after surgery or unconscious patients while they are on their way to hospital.

1. **A for airway.** Check that the airway is not obstructed. If a person is unconscious and lying on his back, the tongue may block the airway. This is a preventable cause of death in unconscious patients. Open the airway by tilting the head back. Remove any blood or secretions of the mouth of a patient.
2. **B for breathing.** Check quickly whether the patient is breathing. If he is breathing, turn him into the coma position. If he is not breathing, give 2 effective artificial breaths.



3. **C for circulation.** Check quickly for signs of circulation. If you detect signs of circulation, continue artificial breaths. If there are no signs of circulation, start with chest compressions.
4. **D for drugs.** Treat any serious condition immediately (for example shock).

Common causes of loss of consciousness

- Brain infection (bacterial and TB meningitis, encephalitis, cerebral malaria)
- Typhoid fever (coma caused by bacterial toxins)
- Hypoxia (pneumonia, drowning)
- Postictal phase after seizure
- Head injury
- Shock
- Poisoning or drug overdose (opiates, sedatives, antidepressants, anticonvulsants, alcohol, carbon monoxide)
- Liver or renal failure
- Stroke
- Hypo- or hyperthermia (heat stroke)
- Hypo- or hyperglycaemia (ketoacidotic coma)
- Raised intra-cranial pressure
- Dissociation (hysteria)

- 'Has he been ill before he became unconscious?'
- 'Has he been unconscious like this in the past?'
- 'Is he abusing drugs?'

Examine the patient

- Do a full physical examination to look for signs of a disease that may have caused the loss of consciousness.
- Look especially for the following:
 - Bleeding or bruising of the head?
 - Signs of shock or severe dehydration?

Common causes of loss of consciousness according to clinical features

Fever

- Meningitis or encephalitis
- Cerebral malaria
- Septicaemia
- Severe typhoid fever
- Heat stroke

Incontinence and tongue bite

- Postictal phase (seizure)

Low blood pressure, fast and weak pulse

- Shock (severe dehydration, blood loss)

Cyanosis and fast breathing

- Hypoxia (severe pneumonia, severe asthma)

Bleeding, bruising, bleeding from ear canal

- Head injury

Head injury a few days or weeks ago

- Subdural haemorrhage

Low body temperature

- Hypothermia
- Septicaemia

High blood pressure, asymmetrical responses, older patient

- Stroke

Low blood sugar

- Hypoglycaemia (especially in malnutrition or severe illness like sepsis or meningitis)

Focal neurological signs

- Hydatid cyst
- Brain haemorrhage
- Stroke
- TB meningitis
- Brain tumour or brain metastasis

Neck stiffness

- Meningitis
- Rare: subarachnoid haemorrhage

Pinpoint (very small) pupils and history of drug abuse

- Opiate or insecticides poisoning

Gradual development of loss of consciousness

- Anything that causes raised intra-cranial pressure
- Brain infection
- Metabolic causes (hyperglycaemia, renal or liver failure)

- Tongue bite? Has urine been passed spontaneously? (Convulsion)
- Neck stiffness? (Meningitis)
- Signs of severe pneumonia?
- Fever or hypothermia?
- Severe malnutrition?
- Similar response to pain on opposite arms and legs? (If different responses, suspect hemiparesis at the side with less response)

- *Assess pupils:*
 - Normal (= both pupils are the same size and become smaller in size when you shine a torch into the eyes)
 - Pinpoint pupils (opiate poisoning)
 - Unequal pupils (raised intra-cranial pressure)
- *Assess the depth of unconsciousness* with a coma scale. This will not help to find the cause but provides (1) information about depth of unconsciousness and (2) helps to monitor progress. The higher the number, the worse the coma:
 - 0 = Is the patient *fully alert*? (Normal consciousness)
 - 1 = Is the patient sleepy but *responding to your voice*? (Drowsiness)
 - 2 = Is the patient only *responding to pain*? (See figure 15–8) (semicoma, stupor)
 - 3 = Is the patient *unresponsive to pain*? (Coma)

Press with your fingernail on the supraorbital nerve or onto the nail bed and test whether the patient shows a response to pain or not.

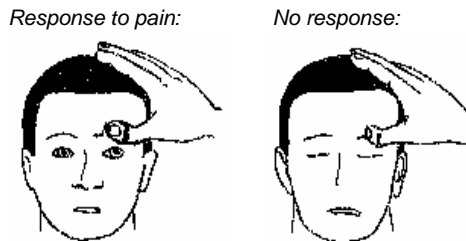


Figure 15–8 How to test response to pain.

Investigations

Investigations depend on your suspected diagnoses. Blood glucose is essential. Hb, WBC and differential count, malaria blood film or a skull x-ray may be useful. Do not wait for the results of your investigations but start treating the most likely cause or causes.

3. Treat the cause of unconsciousness and monitor the patient's progress

1. **Treat the underlying cause.**
2. **Treat for hypoglycaemia** if low blood sugar cannot be excluded.
3. **Treat complications** (for example shock, dehydration or anaemia).
4. **Keep the patient in the coma position and turn him every 3 hours** from one side onto the other to avoid pressure sores.
5. **Monitor the patient's progress.** Check and record temperature, pulse, respiratory rate, blood pressure, fluid in- and output and the patient's level of consciousness at regular intervals.

Blackouts

Blackouts are a sudden loss of consciousness with a fairly quick recovery. The commonest cause is simple **fainting (vasovagal attack)**. This is best identified from the circumstances in which it occurs: when standing for a long time, working without eating or being in hot and crowded rooms. The patient felt suddenly weak, nauseated and was sweating before he fainted. When he layed down he recovered quickly. Another common cause of blackouts is a **seizure**. Ask whether the patient passed urine spontaneously during the 'blackout' and look for a tongue bite to confirm the suspicion of a convulsion. For other causes see box.

Causes of blackouts

COMMON

- Simple fainting (vasovagal attack)
- Epilepsy
- Dissociation (hysterical fit)

LESS COMMON

- Hypoglycaemia
- Cardiac arrhythmia
- Transient ischaemic attack
- Drug abuse

Tetanus

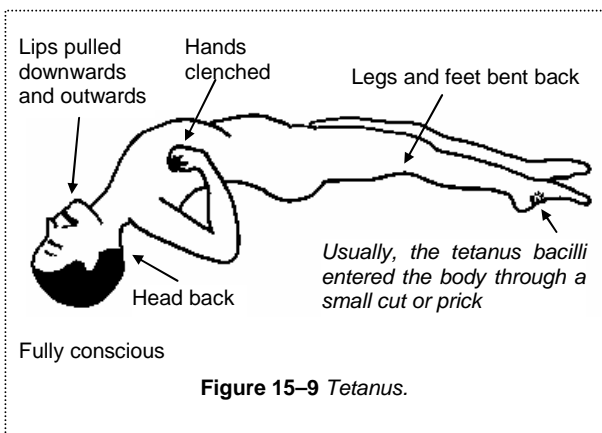
Tetanus is caused by *Clostridium tetanus* bacteria, which produce a toxin that affects the central nervous system. Tetanus is characterised by muscle stiffness (rigidity) and muscle spasms, which are caused by the effect of the toxin (see figure 15–9). The bacteria enter the body through a contaminated wound. Any wound can be the entry for this devastating disease. Of particular danger are puncture wounds, animal bites, burns, wounds contaminated with soil and open injuries that have been treated by a traditional healer. Newborn are at danger of tetanus if the cord is not cut with a clean knife or if traditional colour has been applied to the umbilicus. Tetanus can follow ear piercing, unclean IM injections, circumcision or any other surgical procedure that is not performed under sterile conditions.

Clinical features

- Suspect tetanus in any patient who has difficulties opening his mouth and suffers muscle spasms.
- The incubation period is about 7–14 days. However, many patients do not recall a history of injury. The first symptom of tetanus is difficulty opening the mouth due to stiffness of the jaw muscles (trismus). When the condition progresses, other muscle groups become stiff, including muscles of the face (characteristic facial appearance: risus sardonicus), skeletal muscles of back and neck (opisthotonus) and swallowing muscles (risk of aspiration). Sudden painful

tightening of muscles (spasms) occurs spontaneously or when triggered by stimuli such as loud noise, light or even touching the patient.

- In severe disease, excessive sweating, fever and breathing problems (due to spasms of respiratory muscles) occur several days after the onset of the illness.
- Newborn tetanus, which is common, usually presents between 5-18 days after birth. First sign is difficulty sucking.
- The period between the first symptoms of stiffness and the onset of spasms is between 1-7 days. The shorter the time, the more severe the illness and the greater the risk of dying. If a patient survives, spasms become less frequent over a period of about 1-3 weeks and the stiffness will slowly improve.



Management

Treatment is urgent and should be at hospital. It consists of three strategies:

- 1. Prevent further release of toxin:**
 - Clean any wound and remove necrotic tissue.
 - Give **metronidazole** 500 mg IV every 6 hours for 5 days (in mild cases give orally) to prevent further multiplication of tetanus bacteria. An alternative is benzylpenicillin IM/IV for 7-10 days (100,000–200,000 IU/kg/day divided into 4 doses) but patients treated with metronidazole have fewer spasms and need less sedation.
- 2. Neutralize any free toxin:**
 - Give **anti-tetanus serum** (ATS) to neutralize the tetanus toxin. At first give a test dose (see box). If no allergic symptoms, give adults 10,000–50,000 units IM (newborn 5000 IU). If human immunoglobulin is available, give 30–300 units/kg IM (= about 500–6000 units). A test dose is not necessary. Give 500 units in newborn tetanus.
- 3. Minimize the effects of the toxin that is already acting on the nervous system:**
 - Nurse the patient in a dark, quiet room and avoid any unnecessary handling that may trigger spasms.
 - Control spasms and sedate the patient. Give **diazepam**. Drug dose depends on severity and

Vaccines to prevent tetanus

- 1. Tetanus toxoid** contains inactivated tetanus toxin that stimulates the body to produce immunity against tetanus. The vaccine is part of the national immunization programme. In order for the body to produce enough immunity, the immunisation must be repeated 1 month after the first dose and then after 6-12 months. Afterwards at intervals not greater than 10 years. It takes about 10 days after the first injection until the body has produced sufficient protection (anti-toxins) against tetanus. Therefore tetanus toxoid may not be able to prevent tetanus after an acute injury.
- 2. Anti-tetanus serum** (ATS, made from immune horses) or **tetanus immunoglobulin** (human). These contain antibodies against the tetanus toxins and provide immediate protection against tetanus. However, they do not stimulate the body to produce its own immunity and provide no long-term protection.

Before you give a dose of ATS, give a test dose of 1/10 of the intended dose subcutaneously. Wait for 30 minutes to make sure the patient does not develop allergic symptoms (wheezing, rashes, itching, vomiting or even collapse). If any of these symptoms develop, do not give the main dose. When you give a test dose, keep adrenaline ready in case of an allergic reaction.

ranges for adults from oral or IM 5–10 mg every 2-4 hours in mild cases to 10–20 mg slowly IV every 1-2 hours (in children 0.2 mg/kg every 3-6 hours). Increase the dose gradually. This is important for 2 reasons: (1) to adjust the dosage to the patient's condition until the spasms are controlled and muscle relaxation and regular breathing are established and (2) to prevent the danger of respiratory depression.

When the spasms are controlled, continue with oral or IM diazepam every 4-6 hours. Give an extra dose if spasms occur. Alternative to diazepam is phenobarbital. Continue diazepam for about 2-4 weeks, and then reduce it slowly.

- Some patients need sedation and artificial ventilation for survival.

NOTE: after recovery, vaccinate the patient against tetanus because tetanus infection does not provide life-long immunity.

Prevention

- 1. Immunize all women in childbearing age** or during pregnancy with tetanus toxoid.
- 2. Teach clean delivery practices** (see pages 192-193) including clean care of the umbilicus to prevent neonatal tetanus.
- 3. Make sure that children get all their regular immunisations.**
- 4. Clean all wounds carefully and immunize all patients with wounds, burns or bites.** Tetanus immunisation is needed even for small scratches. If you are not absolutely sure whether a patient had been immunized, give ATS immediately (adults 1500 units; children 750 - if human immunoglobulin is available, give 250–500 units IM) + tetanus toxoid.

5. **Protect patients who undergo operations:**

- If routine surgery is planned and adequate sterility cannot be assured, give tetanus toxoid 6-8 weeks before the operation.
- For any other operation, if adequate sterility cannot be assured, give ATS + tetanus toxoid.

Weakness or paralysis of arms or legs

Paralysis is the inability to move certain muscles because of a problem of the nervous system. It may be caused by problems at different levels of brain, spinal cord or peripheral nerve. Determine at which level the nervous system is damaged and its likely cause by finding the answers to the following questions:

1. **When** did the weakness start? (Acute or chronic) Did it start gradually or suddenly?
2. **Which limbs** are weak or paralysed? (Distribution: for example one leg, both legs or arm and leg; see figure 15-10)
3. **Examine the patient** and find out:
 - Is the muscle tone spastic or flaccid? (See figure 15-11)
 - Is there loss of sensation?

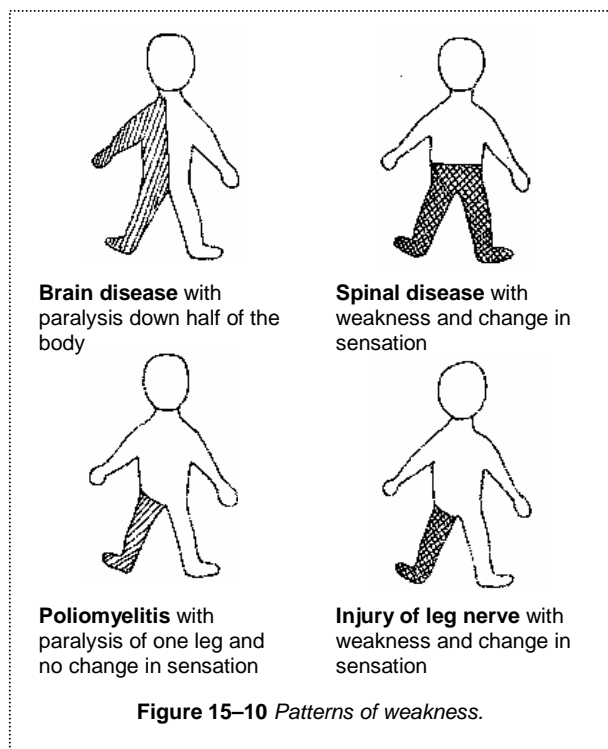


Figure 15-10 Patterns of weakness.

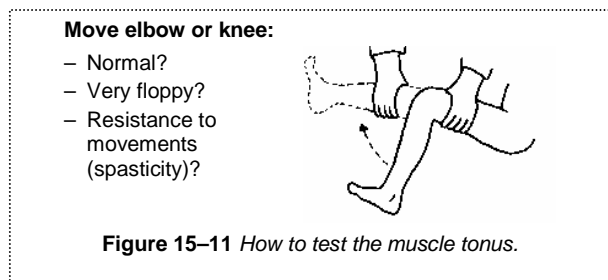


Figure 15-11 How to test the muscle tonus.

Then decide according to onset, muscle tone and sensation to which of the following groups the patient belongs:

Sudden weak legs with spasticity	• Cord compression (TB, abscess, disc prolapse)
Sudden weakness of arms, legs and face with flaccidity	• Stroke (muscle tone becomes spastic later)
Sudden weak legs with flaccidity	• Young child: poliomyelitis (normal sensation) • Injection injury (sensation also affected)
Chronic spasticity	• Cerebral palsy
Chronic flaccidity	• Nerve trauma • Polyneuropathy
Weakness but no loss of sensation	• Poliomyelitis • Motor neurone disease

How to care for a paralysed person

Care of a paralysed person involves more than just managing physical problems. A patient with paralysis will experience fear, depression and anger. He needs support, understanding and encouragement. Be honest and do not give wrong promises (for example do not say to a paralysed person: 'You will be cured soon and be able to walk again'). Telling lies makes it more difficult for the person to accept his new disability and to begin shaping a new life (see figure 15-12).

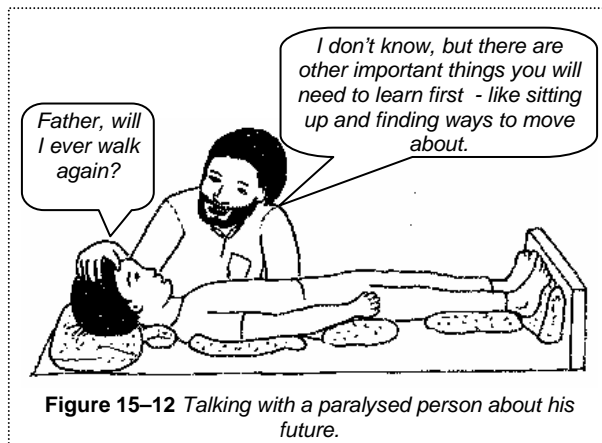


Figure 15-12 Talking with a paralysed person about his future.

Management of a paralysed person has two aims:

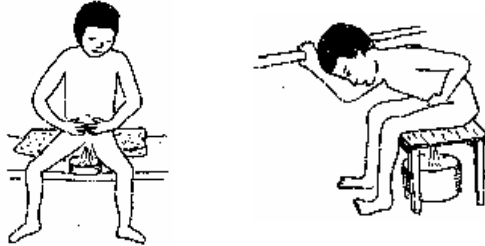
1. **Prevent the three big medical risks:**
 - a. **Prevent pressure sores.** The person should avoid staying in the same position for very long. He should turn or be turned from one side onto the other every 3 hours. Arrange thick soft padding to protect bony parts of the body (especially bottom, sides of hip and ankle). Examine the person every day for pressure sores. First sign of a pressure sore is redness of the skin. If this occurs, the patient should not lie on that area until it is healed. For treatment of pressure sores see page 231.
 - b. **Prevent urinary tract infections.** The person should drink lots of fluid. If a catheter is needed because of urinary retention, it must be inserted under clean conditions and kept clean. For methods of emptying the bladder see figure 15-13. For incontinence, a condom catheter can be used.

THE PUSH METHOD FOR EMPTYING A LIMP BLADDER:

(it can be used for both genders)

Push down over the bladder with the hands, or strain to push the urine out by tightening the stomach muscles.

Alternatively, put a fist over the lower abdomen and gently press it by bending forward.



NOTE: this method should only be used if the urine comes out easily with gentle pressure (or if no other way is available). There is the risk that the muscles do not relax and push the urine back into the kidneys. This causes kidney infection and damage.

Figure 15-13 Methods of emptying a limp bladder.

- c. **Prevent contractures.** Contractures develop easily. Put the patient in a good position (see figure 15-14). Do range-of-motion exercises every day. This means move all limbs and joints 10-20 times each day in all possible directions. If the patient cannot do that himself, the family must do it for him. Let the patient do as much by himself as possible and encourage him to use his hands, arms and legs as much as possible.

Good positioning is important during both, day and night:

- Arms, hips and legs as straight as possible.
- Feet supported so that tiptoeing does not develop.

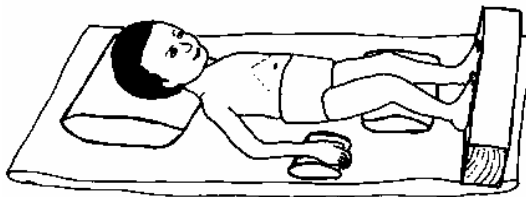


Figure 15-14 Good positioning.

2. Help the person to become less reliant on other:

- Train the person how to move about at home, how to dress and how to maintain his daily hygiene.
- Help him to learn skills that will help him to fulfil his role at home. Enable him to help others and earn a living.
- Take a patient who has had a stroke out of bed as soon as possible after the first two days after the stroke. Help him to walk, even if two strong people must hold him while he tries. The patient must not stay in bed all the time. If he does, many complications will develop but he will not get better.

STROKE and TRANSIENT ISCHAEMIC ATTACK

Stroke is the sudden loss of one of the body functions controlled by the brain. Stroke is caused by disease of blood vessels. Stroke can occur in two ways:

1. **Cerebral ischaemia/infarction.** A blood vessel that carries blood to the brain is blocked by a thrombus. The blockage may also be caused by a blood clot (embolus) that is carried to the brain from the heart.
2. **Cerebral haemorrhage.** A blood vessel in the brain bursts. This may occur in connection with high blood pressure.

Some patients suffer a so-called **transient ischaemic attack (TIA)**. This is a focal loss similar to that in stroke but only lasting for a few minutes. It is caused, as the name indicates, by ischaemia. The ischaemia is caused by embolic events. A person who suffers a TIA is at high risk of developing a full stroke in the near future.

Risk factors of stroke are smoking, high blood pressure, diabetes mellitus, ischaemic heart disease, atrial fibrillation and high cholesterol blood level. The more risk factors a patient has, the higher is his risk of suffering a stroke.

Clinical features

Typically, an older patient presents with an acute onset of focal neurological symptoms. Symptoms depend on which part of the brain is affected:

- Paralysis or weakness of arm and leg on the same side
- Speech problems
- Dizziness, balance problems
- Transient loss of vision
- Loss of sensation
- Difficulties controlling urine or stool
- Often raised blood pressure

Management

Preventing stroke is easier than treating it! Management of stroke patients is often difficult and unsatisfactory. Some patients will be able to regain the lost body functions if you start rehabilitation as soon as the stroke has happened. Others will remain handicapped or die.

1. Start **acetylsalicylic acid** (Aspirin) 75-100 mg once daily, unless you suspect bleeding. There are no diagnostic clinical signs for bleeding. An immediate computer tomogram (CT) would be needed for diagnosis. However, bleeding is more likely if neurological signs are progressing and the patient's consciousness is disturbed.
2. **Follow the general management of a paralysed person** as explained above. Start rehabilitation as early as possible. Involve the family. Without rehabilitation, the patient is at high risk of spending the rest of his life bed-ridden or in a wheelchair.

3. **Discuss how to reduce risk factors** because about 10% of all patients will suffer another stroke within the next year (see box on page 139).

NOTE: it was common practice to lower the blood pressure in stroke patients. However, the latest evidence shows that *it is harmful to lower the blood pressure within the first week after a stroke*. Reducing the blood pressure may further decrease the blood supply to the brain and cause more harm. Therefore, only treat very high blood pressure. That is if the blood pressure is systolic above 240 mmHg or diastolic above 130 mmHg. Malignant hypertension may present with neurological signs but in this case the patient also complains of severe headache, and you usually find signs of heart failure.

POLIOMYELITIS

Poliomyelitis is a viral disease of young children between the age of 8 months and 4 years. Due to widespread immunisation efforts, the disease has become less common. However, you will see many people who are disabled because they have had polio in the past.

Acute poliomyelitis

Clinical features

Acute poliomyelitis typically develops in two phases:

- *First phase:* children present with non-specific symptoms such as diarrhoea, fever or cough.
- About 1% of the children will go through a *second phase*. They complain about muscle pains and may develop flaccid and asymmetrical paralysis. Sensation is normal. Children who have received IM injections during the first phase are at a higher risk of developing paralysis. About one third or more of all cases of paralysis in poliomyelitis have been caused by unnecessary IM injections!

Management

1. Complete bed rest in a good position as shown in figure 15–14 on page 172. Immobilize the affected limbs until the muscle pains are gone.
2. As soon as fever and pain are gone, mobilize the child to prevent contractures and disability.
3. Do not give IM injections.

Disability due to old poliomyelitis

Many people who suffered from poliomyelitis in the past are severely disabled. They may have severe deformities or joint contractures (see figure 15–15). Contractures are shortening of muscles and tendons so that the limb cannot be fully moved.

Management of contractures (see figure 15–16)

1. When contractures are just beginning to develop, stretching exercises and correct positioning are all that is needed.

COMMON CONTRACTURES IN POLIO:

A person with paralysis who crawls around like this and never straightens his legs will gradually develop contractures so that his hips, knees and ankles can no longer be straightened.

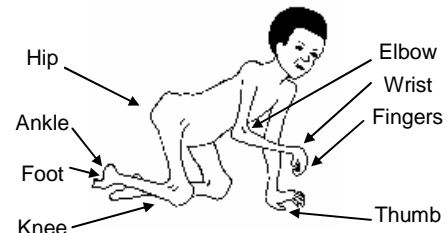
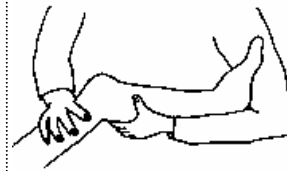


Figure 15–15 Contractures from old poliomyelitis.

EXERCISES TO CORRECT MILD CONTRACTURES:

These exercises are similar to range-of-motion exercises to prevent contractures.



1. Hold the limb in a steady, stretched position while you count slowly to 25.
2. Gradually stretch the joint a little more, and again count slowly to 25.
3. Continue to increase the stretch in this way steadily for 5 or 10 minutes. Repeat several times a day.

MANAGEMENT OF ADVANCED CONTRACTURES:



Correct the contracture as far as you can with stretching exercises and positioning.

Then correct it as much as possible with a series of casts or special braces.

If more correction is still needed, consider surgery that often consists of lengthening the tight cords

Figure 15–16 Management of contractures.

2. When contractures are more advanced, do stretching steadily over a long time. Use fixed positions, casts or braces that keep a continuous pull on the affected joint.
3. When contractures are very long-standing and severe, surgery may be needed.

TRAUMATIC NERVE INJURY

Sadly, traumatic nerve injury is common. It is caused by a wrongly given IM injection that has injured the sciatic nerve. Often the injection was not even indicated. For safe injection sites see page 253.

Clinical features

Paralysis follows immediately after an IM injection. In contrast to poliomyelitis, sensation is lost or reduced.

Management

Teach exercises to strengthen the affected muscles and to prevent contractures.

CORD COMPRESSION FROM SPINAL TUBERCULOSIS

See pages 154-155.

CEREBRAL PALSY

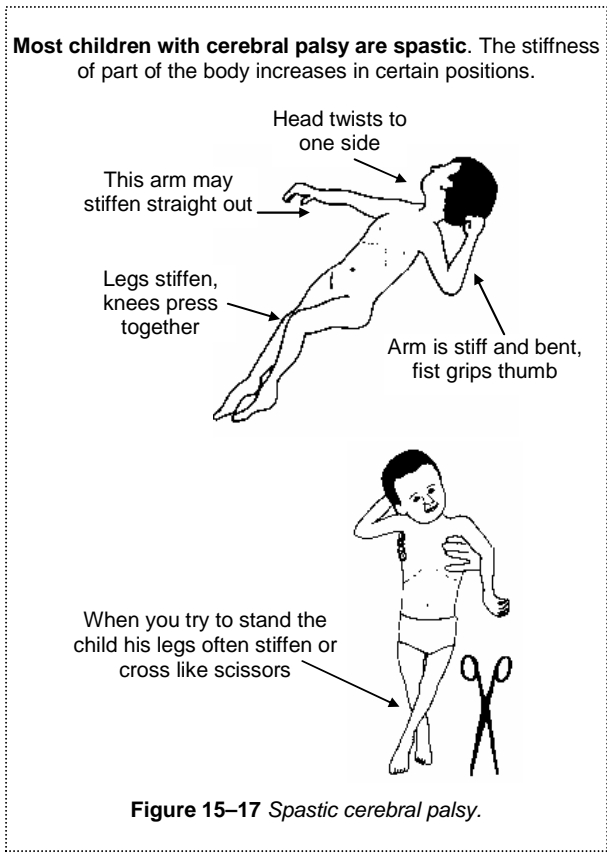
In cerebral palsy the part of the brain that controls body movements and body position is impaired. This is caused by damage to the developing brain, either before birth, during delivery or in the first 2 years of life. The brain damage is not getting worse.

Clinical features

A child with cerebral palsy is spastic. He has stiff muscles that he controls poorly. His face, neck or body may twist or make jerky movements. Often, when you lift up a child, his legs will cross like scissors (see figure 15-17). His mental ability is often not affected.

At birth, the child may seem normal or perhaps floppy. The stiffness comes as he gets older. Some children who are severely affected may never learn to walk. If a child is not treated well, he may develop contractures as the result of his spasticity.

Some children also suffer from additional problems like epilepsy, learning difficulties (mental handicap), vision or hearing problems or restless behaviour.



Management

There are no medicines that can cure the brain damage that makes a child spastic. The aim of management is to help a child to do as much as possible by himself. He needs help to roll over, sit or stand, and then learn to walk. Look for and treat additional problems.

Encourage the child to use his mind and body as much as he can. Our 'Practical Paediatric Guide' contains many details and illustrations about how to help these children.

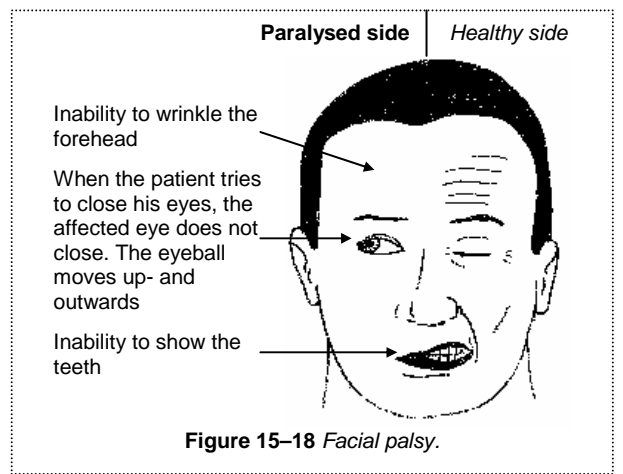
Facial weakness

Various lesions of the brain or the cranial nerves can cause weakness of the face. Commonest are stroke and Bell's palsy.

BELL'S PALSY

This is an acute paralysis of one side of the face (see figure 15-18). The cause is often unknown but there is some evidence that it may be associated with herpes virus. However, it is important to exclude serious causes of facial nerve palsy (see box).

Most patients recover without treatment. For severe cases give prednisolone 1 mg/kg once daily for one week and then reduce gradually during the second week. If the symptoms started less than 72 hours ago, add aciclovir. It is important to protect the eye from drying out during sleep. Apply plenty of tetracycline eye ointment. Put a plaster over the eyelids so that the eye stays closed.



- Causes of facial nerve palsy**
- COMMON**
- Bell's palsy
- RARE**
- Trauma
 - Tumour of parotid gland
 - Cholesteatoma
 - Brain tumour

Abnormal sensation

Lesions in the brain, the spinal cord or damage to the peripheral nerves may cause abnormal sensation in certain locations, depending on the site of the lesion. In this book, only damage to peripheral nerves (peripheral neuropathy) is discussed because it is common. Feet and hands are usually affected.

Change in sensation can present in different ways:

- A patient complains about numbness.
- A patient feels pains or a burning sensation.
- A patient may not feel pain when he injures or burns himself (for example he has burnt his hands because he did not realise that a pot for cooking was very hot).
- The muscles that are supplied by the damaged nerve become weak and wasted and eventually paralysed if the cause is not stopped.

Determine the likely cause by finding the answers to the following questions (see box):

1. Did the abnormal sensation start suddenly or gradually?
2. Is only one nerve affected (mononeuropathy)? Or are both arms or both legs affected symmetrically (polyneuropathy)?

If a specific cause cannot be found, give vitamin B₁₂.

Causes of abnormal sensation because of damage to peripheral nerves

MONONEUROPATHY (*only one nerve is affected*)

- Trauma (for example injection injury)
- Compression of nerve
- Leprosy

POLYNEUROPATHY (*arms or legs are affected symmetrically*)

- Vitamin deficiencies (especially Vitamin B₁₂)
- Leprosy
- Drugs (isoniazid, sulphonamides, chloroquine, cloquinoxil, metronidazole, phenytoin)
- Diabetes mellitus
- Liver failure
- Renal failure
- Poisoning (for example insecticides)

LEPROSY

Leprosy is a chronic infectious disease caused by the bacillus *Mycobacterium leprae*. Leprosy is usually known for its skin signs but the disabling damage occurs in the peripheral nerves. Disabilities can be prevented by early recognition and treatment of the disease. The leprosy bacillus is multiplying very slowly. The time from infection to the appearance of clinical signs is several years. Infection occurs by close contact to a leprosy patient. However, most people who are

infected do not develop the disease because their immunity is strong enough to fight the bacilli.

While leprosy is common in India and some parts of Pakistan, there are only a few new cases every year in Afghanistan.

Clinical features

Clinical signs do not appear in young children because of the long incubation period. In early leprosy, a patient is generally well and it may be difficult to make someone believe that he is suffering from a dangerous illness.

Early signs are numb (anaesthetic), pale skin patches. When a nerve that innervates muscles is affected, it causes muscle weakness followed by muscle wasting and later deformity. In advanced disease, feet or hands may become numb and the patient may injure himself without noticing it.

Whenever you see a chronic skin lesion in an adult or older child ask yourself: 'Could this be leprosy?'

- Look at the lesion and test it for numbness (see figure 15–19). Early signs are one or more pale patches. The patches may be macular or slightly raised. They are usually larger than 1 cm. Because of the nerve involvement the patches are typically *numb*; this means the patient has lost the feeling in that part of the skin. The patches are *never itchy* and there is *never any pus*.
- Nerves in the skin around a leprosy lesion thicken. However, it needs a lot of experience to be able to feel a thickened nerve.

Investigations

Skin scraping is a special test to find leprosy bacilli at the edge of the skin lesion. The test should be done by a specially trained leprosy technician.

Management

1. If you suspect leprosy, refer the person to a leprosy

Take a pointed piece of cotton wool and use it to touch the patient's skin. At first, touch healthy skin and ask the patient to point to the place where you have touched him. Once he has understood your testing, ask him to close his eyes and then touch him on a healthy part of the body and then on the lesion. Repeat it for the different parts of the lesion. If he can tell you when you touched healthy skin, but not when you touch the lesion, he has leprosy.

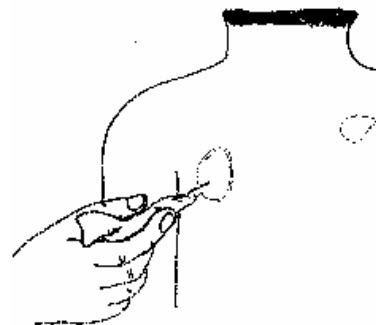


Figure 15–19 How to test for leprosy.

- control programme (1) for diagnosis (2) for defining the stage of leprosy and (3) for supervised treatment. As in tuberculosis, leprosy must always be treated with multiple drugs (dapsone, rifampicin and clofazimine) according to international standard guidelines. Otherwise drug resistance will develop and the patient will not be cured. Treatment must be taken continuously for one or more years.
2. If the patient has numb hands or feet, warn him about the danger of injuring himself without noticing it. He should not walk barefoot and be careful when he handles fire and hot or sharp things.
 3. Explain to the family that (1) leprosy is curable (2) the risk of transmission to other people is very small and (3) there is no need to isolate the patient.
 4. Examine all other people in the household for leprosy.

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16. Mental health problems

Mental health affects the way we feel about ourselves, and how we relate to other people. Good mental health helps us to cope with problems in life. Mental health problems are very common. It has been estimated that about 25% of all patients who come to see a general doctor suffer from a mental health problem.

Sadly, mental health problems are generally poorly managed, even though they can be treated. People with a mental health problem suffer unnecessary disability because of the poor management and many misunderstandings (figure 16–1).

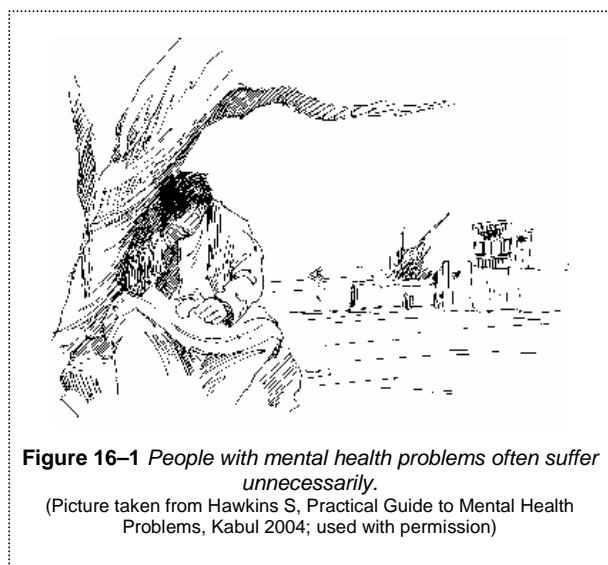


Figure 16–1 People with mental health problems often suffer unnecessarily.

(Picture taken from Hawkins S, Practical Guide to Mental Health Problems, Kabul 2004; used with permission)

There are several reasons for the unnecessary suffering of mentally ill people:

- *The majority of people with mental health problems (about 70%) complain about physical symptoms.* The cause of their symptoms, a mental health problem, is often not recognized. Instead, they undergo expensive and inappropriate investigations and treatment.
- *The wrong belief that mental illness cannot be cured.* Many advances have been made so that now most mental illness can be successfully treated.
- *Many health professionals do not know how to manage mentally ill patients.* Mental illness is seen as a difficult problem that should be left to specialist psychiatrists. However, this approach is not appropriate where mental health services are only accessible for a minority of patients. Instead, every health professional should know the basic management of patients with mental health problems. Most people with mental illness could receive effective treatment through basic health services.
- *There is a widespread fear and misunderstanding of mental illness.* Many people do not realise that mental problems are an illness that can be treated.

Stigma and discrimination are common reactions to mental illness. People with mental illness become isolated and may be laughed at, rejected, chained up, or put to jail because of their behaviour.

What causes mental illness?

Mental illness is caused by biological and environmental factors. Usually more than one factor is responsible for the illness.

Biological factors include changes in the brain (for example encephalitis, head injury or untreated epilepsy) or chronic physical illness, which can increase the risk of depression. Also at risk are people who have become blind or lost a limb. Certain drugs can have side effects that affect the mind. Genetic factors may increase the risk of developing mental illness. This means that if one person in a family is suffering, for example from schizophrenia, other family members have a higher risk of developing that disease.

Environmental factors include traumatic experiences such as war, abuse, torture, earthquakes and refugee situations. Other important factors are poverty, conflicts at home and uncertain future. Drug abuse is another factor.

How mental illness presents

Mental illness can present in three ways:

- **COMMONEST: Physical symptoms:** headache, dizziness and stomach pain without any physical cause; poor sleep; tiredness; loss of appetite; sexual problems (see figure 16–2).
- **Psychological symptoms:** feeling depressed, anxious or sad; talking too much, not at all or in a way that others cannot understand; expressing strange ideas or false beliefs (delusions); poor memory; inability to do simple tasks; seeing, hearing or feeling things that others do not (hallucinations); confusion.
- **Behavioural symptoms:** neglecting personal hygiene, lack of interest in family and friends, wanting to be alone; eating, drinking or smoking more than usual; quarrelling, unacceptable or rude behaviour.

NOTE: symptoms of mental illness may be different in children and young people. Children may present with physical symptoms or behavioural problems (for example aggressive behaviour or they stop talking). They may become angry, cry and say that they are no good and wish that they were dead. Adolescents may become very withdrawn or aggressive, or start to abuse drugs.

Physical symptoms are real!

- Emotional stress can cause physical symptoms or worsen existing physical symptoms
- Physical symptoms make emotional stress worse

Common physical symptoms caused by emotional stress and anxiety:



- General body pains
- Tiredness and weakness
- Dizziness and funny turns
- Headaches
- Swallowing difficulties
- Breathing difficulties
- Chest pain
- Stomach pain
- Frequently passing or urine
- Tremor
- Numbness of hands

Figure 16-2 *Unexplained physical symptoms.*
(Picture taken from Hawkins S, Practical Guide to Mental Health Problems, Kabul 2004; used with permission)

How to assess a patient with suspected mental illness

Early diagnosis and management are one of the keys to good mental health care. To identify mental illness remember: *most patients with a mental problem will only complain about physical symptoms.*

Take a history

Take a history in the same way as you would do for a person with a physical illness. Observe the person's mental state while you ask the questions. For practical tips on how to talk to a person with mental illness see box.

- What are the main symptoms? Ask the patient to describe his symptoms.
- Acute or gradual onset? Did the symptoms start after a certain event (for example imprisonment)? Does the person have symptoms every day, or do they occur in intervals of weeks or months?
- How do the symptoms affect the person's life, for example his work, sleep and appetite?
- Did the person have any similar illness in the past?
- What treatment has the person already received for this illness? (Including traditional treatment)
- What does the family think about the illness?

Examine the patient

The aim is to exclude a physical illness. Examination includes a full physical examination. In a mentally ill patient, observe specifically the following:

Practical tips about talking to a person with mental illness

These tips are of special importance when talking to a person with a mental health problem. However, the tips are also good general rules for communication between people.

1. Listen carefully and give the person a chance to talk without interrupting.
2. Respond verbally (for example by saying that you understand) and non-verbally (for example by nodding your head). Always talk to the patient sympathetically.
3. Do not say that you are in a hurry. Allow enough time, especially if the person is very withdrawn.
4. Be sensitive to a person's emotional distress. Do not comment, criticise or laugh at the person's behaviour or symptoms.
5. Stay calm, especially if the person is restless or excited.
6. Do not deny the person's experiences (for example hallucinations). Remember that they are real to him.
7. Avoid arguing or disagreeing; just accept what the person says.
8. Say that you understand and want to help.

- **Appearance.** Is he properly dressed and clean? Does he look very sad?
- **Behaviour.** Is his behaviour normal or is it strange? Is he restless or overactive?
- **Talk and thought.** Does he say strange things?
- **Mood.** Does he seem unhappy and depressed, or excessively happy?
- **Perception.** Does he see or hear things that others do not?
- **Memory.** Does he know where he is?
- **Insight.** Does he recognise that he is ill? Is he confused?

How to reach a diagnosis

Diagnosis and management become easier when you differentiate between different types and groups of mental illness. Always find answers to the following questions:

1. **Does the person have mental or physical illness, or both?** People with mental illness often present with physical symptoms (somatization), for example back pain, weakness, tiredness, headache, abdominal pain, dizziness or difficulty in breathing, feelings of choking, palpitations, tremor and frequency of urination (see figure 16–2). Note that a patient will not experience all but only some of these symptoms. If a person has three or more physical symptoms in different parts of the body with no obvious physical cause, suspect an underlying mental illness.
2. **If the person has mental illness, which type is it?** Use the symptoms of the most common types of mental illness that are described in the box on the next page and decide whether the person has a *psychotic disorder*, *common mental disorder* or *another mental disorder*.

The three groups of mental illness

1. PSYCHOSIS

- **Schizophrenia.** Schizophrenia usually starts in adolescence or young adulthood. It disturbs the way a person thinks, feels or perceives. It affects his ability to distinguish between what is real and what is not real. People with schizophrenia may talk or behave strangely, hear voices or see visions. They feel afraid or believe that their thoughts, feelings and actions are known to or controlled by others.
- **Bipolar disorder.** Bipolar disorder causes extreme changes in mood, from depression to extreme excitement (mania). During periods of mania, people may talk or behave abnormally and need less sleep. They lose their inhibitions and are not aware of the consequences of their actions.

2. COMMON MENTAL DISORDERS

- **Depression.** Depression is the commonest mental illness. It can be mild or severe. Depression can affect anyone at any age, including children. It may be the result of a traumatic event, but can also have physical causes. Symptoms include feeling sad, loss of interest in usual activities, withdrawal from social contact, tiredness, suicidal thoughts, disturbed sleep and appetite and poor concentration. People with severe depression find life hopeless and meaningless.
- **Anxiety.** Symptoms of generalised anxiety include inability to relax, headaches, dizziness, panic attacks, difficulties in breathing, feelings of choking and palpitations (rapid heart beat).
- **Hysteria** (dissociative or conversion disorder). Hysteria usually affects adults in stressful or difficult personal circumstances. Symptoms include fainting, fits, weakness of the limbs, going into a trance-like state and being unable to speak.

3. OTHER MENTAL DISORDERS

- **Drug addiction.** A person addicted to drugs may show behavioural changes. He may lose interest in his family and work. He is often irritable or aggressive, and then has periods of drowsiness and sleepiness. He may start telling lies or stealing.
- **Mental retardation.** A person with mental retardation is slower to learn than others. This may include learning appropriate social behaviour. Then the person may behave in a way that is culturally unacceptable.
- **Dementia.** Dementia is the result of physical changes in the brain. It is a deterioration in a person's ability to remember, think and carry out day-to-day tasks like getting dressed. The patient may complain about forgetfulness or depression, but is unaware of his memory loss.

- *If the person has psychosis, assess him carefully for any illness, injury or drug that may have started the psychosis, see below. If you find a cause, then you must treat the physical illness as well as the mental illness.*
- *If the person has a common mental disorder, decide whether it is depression, anxiety or hysteria (dissociation). For details about diagnosis and assessment, see below.*
- *If you think the problem is not psychosis or common mental disorder, consider whether the person has another type of mental disorder for example drug addiction or dementia.*

3. Consider the diagnosis for psychosis or depression in more detail:

- *If the person has psychosis, decide whether it is acute or chronic. For how to do that see below.*
- *If the person has depression, decide whether it is mild or severe. For how to do that see below.*

How to manage mental health problems

Like other people, you may also have negative ideas about mental illness. Think honestly about your feelings and whether you need to change your attitudes. Remember that a mentally ill person should be treated as an individual who is ill and needs help. Treat the person with respect and dignity. In many mental problems, non-drug treatment and good family support are more important than drug treatment.

For the key aims of good mental health care see box.

Key aims of good mental health care

1. Early diagnosis and intervention
2. Treatment while the person remains in his community
3. Regular treatment
4. Absence of stigma and discrimination
5. Reintegration and living a normal daily life

Whatever the illness, always explain to the person's family about how to look after him. The main points are:

1. Making sure that the person takes his medicine (if he needs any).
2. Making sure that the person takes part in family and social life.
3. Looking after the person's physical needs - for example making sure that he eats enough, washes and dresses properly.
4. Bringing the person back to you if he is getting worse.

Consider sending a mentally ill patient to a hospital (if the hospital care is better and more specialized than yours) in the following situations:

- ✘ He might hurt himself or others.
- ✘ He is very ill and the family is not able or willing to look after him.
- ✘ He does not know the difference between what is real and what is imagined.

Psychosis

Psychosis is a serious mental illness. Commonly people with psychosis are called 'mad' by other people. They have experiences and thoughts that other people do not have and usually their behaviour is abnormal.

Clinical features

Suspect psychosis if people have noticed a change in a person's behaviour, thinking and feeling.

Symptoms specific for psychosis:

- Incomprehensible talking.
- Delusions. These are false fears or beliefs not shared by other people.
- Hallucinations. He may see things or hear sounds or voices that are not there. He may respond to these voices by talking or shouting to himself.
- Loss of insight. He does not recognise that he is ill.
- Inappropriate mood.

Management

1. **Look for signs of physical illness** (for example typhoid fever or encephalitis). Ask about previous head injury and find out whether he has taken medicines (for example steroids) or is addicted to drugs. If there is a treatable cause, you may often find a reduced level of consciousness, disorientation, confusion and visual hallucinations.
2. **Decide whether the patient has acute, chronic or recurrent psychosis.**
 - Acute psychosis starts suddenly, continues for a short time, and may or may not have precipitating factors (for example bereavement).
 - Chronic psychosis starts slowly. It continues for a long time, often has no obvious cause, and is usually called *schizophrenia*.
 - A person who has periods of mania alternating with periods of depression has *bipolar disorder*.
3. **Decide whether you can treat the patient yourself** or whether you need to refer him to a specialist or hospital. If referral is not possible, treat him as well as you can. For indications for referral see page 179.
4. **Explain the condition to the family.**
5. **Treat any physical illness** that may be responsible for the symptoms.
6. **Treat the psychosis itself** with *chlorpromazine* (or haloperidol):
 - *If a patient is very disturbed and needs restraint*, give oral chlorpromazine 100 mg 3 times daily (or 50 mg IM). If the patient remains very disturbed after 3 days, increase to 100 mg 4 times daily. If this does not improve his condition after 10 days, refer to a hospital. As soon as his condition has improved, reduce the dose to 50 mg orally 3 times daily.
 - *If the patient is less disturbed*, give chlorpromazine 25–50 mg 3 times daily. If there is no significant improvement after 4 weeks, refer.
7. **Duration of treatment:** *in most patients*, the abnormal symptoms will become less after about one week. When the patient has fully recovered, continue chlorpromazine for another 4 weeks, then reduce the dose by 50 mg every week.

In patients with chronic psychosis, treatment is needed for several months. If the patient had many years of mental illness in the past (recurrent psychosis), give him treatment life-long. Instead of chlorpromazine tablets, give an injection of *fluphenazine*. The injections may also be used in acute psychosis if the patient is not willing to take tablets.

- Give a test dose of fluphenazine 12.5 mg IM.
- If there are no bad reactions, give 25 mg IM one week later, and then 25 mg IM every month.
- If the symptoms are not well controlled, give 25 mg IM every 3 weeks instead of every month.
- Make sure the family and the patient understand that treatment is long-term, or even life-long. They must understand that the patient is likely to become psychotic again if they stop the injections.

8. Side effects of treatment:

Common side effects are sedation, low blood pressure, tremor, rigidity of muscles (stiffness) and shuffling gait. An acute reaction in muscles of head and neck is rare: the head is forced to one side, the eyes are forced upwards and the tongue may stick out.

You should inform the patient about these side effects. To prevent or reduce tremor, rigidity of muscles, shuffling gait and acute reaction in head and neck muscles, give *trihexyphenidyl* 2 mg orally 2 times daily. Increase to 2 mg 3 times daily if the patient is on a high dose of chlorpromazine. You can give this dose as long as the patient takes chlorpromazine or receives fluphenazine injections. In case of an acute reaction of head and neck, give immediately 4 mg orally.

Common mental disorders

These conditions are less severe mental illnesses than psychosis. Sometimes they are also called neurosis. In psychosis, the person has abnormal experiences and thoughts. In depression, anxiety and hysteria (dissociation), the patient has not lost touch with reality. He can understand that he is not well. He does not seem strange or abnormal. Usually he does not trouble other people but he himself experiences personal suffering and distress. He cannot cope with his usual family and work responsibilities.

The role of post-traumatic stress

A reaction to distressing life events (for example torture, war experiences or rape) is an important cause in some of the patients with common mental disorders. It is normal for everyone to have strong emotional reactions after very bad experiences. These reactions usually lessen after a few weeks or months. Some people will continue to have problems. Then they suffer

from so-called post traumatic stress syndrome and need help.

How to support someone after a bad experience

It is important that the person can tell what happened to him and express how he felt and feels about it. By doing this, gradually remembering what happened will become less painful. It has been said that as long as an experience has not been communicated, it remains in the heart and is felt. Once it has been expressed, it becomes more part of thinking and becomes increasingly distant from feelings; its burden becomes lighter.

This process takes time. Medicines cannot speed it up.

DEPRESSION

Depression is often not diagnosed because the patient usually presents with physical symptoms (see box). Depression may be caused by difficult life events, by physical illness (for example tuberculosis) or by drugs (for example methyl dopa).

Clinical features

- Occurring at every age
- Onset often after distressing life events
- Often presenting with physical symptoms
- Extreme sadness and frequent crying
- Poor sleep and poor appetite
- Loss of interest in usual activities (for example in work or family life)

Management

1. **To decide whether a patient has depression**, find out the answers to the following questions:
 - How well is he sleeping?
 - How well is he eating?
 - Does he cry a lot?
2. If you have decided that a patient suffers from depression, then **decide whether it is mild or severe depression**. Mild depression does not interfere with a person's work and social life. In severe depression, a person finds it hard to cope with everyday work

Undetected depression - a case report

Mohammad Aziz was a 35-year-old labourer. His wife had taken his children to a clinic for malnutrition. The doctor enquired about the home situation and found out that Mohammad Aziz had not been to work for several weeks because of body and joint pains. He could not buy food for his family - this was the reason why their children were starving.

Mohammad Aziz was asked to come to the clinic. When he arrived, he sat down looking sad and discouraged. He complained about diffuse pains in his legs. Clinical examination did not reveal any abnormality. Blood tests were normal. The clinic treated him with painkillers. No one thought about the physical symptoms as a sign of possible mental illness. No one assessed him for depression.

He did not get better. A simple prescription of amitriptyline and some advice would have changed his life and would have saved his family.

and life. He may think of suicide.

The principles of treatment are to arrange support for the patient and to give anti-depressive medication if needed.

3. **Find out whether the patient takes any medicines causing depression** (for example methyl dopa or steroids). Treat any underlying illness.
4. **Find out whether the patient is at risk of killing himself**. You do this by asking him directly whether he had thought about suicide and if he has a plan of how to do it. If he has a plan for how to kill himself, he is at high risk. Advise the family that someone should stay with him all the time. Keep him away from knives etc. Consider referring him to hospital.
5. **Arrange support for the patient** through family, friends and community. Support includes:
 - Identifying problems a person has and then looking at ways to solve these problems. The ways should be manageable for the patient. His family should encourage him in the small steps he takes.
 - Helping a person to do those things he enjoys doing.
 - Helping a person to change his way of thinking. For example changing from 'I will never be happy again and my life will always remain dark' to 'I feel bad but the feelings will not last forever. With support (and medication) I will feel better in a few weeks.'
6. Give **amitriptyline** 50 mg in the evening after food. In old people start with 25 mg once daily. Explain to the patient that he may experience tiredness, dryness of mouth or dizziness. Most of these side effects will get better after 1-2 weeks. This is why you increase the dosage gradually. Explain to the patient that improvement cannot be expected earlier than 14 days; often it takes 4-6 weeks before he starts feeling better.

If the patient does not experience many side effects, increase amitriptyline to 25 mg in the morning and 50 mg at night and continue this dose for 2 weeks. If there is no improvement, increase the dose to a maximum of 150 mg/day by adding an extra tablet every 7 days.

If the patient is getting better, continue amitriptyline at least for another 8 weeks. If he had treatment for depression before, continue for 1 or more years. When you stop it, it is important to reduce the dose very gradually over several weeks.

One alternative to amitriptyline is imipramine.

Special case: post-natal depression

Some women become very sad and tearful after the birth of a baby. A new mother with post-natal depression may show no interest in caring for the baby or for herself. She may have strange behaviour and thoughts. Any new mother acting in this way needs urgent help and treatment.

ANXIETY

As with depression, anxiety usually presents with physical symptoms.

Clinical features

- Unexplained physical symptoms.
- Severe anxiety; more than expected for the stress of a situation. The anxiety prevents the patient from carrying out his usual daily life.

Management

1. **Check for depression.**
2. **Help the patient to understand the relationship between his symptoms and his problems.** Reassure him that he has no serious physical illness.
3. **Find out about his stresses** and talk with him and his family about ways of helping him to lessen his problems.
4. **Advise about relaxation exercises** (see box).
5. **Avoid giving medicines.** Diazepam or lorazepam, which are sometimes given, can both cause addiction if given for more than 10 days. If the patient cannot sleep, give him amitryptiline 50 mg at night. An alternative is promethazin 25 mg. These two will not cause addiction.

Relaxation exercise

In the following breathing exercise, breathe in through your nose and use your stomach (not your chest).

Practise the exercise for 5 to 10 minutes every night in a comfortable position. Remember that the benefits of relaxation will not occur unless you practice. Do not try hard to relax or to sleep, just carry out the exercise.

1. Breathe in slowly while you count 3 seconds.
2. When you get to 3, slowly breathe out to the count of 3 seconds.
3. Pause for 3 seconds, before breathing in again.
4. After about 5 minutes, say the word 'rest' to yourself as you breathe out.

HYSTERIA (DISSOCIATION or CONVERSION DISORDER)

Some people cannot talk about their problems. However, they want other people to know how distressed they are. These people may develop certain physical problems, like an illness. However, these problems have no physical cause. The people do not develop the symptoms deliberately to deceive people. They themselves do not know what their problems are. The symptoms are like a subconscious cry for help.

Clinical features

- Usually adults
- Becoming suddenly unresponsive or unable to speak
- Fits (important to differentiate from epileptic fits, see box)
- Weakness or paralysis of one leg, sometimes a strange gait
- Shaking (tremor) without an organic cause
- Swallowing difficulties without an organic cause

How to differentiate between the fits of dissociation and epilepsy

Dissociation	Epilepsy
No tongue biting or urine loss	Tongue biting, urine loss
No total loss of consciousness	Unconscious
No or only minor injuries	Hurts himself
Irregular muscle jerks	Regular, rhythmic muscle jerks
Fits lasting a long time, often from 30 min. to a whole day	Fits are usually short - a few minutes

Management

1. **Check for depression**, because depression sometimes causes hysteria.
2. **Reassure the patient** and his family that he is not seriously physically ill. Explain to them what causes his problem. For example: 'Because of stresses in your life, your brain loses control from time to time and this affects your body.'
3. **Arrange support** for the patient, as explained under depression.
4. **Do not prescribe medications**, they do not help. Prescribing medicines will confuse the patient because you tell him that he has no physical disease, but on the other hand, you prescribe medication.
5. *If the symptoms have existed for a long time*, it may take a long time before they improve. See the patient repeatedly and offer encouragement, reassurance and support.

Other mental disorders

DRUG ABUSE

A person is dependent on a drug when it becomes very difficult or even impossible for him to stop taking the drug.

Clinical features

Suspect drug abuse if a person shows one or more of the following features. Be aware that none of them is specific for drug abuse. Be aware that when you ask a drug addict about these features, he will often invent stories and tell lies.

- Sudden mood changes
- Irritability and aggression
- Loss of interest in work, friends and family
- Loss of appetite and weight
- Bouts of drowsiness or sleepiness
- Telling lies or behaving secretly
- Stealing
- Very small (constricted) pupils
- Sniffing and appearing to have a cold (this occurs if the person did not have drugs for a few days)

Management

You can only help an addicted person if he is motivated to change. All efforts will be useless if the patient does not want to become free of drugs.

The main treatment is not medicines! They may only be needed for a very short time if the patient develops severe withdrawal symptoms.

1. Find out **what and how much** he is taking.
2. **Discuss the negative effects of drug addiction** on his family, his finances and his social status. Do not condemn the person. He is ill and needs your help.
3. **Help him to stop the drug.** If he is unwilling to stop, help him to reduce the amount he is taking. Already this will help to reduce the harm caused by the addiction.

Drug withdrawal usually takes about 5-8 days and during that time, the addict should be watched and supervised constantly.

If he has been addicted to opiates, he may withdraw from them without any medication. He may develop withdrawal symptoms: aching muscles, abdominal cramps, vomiting, diarrhoea, sweating, a runny nose and eyes and cannot sleep. These symptoms are very unpleasant for the addict but are usually not dangerous.

4. **It is important to involve the whole family.** They can help the addict to change his social contacts. This means he should not be in contact with other addicts and not go to places where drugs are sold. He needs to live a new life with new friends in a new surrounding. Otherwise, the temptation to start taking drugs again remains strong.
5. **See the patient regularly for one year**, for example once a month, to support him and talk about his situation. Relapses are common but do not give up the patient. Try again to help him.

MENTAL RETARDATION

Mental retardation or mental handicap means a delay or slowness of a child's mental development. Families are usually aware whether a child is developing normally, or whether there are problems. Mental retardation can be caused by different events before, during or after birth (see box).

Clinical features

Compared with other children of his age, a child with mental retardation learns more slowly. This slowness can affect one or more areas of a child's development, for example gross motor development (walking), or fine motor development (using his hands and fingers to

Causes of mental retardation

- **Born with a malformed (badly made) brain.** (causes include iodine deficiency of the mother during pregnancy, or an intrauterine infection like rubella, but often we do not know the exact reason)
- **Damage to the brain during delivery** (for example birth asphyxia, birth trauma)
- **Brain damage caused by a serious disease** (for example malnutrition, meningitis, severe newborn infection, neonatal jaundice)
- Some children with **congenital diseases** have a mental handicap

perform tasks), learning or speech. It can also include slowness to learn correct culturally acceptable social behaviour.

Management

Mental retardation cannot be cured. This may be very frustrating for families who had put great hope in a child. However, a mentally handicapped person can be helped:

1. Find things a mentally handicapped person can do for himself. Encourage him and help him to care for himself.
2. Help him to learn skills.
3. Treat any additional problems, for example poor vision or poor hearing.

CHILDHOOD MENTAL PROBLEMS

Children can suffer from mental problems. The commonest seen is mental retardation, see above. However, they can also develop depression, anxiety or psychosis. Usually these are caused by bad, stressful experiences (for example witnessing or experiencing violence), lack of love and acceptance in a family, death of father or mother.

Clinical features

Children usually do not express their mental problems directly. For example, they may become withdrawn or aggressive, crying a lot, becoming fearful, wanting to die, losing control over urine or stool or having violent fantasies.

Management

1. Try to get the child to express his stresses and fears. This can be by talking about it to a person they trust or by drawing or re-acting the experience.
2. Make sure the child feels loved and accepted and can express his feelings.
3. Continue the daily routine life and give the child tasks he can cope with.

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17. Women's health and newborn care

Afghanistan has the second highest maternal mortality rate in the world. Any woman may develop complications during pregnancy, childbirth or in the 40 days following delivery (postpartum period). Some pregnancies carry more risks than others. Most maternal deaths result from bleeding, infections, eclampsia and obstructed labour. Many other women develop health problems during pregnancy and childbirth. Frequent pregnancies do not give a woman enough time to regain her strength between births and exhaust her body resources. Poor maternal health also affects the health of children because only healthy mothers will have strong and healthy children, and so many babies die during the early newborn period.

Even without special obstetric training, you must know the essential ways in which this disastrous situation can be changed. You should be able to recognize and provide first aid and refer urgently obstetric emergencies.

The key principles of safe motherhood and newborn care are:

1. A planned pregnancy is safer (**family planning** and **child spacing**- you should know how to advise about methods of planning a family).
2. Every woman should be assessed at least 4 times during her pregnancy (**antenatal care**).
3. The delivery should be attended by a *skilled birth attendant* (**safe delivery care**). At present in Afghanistan, only 15% of all deliveries are attended by a skilled birth attendant. Skilled birth attendants are people with midwifery skills who have been trained to manage normal deliveries and provide emergency obstetric care. Traditional birth attendants (TBAs) are not included in that category. To train them has not been shown to reduce maternal mortality.
4. The woman and her baby should be assessed several times after delivery (**safe newborn** and **postpartum care**). Immediate and exclusive *breastfeeding* must be encouraged and *family planning* discussed.

How to know that a woman is pregnant

The following are symptoms and signs of pregnancy:

- a woman misses her period
- she feels as if she is going to vomit in the morning
- she may have to urinate more often and
- her abdomen and her breasts get bigger. During about the fifth month of pregnancy, she feels the baby moving in her womb.

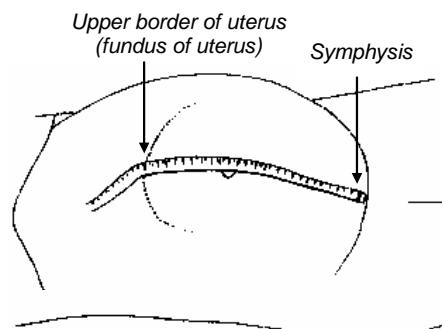
It is important to know the expected date of delivery (EDD) in order to make a birth plan for a safe delivery. If a woman remembers when her last monthly

bleeding began ('last menstrual period' = LMP), add 9 months + 7 days (*Naegele's rule*). The baby will probably be born any time in the two weeks before or after that date. Where available, an early ultrasound is also useful for dating a pregnancy.

However, often a woman cannot remember when her LMP began. Then feel the abdomen for the size of the uterus as shown in figure 17-1 and measure the fundal height to estimate the time of pregnancy.

HOW TO MEASURE FUNDAL HEIGHT:

1. Take a tape measure.
2. Feel for the upper border of the symphysis (pubic bone) and for the upper border of the uterus (fundus of uterus).
3. Measure the distance between the symphysis and the fundus.



By measuring the fundal height, you can observe uterine growth. **Normally**, the fundal height is within a range of 2 cm above or below the number of weeks of pregnancy (for example at 24 weeks, the normal fundal height is 24 +/- 2 cm = between 22-26 cm).

The fundal height (uterine growth) is **abnormal** if more than 3 cm different from pregnancy age.

- *If too low*: foetal growth retardation, foetal death
- *If too high*: twins, polyhydramnios

The fundal height is also helpful in determining the age of pregnancy if a woman cannot remember the onset of her last menstrual period. As a general rule:

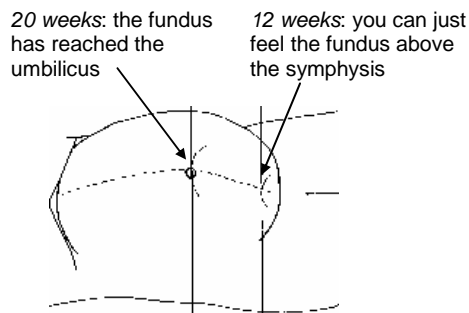


Figure 17-1 How to measure fundal height.

Antenatal care - how to care for a woman during pregnancy

The aim of antenatal care is to have a healthy mother and a healthy baby at the end of the pregnancy. At present in Afghanistan, only about 12% of all women receive antenatal care. Therefore, whenever a pregnant woman comes to you as a patient, for whatever problem, ask whether she is having antenatal care. If not, assess her to make her pregnancy safer. A proper assessment may take around 30 minutes but these 30 minutes may be life-saving for the mother and her baby.

A pregnant woman should be assessed at least 4 times during her pregnancy; more often if there are risk factors or problems. For a summary of the elements of each antenatal visit see box.

During each antenatal visit, concentrate on three areas:

1. **Assess the woman for risk factors** and decide about indications for referral.
2. **Prevent, detect and treat diseases** (anaemia, tetanus, malnutrition, malaria).
3. **Give essential health education** (nutrition, anaemia and malaria prevention, need of skilled birth attendant,

	CONTENTS OF ANTENATAL VISITS		REMARKS
	Assessment	Management	
<p>VISIT 1: Time: as early as possible in pregnancy (before 4 months = around 12 weeks)</p>	<p><i>Take a history</i></p> <ul style="list-style-type: none"> ○ Age? ○ General health: <ul style="list-style-type: none"> – Previous or present health problems? – Tetanus immunisation? – Drugs? ○ Obstetric history: <ul style="list-style-type: none"> – Number of previous pregnancies? – Problems during previous pregnancies? – Problems during present pregnancy? ○ Last menstrual period? <p><i>Examine the woman</i></p> <ul style="list-style-type: none"> ○ Height? Weight? Malnutrition? ○ Anaemia? ○ High blood pressure (above 140/90 mmHg); signs of pre-eclampsia? ○ Any other problems (for example heart murmur)? <p><i>Arrange investigations</i></p> <ul style="list-style-type: none"> ○ Urine for bacteria, glucose and protein ○ Haemoglobin, possibly blood grouping ○ Consider VDRL <p><i>Pregnancy examination</i></p> <ul style="list-style-type: none"> ○ Measure the fundal height. ○ Feel the baby's position if the first visit is later than 32 weeks of pregnancy. 	<ol style="list-style-type: none"> 1. Assess the need for referral. 2. Start prevention or treatment of anaemia (ferrous sulphate + folic acid). 3. Advise about malaria prevention. 4. If needed: immunize against tetanus. Treat for syphilis if VDRL positive. 5. Take time to explain all key health messages: <ol style="list-style-type: none"> a. How to stay healthy during pregnancy. b. How to recognize danger signs and where to get help. c. How to have a safe delivery. 6. Record all information and make an appointment for the next visit. 	<p>Do a full assessment as described whenever a woman comes for the first time, even if it is late in pregnancy!</p>
<p>VISIT 2: Time: 6 months (26 weeks)</p>	<p>Always review relevant issues from previous history and examination.</p> <p><i>Take a history</i></p> <ul style="list-style-type: none"> ○ Any problems since last visit? ○ Foetal movements? 	<ol style="list-style-type: none"> 1. Assess the need for referral. 2. Make sure the mother takes iron/folic acid tablets. 3. Take time to explain all key health messages: <ol style="list-style-type: none"> a. How to stay healthy during pregnancy. b. How to recognize danger signs and where to get help. c. How to have a safe delivery. 4. Record all information and make an appointment for the next visit. 	<p>At 32 weeks: The family should have made a definite birth plan. If hospital delivery is indicated, refer the mother BEFORE onset of labour! Does the family know: ... where to deliver? ... who will attend the delivery? ... the danger signs? ... what to do in case of an emergency?</p> <p>At 32 and 36-38 weeks: ○ Feel for possible twins and determine the position of the baby.</p> <p>At 36-38 weeks: Also discuss breastfeeding and the value of postnatal care.</p>
<p>VISIT 3: Time: 8 months (32 weeks)</p>	<ul style="list-style-type: none"> ○ High-risk symptoms? (Severe headache, blurring of vision, vaginal bleeding, shortness of breath, abdominal pain, fever) <p><i>Examine the woman</i></p> <ul style="list-style-type: none"> ○ Measure weight. 		
<p>VISIT 4: Time: 9 months (36-38 weeks)</p>	<ul style="list-style-type: none"> ○ High blood pressure? ○ Severe anaemia? ○ Measure the height of the uterus. ○ Listen to the foetal heart sound. <p><i>Arrange investigations</i></p> <ul style="list-style-type: none"> ○ Urine for bacteria, glucose and protein ○ Haemoglobin, if it was less than 7 g/dl at the previous visit 		

recognition of danger signs, plan in case of emergencies, birth plan, value of postnatal care, breastfeeding and family planning).

The first antenatal visit

The first visit should be as early in pregnancy as possible. However, even if a woman comes late in pregnancy, always assess her as described below but include the additional pregnancy assessment as appropriate for the time of the pregnancy (for example feeling the position of the baby after 32 weeks and measuring the fundal height).

Take a history

General history:

- 'How old are you?' Women younger than 17 years are at increased risk of eclampsia and prolonged or obstructed labour. Women older than 35 years are at increased risk of prolonged labour and bleeding.
- 'Do you have any health problems?' Ask specifically about heart problems, tuberculosis, high blood pressure, kidney problems, epilepsy, diabetes, liver problems and previous operations.
- 'Have you been immunized against tetanus?'
- 'Are you taking any medicines?' If yes: which ones and why?

Obstetric history:

- 'How often have you been pregnant before?' The first pregnancy carries a higher risk of complications (for example eclampsia). Women who have had 5 or more children are also at an increased risk of complications (for example anaemia, preterm labour, rupture of uterus and postpartum haemorrhage).
- 'Did you have any problems during *previous pregnancies*?' Complications may recur during this pregnancy. At risk pregnancies are those with any of the following in a previous pregnancy:
 - High blood pressure
 - Convulsions
 - Bleeding during pregnancy or after delivery
 - Abortion or stillbirth
 - Abnormal delivery (for example caesarean section or labour lasting more than 12 hours)
 - Retention of placenta
 - Death of the newborn during the first week
 - Problems with breastfeeding
- 'Have you had any problems during *this pregnancy*?' Ask specifically about vaginal bleeding, abnormal vaginal discharge (some vaginal discharge is normal in pregnancy; it is abnormal if it is foul-smelling or bloody), abdominal pain, severe headache or generalised swelling.
- 'When did your last menstrual period (LMP) start?'

Examine the woman

Examine every woman for unrecognised problems that could deteriorate during this pregnancy:

- **Measure the woman's height and weight.** If her height is less than 145 cm, she is at risk of obstructed labour. Normally, a woman will put on about 7-10 kg weight during the pregnancy. If she puts on less than 6 kg her food intake may be insufficient or she is suffering from an underlying disease like tuberculosis. Her baby is at risk of being born with a low birth weight, which increases the risk of newborn death. Excessive weight gain may be a sign of fluid retention and pre-eclampsia.

Assess for existing malnutrition and measure the circumference of the middle of the left upper arm (MUAC: mid-upper arm circumference, see page 48). If MUAC is less than 22.0 cm, the woman is significantly malnourished.

- **Assess for anaemia**, which is a common and serious problem in pregnancy. More than half of all women of childbearing age in Afghanistan are anaemic. Factors responsible for maternal anaemia are a poor diet, frequent pregnancies, chronic infections and malaria. Anaemia is dangerous because even a very little blood loss during the delivery may cause shock and death in an anaemic woman. Heart failure can occur at any time during pregnancy or in the first days after delivery. Anaemia also makes the mother more susceptible to infections.

Ask her about symptoms of anaemia (tiredness, headaches, breathlessness, palpitations).

Examine her palms and gums for paleness (see figure 12-2 on page 127).

- **Measure the blood pressure and look for signs of eclampsia.** Pre-eclampsia is a medical emergency. It usually develops during the second half of pregnancy. Young women, first pregnancies and women with pre-eclampsia in former pregnancies are at an increased risk. Suspect imminent eclampsia in any woman complaining of:
 - Severe headache
 - Blurring of vision
 - Oedema of face and hands
 - Upper abdominal pain

- Do a full physical examination. Especially **listen for heart murmur**, which may be a sign of a damaged heart valve. A woman with a heart murmur may be at risk of developing heart failure during pregnancy or after delivery. If the woman has a **goitre**, she may be iodine deficient. This puts the child at risk of being born with a mental handicap.

NOTE: a vaginal examination is not routinely indicated.

Arrange investigations

- **Test urine for protein and sugar.** Arrange urine microscopy for bacteria if protein is mildly positive.

If you find sugar in the urine, you must do a blood sugar. *Gestational diabetes* is dangerous for mother and baby. Refer. Usually insulin is needed for treatment.

- **Measure haemoglobin.** The woman is anaemic if Hb is less than 11 g/dl. Anaemia is severe if Hb is below 7.0 g/dl. If the family is very poor, measure Hb only if clinical examination suggests severe anaemia or if the woman has symptoms of anaemia.
- If the woman's blood group is not known, consider blood group typing (ABO and Rhesus factor) to detect Rhesus negative women.
- A VDRL test for syphilis is recommended.

Management

1. **Assess the need for referral**, either for a specialist assessment (for example diabetes or heart disease), or for hospital delivery, see box. Refer a woman to hospital early (before the onset of labour!).
2. **Give treatment to prevent or cure anaemia:**
 - If a woman has no signs of anaemia, give *ferrous sulphate/folic acid* (200 mg/0.4 mg) 2 times daily throughout pregnancy. If no combined tablet is available, give ferrous sulphate 200 mg 2 times daily and folic acid 5 mg once a day to prevent anaemia.
If a woman has non-severe anaemia (Hb 7-11 g/dl), give ferrous sulphate/folic acid 4 times daily.
If a woman presents with severe anaemia, give ferrous sulphate/folic acid as for non-severe anaemia. Consider a blood transfusion, if the woman presents late in pregnancy, or if she has very severe anaemia (Hb below 5 g/dl) or has signs of heart failure.
 - Advise a diet rich in iron-containing food (see page 129).

Indications for referring a woman to give birth in a hospital

Risk factors from previous pregnancies

- Caesarean section or instrumental delivery
- Postpartum haemorrhage
- Retained placenta
- Labour longer than one day
- Last baby stillborn or died in first week

Risk factors in the present pregnancy

- First pregnancy or more than 5 previous deliveries
- Pre-eclampsia/eclampsia
- Vaginal bleeding towards the end of pregnancy
- Baby's position is not head first
- Multiple pregnancy (for example twins)
- Severe anaemia
- Rheumatic heart disease
- Very short stature
- Low birth weight baby expected

- Advise women who live in malaria endemic areas to seek prompt help if they get a fever. Teach them about malaria prevention (see page 29).

3. **Immunize against tetanus** to protect the baby from neonatal tetanus, which is a common cause of neonatal death. The full schedule to provide life-long protection is: TT1 (tetanus toxoid 1): give at first contact, or as early as possible during pregnancy; TT2: give at least 4 weeks after TT1; TT3: give at least 6 months after TT2; TT4: give at least 1 year after TT3; TT5: give at least 1 year after TT4 or during next pregnancy.

It may be more practical if you remember to give a woman tetanus toxoid as early as possible in pregnancy, and at least one month before the expected date of delivery. Give a booster at any further pregnancy at around six months of pregnancy.

4. **Treat for syphilis if VDRL is positive.** Syphilis is rare in Afghanistan but if a mother is infected the baby may be born severely ill and die. If VDRL is positive, give the mother benzathine benzylpenicillin 2.5 million units IM as one single dose (if penicillin allergy, give erythromycin).

5. **In areas with a high incidence of goitre**, all women of childbearing age and all pregnant women should receive a dose of iodized oil (400–600 mg = 3 capsules); for details see page 208.

6. **Explain key health messages.** Listen to the woman to hear her concerns and questions. Do not give all key messages at the same time but concentrate on the one that is important for the individual woman at her particular time of the pregnancy. For a summary of the key health information see boxes on the next page.

It is very important that the woman and her family have understood the following:

- a. *How to stay healthy during pregnancy.* Use the traditional concept of 'parhez' (special diet) to advise a healthy mixed diet that is rich in protein food, energy food and vitamins. If the woman is malnourished, advise her to eat one extra plate of staple food (for example superflour). Discourage dangerous diets. Do not comment on harmless ideas. All women need more rest than usual during pregnancy.
- b. *How to recognize the warning signs of dangers and to know where to get help if any of them occurs.*
- c. *How to have a safe delivery and how to care for the newborn.* Particularly stress the importance of a skilled birth attendant at the time of delivery. By eight months of pregnancy the family should have made a birth plan that includes (1) where to give birth and which skilled birth attendant will attend the birth (2) where to go in case of emergencies and how to get there (3) to have prepared an emergency fund to cover costs in case of emergencies (4) to have prepared all items needed for a clean delivery.

Key health messages for pregnant women

Explain the following health messages to the woman and her family whenever she comes during her pregnancy.

1. Regular assessment will make your pregnancy safer.
2. Eat a good diet containing protein-rich food, dairy products and vitamins; use iodized salt for cooking. Rest more often than usual.
3. Take ferrous sulphate and folic acid throughout pregnancy.
4. Watch out for the following warning signs that may indicate a danger. Seek urgent help if any of those occur:
 - Vaginal bleeding
 - Severe abdominal pain
 - Severe headache with blurred vision
 - Convulsions, loss of consciousness
 - Fever
 - Swelling of hands and face.
5. Do not take unnecessary medicines.

Key health messages for late pregnancy and delivery

Explain the following health messages to the woman and her family later in her pregnancy so that they know about safer delivery.

1. They must know the safest place for delivery, which should be decided according to the woman's individual risk and facilities. A skilled birth attendant must monitor the labour and must know where to get help if problems occur.
2. Watch out for the following warning signs that may indicate danger. Seek help if any of those occur.

Danger signs - mother:

- Labour pains continue for more than 12 hours
- Ruptured membranes without onset of labour after 6 hours
- Heavy vaginal bleeding during or after delivery
- Placenta is not expelled 1 hour after the birth of the baby.

Danger signs - baby:

- Very small
 - Difficulty breathing
 - Convulsions
 - Hot or cold to touch
 - Not able to feed
 - Bleeding
3. Teach the family how to care for the newborn:
 - Dry the baby immediately.
 - Keep the baby warm.
 - Start breastfeeding immediately (within one hour after delivery).
 4. Arrange for postnatal care.

d. At the end of the pregnancy start talking about the *benefit of immediate and exclusive breastfeeding*, and of the *benefit of having postnatal care visits* after delivery.

7. **Record all your findings**, ideally on an antenatal card that the mother keeps, and arrange the date for

the next antenatal visit. Write down important instructions (for example the danger signs or where to get help if needed).

NOTE: avoid unnecessary drugs because drugs may harm the baby at any time during pregnancy. If you have to use medicines, only give those that are safe in pregnancy.

The second visit

This visit is ideally at around 6 months (26 weeks) of the pregnancy. Review the woman's previous record so that you can address relevant issues and risk factors.

Take a history

- Ask about any problems since the last visit.
- Ask whether the mother has felt *foetal movements*. Foetal movements are usually felt between 4-5 months of pregnancy. If she has not felt foetal movements, listen to the foetal heart. If you cannot hear it, refer the woman to hospital because the baby may be dead.
- Ask about all the high-risk symptoms:
 - Severe headache
 - Blurring of vision
 - Vaginal bleeding
 - Shortness of breath
 - Abdominal pain
 - Fever

Examine the woman

- Measure the woman's weight.
- Take the blood pressure.
- Look for signs of *severe anaemia*.
- *Measure height of the uterus* (see figure 17-1 on page 184). If the uterine height is more than 3 cm different from the gestational age, it is abnormal. If it is too small, this may indicate foetal growth retardation. Refer.
- *Listen to the foetal heart sounds*. They are normally at a rate of between 120 to 160 beats/minute and you can only hear a single sound. If you can hear two heart sounds, it may be a twin pregnancy. If the heart beat is slower than 120 or faster than 160 (unless the baby is very active), this may indicate foetal distress. Refer urgently.

Arrange investigations

- Test urine for sugar and protein.
- Measure haemoglobin if it was below 7.0 g/dl at the first visit, or if you find signs of severe anaemia on examination.

Management

1. **Assess the need for referral.**
2. **Give preventive or curative treatment for anaemia.** Make sure the woman takes ferrous sulphate and folic acid. Repeat the advice about malaria from the first visit
3. **Explain key health messages.**
4. **Record all your findings** and arrange the date for the next antenatal visit.

The third visit

This visit is ideally around 8 months (32 weeks) of the pregnancy. Review the woman's previous record so that you can address relevant issues and risk factors. Basically, do everything you did at the second visit.

In addition to measuring the uterine height feel the baby's position to discover whether the baby is in a position that may cause a difficult or dangerous birth. Determine whether there is only one baby in the uterus (see figure 17-2).

Assess the need for referral. If a woman has risk factors for delivery from her history or present assessment, refer her to hospital early (before onset of labour!).

Examine the breast for inverted nipples that may make breastfeeding difficult.

By this visit, the mother should have a definite *birth plan*. Ask the family about their preparations. Check that they know the danger signs and that they know what to do in case of emergencies. Talk to them again about the essential health messages. Explain to them the benefit of postnatal care (see below).

Record all your findings and arrange the date for the next antenatal visit.

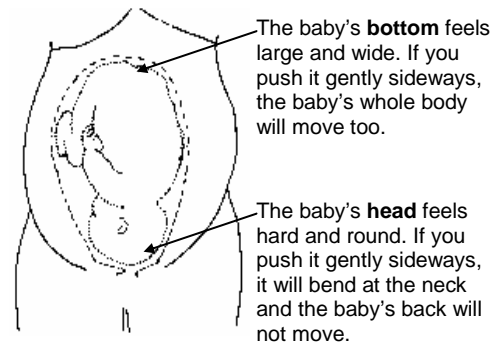
The fourth visit

This visit is ideally at 9 months (around 36-38 weeks) of the pregnancy, shortly before delivery. Review the woman's previous record so that you can address relevant issues and risk factors. Basically, do everything you did at the third visit. It is again important to determine the baby's position. Assess the need for referral. Check again that the family know the danger signs and that they know what to do in case of emergencies. Ask who will attend the delivery as the skilled birth attendant.

Talk to the family about what will happen after birth, especially discuss the benefit of immediate and exclusive breast-feeding and safe newborn care. Explain to them the benefit of postnatal care.

Record all your findings. Tell the woman to come for review if she has not delivered by 2 weeks after the expected date of delivery.

CHECK THAT THE BABY IS IN A GOOD POSITION:



- If the baby's head is down (*cephalic presentation*), his birth is likely to go well.

DANGEROUS POSITIONS:

- ✘ If the baby is sideways (*transverse lie*), the mother must have her baby in a hospital. She and her baby are at danger.
- ✘ If the baby's head is up (*breech presentation*), the birth may be more difficult (breech delivery) and delivery should be at a hospital.

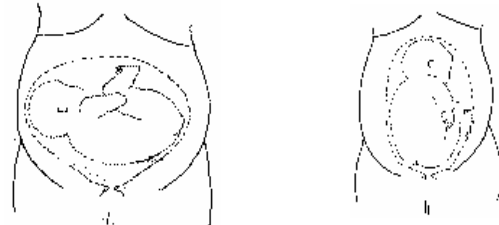


Figure 17-2 Positions of the baby.

How to manage problems during pregnancy

Many women experience minor problems such as morning sickness, burning of the stomach, mild swelling of the feet and low back pain. All these are normal and common problems that do not need specific treatment. This chapter only covers the important and possibly dangerous problems.

For differential diagnosis of vaginal discharge and fever see boxes on this and on the next page.

Important causes and symptoms of abnormal vaginal discharge in pregnancy

- Gonorrhoea, chlamydia, trichomonas infection
- Vaginal thrush (intense itching)
- Womb infection (foul-smelling discharge, fever, abdominal pain)
- Pre-labour rupture of membranes (sudden gush of watery discharge)

Important causes of fever in pregnancy

- Urinary tract infection (cystitis, pyelonephritis)
- Septicaemia
- Malaria
- + Any cause that occurs in non-pregnancy!

HIGH BLOOD PRESSURE, PRE-ECLAMPSIA AND ECLAMPSIA

Find the answers to the three following questions to differentiate between the causes of high blood pressure in pregnancy:

1. **Is the blood pressure (BP) high?** BP in pregnancy is raised if it is systolic above 140 mmHg or diastolic above 90 mmHg.
2. **Does the urine contain protein?** (Proteinuria)
3. **Did the woman have convulsions?**

Decide about the diagnosis:

- If the woman has high blood pressure but no proteinuria or convulsions, she suffers either from **pregnancy-induced hypertension** (gestational hypertension), or she already had **high blood pressure** before becoming pregnant.
- If the woman has high blood pressure + proteinuria but no convulsions, she suffers from **pre-eclampsia**.
- If the woman has high blood pressure + proteinuria + convulsions, she suffers from **eclampsia**.

Management of pregnancy-induced hypertension and pre-eclampsia

1. **Advise bed-rest** and check the blood pressure 2 times a week.
2. **Tell the woman** to seek immediate medical help if she develops any of the following danger signs:
 - Severe headache
 - Blurring of vision
 - Oedema of face and hands (oedema of feet does not indicate an increased risk)
 - Abdominal pain
3. **Refer to hospital if** (1) the blood pressure rises (diastolic 90-100 mmHg + proteinuria; or diastolic above 100 mmHg with or without proteinuria) or (2) if the symptoms worsen.
4. *Drugs to reduce the blood pressure cannot cure the underlying vascular abnormality!* They are only used to reduce the risk of brain haemorrhage (a common cause of death in eclampsia) and to protect the mother while urgent referral is being arranged. The only cure for eclampsia is delivery. Give methyldopa 250-500 mg 2-4 times daily. If this does not control the blood pressure, add propranolol 40 mg 2 times daily or hydralazine 25-50 mg orally 4 times daily. Refer urgently.
5. Give prophylactic **magnesium sulphate** as described below for eclampsia in the following situations:

- If the blood pressure is very high (systolic above 170 mmHg or diastolic above 100 mmHg) + proteinuria.
- If the blood pressure is high (systolic above 150 mmHg or diastolic above 100 mmHg) + two or more danger signs.

NOTE: do not give diuretics or advise a low salt diet.

Management of eclampsia

Treat any convulsion in pregnancy as eclampsia unless there is another proven cause (see boxes). The onset of convulsions is often unpredictable and can occur without previously high blood pressure.

1. **Follow the ABC of resuscitation** (Airway, Breathing, Circulation see pages 239-241), give oxygen.
2. Take a 50% solution of **magnesium sulphate**. Of this solution, mix 8 ml (= 4 g) with 12 ml sodium chloride 0.9% into a 20 ml syringe (or add to 500 ml infusion solution). Give this as a loading dose IV slowly over 5-10 minutes as an immediate protection. In addition, give magnesium sulphate 50% 20 ml (= 10 g) IM (give as 10 ml = 5 g in each buttock). Then give magnesium sulphate 10 ml (= 5 g) IM every 4 hours in alternate buttocks.

If convulsions recur, repeat the loading dose.

NOTE: magnesium overdose can be fatal. When you give magnesium sulphate IV, check the knee reflex (knee jerk) every 15 minutes. If the reflex disappears, or if the patient becomes drowsy with a slow respiratory rate below 12 breaths/minute, give calcium gluconate 10% 10 ml (= 1 g) slowly IV, which is the antidote to magnesium.

If magnesium sulphate is not available, control convulsions with diazepam 10 mg IV slowly over 2 minutes or 20 mg rectally. Repeat if convulsions recur. For maintenance, add 40 mg diazepam to 500 ml sodium chloride 0.9% (or Ringer's lactate) and give as slow infusion (5-10 mg/hour, maximum 30 mg/hour) to keep the woman sedated but rousable.

Important causes of convulsions in pregnancy

- Eclampsia
- Cerebral malaria
- Epilepsy
- + Any cause that occurs in non-pregnancy!

Important causes of loss of consciousness in pregnancy

- Eclampsia
- Cerebral malaria
- Epilepsy (post-ictal phase)
- Diabetic coma
- Sepsis
- Shock
- + Any cause that occurs in non-pregnancy!

3. **Treat high blood pressure** with *hydralazine* 5 mg IV every 30 minutes. The aim is to stabilize the diastolic blood pressure at about 100 mmHg. If the blood pressure is stabilised give hydralazine 12.5 mg IM every 2 hours if needed.
4. **Refer urgently to hospital** unless delivery is imminent.
5. **Continue treatment after delivery** because convulsions sometimes occur within 24 hours after delivery. Monitor clinical signs, blood pressure, proteinuria and urine output.

VAGINAL BLEEDING DURING PREGNANCY

If a woman bleeds during pregnancy - even if it is only a little - this is a sign of danger. A helpful guide to diagnosis and management is to differentiate whether the bleeding occurs within the first 5 months of pregnancy or later (see box). The three parts of management are always (1) Find the source of bleeding (2) stop the bleeding and (3) replace the blood loss.

Causes of vaginal bleeding in pregnancy

BLEEDING DURING THE FIRST 5 MONTHS

- Miscarriage (abortion)
- Ectopic pregnancy

BLEEDING AFTER THE FIRST 5 MONTHS

- Placenta praevia
- Abruption of placenta
- Early labour (preterm labour) or show

Bleeding during the first 5 months of pregnancy

The commonest cause of bleeding in early pregnancy is a **miscarriage (abortion)** (see figure 17-3). This is a pregnancy that ends by itself before the baby is fully developed. Most miscarriages happen in the first 3 months of pregnancy. The signs of a miscarriage are pain and bleeding. These begin like normal monthly bleeding and then get heavier and stronger. There may be some fleshy tissue with the blood. If the bleeding continues for several days or if the woman develops fever and a bad-smelling discharge from her vagina, part of the pregnancy may still be inside the womb. This is called **incomplete abortion**, which can lead to heavy blood loss, sepsis and even death.

Another important cause of abdominal pain and bleeding is **ectopic pregnancy** (see figure 17-3 and page 99). In a miscarriage, usually the vaginal bleeding comes first, then the pain and vaginal bleeding is often heavy. In ectopic pregnancy, the pain, often colicky, comes first, and then slight vaginal bleeding or brown discharge starts. The woman feels dizzy and may faint. If the patient is in shock, ectopic pregnancy is more likely than abortion.

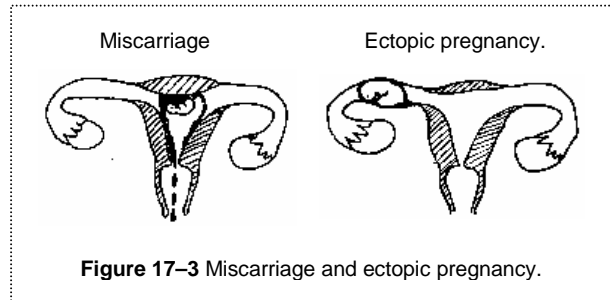


Figure 17-3 Miscarriage and ectopic pregnancy.

Assess for the following danger signs:

- ✗ Shock?
- ✗ Heavy bleeding?
- ✗ Fever and bad-smelling discharge? (Sepsis)
- ✗ Abdomen tender with rebound and guarding? (Peritonitis)

Management

If there are **no danger signs** and no expulsion of fleshy tissue, and no suspicion of ectopic pregnancy, treat the bleeding as threatened abortion. Refer to hospital if bleeding continues or signs of infection develop.

If danger signs:

1. Treat shock.
2. Give ergometrine 0.25–0.5 mg IM.
3. Refer to hospital urgently.
4. If sepsis, give ampicillin (or amoxicillin) + metronidazole.
5. Give tetanus toxoid.
6. After the crisis is over, give ferrous sulphate and folic acid for at least 3 months.

Bleeding after the first 5 months of pregnancy

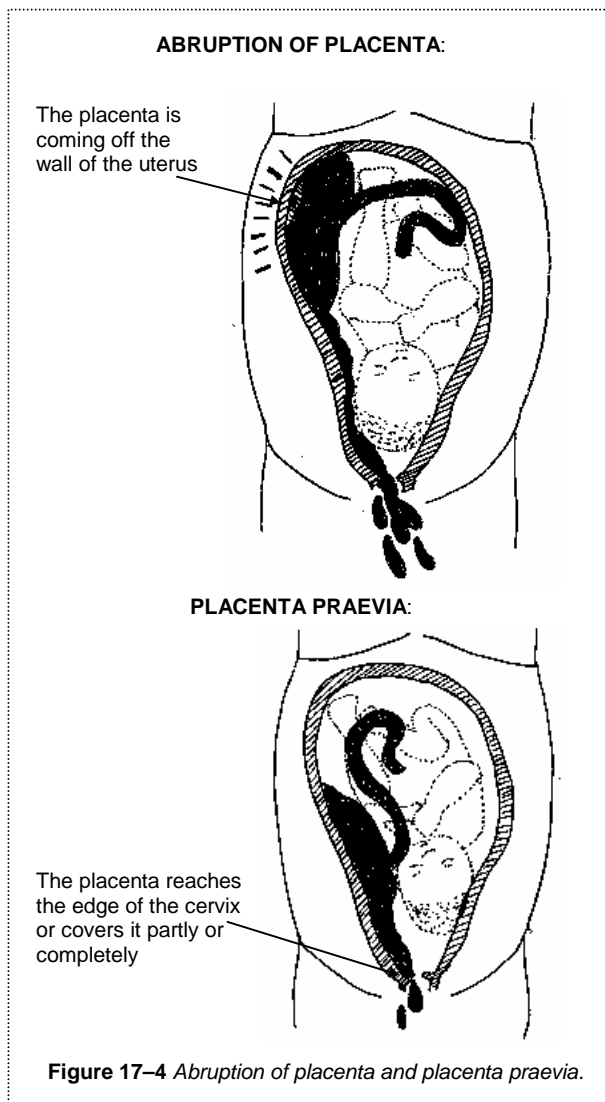
Bleeding late in pregnancy may mean that the placenta is in the lower segment and partly or wholly obstructs the birth canal (**placenta praevia**), or that it is coming off the wall of the womb (**abruption of placenta**) (see figure 17-4). Both conditions are very dangerous. Abruption of placenta is associated with strong constant pain while the bleeding of placenta praevia is painless.

1. Assess:
 - Shock?
 - Heavy bleeding?

NOTE: do not perform a vaginal examination, which may be fatal for a woman with placenta praevia.
2. Treat shock.
3. Refer urgently to hospital and organize blood donors.
4. After the crisis is over, give ferrous sulphate and folic acid for at least 3 months.

LOWER ABDOMINAL PAIN DURING PREGNANCY

The pregnancy-related causes of abdominal pain are different for early and for late pregnancy. Most pregnancy-



related causes of pain are associated with bleeding. Assess for signs of peritonitis (see box).

Pain that comes and goes during the 7th or 8th month of pregnancy could mean that the woman is going into labour too early (preterm labour). Lower abdominal pain may be caused by a urinary tract infection (UTI). UTI in pregnancy may rapidly progress to severe pyelonephritis, may cause foetal death or induce premature labour.

Delivery care - how to care for woman during delivery

Care of the newborn is described later in this chapter.

Advise the woman to contact the skilled birth attendant when she notices any of the following signs that labour has started:

- Bloody sticky discharge
- Regular painful contractions every 20 minutes or less
- The waters have broken

Causes of abdominal pain in pregnancy

PAIN AT ANY TIME DURING PREGNANCY

- Urinary tract infection (cystitis, acute pyelonephritis)
- Peritonitis
- + Any other cause of abdominal pain, unrelated to pregnancy (for example appendicitis)

PAIN DURING THE FIRST 5 MONTHS

- Miscarriage (abortion)
- Ectopic pregnancy (usually at 6-9 weeks)
- Ovarian cyst

PAIN AFTER THE FIRST 5 MONTHS

- Pre-eclampsia
- Abruptio of placenta
- Ruptured uterus
- Obstructed labour

NOTE: hopefully, a woman, who is at risk and should deliver at a hospital, has been admitted there before the onset of labour! However, unforeseen complications can occur during any delivery and that is the reason why every delivery must be attended by a *skilled birth attendant* and not just a family member or traditional birth helper.

Labour is divided into three stages:

- **First stage:** from the onset of regular contractions to full dilatation of the cervix (should not take more than 12 hours).
- **Second stage:** from full cervical dilatation to delivery of the baby (should not take more than 2 hours).
- **Third stage:** from delivery of the baby to delivery of the placenta (should not take more than 1 hour).

The first priority for a delivery is to be safe and clean. Most maternal deaths during childbirth are due to the failure to detect complications early and get skilled help in time. A delivery should always be attended by a skilled birth attendant (for example community midwife).

The key points everyone, even those without special obstetric training, should know about are:

1. The principles of clean delivery.
2. The danger signs of delivery.
3. First aid in emergencies during delivery.
4. Safe newborn care.

Principles of clean delivery

1. **Clean hands.** Everyone involved in the delivery must wash his hands with soap and clean water. After washing the hands, nothing dirty should be touched, otherwise handwashing must be repeated.
2. **Clean genital area (perineum).** Wash the mother's perineum with soap and water.

3. **Clean delivery surface.** The place onto which the mother delivers the baby must be clean. If possible, use a clean plastic sheet.
4. **Clean cutting of the cord.** A razor blade that has been sterilised by boiling for 10 minutes is one of the best tools for cutting the cord. The cord should be cut after it has stopped pulsating. Never allow anyone to apply traditional colour to the cord because this is associated with a high risk of neonatal tetanus. Use gentian violet if the family insists on traditional ways of treating the cord.

Danger signs during delivery

The following are danger signs during delivery:

- ✘ **Labour pains lasting for more than 12 hours** without delivery of baby (sign of prolonged or obstructed labour). However, delay should be diagnosed before this and the patient transferred early. The best tool for early recognition of problems is the partograph (see figure 17-5 on the next page).
- ✘ **Ruptured membranes for more than 12 hours** (sign of prolonged or obstructed labour).
- ✘ **Heavy vaginal bleeding or severe abdominal pain** (for example placenta praevia or ruptured uterus).
- ✘ **Foetal distress** (foetal heart sounds slower than 120/min or faster than 160/min).

Management of emergencies during delivery

Important emergencies that require obstetric training are breech delivery, cord prolapse and shoulder dystocia, their management needs to be learned in a maternity ward.

PROLONGED AND OBSTRUCTED LABOUR

Prolonged and obstructed labour are important causes of maternal and neonatal deaths during delivery. **Obstructed labour** is a labour in which a woman's pelvis is not large enough for her baby to pass through (for example a deformed pelvis from previous rickets). Delivery often requires a caesarean section. **Prolonged labour** is active labour with regular uterine contractions and progressive cervical dilatation for more than 12 hours. This means delivery progresses too slowly.

In both situations, rupture of uterus and infection are great risks to the mother. Obstructed labour may also lead to severe maternal injuries (for example fistula between bladder and vagina). The baby is at risk of death.

Women with prolonged labour and severe abdominal pain or weakness may have a ruptured uterus.

Assessment of a woman who is in labour for more than 12 hours without delivery

Generally, refer woman with prolonged or obstructed labour to hospital urgently. The following questions help you (1) to differentiate between obstructed and prolonged labour and (2) to assess the condition of the baby, and can guide your immediate management before referral.

1. **What is the baby's position (lie)?** (See figure 17-2 on page 189)
2. **Is the baby's head engaged?** What is the actual level of the head when you feel it through the abdomen? (Presentation)
3. **Can you hear foetal heart sounds?** Are they normal, fast or slow?
 - In *prolonged labour*, the lie/presentation of the baby will be normal and the head is engaged.
 - In *obstructed labour*, the lie/presentation is abnormal and the head is not engaged.

Management of prolonged labour

1. Empty bladder, catheterize if necessary.
2. Give ampicillin 2 g every 6 hours IV/IM + gentamicin 5 mg/kg every 24 hours if the woman has been in active labour for more than 24 hours, or if the waters are green or brown or foul-smelling, which suggests infection.
3. Refer immediately to hospital. In hospital, artificial rupture of the membranes or oxytocics may be needed. Some women will need a caesarean section.

Management of obstructed labour

1. Treat shock.
2. Refer urgently to hospital. Caesarean section will often be necessary.

NOTE: never give oxytocics to a patient with obstructed labour. This may cause rupture of the uterus.

PROLONGED RUPTURE OF MEMBRANES

See above under prolonged labour.

POSTPARTUM BLEEDING (BLEEDING AFTER DELIVERY)

Postpartum haemorrhage (PPH) is heavy bleeding (loss of 500 ml blood or more) from the genital tract after delivery of the baby. For practical reasons, the bleeding is heavy if a pad is soaked in 5-15 minutes. Commonest causes are an insufficiently contracted uterus (sometimes caused by a full urinary bladder), retained placenta, genital tract tears or a ruptured uterus (see box).

THE PARTOGRAPH:

The partograph is a simple chart that shows the stages of labour. Progress of labour, the condition of the woman and of her baby are recorded. The use of the partograph saves lives of mothers and babies and should always be used in the management of labour. Its use requires basic midwifery training and the ability to assess cervical dilatation.

When a woman has started active labour the descent of the baby (O) and the dilation of the woman's cervix (X) are indicated (plotted) on the chart. This helps to monitor that the woman's labour is progressing normally. It shows you when interventions may be needed. In addition details about the general condition of mother and baby (foetal heart rate, colour of liquor, the pattern of contractions), and medications are recorded.

On the chart, you see an alert and an action line. The alert line is plotted to correspond with the onset of the active phase of labour (dilation of the cervix to 4 cm). When the woman's cervix reaches 4 cm, the dilation should continue at a rate of about 1 cm per hour. The action line is plotted 4 hours after the alert line. If the woman's labour is not following the expected course after 4 hours, the plot of her labour will begin to approach the action line. This shows the need to take action. The chart also helps you to see the conditions of both, mother and baby and to recognize problems early.

Every time you plot data on the graph, ask yourself: 'Is this what should be happening this point?' If the answer is 'Yes', think ahead to what to expect in the next 2 to 4 hours. If the answer is 'No', consider what to do to manage the woman's condition. In this way, the partograph helps you to make sure that women are being carefully monitored during labour, to avoid unnecessary interventions, and to recognize and respond to complications early.

The partograph gives objective data on which clinical decisions can be based. However, it is important to have clear management plans, which actions should be taken at what point. These are different for deliveries taking place at hospitals and for those health facilities in remote areas. For example, if you are in a remote area, the partograph helps to identify problems early and to refer immediately to the next hospital with facilities for caesarean section.

EXAMPLE OF HOW THE PARTOGRAPH MAKES DELIVERY SAFER AND SAVES LIVES:

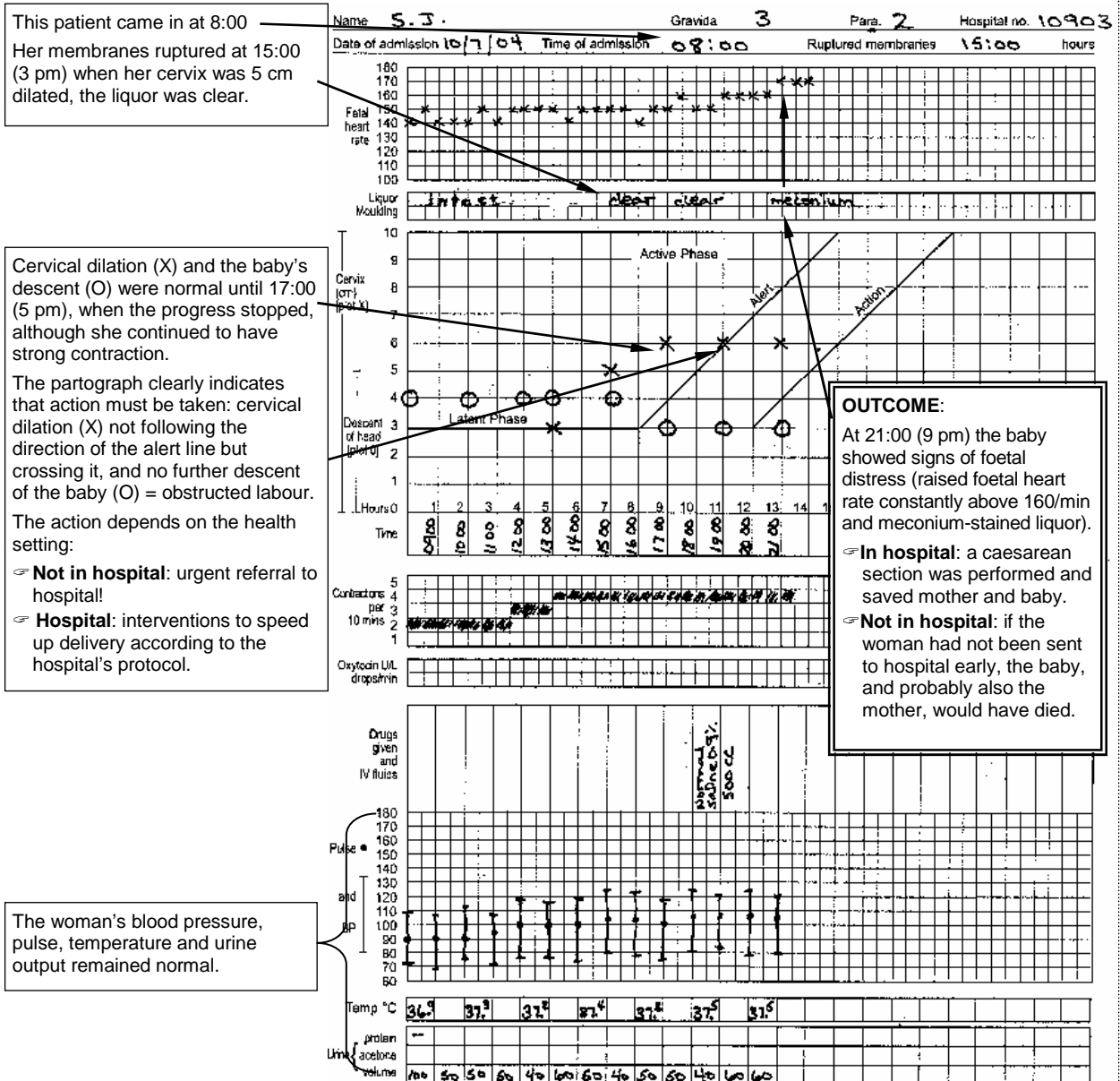


Figure 17-5 How to use the partograph (see page 273 for a partograph that you can copy and use).

Causes and signs of postpartum bleeding (PPH)

- Insufficiently contracted uterus (uterus is soft and large)
- Genital tear (uterus is contracted, placenta complete)
- Retained placenta (uterus is soft or contracted)
- Inverted uterus (fundus of uterus not felt)
- Ruptured uterus (sudden severe abdominal pain, shock, tender abdomen)

The risk of postpartum haemorrhage can be reduced (1) by giving ergometrine 0.25–0.5 mg IM immediately after delivery of the baby (never before delivery! Contraindicated in high blood pressure of any cause (including pre-eclampsia and eclampsia) and (2) by immediate breastfeeding.

Assessment

- Shock?
- Has the placenta been completely delivered within one hour after delivery? (Examine the placenta for missing pieces; see figure 17–6.)
- Does the uterus feel hard and round (= normal) or soft and uncontracted (= sign of insufficient contraction)?
- Examine the genital area for bleeding lacerations.

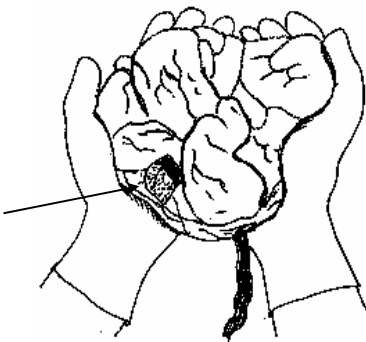


Figure 17–6 Missing piece of placenta.

Management

1. Start **Ringer-Lactate** solution or sodium chloride 0.9% IV and treat shock.
2. *If the placenta has not come out*, ask the mother to pass urine and catheterize if necessary. Put the baby to the mother's breast. Give ergometrine 0.25–0.5 mg IM (or oxytocin 10 units IM or 5 units IV). If the mother is too weak to push out the placenta herself, do controlled cord traction. Rub the fundus of the uterus in a circular motion with the palm of your hand until the uterus is well contracted. Hold the

cord with one hand, with the other hand hold the uterus. Then pull slowly and firmly at the cord. Do not pull hard. If you do not feel the placenta move, stop pulling.

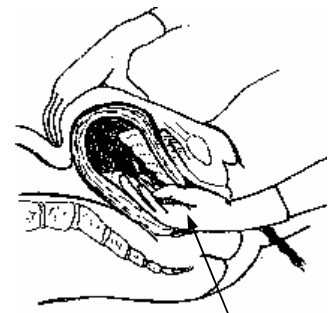
If you do not succeed, refer urgently to hospital. If the hospital is far away, examine the inside of the uterus with your index finger wearing sterile gloves and try to manually remove the placenta. This is only possible shortly after birth while the cervix is still open (see figure 17–7).

3. *If the bleeding has started after the placenta has come out*, then vigorously rub the uterus. Ask the woman to pass urine or catheterize her. Give ergometrine or oxytocin as above.

If these measures do not reduce severity of bleeding, refer urgently to hospital. Continue treating for shock during transport. Use bimanual compression of the uterus or compression of the abdominal aorta as emergency measures to try to stop the bleeding (see figure 17–8). Continue these during transport.

4. **Repair genital lacerations.** If you are unable to do it, press on them with a clean cloth and refer urgently to hospital. Refer urgently to hospital if the tear extends into the anus or the rectum.
5. Organize blood donors.
6. *After the crisis is over*, give ferrous sulphate 200 mg 2–3 times daily for 3 months.

5. Detach the placenta with this hand by gently sliding the hand back and forth between the placenta and uterus. With the other hand support the fundus.



6. Withdraw the hand from the uterus while you hold the uterus with the other hand to prevent a uterine prolapse.

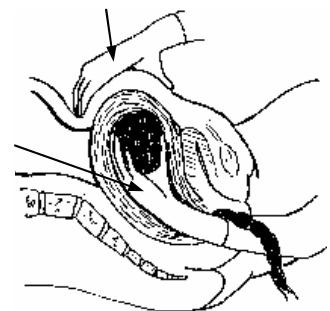
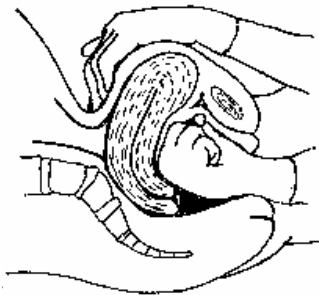


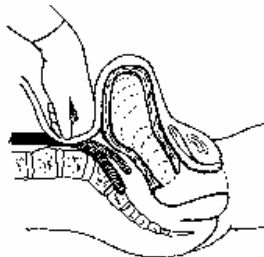
Figure 17–7 How to do a manual removal of the placenta.

HOW TO DO BIMANUAL COMPRESSION OF THE UTERUS:

1. Wear sterile gloves.
2. Insert one hand into the vagina and remove blood clots.
3. Form a fist and apply pressure against the anterior wall of the uterus.
4. With the other hand press deeply into the abdomen against the posterior wall of the uterus.
5. Maintain pressure until the bleeding stops and the uterus contracts, or until you reach the hospital.

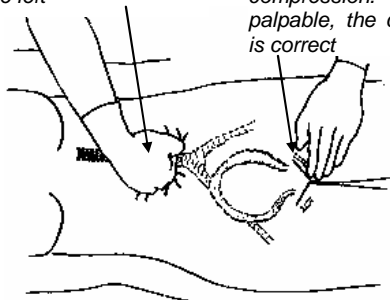
**HOW TO COMPRESS THE ABDOMINAL AORTA:**

Apply pressure downwards with a closed fist over the abdominal aorta.



The point of compression is just above the umbilicus to the left

With the other hand feel the femoral pulse during compression. If it is not palpable, the compression is correct



Maintain compression intermittently for 90 seconds until the bleeding stops.

Figure 17-8 Emergency first aid in severe postpartum bleeding: bimanual compression of uterus and compression of abdominal aorta

A rule of 6 has been suggested as a rough guide: postnatal visits should take place roughly at 6(-12) hours after birth, (3-)6 days, 6 weeks and 6 months. The care should not end at 6 weeks but be continued to provide ongoing support with immunizations, family planning, breastfeeding, and weaning at 6 months. Remember this, whenever you see a woman who has given birth to a baby within the last 6 months. The topics that should be covered at each visit are summarized in the box on the next page.

A postpartum mother is mainly at risk of three dangers:

1. **Postpartum bleeding** (normally the amount of bleeding after delivery is similar to that of a menstrual period. It lasts for 5-20 days and gets lighter and lighter)
2. **High blood pressure:** diastolic blood pressure higher than 110mmHg (risk of eclampsia or stroke)
3. **Infection** (fever and bad-smelling vaginal discharge)

What to do at the postpartum visits

Take a history

- Details of the delivery (including problems during delivery and whether the placenta was complete)
- Pain or fever?
- Bleeding since delivery?
- Problems with passing urine?
- Problem with breasts or breastfeeding?
- Ask the woman: 'Do you have any concerns or questions?'

Examine the woman

Perform routine physical examination and pay special attention to the following:

- Signs of severe anaemia?
- Fever? (For causes see box)
- High blood pressure?
- Feel the uterus (it is normally hard and round)
- Heavy bleeding? Bad smelling discharge? (A little bloody discharge is normal)

Postpartum care - how to care for a mother and her baby after delivery

The postpartum period starts after the delivery of the placenta and lasts for 6 weeks (about 40 days). It is good if you pay a lot of attention to pregnancy and delivery. However, the postpartum period is equally important and dangerous. Up to 50% of all maternal deaths occur during that period, and the early newborn mortality is also very high. Therefore, all women and their newborn need good postnatal care. As with antenatal care, regular visits are advised. The first visit should take place within the first 24 hours after delivery.

Causes of fever during the postpartum period

- Puerperal sepsis
- Urinary tract infection
- Mastitis (often during weeks 2 or 3)
- Respiratory infections (often after general anaesthesia)
- + Any cause of fever unrelated to the postpartum period

Cover the following topics during each postnatal visit:

	'6 hours' (= first day)	'6 days' (= 3-6 days)	'6 weeks'	'6 months'
Baby	<ul style="list-style-type: none"> Breathing Warmth Breastfeeding Cord care Immunizations 	<ul style="list-style-type: none"> Breastfeeding Signs of infection 	<ul style="list-style-type: none"> Feeding/weight Immunizations 	<ul style="list-style-type: none"> Growth and development Breastfeeding and weaning Immunizations Good child care (use mother card, page 269)
Mother	<ul style="list-style-type: none"> Abnormal blood loss? High blood pressure? Abnormal abdominal pain? <p><i>Explain about:</i></p> <ul style="list-style-type: none"> Danger signs (mother and newborn) 	<ul style="list-style-type: none"> Fever? Infection? Mood? (Postnatal depression) Problem with breastfeeding? Urinary problems? Uterus and vaginal discharge normal? <p><i>Explain about:</i></p> <ul style="list-style-type: none"> Danger signs (mother and newborn) Breastfeeding 	<ul style="list-style-type: none"> Anaemia? Problems with breastfeeding? <p><i>Explain about:</i></p> <ul style="list-style-type: none"> Child spacing and family planning Arrange immunizations 	<ul style="list-style-type: none"> General health Child spacing and family planning

Examine the newborn

See below under newborn care.

Investigations

- Haemoglobin, if signs of severe anaemia.
- Blood grouping of the mother if not done earlier. If the mother is Rhesus negative, check the baby's blood group.

Management

1. **Assess the need for referral.**
2. If not anaemic, give *ferrous sulphate/folic acid* orally once a day for 4 months. If anaemia, treat.
3. Give *vitamin A* 200,000 IU as one single dose to every breastfeeding mother, but only during the first month after delivery.
4. If *Rhesus incompatibility* (Rhesus negative mother, Rhesus positive baby), arrange for Rhesus immune globulin (RhoGAM) injection within 72 hours of delivery.
5. Complete *tetanus immunization* if the mother did not have the full course.
6. If the woman is not using iodized salt or has not received a dose of iodized oil during her last trimester of pregnancy, give a dose of iodized oil 400–600 mg (2 or 3 capsules).

Health education

Teach the woman and her family (1) the danger signs of newborn illness (2) the danger signs of womb infection and (3) the danger signs of too much bleeding. Make

sure they know where to get help if any of them occur. Advise about hygiene, newborn care, breastfeeding and family planning (see box).

Key health messages for the first month after delivery (postpartum period)

Explain these health messages to the woman and her family when the baby is delivered.

1. **'Watch out for the following warning signs** that may indicate a danger. Seek help if any of those occur.'

Danger signs - mother:

- Fever and chills, lower abdominal pain
- Smelly discharge
- Heavy vaginal bleeding

Danger signs - newborn:

- The baby stops feeding well
- The baby is irritable or lethargic
- Fast breathing with grunting noise
- Convulsions
- Jaundice on the first day, or later jaundiced arms or legs
- Pus is draining from red eyes or umbilicus

2. **About breastfeeding:**

- 'Give your baby breastmilk only for the first 6 months but no other drinks.'
- 'Breastmilk will protect your child from infections.'
- 'Give your baby breastmilk whenever he wants it.'
- 'If you feel you don't have enough milk, do not give additional feeds but breastfeed more often because frequent breastfeeding causes more milk to be produced.'
- 'Do not use a dummy (pacifier).'

3. **About hygiene:** 'Wash your hands with soap before you handle the baby. Wash the genital area daily and after you have passed stool.'

4. **Teach good newborn care.**

5. Explain the value of **birth spacing and methods of family planning.**

Danger signs of too much bleeding:

- ✘ Soaks more than 1 pad per hour, or the bleeding increases instead of decreases after delivery
- ✘ Continuous small flow of blood

Danger signs of womb infection (puerperal sepsis):

- ✘ Fever and chills
- ✘ Severe abdominal pain
- ✘ Bad smelling discharge from the vagina

Other danger signs:

- ✘ Breathlessness (possible sign of severe anaemia or heart failure)
- ✘ Convulsions and severe headache (very important in a woman who had pre-eclampsia during pregnancy)
- ✘ The mother is feeling deeply unhappy, cries easily or has suicidal thoughts. She finds it difficult to care for her baby (postnatal depression).

POSTPARTUM BLEEDING

See above.

PUERPERAL SEPSIS

Puerperal sepsis is an important cause not only of mortality but also of infertility. Unclean delivery practices, prolonged rupture of membranes and prolonged labour are important factors in the development of subsequent sepsis.

Clinical features

Suspect puerperal sepsis in any woman who develops fever within the first ten days after delivery.

If the fever is caused by infection of the womb (puerperal sepsis), the vaginal discharge is abnormal (for example pus) and bad smelling. The women will complain about pelvic pain and the uterus is larger than expected and tender on palpation (usually it shrinks about 2 cm per day during the first 8 days after delivery and is not tender).

If the fever is not caused by womb infection, vaginal discharge will be normal and the shrinking (involution) of the uterus normal.

Do not forget to examine the breasts because mastitis is a common cause of fever in the puerperal period.

Management of puerperal sepsis

1. Give **ampicillin** 2 g three times daily IV/IM + **gentamicin** 5 mg/kg IV/IM once daily + **metronidazole** 400 mg orally or IV 3 times daily until the woman is fever-free for 2 days.

2. **Treat any infected wound. Treat shock.** *If vaginal bleeding and enlarged uterus, consider that pieces of placenta may still be retained in the womb. Refer.*
3. **Refer to hospital if not improving** after 2 days of antibiotic treatment.

MASTITIS

Mastitis is an inflammation of the breast that may or may not be associated with infection. It is caused by milk stasis when milk is not removed from the breast efficiently because of poor breastfeeding technique. The milk stasis may progress to infection (usually staphylococcus bacteria).

Mastitis and breast abscess are usually preventable if the woman has been taught about good breastfeeding techniques from the beginning.

Clinical features

- Fever
- Tender, red and hot swelling of part of the breast. If not treated early, the swelling becomes fluctuant and an abscess develops

Management

1. **Effective milk removal and continued breastfeeding:** advise the mother that it is safe to continue breastfeeding. The milk from the affected breast will not harm the baby. It is important that the milk ducts are emptied otherwise the infection will progress. Check feeding position, see below.
2. **Antibiotics:** give oral **cloxacillin** 500 mg 3 times daily for 5 days. *If penicillin allergy, give oral erythromycin* 500 mg 3 times daily for 5 days. If an *abscess* has formed, drain it.
3. Put warm, wet clean cloths on the infected part several times a day.

URINARY PROBLEMS

If there is a continuous dribble of urine, the mother may have developed a fistula between the bladder and the vagina. Refer for specialist assessment.

Safe newborn care

Most newborn deaths are due to infections that occur either at birth (from unclean delivery) or shortly after birth because of unsafe newborn care and late onset of breastfeeding. Other common causes of newborn deaths are from lack of oxygen during delivery (asphyxia) or injury during delivery (birth trauma).

Most of these deaths could be prevented by simple measures. Good care for the newborn is neither difficult nor expensive. For a summary of the key points see box on the next page.

Summary - the key elements of good care for the newborn

1. **Air:** resuscitate newborns who are not breathing at birth.
2. **Warmth:** dry the newborn and prevent him from getting cold.
3. **Breastfeeding:** start breastfeeding within 1 hour of delivery. Continue exclusive breastfeeding on demand day and night for 6 months.
4. **Infection prevention:**
 - Assure a clean delivery and cord care.
 - Prevent eye infections.
 - Give immunizations.
5. Give **vitamin K**.
6. **Care and love:** keep the newborn close to his mother.
7. Provide **extra care for low birth weight babies** (feeding and warmth)
8. **Recognize danger signs** and manage newborn problems.

Use only your cheek muscles to blow air into the baby's lung at a rate of 40-60 breaths per minute.

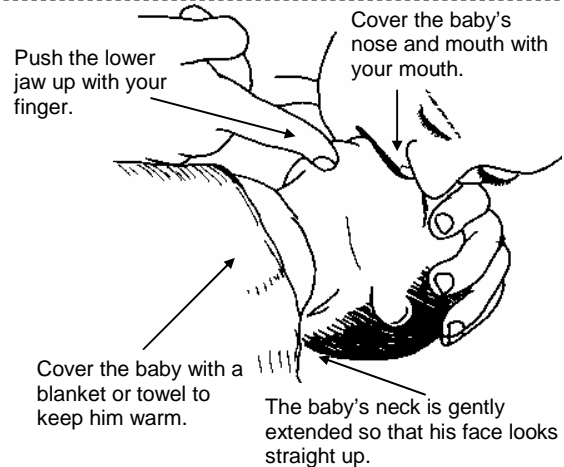


Figure 17-9 How to resuscitate a newborn who does not breathe: mouth-to-nose/mouth breathing.

Immediate assessment and management at delivery

1. Resuscitate newborns who are not breathing at birth

Birth asphyxia is a delay in starting to breath after birth. It is a common cause of neonatal death and morbidity. Suspect birth asphyxia if a newborn does not cry immediately after birth.

1. **Dry and cover the baby quickly** so that he does not become hypothermic.
2. **Clear the baby's airways** by wiping the mouth with a finger covered with a clean cloth. If possible do suction of mouth and nose.
3. **Observe breathing:** is the chest rising symmetrically with a frequency of more than 30 times per minute? *If the baby is not breathing* or is breathing less than 30/minute, start mouth-to-nose/mouth breathing immediately to inflate the baby's lungs. This is a very effective method to which most newborns will respond (see figure 17-9).
 - *If the newborn starts crying*, stop ventilating and do the following:
 - Keep the newborn warm.
 - Ask the mother to start breastfeeding immediately to reduce the risk of hypoglycaemia.
 - Observe the newborn for 24 hours. Count the respiratory rate every hour.
 - Give vitamin K to prevent haemorrhagic disease of the newborn.
 - *If there is no gasping or breathing at all after 20 minutes* of ventilation, stop ventilating. If there was gasping, stop after 30 minutes.

2. Dry the newborn and prevent him from getting cold

A baby loses his body heat very rapidly, even in summer. Hypothermia is an important factor in many neonatal deaths. Preterm and low birth weight babies are particularly at risk. When a baby gets too cold, it is usually from lack of knowledge and not lack of equipment.

1. At birth, **dry the baby immediately** with warm towels and cover him, before the cord is cut.
2. **Wrap the baby in a dry towel that should also cover his head.** The mother's body is the best heat source, especially for low birth weight babies (*kangaroo care*, see figure 17-10). If skin-to-skin care is not practiced, dress the baby immediately with several layers of warm clothing. Include a hat,

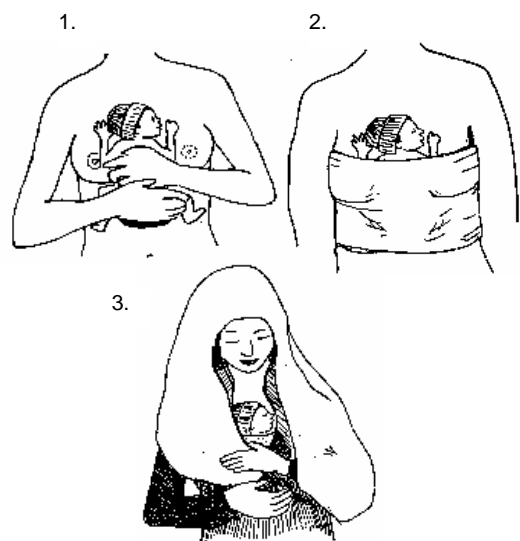


Figure 17-10 Skin-to-skin care to keep the baby warm.

because a newborn loses most of his heat from the head. It is more effective to wrap the clothes loosely around the baby than to swaddle it.

3. **Start breastfeeding within one hour after birth.** This will provide the baby with food calories to produce body heat.
4. **Do not bath a newborn within the first 24 hours after birth.**

3. Start breastfeeding within 1 hour after birth

See below.

4. Prevent infections

1. **Follow the principles of clean delivery** as explained above. Keep the cord clean and dry and do not apply anything to it. Everyone should wash his hands before he handles the baby.
2. **Prevent eye infections:**
 - Wipe the eyes of the newborn immediately after birth with clean water (boiled and cooled) and a clean cloth.
 - Apply silver nitrate 1% solution or tetracycline eye 1% ointment to both eyes within 1 hour after delivery.
3. **Immunize the baby.** Give BCG and the first oral polio vaccine soon after birth.
4. **Treat infections promptly.**

5. Give vitamin K

Give vitamin K 1 mg IM to prevent haemorrhagic disease of the newborn.

6. Care and love

Make sure that the newborn stays close to his mother and his family. He needs their care and love.

7. Provide extra care for low birth weight babies

Low birth weight (LBW = less than 2.5 kg) increases the risk of neonatal death. LBW babies have more difficulties in starting breathing after birth and are at risk of hypothermia, hypoglycaemia and haemorrhagic disease of the newborn.

An indicator during pregnancy that the baby will be born with a low birth weight is a fundal height of more than 4 cm below the expected value during week 22-34. If a baby weighs less than 1.75 kg refer to a specialised ward if possible.

If you cannot weigh a baby, measure his chest circumference. If it is below 30 cm, the baby is likely to weigh

less than 2.5 kg. Most low birth weight babies are born at the expected time but their weight is too low. Preterm babies also have a low birth weight but that is because they are born too early (before week 36). In addition to the problems mentioned, they may have problems with feeding, breathing, sepsis or neonatal jaundice.

1. Tell the mother to breastfeed the newborn immediately and frequently to avoid hypoglycaemia and to help the child to gain weight.
2. If the baby has difficulty suckling, express breastmilk and feed through a nasogastric tube.
3. Provide extra warmth (see above kangaroo care).

Recognise danger signs and manage newborn problems

At the postnatal visit look for danger signs, assess feeding and do a full assessment of the newborn (see figure 17-11 on the next page).

The following symptoms may indicate a serious newborn illness. Teach the woman and her family the warning signs of a possibly serious newborn problem and tell them to seek medical help whenever any of it occurs:

Danger signs of possible serious bacterial infection:

- ✘ The baby is unable to feed (see box).
- ✘ The baby is irritable, lethargic or floppy.
- ✘ The baby is cold to touch or very hot.
- ✘ The baby is breathing fast or makes grunting noises.
- ✘ The baby has convulsions (see box).

Other danger signs

- ✘ The baby is jaundiced on the first day or later, or he has jaundiced arms or legs (severe neonatal jaundice).
- ✘ Pus is draining from red eyes (see page 202) or umbilicus (local bacterial infection).

Causes of inability to feed

- Severe bacterial infection (for example meningitis, sepsis or pneumonia)
- Neonatal tetanus
- Hypoglycaemia (low blood sugar)
- Severe jaundice (kernicterus)
- Brain injury

Common causes of neonatal convulsions

- Birth asphyxia, cerebral bleeding
- Hypoglycaemia
- Severe bacterial infection (for example meningitis, sepsis or pneumonia)
- Severe jaundice (kernicterus)
- Neonatal tetanus (not true convulsions but muscle spasms)
- Severe dehydration
- Hyperthermia
- Withdrawal symptoms if the mother has been addicted to drugs (opium, benzodiazepines)

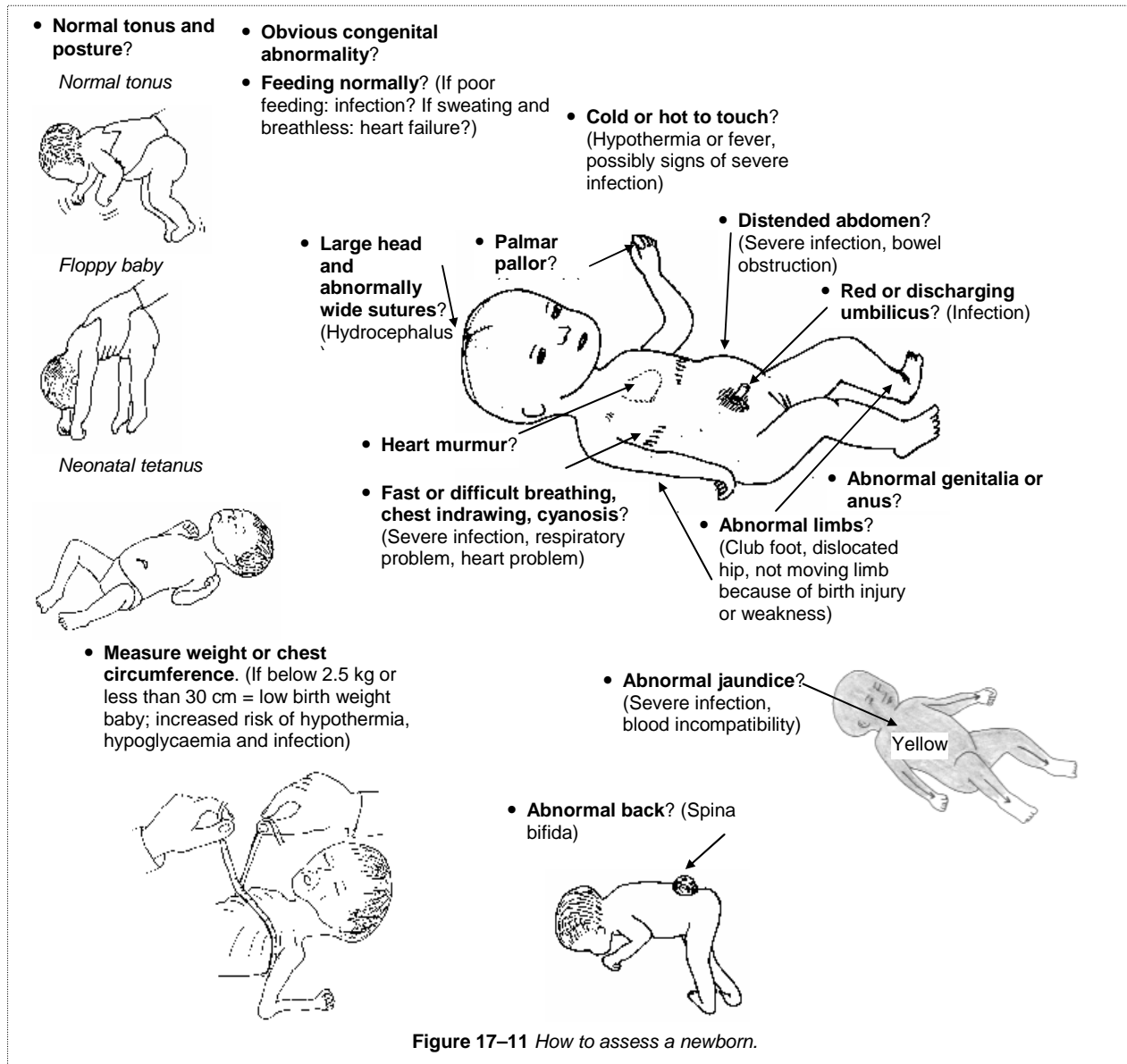


Figure 17-11 How to assess a newborn.

- ✘ The baby is bleeding (insufficiently tied cord, haemorrhagic disease of the newborn; lack of vitamin K).
- ✘ The baby is continuously vomiting (infection, intestinal obstruction).
- ✘ The baby is very pale (anaemia, infection).
- ✘ The baby is very stiff and has spasms (neonatal tetanus, see pages 169-171).

Management of serious bacterial infection

1. *If possible treat at hospital.* Give **ampicillin** 300 mg IM/IV every 12 hours + **gentamicin** 15–20 mg IM/IV once a day for 10-14 days. Give the first dose IM before referral to hospital.
2. **Keep the baby warm.**
3. **Treat complications** (for example hypoglycaemia or convulsions).

Management of local bacterial infection

Infected umbilicus

1. *If pus is draining from the umbilicus and the surrounding skin has become red but is less than 1 cm:*
 - a. Clean the stump.
 - b. Apply gentian violet 2 times daily.
 - c. Treat with oral cloxacillin.
2. *If the baby is generally unwell or if the redness is widespread, treat as for 'serious bacterial infection' but give cloxacillin instead of ampicillin.*

Eye infections (ophthalmia neonatorum) see below.

Management of severe jaundice

1. To reduce the risk, start breastfeeding within one hour after delivery.
2. Refer to hospital for phototherapy.

Management of convulsions

1. Control the convulsions:

- Give **oxygen**.
- Give **glucose 10%** 2 ml/kg IV or through nasogastric tube.
- If no response, give **phenobarbital** 20 mg/kg slowly IV or IM. Repeat 10 mg IM after 30 minutes if convulsions have not stopped.
- If the child suffers from recurrent convulsions, start phenobarbital 15 mg orally once daily.

2. Treat as for 'serious bacterial infection'.

Management of eye infections

The dangers of newborn conjunctivitis are corneal ulceration and blindness. Newborn conjunctivitis is caused by various bacteria of which gonococci and chlamydia are the most dangerous. Often, gonorrhoea causes a very severe eye infection with swelling of both eyelids and purulent discharge that starts within the first 4 days after delivery. Chlamydia is often less severe and starts after 4 days of delivery. However, it is difficult to differentiate between these two serious eye infections from their clinical manifestation. Therefore, if in doubt, treat for both at the same time.

- For **gonococcus**: give **ceftriaxone** 125 mg IM as one single dose (or benzylpenicillin IM 2 times daily for 3 days).
- For **chlamydia**: give oral **erythromycin** 62.5 mg 2-3 times daily for 2 weeks (or cotrimoxazole 240 mg 2 times daily).

Breastfeeding

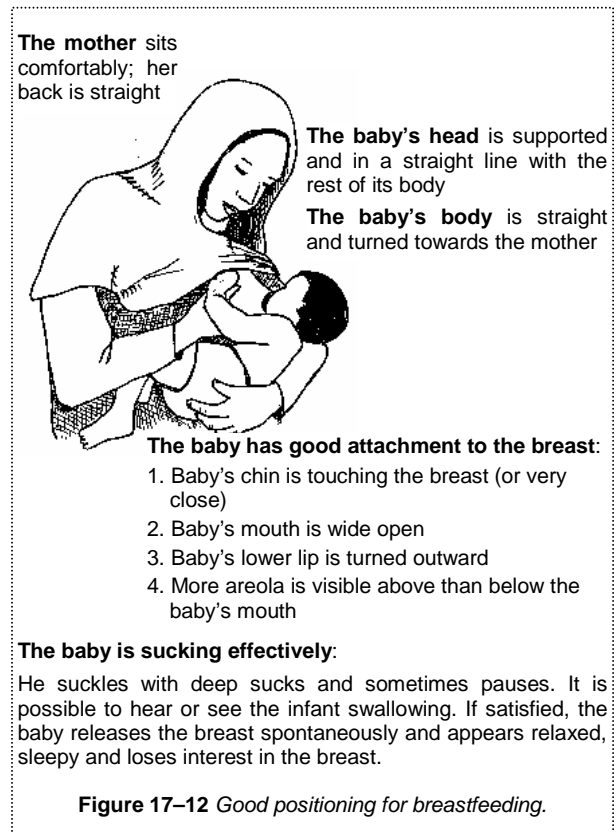
Breastmilk is the only perfect food for babies. If breastfeeding is started within one hour of delivery, the risks of neonatal infections, hypothermia, hypoglycaemia and jaundice are reduced. Early breastfeeding also helps the womb to contract and reduces the risk of postnatal bleeding and maternal infection. Exclusive breastfeeding contributes to contraception and child spacing. Breastfeeding creates a special bond between mother and child. Breastmilk alone is the only food and drink a baby needs for the first six months. No other food or drink, not even water, is needed during this period. From the age of six months, babies need a variety of additional foods, but breastfeeding should continue through the child's second year and beyond. The baby should breastfeed whenever he wants to (demand feeding). At hospitals, women and their babies should stay in the same room (rooming-in) to facilitate successful breastfeeding.

The important points to teach the mother are:

- '**Start breastfeeding immediately after birth**'. The first milk (colostrum) is yellow-coloured. Some uninformed people wrongly believe it is harmful. The opposite is true. Colostrum contains a special mix-

ture of everything that the baby needs for a healthy start into life.

- '**Do not give any food but breastmilk until the baby is 6 months old.**' Research has now shown that exclusive breastfeeding provides everything a baby needs for the first 6 months. Weaning at 4 months is no longer recommended.
- Show the mother how to position and attach the baby to the breast** (see figure 17-12).



Common problems with breastfeeding

A woman puts her baby's life at risk (1) if she does not start breastfeeding immediately after birth (2) if she stops breastfeeding early or (3) if she gives additional fluids or foods before 6 months. Most of these dangers for the baby are caused by lack of information and wrong ideas. Do all you can to encourage women to start early and exclusive breastfeeding.

Common fear: 'I don't have enough milk!'

Often a woman thinks that her breasts do not produce enough milk after delivery because her breasts may feel soft and empty for the first 2 or 3 days after delivery. You can assure her that this is normal. If she lets her baby suckle her breast, he will get everything he needs because frequent breastfeeding causes more milk to be produced. Even malnourished women generally make enough milk for their babies.

The amount of milk the breasts make depends on how much the baby suckles. The more the baby suckles the more milk will be made. This is the reason why it is

dangerous to give a breastfed baby additional fluids. Then the baby will suckle less and less milk is produced. Using dummies (pacifiers) is equally dangerous because the sucking action for these is very different from suckling at the breast. Then the baby will suckle less effectively at the breast and less milk will be produced.

Some days it seems that the baby wants to breastfeed continually. If a mother feeds her baby whenever he is hungry, her milk supply will increase because it adjusts to the baby's demand. In a few days the baby will probably be satisfied. The woman (and you) should never believe anyone who says that a woman does not have enough milk. It is even possible to re-establish milk production in a breast that has been dry for a few days if the mother lets her baby suckle frequently. Crying is not always a sign that a baby is hungry. It may mean that the baby wants to be held and cuddled more.

For successful suckling and milk-production, the baby's position is very important. Poor positioning often causes problems with breastfeeding.

Painful cracked nipples

Painful cracked nipples are usually caused by a poor suckling position. Make sure the mother is holding the baby well. Make sure the baby puts enough breast into his mouth and not just the nipple. Also assess the baby for oral thrush, which may cause sore nipples. If the nipples are cracked, advise the mother to continue breastfeeding from both breasts. Ask her to express some milk after each feed, massage it into the cracked nipples and let it dry.

Pain and swelling in the breasts

When the milk first comes in, the breasts often feel swollen and hard. They also become swollen and hard

when a milk duct is blocked by thick milk. When the breast is swollen, it is important to continue breast-feeding. Make sure the baby is in a good position. If the baby cannot suckle well because the breast is too full, express some breastmilk by hand and then let the baby suckle. It may ease the pain to put some cool wet clean cloths on to the breasts after feeding (see also 'Mastitis').

Child spacing and family planning

Only healthy mothers will have healthy children. For the health of both mothers and children, it is best to plan a pregnancy and leave a space of at least 2 years between births (child spacing). Various family planning methods are available. Whatever your personal opinion about family planning, it is important for a health professional to know the basics about these family planning methods. The Ministry of Public Health in Afghanistan strongly advocates family planning and child spacing to improve the health of the Afghan nation. To discuss family planning and child spacing is part of routine postnatal care. Without using a family planning method, a woman may become pregnant as soon as 4 weeks after birth.

The following methods can be used to protect against becoming pregnant. The box shows how soon after birth the methods can be used:

- **Exclusive breastfeeding** can give a woman more than 98% protection against pregnancy for 6 months after giving birth.
- **Condoms** prevent the sperm from reaching the egg. They also prevent the spread of sexually transmitted infections. Condoms are effective when used correctly. A condom must be put on the man's penis while it is hard before attempting intercourse. The

Family planning methods - How soon can they be used after birth

Family planning method	Timing after birth	Remarks
Exclusive breastfeeding for 6 months	Immediately after delivery	98% effective if: 1. The interval between breastfeeds is not more than 4 hours during the day and 6 hours during the night. 2. Feeding is on demand and it is more than 6 times per 24 hours. 3. Breastfeeding is exclusive and no additional fluids or feeds are given to the baby. 4. The woman's menstruation has not yet started.
Injectable medroxy-progesterone (Depo Provera)	At 6 weeks after delivery	<ul style="list-style-type: none"> • If menstruation has started, rule out pregnancy before injecting. • Does not affect amount or quality of breastmilk.
Combined oral contraceptive pills	Earliest 6 weeks after delivery. However they should be avoided until 6 months after delivery unless no other appropriate method is available	<ul style="list-style-type: none"> • If given before 6 weeks after delivery, the woman is at increased risk of deep vein thrombosis. • Reduces the amount of breastmilk.
Progestogen-only oral contraceptives	At 6 weeks after delivery	<ul style="list-style-type: none"> • Does not affect amount or quality of breastmilk.
IUD	At 6 weeks after delivery	<ul style="list-style-type: none"> • Does not affect amount or quality of breastmilk.
Condoms	Any time	

condom has to be unrolled until it covers the entire penis. The loose part at the end of the condom will hold the man's sperm. This space must be left otherwise the condom may break. After ejaculation the condom must be removed carefully so that sperm does not spill or leak out.

- **Family planning pills and family planning injection** are one of the most effective methods when taken correctly. They prevent the woman's ovary from releasing the egg.

- **Family planning pills** usually come in packets of 21 or 28 pills (see figure 17–13). Usually they contain two different hormones (combined oral contraceptives). The progestogen-only pill is less frequently available.

The pills are generally safe to take. *Common side effects* are mild headaches, nausea, swelling of the breasts and changes in monthly bleeding (irregular bleeding and spotting). Side effects often become less after the first 2-3 months.

Women with high blood pressure (above 140/90), previous stroke, breast cancer, liver disease, heart disease or previous venous thrombosis should not take the pills.

If a woman wants to stop the pills, she should do it when one package is finished. She is able to become pregnant during the next cycle because the pills do not affect infertility.

- **Family planning injections** contain only progestogen. They are good for women who are breastfeeding. The injection provides immediate protection if it is given within 5 days after the monthly bleeding begins.

Medroxyprogesterone (Depo-Provera- DMPA) is most commonly used and must be injected every 3 months. If a woman is late for her injection, the injection becomes less effective.

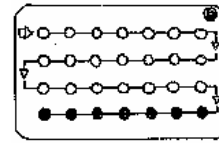
Common side effects are irregular or heavy bleeding, absent menstruation and weight gain. If irregular or heavy bleeding is a problem, a woman should take 2 cycles of a normal family planning pill along with the injection. Most irregular bleeding will stop after a few months.

Women should not use the injection if they have breast cancer, have irregular bleeding for unknown reasons, are pregnant or want to become pregnant in the next year.

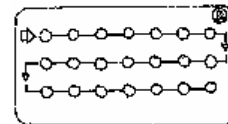
If a woman wants to stop the injection, she can do so at any time. After she stops it may take a year or more before she can become pregnant and before the monthly bleeding returns back to normal. Therefore it is not a good method if a woman wants to become pregnant straight away. However, the injection does not cause permanent infertility.

- **Intrauterine devices (IUD)** usually prevent the man's sperm from fertilizing the woman's egg. Rarely it prevents a fertilized egg from developing in the womb, which is a reason why some people do

In a 28-day packet, one pill is taken every day of the month. As soon as the packet is finished, the next one should be started.



In a 21-day packet, one pill is taken every day for 21 days. Then the woman should wait 7 days. The monthly bleeding will usually start during these 7 days. After these 7 days the next packet is started.



The pills must be taken every day even if there is no intercourse. It helps to take them every day at the same time.

If the woman forgets to take a pill she can become pregnant. She should take the pill as soon as she remembers. Then she should take the next one at the regular time. If she forgets to take 2 pills in a row she should take 2 pills for 2 days and then continue taking one pill each day until she finishes the packet. If she forgets to take 3 pills, she should stop them and wait for the new cycle. She is then no longer protected.

During severe diarrhoea and vomiting or while taking antibiotics and for 7 days afterwards, the pills may not offer reliable protection although the woman should continue taking them. In these situations, the couple should use condoms for additional protection.

Figure 17–13 Family planning pills (*Ethinylestradiol + levonorgestrel or Ethinylestradiol + norethisterone*).

not feel comfortable using it. IUD is a small object that is inserted in the womb by a specially trained health worker. It can stay in the womb for up to 10 years. If correctly inserted it provides good protection.

A *common side effect* is slight bleeding during the first week after inserting the IUD. The most serious problem is pelvic infection if an IUD was not inserted under clean conditions. Signs of infection are lower abdominal pain, fever and bad-smelling vaginal discharge.

An IUD should not be used if a woman might be pregnant, ever had an infection of her womb or tubes, had an ectopic pregnancy, never had been pregnant or is very anaemic.

If a woman wants to stop using the IUD, it has to be removed by a trained health worker. She should never remove it herself. She can become pregnant as soon as it is removed.

- **Natural methods** help a woman to know when she is fertile. Not having intercourse during that time reduces the likelihood of pregnancy. These methods are not very reliable.
- **Sterilization** (in women, tubal ligation; in men, vasectomy) is an operation if a couple does not want any more children.

COMMON GYNAECOLOGICAL PROBLEMS

Menstrual problems and abnormal uterine bleeding

The monthly cycle is different for each woman. It begins with the first day of the monthly bleeding. Most women bleed every 28 days, but some bleed as often as every 20 days or some as little as only every 45 days. The cycle is regulated by hormones produced by the ovary. During the first half of the cycle, a thick lining in the womb is built up so that the baby could grow there if the woman becomes pregnant. In the middle of the cycle, one egg is released from the ovary (ovulation). At this time a woman is fertile. During the second half of the cycle, the lining of the womb is prepared for pregnancy. However, if the woman is not pregnant, the lining breaks down and leaves the body together with the egg. The woman starts to bleed.

Abnormal uterine bleeding can present in different ways (for causes see box):

- **During regular periods:**
 - Regular periods are too heavy (a pad or cloth is soaked through in less than one hour or there are blood clots)
 - Regular periods are too long (they last for more than 8 days)
- **At other times:**
 - Between periods
 - After intercourse
 - After menopause

Some irregularity in the duration of monthly bleeding is normal. In young girls who recently started to menstruate, and for women older than 40 years, it is not unusual to miss a period because they do not ovulate during every cycle. In some women it may be a sign of stress or a chronic illness. If a period does not come on when expected it is often a sign of pregnancy.

In *bleeding after menopause*, always suspect cancer of the uterus.

Causes of abnormal vaginal bleeding in non-pregnant women

- Dysfunctional bleeding especially at the time of puberty and around the menopause
- Side effect of family planning pills or injections
- Cervicitis, sexual transmitted infections
- Cancer of the cervix or uterus
- Polyp
- Fibroids of uterus
- Injury (rape)

Management of abnormal uterine bleeding in non-pregnant women

1. **Perform a vaginal examination** and look at the cervix. Then treat the underlying cause.
2. **Assess and treat for anaemia.**
3. *If dysfunctional bleeding*, give **ibuprofen** 200–400 mg 3 times daily for 5 days.

If bleeding continues, give family planning pills: one pill 2 times daily for 3–5 days. Give an anti-emetic like metoclopramide at the same time because the women feel often nauseated.

When the bleeding is *better*, give regular contraceptive pills for 3 months. Explain to the woman and her family that this is not for contraception but to regulate the hormone imbalance.

NOTE: ergometrine is often wrongly given for bleeding abnormalities. This is illogical and useless because the mechanisms of abnormal vaginal bleeding and postpartum bleeding are entirely different.

Breast lumps

Breast lumps are very common (see box). Commonest are soft, fluid-filled lumps (**cysts**). They usually change during a woman's cycle and sometimes feel sore or tender.

In a woman who is breastfeeding the most likely cause of a breast lump is mastitis that has formed an **abscess**.

Few breast lumps are cancer. But since cancer is always a possibility, a woman should try to feel her breasts for lumps once a month. Possible signs of **breast cancer** are a hard lump that is only in one breast. It does not hurt when palpated. Sometimes it cannot be moved under the skin. Further signs are a nipple that is pulled inwards, or skin of the breast that is pulled in and looks like orange peel. Sometimes there is bloody discharge from one nipple. If the cancer is advanced, the lump may ulcerate and because of spread of the tumour, lymph nodes in the axilla may enlarge. If you suspect breast cancer, refer to a specialist for diagnosis and treatment.

Vaginal discharge

See page 124.

Causes of breast lumps

- Benign cysts
- Breast abscess
- Breast cancer

Incontinence

Incontinence is poor control of urine. There are three types of incontinence (1) stress incontinence (2) urge incontinence and (3) continuous dribbling of urine.

STRESS INCONTINENCE

Stress incontinence is mainly a problem of older women or of women after childbirth. The urine leaks out when a woman puts pressure on the weak vaginal muscles by laughing, coughing or lifting. These muscles can be strengthened by the 'squeezing exercise'. This exercise is likely to improve the incontinence and prevent future problems'.

Advise a woman: 'when you pass urine, stop it coming out by tightly squeezing the muscles of your vagina. Count to 10 and then relax the muscles to let the urine come out. Repeat this several times whenever you pass urine. Once you know how to do it, practise it at least 4 times every day. Squeeze your muscles 10 times each time. When you have learnt which muscles to use, then do it at other times when you are not passing urine.'

URGE INCONTINENCE

Urge incontinence means the sudden desire to pass urine followed by incontinence. There is usually also increased frequency of micturition. It is due to an irritable bladder and often difficult to treat.

Exclude a urinary tract infection and bladder stones. In older patients also exclude a bladder tumour.

Drugs may help some women (give a trial of oxybutynin 2.5–5 mg 3–4 times daily. Start with a low dose).

CONTINUOUS DRIBBLING OF URINE

When a woman leaks urine all the time, she may have a hole between her vagina and bladder (vesico-vaginal fistula). This serious problem is usually caused by a complicated birth. Refer to a specialist for assessment and operation.

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18. Endocrine problems

The symptoms of endocrine problems depend on which gland is affected. Figure 18–1 shows the endocrine glands and their main functions. Endocrine problems are difficult to diagnose without good laboratory facilities. This chapter concentrates on thyroid problems, diabetes and on Cushing's syndrome, which is often caused by the incorrect use of steroids.

THE MAIN FUNCTIONS OF ENDOCRINE GLANDS:

Endocrine glands control many body functions. They do this by secreting hormones into the blood. These hormones take messages to other parts of the body to change their functions according to body needs. Diseases of endocrine glands can cause symptoms and signs in three different ways:

1. More hormone than needed is secreted.
2. Less hormone than needed is secreted.
3. The glands swell or change as a result of disease.

The pituitary gland controls all the other endocrine glands.

The parathyroid glands control calcium in blood and bones.

The thyroid gland controls the rate at which all parts of the body work and use nutrients.

The adrenal glands control salt, water, blood pressure and the body's reaction to stress.

The pancreas controls blood sugar.

The ovaries control menstruation and breast development in women.

The testes control sexual characteristics of men.

Figure 18–1 Basic functions of endocrine glands.

Thyroid problems

The thyroid gland makes thyroid hormone to allow the body cells to work normally. The release of thyroid hormones (T3 and T4) is regulated by the so-called thyroid stimulating hormone (TSH) from the pituitary gland. This means, if there is less T3 and T4 than needed, more TSH is produced. If there is too much T3 and T4, less TSH will be produced.

In **hypothyroidism** (myxoedema) the thyroid gland produces too little, in **hyperthyroidism** (thyrotoxicosis) it produces too much of the hormones. TSH and the thyroid hormones can be measured in the blood:

Normal	TSH normal	T3 and T4 normal
Hypothyroidism	TSH high	T3 and T4 low
Hyperthyroidism	TSH low	T3 and T4 high (diagnosis is clear if two times upper limit)

IODINE DEFICIENCY DISORDERS (IDD) - GOITRE and CRETINISM

The thyroid gland needs iodine to make thyroid hormones. If there is iodine deficiency the thyroid gland enlarges (goitre) to adjust to the lack of iodine. Initially the gland will produce enough hormones but when iodine deficiency becomes more severe, the gland produces less thyroid hormone. The person develops hypothyroidism.

Research has shown that IDD is severe in Afghanistan, especially in the northeast and southwest regions and along the banks of the Oxus River. Goitre and iodine deficiency were considered a minor problem in the past. However it is now known that the consequences of iodine deficiency are much wider and more serious than previously thought. Only a minority of these serious consequences are obvious (cretinism). In about 90% of all people with iodine deficiency disorders (IDD) the consequences like hypothyroidism, infertility, increased rates of miscarriage, increased childhood mortality rate and mental retardation are hidden and not obvious (see figure 18–2).

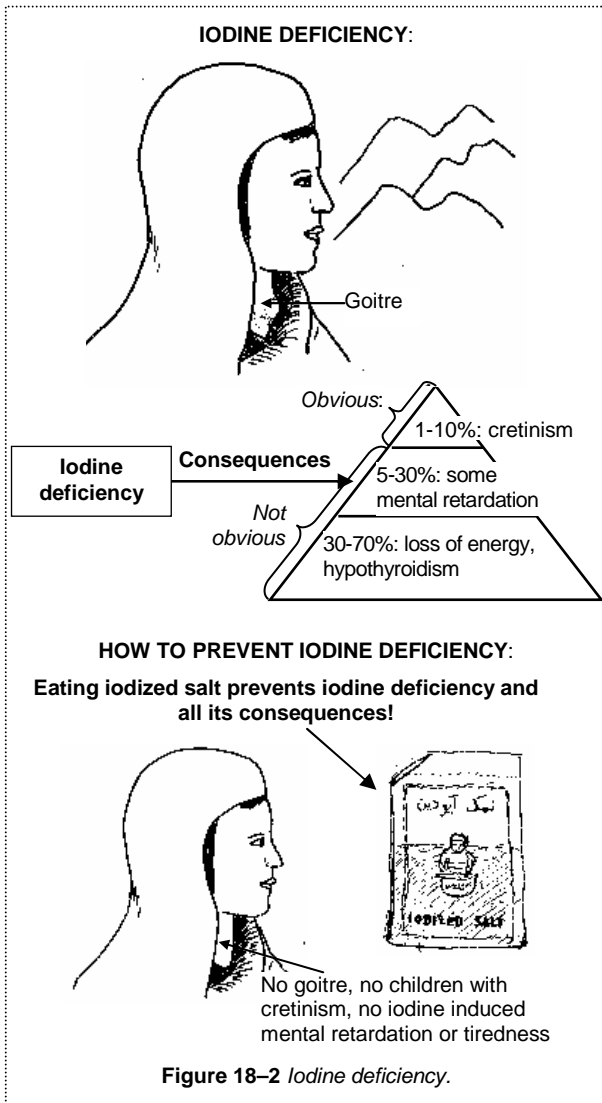
Iodine deficiency becomes especially significant when a woman becomes pregnant. Then iodine deficiency can result in stillbirth, miscarriages and the baby being born with severe mental handicap (cretinism). *Iodine deficiency is the commonest preventable cause of brain damage worldwide.*

Clinical features

Goitre. Patients with IDD most commonly present with goitre (children: diffuse goitres; adults: nodular goitres). If a goitre is large, it may compress the trachea and

How to assess patients with suspected endocrine problems

Through general history taking and examination you collect information about the main problems of a patient. If you suspect an endocrine problem, look for clinical signs to confirm your suspicion. In many cases, a definite diagnosis depends on laboratory tests that are often not available.



cause hoarseness, breathing difficulties or swallowing difficulties.

Hypothyroidism. Patients with severe iodine deficiency may also have hypothyroidism or women have babies who are born with cretinism (see below).

Cretinism is the most extreme feature of iodine deficiency. There are two types but often children have features of both types:

1. **Neurological cretinism**, which is caused by lack of maternal thyroid hormones during pregnancy.
 - Mental impairment and slow development (a child is slower than other children. For example he will learn to sit or walk later than others)
 - Deafness and inability to speak from birth
 - Spastic legs and squint

NOTE: not all children will have all symptoms. Some will only suffer a slight mental impairment.

2. **Myxoedematous cretinism**, which is caused by hypothyroidism of the baby itself due to lack of iodine. The newborn will show signs of hypothyroidism. If hypothyroidism is not diagnosed and treated early, the baby will become mentally retarded. For clinical features see below.

Management and prevention of iodine deficiency

1. The best way to prevent iodine deficiency is by using **iodized salt** for cooking. This should become widely recommended and available.

A small diffuse goitre in children or pregnant women often disappears with iodine supplements. Nodular goitres will not become smaller. If you give iodine to older people with nodular goitres also watch for signs of hyperthyroidism.

NOTE: it is not true, as believed by some people, that iodized salt leads to infertility. The opposite is true: iodine deficiency causes infertility and miscarriages; iodized salt helps preventing them.

2. For those areas of moderate or severe iodine deficiency (more than 10% of all people in that area have a visible goitre) in which not everyone uses iodized salt, give iodized oil orally once a year, or IM every 2 years. Because damage to the developing brain is the most severe consequence of iodine deficiency, women of childbearing age and adolescent girls are the priority groups for receiving iodized oil. Some health programmes will also include other groups of the population.

Give **oral iodine capsules** 200 mg once a year (children under 1 year 1 capsule; 1-5 years 2 capsules; over 5 years and adults 3 capsules every year) or **iodized oil IM** (ampoules of 480 mg/ml) if communities cannot be reached every year (children under 1 year 240 mg; over 1 years and adults 480 mg every 2 years).

Management of cretinism

If the baby has hypothyroidism, treat with levothyroxine, see below. Otherwise there is little you can do. Support the child like any other child with a mental handicap.

HYPOTHYROIDISM

Hypothyroidism develops when the thyroid gland does not produce enough thyroid hormone. The main cause is iodine deficiency. Autoimmune disease causes hypothyroidism in some patients, usually women.

Clinical features

All parts of the body work slower and less well than normal. For clinical features in adults and newborn with myxoedematous cretinism see figure 18-3.

Investigations

TSH is high, T3 and T4 are low.

Management

Give thyroid hormone tablets (levothyroxine) to replace the hormones that the thyroid gland does not produce. The amount depends on the individual patient's response:

In adults, start with *levothyroxine* 50–100 micrograms daily (in elderly people or those with heart disease start with 25 micrograms daily). Increase the dose by 50 micrograms every 4 weeks (25 microgram if heart disease) until thyroid metabolism becomes normal. Regular controls of TSH are necessary until the right dose has been determined. Aim for a TSH at the lower limit of normal. The usual long-term dose (maintenance dose) is 100–200 micrograms daily. Treatment is life-long. The dose may need to be increased during pregnancy.

In children up to age 1 month, start with *levothyroxine* 5–10 micrograms/kg/day (about 25 micrograms once daily). In children older than 1 month start with 5 micrograms/kg/day. Increase the dosage in steps of 25 micrograms every 2–4 weeks until mild toxic symptoms appear, then reduce the dose slightly. The dose needs to be adjusted while the child is getting older. A usual dose is about 50 micrograms once daily up to age 1 year, then 100 micrograms by age 5 years.

HYPERTHYROIDISM (THYROTOXICOSIS)

Hyperthyroidism develops when the thyroid gland produces too much thyroid hormone. The common causes are autoimmune disease or a nodule (for example in a nodular struma) that starts producing thyroid hormones (toxic adenoma). Hyperthyroidism is rare compared with hypothyroidism.

Clinical features

All parts of the body work faster but less well than normal (see figure 18–4).

Investigations

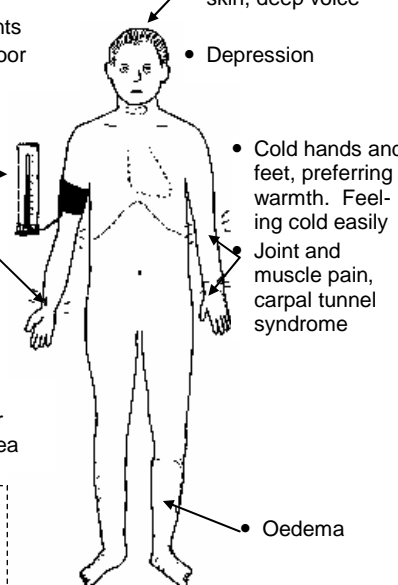
TSH is low, T3 and T4 are high.

Management

If you suspect hyperthyroidism, give a beta-blocker (for example propranolol 40 mg 3 times daily) to reduce the work for the heart and refer to a specialist.

Women are more commonly affected than men!

- Mental slowness and tiredness
- Slow movements
- Weight gain, poor appetite
- High blood pressure
- Slow pulse
- Sometimes heart failure
- Constipation
- Menorrhagia or oligomenorrhoea



- Dry, thin hair and dry skin, deep voice
- Depression
- Cold hands and feet, preferring warmth. Feeling cold easily
- Joint and muscle pain, carpal tunnel syndrome
- Oedema

Investigations:
TSH high
T3 or T4 low

NEONATAL HYPOTHYROIDISM:

- Dry skin
- Prolonged neonatal jaundice
- Floppy, slow development and growth (stunting)
- Constipation
- Coarse facial features
- Hoarse cry
- Umbilical hernia

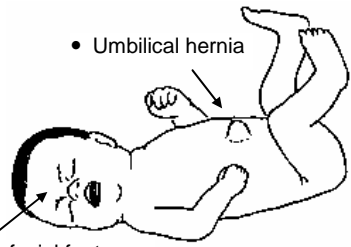
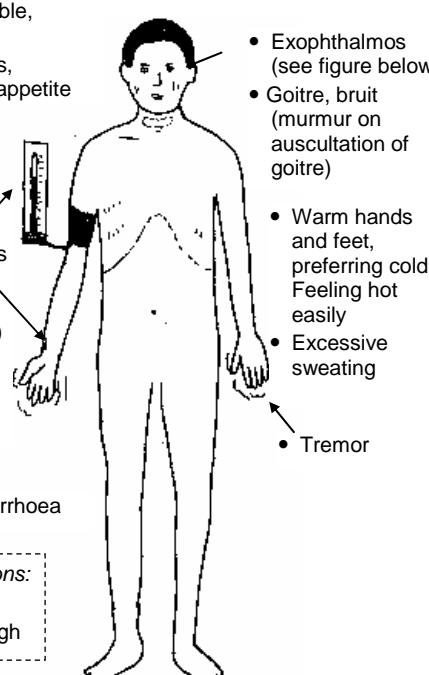


Figure 18–3 Hypothyroidism in adults and newborn.

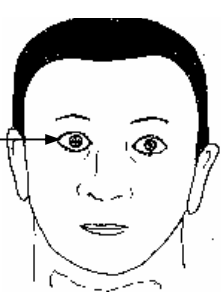
- Tired, irritable, restless
- Weight loss, increased appetite
- High blood pressure
- Palpitations
- Fast pulse (over 100 beats/min.)
- ECG: atrial fibrillation
- Heart failure
- Oligomenorrhoea



- Exophthalmos (see figure below)
- Goitre, bruit (murmur on auscultation of goitre)
- Warm hands and feet, preferring cold. Feeling hot easily
- Excessive sweating
- Tremor

Investigations:
TSH low
T3 or T4 high

Exophthalmos: the eyeball is pushed forward, it is often more obvious in one eye (found in a few patients with thyroid eye disease - Graves disease):



- White sclera is visible between upper lid and iris

Figure 18–4 Hyperthyroidism.

Blood sugar problems

DIABETES MELLITUS

Diabetes mellitus is a chronic disease, which is caused by an inability of the pancreas to produce enough insulin or by the insulin being ineffective. This results in increased glucose (sugar) in the blood, which damages especially blood vessels and nerves. Diabetes also increases the risk of complications in pregnancy.

There are two groups of patients:

1. **Type 1 diabetes** (formerly called insulin-dependent) in which the pancreas fails to produce insulin. This form usually develops in children or young adults.
2. **Type 2 diabetes** (formerly called non-insulin dependent) is caused by the body's inability to respond properly to the action of insulin. It is more common than type 1 and accounts for about 90% of all cases of diabetes mellitus. Often these patients are overweight and already have complications of diabetes when they are diagnosed.

Clinical features

Consider diabetes mellitus in patients with any of the following:

- Weight loss and tiredness
- Frequent infections (for example skin infections or vaginal thrush)
- Continuous thirst (polydipsia)
- Excessive passing of urine (polyuria)
- General itching without skin lesions

Complications of diabetes: sometimes, these are the presenting symptoms:

- Heart disease, high blood pressure
- Loss of vision (diabetic retinopathy)
- Renal failure, proteinuria
- Numbness or burning pains in feet and hands (diabetic polyneuropathy)
- Chronic foot ulcers, foot deformities (diabetic foot disease)

Investigations

Blood glucose. Diabetes is confirmed by a blood test, not by urine testing (glucose is sometimes found in the urine of healthy people). Take a *fasting blood sugar* - this means the patient should not have eaten for at least 8 hours before taking the blood sample. A random blood sugar can be misleading. In the absence of clinical symptoms repeat a positive fasting blood test the following day. If the blood sugar is borderline - this means it is abnormally high but not high enough to diagnose diabetes - then an oral glucose tolerance test is recommended. *Oral glucose tolerance test* confirms diabetes if blood sugar is above 200 mg/dl (above 11.1 mmol/l) after 2 hours. If it is less than that but above normal, the patient has *impaired glucose tolerance*.

If an oral glucose tolerance test is not possible, advise patients with borderline high sugar about diet and staying physical active. Check a fasting blood sugar every 3-6 months.

	Normal	Borderline	Diabetes mellitus
Fasting blood sugar	70-110 mg/dl (3.8- 6.1 mmol/l)	110-126 mg/dl (6.1-7.0 mmol/l)	Above 126 mg/dl (7.0 mmol/l)
1 hour after a meal	Less than 140 mg/dl (7.8 mmol/l)	140-200 mg/dl (7.8-11.1 mmol/l)	Above 200 mg/dl (11.1 mmol/l)

NOTE: all measurements are venous blood; capillary blood (finger-prick) is about 5-20 mg/dl lower.

Management

1. **Tell the patient to stay physically active.**
2. **Advise about diet**, which should contain as little pure sugar and fat as possible. Most traditional diets are usually acceptable. Several smaller meals spread throughout the day are better than one large main meal. Overweight patients should lose weight.
3. **Drug treatment.** About 40% of diabetes sufferers need oral medication for satisfactory blood sugar control, and about 40% need insulin injections. People with type 1 diabetes are usually totally dependent on daily insulin injections for survival. Patients with type 2 diabetes do not depend on insulin for survival, but about one third of them need insulin for reducing their blood sugar levels.

The *treatment aim* is a fasting blood sugar below 120 mg/dl (6.7 mmol/l) and a sugar less than 160 mg/dl (8.9 mmol/l) one hour after a meal. Under ideal circumstances, HbA1c measurement is available that reflects blood sugar control over the previous 3 months. HbA1c should be below 7%.

- If the blood sugar in a patient with type 2 diabetes is not controlled with diet and physical exercise, give *glibenclamide*. Start with 5 mg (2.5 mg in elderly) once daily with breakfast. If necessary, increase to a maximum of 15 mg. If you give 15 mg, then give 10 mg with breakfast and 5 mg in the afternoon. Sometimes hypoglycaemia may occur about 4 hours after taking the drug. Warn the patient about it. If he starts sweating and feeling faint, he should eat some bread. If symptoms of hypoglycaemia occur repeatedly, confirm hypoglycaemia by blood test and reduce the dose. If available, first choice in overweight patients is *metformin* 500 mg 2-3 times daily.
- **Insulin** treatment should be started by a specialist. A common regimen is to use an insulin that contains a short-acting + a long-acting insulin. Give two third of the total insulin in the morning half an hour before breakfast and one third in the evening half an hour before the evening meal. Vials with insulin need to be kept cool in order to remain effective.

- Control blood pressure.** Long-term survival improves if the blood pressure is kept below 130/80 mmHg. Treat the blood pressure if it is higher than that.
- Look for and treat complications.** Treat painful *polyneuropathy* with amitriptyline 25 mg once a day.

HYPOGLYCAEMIA

Hypoglycaemia is a common complication of severe infections, especially in malnourished children. For causes see box.

Causes of hypoglycaemia

- Severe malnutrition or starvation
- Severe infection (for example meningitis or sepsis)
- Drug side effect (especially quinine IV)
- Side effect of treatment of diabetes mellitus with insulin or glibenclamide
- Liver failure

Clinical features

Consider hypoglycaemia in any patient who becomes drowsy, comatose or has convulsions, especially if he suffers from a serious disease or is a child.

Investigations

Blood sugar below 45 mg/dl (2.5 mmol/l)

Management

- If a patient can swallow*, give him 2 teaspoons sugar (about 10 g glucose), and then food (for example bread or milk).
- If a patient is unconscious*, **treatment is very urgent.** **Adults:** give glucose 50% 25 ml IV (or glucose 20% 50 ml IV).
Children: give 5 ml/kg of 10% glucose solution fast IV (prepare a 10% glucose solution by taking one part of a glucose 50% solution and mix it with 4 times that amount of sodium chloride 0.9% or water for injection).
- Recheck the blood sugar after 20 minutes.** If blood sugar remains low (less than 45 mg/dl = less than 2.5 mmol/l), repeat the IV dose. If rechecking is not possible, judge the effect by the patient's response:
 - *If the patient is still not fully alert*, repeat the injection. In children, give the glucose by continuous infusion.
 - *If the patient has improved* and is able to eat, give him food.
- Continue monitoring the patient** to make sure he is not becoming hypoglycaemic again.
- Treat the underlying cause.**

Cushing's syndrome and acute adrenal insufficiency

Cortisone is a hormone produced in the adrenal glands. Cushing's syndrome and adrenal insufficiency are usually caused by wrong treatment with cortisone-like drugs (steroids like dexamethasone, prednisolone or hydrocortisone)

Cushing's syndrome occurs if corticosteroids are given in a high dose for several weeks or longer. Rarely it is caused by a hormone-producing tumour.

After some weeks of taking steroids, the adrenal glands stop making cortisone. If the patient then suddenly stops taking the steroids, he will have no cortisone in his body. This is called **acute adrenal insufficiency**, which may result in shock and death. Primary adrenal insufficiency (Addison's disease) from destruction of adrenal glands is rare.

For how to use steroids safely see box on the next page.

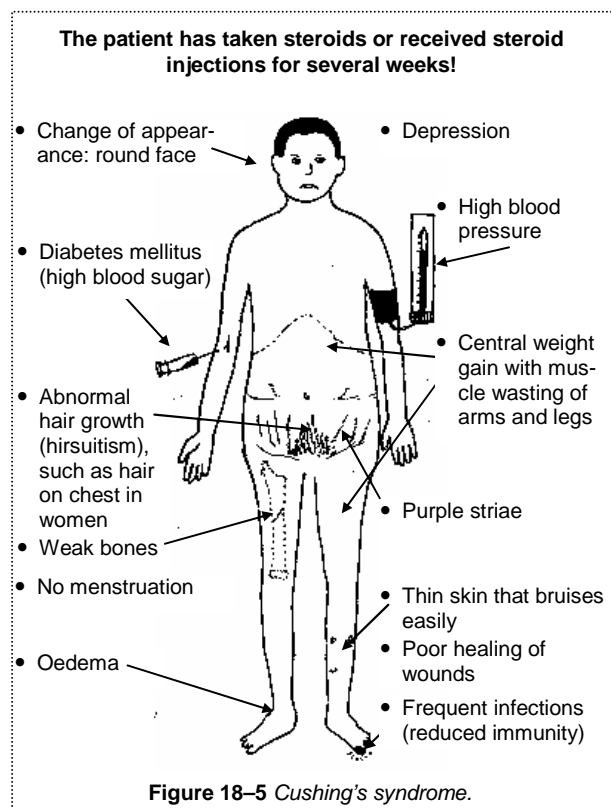
CUSHING'S SYNDROME

Clinical features

See figure 18-5

Management

Reduce the steroids slowly. If you stop them abruptly, you risk an acute adrenal insufficiency. See box 'How to use steroids safely'.



How to use steroids safely

Steroids (for example prednisolone, dexamethasone, hydrocortisone) should only be prescribed by well-trained health professionals and never be sold without prescription.

Indications: asthma, acute allergic reaction, severe typhoid fever with confusion, miliary TB, nephrotic syndrome, some cases of rheumatoid arthritis.

NOTE: never give steroids for back pain or unspecific joint pains!

How to compare the strength of the different steroids

The strength of 5 mg prednisolone is equivalent (similar) to that of 0.75 mg dexamethasone or of 20 mg hydrocortisone.

The best way to give steroids

1. *Only use steroids if there is no alternative.* Try them for a period as short as possible.
2. *Always start with a high dose.* It is best to give steroids as one single morning dose.
3. *If you give steroids for 7 or less days, you can stop them abruptly.*
4. *If you give steroids for longer than 7 days:*
 - Avoid a dose higher than 7.5 mg prednisolone or the equivalent for a prolonged time.
 - Tell the patient not to stop the steroid without supervision.
 - Give prophylactic isoniazid to prevent activation of tuberculosis.
 - Be aware of the main side effects of long-term treatment with steroids:
 - Obesity
 - Growth retardation
 - Hypertension
 - Diabetes mellitus
 - Osteoporosis
 - Adrenal gland suppression.

How to stop steroids gradually

The following patients should stop steroids gradually:

- Patients who took repeated courses of steroids recently (they should stop the steroids gradually to avoid a relapse of the disease for which they took the steroids).
- Patients who took more than 40 mg prednisolone or the equivalent of another steroid.
- Patients who took repeated doses of steroids in the evening.
- Patients who took steroids for more than 2 weeks.

When you want to stop steroids, **reduce the dose gradually** every 3-7 days because of the risk of acute adrenal failure. Reduce by 5 mg daily every week until the patient takes only 7.5 mg prednisolone a day, then reduce by 2.5 mg every week. If the patient takes another steroid, give the equivalent dose, see above.

While you gradually reduce the steroids, assess the patient's condition regularly to make sure that his disease does not relapse during withdrawal of the steroid.

For example: a patient took prednisolone 15 mg for 3 weeks for severe asthma. He has improved and now you want to stop prednisolone: give 10 mg for one week, then 7.5 mg for one week, then 5 mg for one week, then 2.5 mg for one week, then you can safely stop it.

ACUTE ADRENAL INSUFFICIENCY

Acute adrenal insufficiency is less common than Cushing's syndrome.

Clinical features

- Patient who took high dose steroids for several weeks has stopped them suddenly
- Weakness
- Diarrhoea and vomiting
- Low blood pressure and shock
- Abdominal pain

Management

Management is difficult and should be supervised by a specialist. Continue with the steroids and try to reduce the dose very slowly in small steps of 1–2.5 mg per week according to the respond of the patient. Often this will not be possible and the patient will become dependent on steroids.

When the patient has an infection or undergoes an operation, give 3 times the normal corticosteroid dose because his body needs more cortisone. If shock occurs, give hydrocortisone 100 mg IV and then the same dose IM 4 times a day until the patient is stable.

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19. Eye problems

Eye disease may result in blindness and therefore it is important for every health professional to know the basics of eye care. About 25,000 people in Afghanistan become blind every year. About 80% of these new cases of blindness could be prevented. The main causes of blindness in adults are trachoma, glaucoma and injury. In children, the main causes of blindness are vitamin A deficiency, congenital cataract and newborn eye infections.

Knowledge of basic eye care means you can recognise and treat common eye diseases and that you are able to identify those patients who should be referred for specialist care.

There are several main ways in which eye problems present:

1. Red eyes
2. Pain in the eyes
3. Loss or impairment of vision (difficulty in seeing)
4. Abnormal whiteness of the eye
5. Injuries and foreign bodies
6. Swellings around the eye

How to assess patients with eye problems

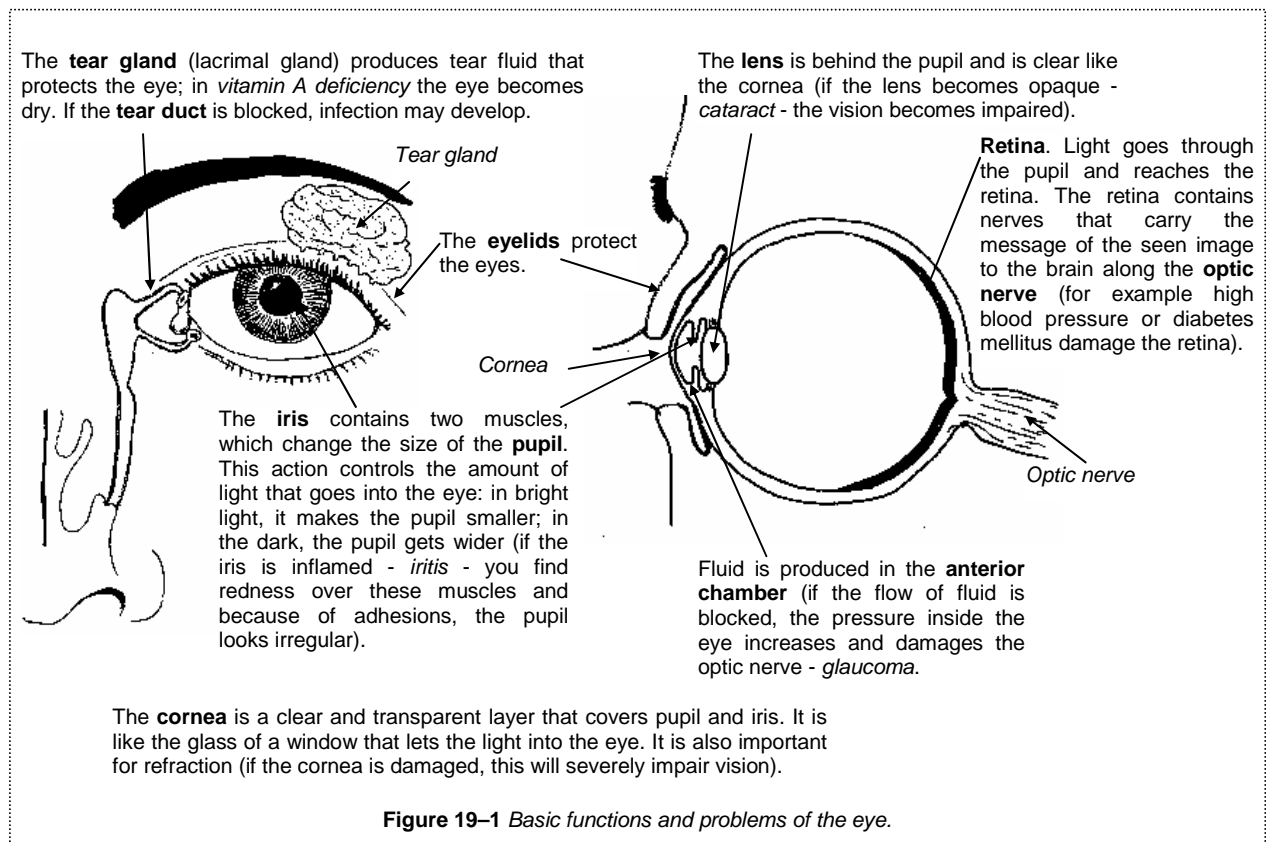
Basic assessment is the same for all eye problems.

Take a history

- Ask the patient:
 - ‘When did the symptoms start?’ ‘Are they getting better or worse?’
 - ‘Can you see well?’
 - ‘Is there pain, itching or discharge?’
 - ‘Has there been an injury to your eye or did something go into your eye?’

Assess the general condition

- Does the patient appear **ill or well**? Examine as appropriate (for example do not miss the signs of measles in a child with red eyes).



Examine the eye

○ Always **look at all these parts of the eye** carefully:

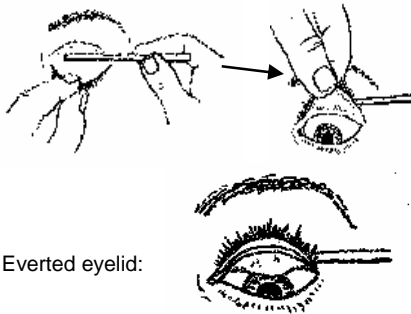
1. *Cornea*: is it clear?
2. *Pupil*: is it black or not? (You can best see the whiteness of cataract if you shine a torch into the pupil)

Is the pupil round or irregular shaped?

Shine a light into the pupil: does it react to light? (Normally the pupil will get smaller)

3. *White of the eye* (conjunctiva): is it white or red? Is there any purulent discharge, any dryness or are there any white spots?
4. *Eyelids*: any swelling? Evert the eyelid if you suspect a foreign body, trachoma or allergic conjunctivitis (see figure 19–2).

1. Wash your hands.
2. Ask the patient to look down.
3. Turn the eyelid up over a stick (for example a match).



Everted eyelid:

Figure 19–2 How to evert an eyelid.

NOTE: the examination of the posterior part of the eye (retina, optic nerve and retinal blood vessels) and the measurement of the pressure inside the eye (raised in glaucoma) requires an ophthalmoscope and a tonometer.

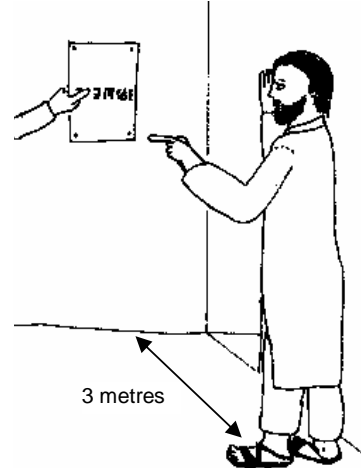
○ **Test the vision** (see figure 19–3). An eye doctor will do a detailed vision test. For a general health professional, it is sufficient to test whether the vision is severely impaired.

Danger signs

Always refer a patient with any of the following problems because he may be suffering from a serious condition and may be at risk of becoming blind:

- ✗ Loss or impairment of vision
- ✗ Severe eye pain
- ✗ Any disease that has affected the cornea (unless it is an old scar)
- ✗ Any injury that may have penetrated the eye
- ✗ Eyelashes that are turned in and scratch the cornea

1. Hang the chart from page 272 in a brightly lit room or in sunlight.
2. Stand the patient exactly 3 metres away from the chart. The bright light should not shine into his eyes.
3. Ask him to cover his left eye with his left hand.
4. Point to different letters on the chart and ask the patient each time in which direction the three branches of the letter point.
5. Repeat the same for the right eye.



Indication for referral:

Refer any patient whose vision in one or both eyes is so poor that he cannot indicate the direction in which the branches of the letters point.

Figure 19–3 A quick way to detect severe vision impairment.

The red eye

Causes of the red eye

ACUTE RED EYE

- Conjunctivitis (bacterial or viral)
- Corneal ulcer
- Eye injury with inflammation
- Chalazion or Hordeolom
- Dacryocystitis
- Foreign body
- Iritis
- Acute glaucoma
- Orbital cellulitis

CHRONIC RED EYE

- Trachoma
- Allergic conjunctivitis
- Dry eye

A helpful way to the correct diagnosis is to find the answers to questions in the table of the following page:

	Acute conjunctivitis	Corneal ulcer	Iritis	Acute glaucoma	Trachoma	Allergic conjunctivitis	Chronic dry eye
1. Acute or chronic problem?	Acute	Acute	Acute	Acute	Chronic	Chronic	Chronic
2. Is only one eye affected, or both eyes?	Usually both eyes	One eye	One eye	One eye	Both eyes	Both eyes	Both eyes
3. Is the eye very painful?	No, sore and itchy or a foreign sensation	Yes	Yes	Yes	No	No, very itchy	No, sore, itchy or irritated
4. Is there any discharge? If yes, what is it like?	Yes, very sticky pus (bacterial) or mucoid (viral)	Yes, watery	Yes, watery	No	Yes, pus	Yes, clear watery	Some patients no; some patients yes - mild watery and clear
5. Is the pupil normal?	Yes	Yes	No, it is small and irregular and will not dilate	No, it is dilated and will not constrict	Yes	Yes	Yes
6. Is the cornea normal?	Yes	No	Yes	Yes, but it may be slightly clouded	Yes in early stages, no in late stages	Yes	Yes, except in severe cases
7. Is the vision impaired?	No	Often	Yes	Yes	In late stages	No	No, except in severe cases

NOTE: if only one eye is affected, consider also the possibility of a foreign body.

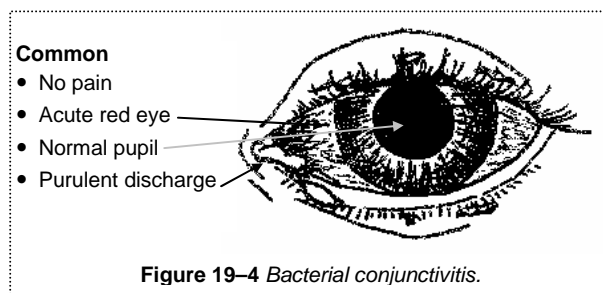
The acute red eye

CONJUNCTIVITIS

Bacteria and many viruses can cause inflammation of the conjunctiva (see figure 19-4).

Clinical features

- Acute onset; usually both eyes are affected.
- Discharge. In bacterial infection, it is very sticky and purulent (yellow) or mucous (white). In viral infection, there is less pus. However, in practice it is difficult to distinguish between viral and bacterial infection just by looking at the discharge. If the discharge is just watery, it is not caused by bacteria. In viral conjunctivitis, there are usually signs of an upper airway infection.
- Discomfort but no real pain.
- Cornea, pupils and vision are normal.



Management

1. Exclude a *foreign body* (see below).
2. Treat bacterial conjunctivitis with **tetracycline** eye ointment 4 times daily for 5-7 days (see figure 19-5).

If there is no response after 2 days, give gentamicin or chloramphenicol eye ointment/drops. Do not use gentamicin eye drops for longer than 1 week. Viral conjunctivitis is part of a viral illness and resolves spontaneously without treatment.

For conjunctivitis in measles see pages 32-33.

HOW TO GIVE EYE OINTMENT CORRECTLY:

Explain the following to the patient or family:

1. Wash your hands before you insert eye medicines
2. Wash off any purulent discharge with warm clean water or tea.
3. Ask the patient to look up. Pull down the lower eyelid and squeeze a small amount of ointment (about 1 cm) into the lower eyelid.

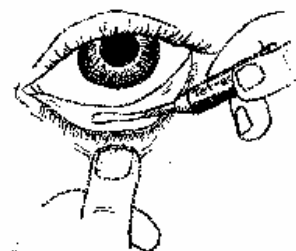


Figure 19-5 How to give eye ointment correctly.

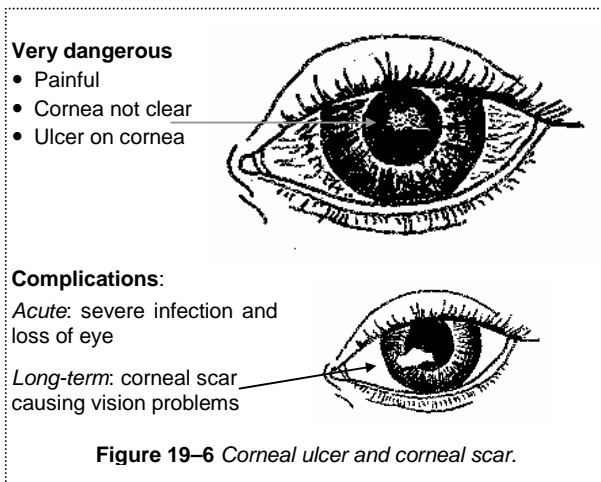
CORNEAL ULCER

Corneal disease is very dangerous. A small scratch may damage the thin surface of the cornea and causes a *corneal abrasion*. This is dangerous because an infection may develop and lead to a *corneal ulcer*. In very severe cases, the cornea may perforate and parts of the eye come out. Corneal ulcers often heal with scarring so that the clearness of the cornea is lost and vision is reduced (see figure 19–6).

Many different problems may cause corneal damage. In children, it is often a combination of measles and malnutrition (vitamin A deficiency). Other causes are a foreign body, corneal abrasion or other injuries and herpes virus infection. Severely ill or unconscious patients are at risk of corneal ulceration when they are not able to close their eyes properly. The exposed part of the cornea will dry out and become ulcerated.

Clinical features

- Usually only one eye is red with watery discharge.
- Severe pain and photophobia.
- The cornea is not clear. You may see the lesion as a grey patch or as a part of the cornea that is less shiny.
- Normal pupil. However, if perforation has occurred, then the pupil is irregular in shape.
- Impairment of vision.
- In severe cases, you may see pus behind the cornea (hypopyon). This is a sign that the eye is in great danger. If the cornea bursts parts of the eye may come out.



Management

Corneal ulceration is an emergency and needs intensive treatment. Start treatment and, if possible, refer the patient for specialist treatment.

1. Give **vitamin A** (retinol) to all children with corneal disease; for dosage see below under vitamin A deficiency.
2. **Intensive antibiotic treatment** is needed. Tetracycline eye ointment is not sufficient. **Strong gentamicin eye drops** are used. They are made up by

injecting 80 mg gentamicin into a 5 ml-bottle of ordinary gentamicin eye drops. At first, give gentamicin drops hourly. When the infection is improving, reduce the frequency to 2-hourly, then 4-hourly.

3. Give **atropine eye ointment** or eye drops 3 times a day for 1 week. This is to dilate the pupils because the iris is usually also inflamed.

Prevention

1. Treat a small corneal abrasion with tetracycline eye ointment until it has healed.
2. Give vitamin A to all children with measles or malnutrition.
3. Refer all patients whose eyelashes are turned in (trachoma) for operation.
4. If the eye is exposed because a patient who is severely ill or has facial palsy cannot close his eyes, apply plenty of tetracycline eye ointment. Put a plaster over the lids so that the eye stays closed.
5. Do not use traditional eye medicines.

IRITIS

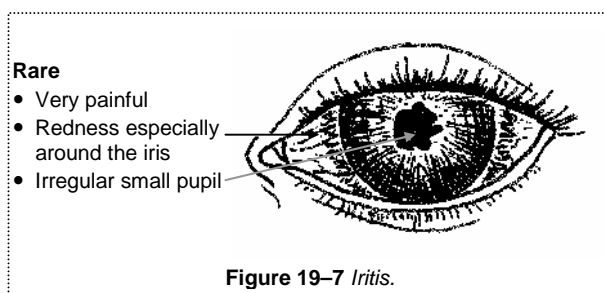
Inflammation of the iris may be caused by an infection from the outside (for example injury or corneal ulcer), or by a non-infectious reaction to systemic disease (for example in leprosy or rheumatoid arthritis). In most cases, the cause remains unknown (see figure 19–7).

Clinical features

- Slow or sudden onset.
- Severe pain and photophobia. Watery discharge but no pus.
- Redness is greatest around the cornea.
- The pupil may be small or irregular or it may be in mid-position. It does not react well to light.
- Sometimes there is impaired vision.

Management

Iritis is dangerous because the inflamed iris may stick to the front of the lens or form a membrane over the pupil. These may cause glaucoma (increased pressure inside the eye) or blindness. To prevent these complications, fully dilate the pupil because dilatation pulls the iris away from the lens. Give **atropine eye drops** or ointment 3 times a day for 1 week. The inflammation will often settle down by itself but it may cause problems in the posterior part of the eye (vitreous, retina and optic nerve). If possible, refer the patient to an eye specialist.



GLAUCOMA

Glaucoma is defined as optic neuropathy that is usually associated with high pressure inside the eye. The high pressure damages the optic nerve and causes loss of vision. Causes of glaucoma are iritis, bleeding inside the eye or the long-term use of steroid eye medication. However, often the cause is not known. Glaucoma is rare in children and young people.

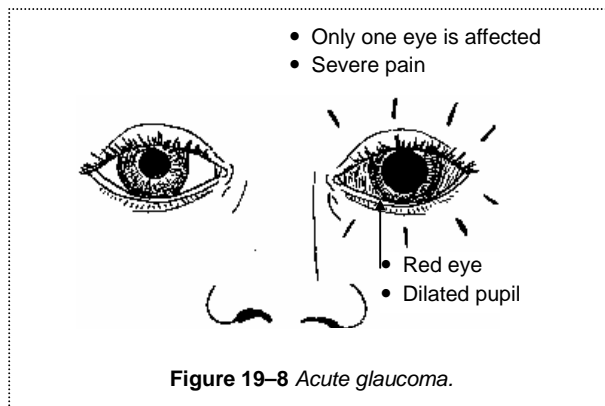
Clinical features

We differentiate between two forms of glaucoma:

In **acute glaucoma** (closed angle glaucoma) the pressure inside the eye rises quickly and the patient complains about sudden severe symptoms (see figure 19–8):

- Usually only one eye is affected
- Severe eye pain and severe headache
- Nausea and vomiting
- Red eye
- Dilated pupil that does not respond to light

In **chronic glaucoma** (open angle glaucoma) the pressure inside the eye rises slowly. The patient does not notice symptoms until a lot of his sight is lost. This type of glaucoma is more common than acute glaucoma. However, many patients with chronic glaucoma have so called 'normal pressure glaucoma' and never develop high pressures. Sadly, chronic glaucoma is usually diagnosed very late when loss of vision has already occurred. Refer to an eye specialist for excluding chronic glaucoma (1) all adults who complain about occasional headache and eye pain and (2) all who have a relative who has been diagnosed with glaucoma.



Management

Treatment of both types of glaucoma is by eye surgery.

Acute glaucoma is an emergency because without treatment the patient will become blind within a few days. Start immediate medical treatment and refer urgently. Treatment for acute glaucoma consists of oral **acetazolamide** 250 mg 2 times daily. If the patient cannot take acetazolamide orally, give it slowly IV/IM (or give mannitol 20% up to 500 ml = 100 g by slow infusion until pressure is reduced). In addition give **timolol** maleate eye drops 0.5% 2 times daily. Eye surgery is performed after the acute crisis is over.

The chronic red eye

The main causes of the chronic red eye are allergic conjunctivitis and trachoma. Allergic conjunctivitis and trachoma can be differentiated by clinical features. If only one eye is chronically red, exclude a foreign body.

Trachoma	Allergic conjunctivitis
● Sticky discharge	● Watery discharge
● Sore but not itchy	● Very itchy
	● Seasonal differences
● Everted eyelid: <i>Early stage:</i> redness and small whitish spots (about 1mm or less) called follicles. <i>Later stage:</i> thickening (whitish patches) and redness. The patches make it impossible to see the normal blood vessels.	● Everted eyelid: Conjunctiva may look normal and there may be watery swellings.

TRACHOMA

Trachoma is a chronic form of conjunctivitis that slowly gets worse over many months or years. It is one of the main causes of blindness worldwide. It occurs especially in dry, dusty areas with a lack of water and poor sanitation. Trachoma is caused by chlamydia bacteria, which are spread by touch or by flies. Transmission often occurs when mothers use a dirty scarf or cloth to wipe away discharge from the eyes of their children. The repeated infections cause scarring of the eyelids, which pulls the eyelashes inwards (trichiasis). The intumed eyelashes scratch the cornea and cause corneal ulceration, scarring and blindness. The infection starts in childhood but the late stage of blindness is usually reached in adulthood.

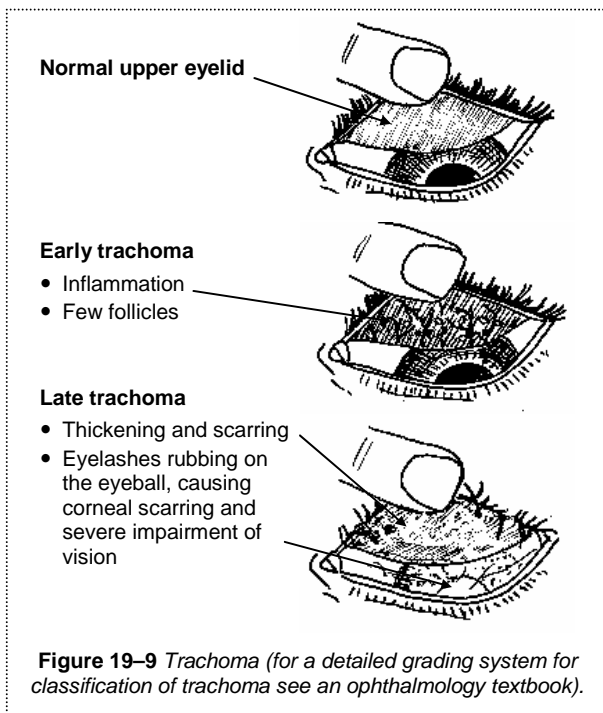
Clinical features

- The eye has been mildly red with sticky discharge for several weeks and often other children in the same household are affected.
- The main signs occur on the conjunctiva inside the upper eyelid. Trachoma is classified into different stages according to these clinical findings (see figure 19–9).

Management and prevention

When you find a person with trachoma, examine the other household members. Trachoma spreads easily from one person to another. The main management aim is to interrupt the mechanisms of transmission. Therefore, health education is very important:

1. **Explain to the family** that they suffer from a chronic eye infection that will cause blindness in future. Explain to them that the infection is caused (1) by flies on a child's face (2) by wiping a child's face with dirty cloth and (3) by a child rubbing his eyes with his dirty fingers. Therefore, the main health message is: 'Cleanliness helps to prevent



trachoma!’ This means practically that you teach the family:

- Wash the hands of children at least 2 times a day, preferably before each meal.
 - Only use clean cloths to wipe your children’s faces.
 - Cover the eyes of sleeping children with a clean cloth.
 - Reduce the number of flies in the house.
2. **Treat infected eyes** with *tetracycline eye ointment* 2 times daily for 6 weeks. Make sure the family understands that they must not stop treatment earlier.
- If inflammation under the eyelid is severe, give doxycycline 100 mg once daily for 3 weeks (contraindicated in children and pregnancy). To children and pregnant women give oral erythromycin 2 times daily for 3 weeks. Azithromycin (20 mg/kg, maximum dose 1 g) is a new, expensive drug. It is effective in a single dose but should not be used in pregnancy or in children under the age of 6 months.*
3. **Refer people with inturned eyelashes** urgently for surgery.

ALLERGIC CONJUNCTIVITIS

Not every red eye is caused by infection; allergic conjunctivitis is a very common chronic eye disease. It is caused by allergy to dust or pollen.

Clinical features

- Seasonal differences: worse during the summer and better in winter
- Red and itchy eyes with watery discharge but no pus
- Sometimes swelling around the iris or of the conjunctiva under the eyelid.

Management

1. Explain to the patient that his troublesome symptoms are caused by an allergy to dust or pollen. It is a chronic problem for which you can treat the symptoms but there is no cure. It often improves when a person is getting older. He should try to avoid whatever is causing his allergy.
2. If there are other allergic symptoms (watery nose and sneezing) give chlorphenamine or promethazine.
3. If symptoms do not improve, refer to an eye specialist to identify those patients with vernal keratoconjunctivitis (‘spring catarrh’) who can become blind, either by their disease or by misusing topical steroids.

NOTE: do not give steroid eye ointments or drops. Steroid eye medicines are associated with serious dangers, including blindness, and should only be prescribed by an eye specialist.

CHRONIC DRY EYE

Dry eye occurs in adults of any age, although it worsens with age. It is made worse by being outdoors a lot and by visually attentive activity (for example reading). Patients usually complain of eye pain, foreign body sensation or often of watery eyes, itching and sometimes mild discharge. Usually dry eye is misdiagnosed as infectious or allergic conjunctivitis, and is treated with drops that do no good or make the condition worse. To give artificial tears is of course the first choice treatment.

Eye injuries and foreign bodies

When assessing a patient with an eye injury, find the answers to the following two questions:

1. **Can the patient see well?**
2. **Is the eye wounded** (penetrating injury) or not (blunt trauma)?

PENETRATING INJURY

The depth of the penetration determines severity and urgency. One danger is infection. Always check the vision.

Management

1. **Treat the following with prophylactic antibiotic eye ointment to prevent infection:**
 - *Torn conjunctiva.* It usually heals well by itself, but you must be sure that no deeper structures have been damaged.
 - *Corneal abrasion.* This is a superficial injury in which only the outer part of the cornea is involved. It is often caused by a scratch with a fingernail or a twig. The patient complains of mild

pain and soreness. The abrasion will heal without scarring if infection does not develop.

2. Refer the following patients urgently:

- *Patients with corneal perforation* even if it is very small, because the whole depth of the cornea has been damaged. Germs can enter and this can result in severe infection and loss of the eye. Apply antibiotic eye ointment, cover the eye with a clean pad and refer urgently.
- *Patients with severe penetrating trauma.* Do not apply any medicines to the eye. Cover the eye with a clean eye pad that should not press on the eye and refer urgently.
- *Patients with loss or impairment of vision.*
- Any patient when you are uncertain about the depth or severity of the injury.

BLUNT TRAUMA

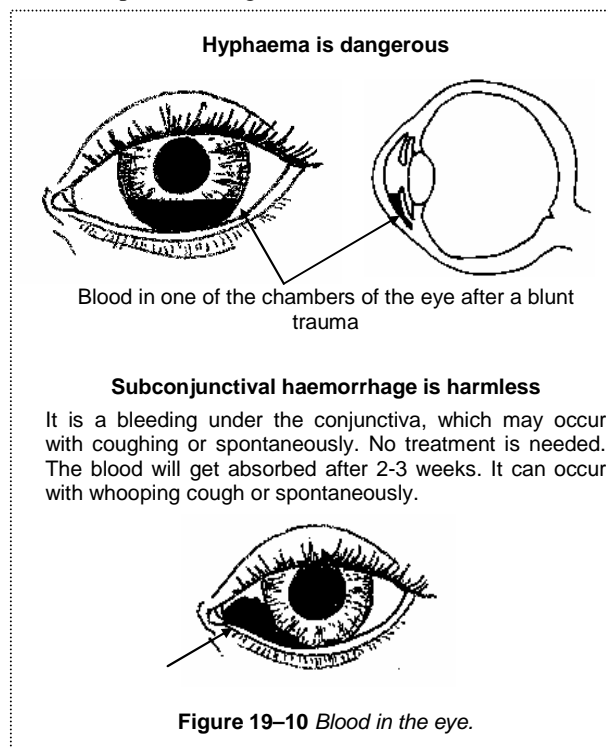
In blunt trauma (for example a punch with the fist), examine all parts of the eye to make sure that there is no damage and that the eye is not perforated. Check the vision.

Management

1. Apply antibiotic eye ointment.

2. Refer the following patients urgently:

- Patients with impairment or loss of vision.
- Patients whose eyeball is filled with blood (hyphaema) (see figure 19–10). If there is blood in the chamber but immediate referral is not possible, give atropine eye drops + acetazolamide tablets (adults 250 mg 6 hourly, children 62.5–125 mg 6 hourly). The patient should rest. If only part, but not all of the chamber is filled with blood, the blood will usually get absorbed. A complication is glaucoma.



CHEMICAL INJURIES

If an irritating chemical has come into the eye, immediately flush it out with clean water for 15 minutes. Cover the healthy eye to make sure no acid fluid gets into it. Apply antibiotic eye ointment for 5 days. If the cornea is not clear or if there is a possibility of damage to the eye, refer the patient urgently.

BURNS

Immediately wash a burnt eye with clean water for 15 minutes. Then apply tetracycline eye ointment every 2 hours for the first 2 days. Tell the patient to open and close his eyelids frequently until the burn has healed to prevent adhesions between eyelid and eyeball. If the cornea is not clear or if there is a possibility of damage to the eye, refer the patient urgently.

FOREIGN BODIES

When you examine a patient with a suspected foreign body in the eye, always evert the upper eyelid to check for a foreign body there (see figure 19–2 on page 214).

Decide whether the foreign body is on the surface of the eye or whether it has penetrated the eye:

- A foreign body that is on or inside the conjunctiva or cornea causes redness of the eye, irritation and watering.
- When a foreign body has entered the inside of the eye, there are few symptoms in the beginning. However, it is an emergency because serious infection may develop rapidly.

Management of a non-penetrated foreign body

1. Try to remove the foreign body by gentle wiping with a cotton swab (or clean cloth) towards the nose or by flushing with clean warm water. After removal of the foreign body, check again that there is no wound (penetrating injury).
2. Apply tetracycline eye ointment for 3 days.
3. *If you cannot remove the foreign body*, refer to an eye specialist.

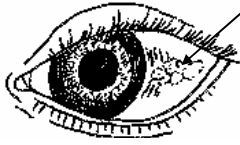
Management of a penetrated foreign body

Do not try to remove the foreign body but refer urgently. If the nearest eye specialist is a long distance away, start antibiotic eye drops and give gentamicin and ampicillin IM (or ceftriaxone).

Abnormal whiteness of the eyes

Abnormal whiteness can be found on the conjunctiva (Bitot's spots of vitamin A deficiency), on the cornea (corneal scar), or the pupil may appear white (cataract) - see figure 19–11.

- Bitot's spots or dryness of cornea: **xerophthalmia (vitamin A deficiency)**.



- **Corneal scar**: whiteness in front of the pupil. Part or all of the cornea is white. You may not be able to see the pupil. There is no redness.



- **Cataract**: white pupil. The cornea is clear. You can see the pupil but it is white or grey. This comes from cloudiness of the lens, or in children very rarely from a **retinoblastoma** (eye tumour).

White pupil (cloudy lens)

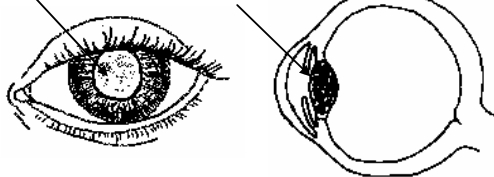


Figure 19–11 Causes and differential diagnosis of abnormal whiteness of the eye.

VITAMIN A DEFICIENCY DISORDER and THE EYES (xerophthalmia = dry eyes)

Vitamin A is very important for several body functions (vision, body defence and growth). For the eyes, it is essential for the transmission of the light stimulus from the retina to the brain. This explains why the earliest sign of vitamin A deficiency is night blindness.

Clinical features

(See figure 19–12) Many children suffer asymptomatic and hidden vitamin A deficiency. In a situation where there is a sudden demand for vitamin A to repair body surfaces, a child may pass rapidly to the stage of corneal softening and perforation. Risk situations are severe malnutrition, especially during the recovery phase, measles and chronic diarrhoea.

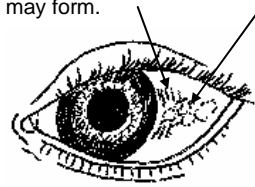
Management

1. Even if you only suspect vitamin A deficiency, give treatment. Give one dose **vitamin A** (retinol) when you first see the child, then on the next day and again after 2 weeks. Repeat one single dose after 4 months. Give to children under 6 months 50,000 units; 7-12 months 100,000 units; over 1 year 200,000 units (contra-indicated in pregnancy).
2. If there are signs of infection, give tetracycline 1% eye ointment.

- Earliest symptom: **night blindness**; as soon as it gets dark, a person has difficulty in walking around.



- Later: dryness of the conjunctiva (**xerophthalmia**); the conjunctiva appears dry and wrinkled. **Bitot's spots**, little grey plaques, may form.



- As the disease gets worse, the cornea becomes dry, hazy (not clear) and rough.



(These stages are completely curable with vitamin A treatment)

- **Ulceration of the cornea** may develop rapidly. In late stages, the cornea softens (**keratomalacia**) and melts away. This makes the patient blind. Parts of the eye may prolapse to the outside. Often this stage is so acute that a person becomes blind in a few hours or days. When treated quickly, the scar that develops may allow some sight to come back.

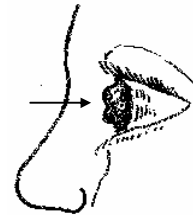


Figure 19–12 Vitamin A deficiency.

3. If there is a corneal ulcer or parts of the eye have come out, give vitamin A + gentamicin eye drops. Make sure the eye is closed, cover the eye with a sterile or clean pad and refer urgently to an eye specialist.

Prevention

Prevent vitamin A deficiency by giving vitamin A to all children at risk (especially those with measles, malnutrition or chronic diarrhoea) and by advising children and pregnant women to eat a diet rich in vitamins, including vitamin A (carrots, green leafy vegetables). If there is a good supply of vitamin A capsules, give one dose every 6 months to all children between 6 months to 5 years.

NOTE: high dose vitamin A capsules are contraindicated in pregnancy.

CORNEAL SCAR

If the cornea was damaged by injury or corneal ulcer, healing will usually leave a scar. This scar, depending

on its position, may impair a person's vision. There is no treatment available (see figure 19–11).

CATARACT

A cataract has formed when the clear lens of the eye has become cloudy. Common causes of cataract are eye injuries, intraocular inflammation, old age, steroids or, in children, congenital. Risk factors for developing cataract are previous episodes of acute dehydration (for example from severe diarrhoea or heat stroke). Smoking seems also to increase the risk of developing cataracts.

In congenital cataract, often more than one family member is affected. The cloudiness of the lens prevents light from reaching the retina. Without an operation within the first year of life, a child will not develop normal vision. An important differential diagnosis to cataract in children is **retinoblastoma**, a rare cancer.

Clinical features (see figure 19–11)

- White lens, normal cornea
- Impaired vision

Management

Refer children with white pupil urgently.

The only treatment for cataract is eye surgery. If loss of vision in an adult is caused by cataract, an operation may help him to see again. The best results are achieved by extra capsular cataract extraction with an intraocular lens implant (ECCE+IOL). If a lens implant is not used, then thick spectacles will probably be necessary after surgery.

Swellings around the eye

Find the answers to the following questions:

1. Is the patient well or ill?
2. Are both eyes affected or only one eye?
3. Where is the exact location of the swelling?
4. Are there signs of inflammation? (Redness, tenderness and warmth)

ORBITAL CELLULITIS

Orbital cellulitis is a very dangerous infection within the bony orbit of the eye. The infection can spread to the brain and cause septicaemia. If not treated quickly, an abscess may form and push the eye forward (see figure 19–13).

1. Give **ceftriaxone** IM. If not available, give benzylpenicillin + chloramphenicol IM/IV.
2. **Refer urgently** to an eye specialist because surgical drainage may become necessary.

Causes of swelling around the eye

USUALLY ONLY ONE EYE IS AFFECTED

- Chalazion
- Hordeolom
- Dacryocystitis
- Periorbital cellulitis
- Cutaneous anthrax
- Severe conjunctivitis

BOTH EYES ARE AFFECTED

- Severe conjunctivitis
- Oedema from a systemic disease (for example renal disease, allergy: angio-oedema)

Very dangerous!

- The patient is ill with fever
- Only one eye is affected
- Red eye and redness and swelling around the eye
- Limited eye movements
- The eye may be pushed forward

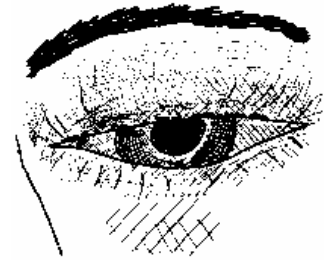


Figure 19–13 Orbital cellulitis.

DACRYOCYSTITIS

Dacryocystitis is an infection of the tear sac (see figure 19–14). An abscess may develop or the infection may become chronic.

1. Apply a hot compress: wet a clean cloth with warm water. Do not make it too wet, water should not run from the cloth. Hold this warm compress on the lump for 15 minutes, 4 times a day.
2. Give tetracycline eye ointment.
3. In severe cases, give oral cloxacillin.

- Only one eye is affected
- The eye waters a lot. A drop of pus may appear at the corner of the eye, when you gently press on the swelling
- Red and tender swelling at side of nose

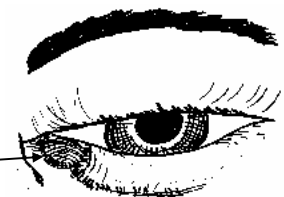


Figure 19–14 Dacryocystitis.

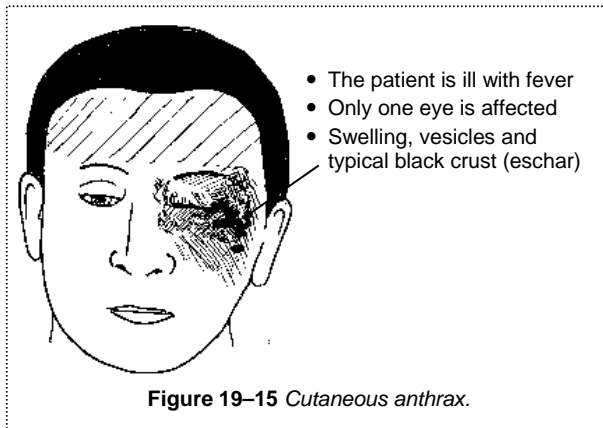
CUTANEOUS ANTHRAX

Infection is through contact with contaminated animal skins (for example from dead animals). Anthrax is also transmitted by insect bites.

Clinical features

Cutaneous anthrax can occur at any place on the body but often involves the eyelids and regions around one

eye. A red papule forms at the place where the anthrax bacteria entered the skin. The next day there are vesicles around the lesion, which break and form ulcers and the typical black crust (eschar) (see figure 19–15).



Management

Give *benzylpenicillin* IV (or procaine penicillin IM). In mild cases, give oral amoxicillin.

If *penicillin allergy*, give co-trimoxazole or in very ill patients ciprofloxacin.

It will be about 2-6 weeks before the lesion has healed.

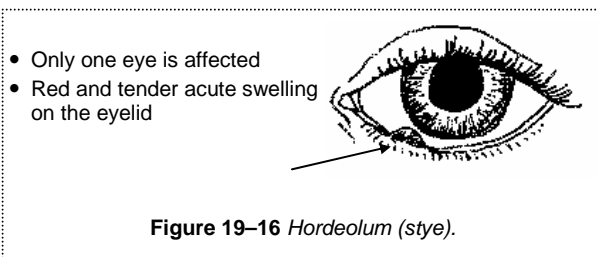
LUMPS OF THE EYELIDS

Hordeolum (stye)

Hordeolum is an infection like a boil. It is acute and painful (see figure 19–16).

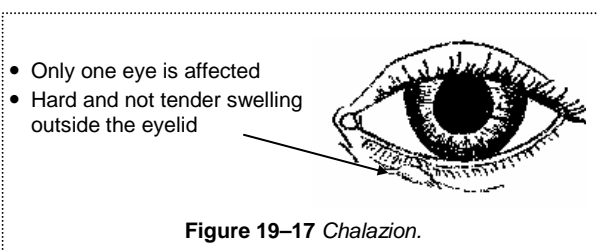
Management

1. Give tetracycline eye ointment.
2. Apply a warm compress (see 'Dacryocystitis').



Chalazion

Chalazion is caused by a blocked sweat gland. The swelling is hard and not painful. It may persist for several months (see figure 19–17).

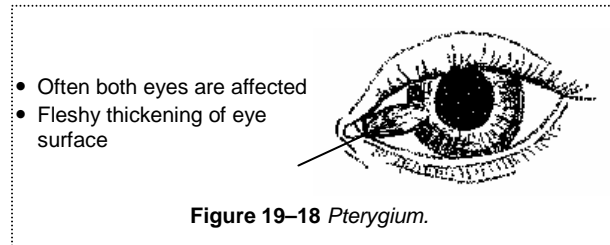


Management

Apply a warm compress (see 'Dacryocystitis').

PTERYGIUM

Pterygium is a benign, fleshy thickening of the eye surface. It can interfere with vision. Once it has reached the border of the pupil, refer for assessment and possible operation (see figure 19–18).



Loss or impairment of vision

The important aim of eye care is to prevent blindness. A patient may lose his sight gradually or acutely (see box).

It is essential to test vision in people with eye problems (see figure 19–2 on page 214). This will help to identify those serious causes that may lead to blindness like injuries or corneal problems.

Causes of loss of vision

ACUTE LOSS OF VISION

- Injury
- Severe infection or acute inflammation (including newborn eye infection - ophthalmia neonatorum - measles)
- Retinal detachment
- Blockage of retinal arteries or veins

GRADUAL LOSS OF VISION

Adults:

- Cataract
- Trachoma
- Chronic glaucoma
- Presbyopia
- Corneal scar (including trachoma)
- Retinal degeneration (for example associated with diabetes mellitus or high blood pressure)
- Space-occupying lesion

Children:

- Vitamin A deficiency (loss may be acute)
- Congenital cataract

How to help a person who cannot see well

1. Give a blind person many opportunities to learn about his world. Give him different materials to touch.
2. Encourage the family to explain to him everything they see.
3. Encourage the family to help him to move around and to learn to take care of himself. Some families are overprotective.
4. Teach families how to walk with the person. They should lead from the front and not walk behind him. They should help him to walk alone in the area they live. The family should show him important landmarks in the area that he can feel or hear.
5. Teach him how to use a stick to find his way.
6. Take care of the education of a blind child. The blind alphabet (Braille) is available for Afghanistan. IAM offers services for visually impaired children (VISA programme). Find work for a blind person that he can do easily.

PRESBYOPIA (LONG SIGHTEDNESS)

Often elderly people complain that they cannot see well. When you test their vision as described in this book, you will not find a big problem because you test their far vision. However, their problem is that they cannot see close objects clearly. For example, this may cause problems when a person tries to sew. It is called presbyopia and is caused by the natural aging of the lens. Glasses will solve the problem.

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20. Skin problems

MAIN FUNCTIONS OF THE SKIN:

- Protecting the body from things outside the body (for example injury, heat, cold, pathogens).
- Keeping salt and water inside the body .
- Keeping the body temperature normal (for example sweating when the body is too hot).
- Taking information into the body (for example touch, pain, heat, cold).

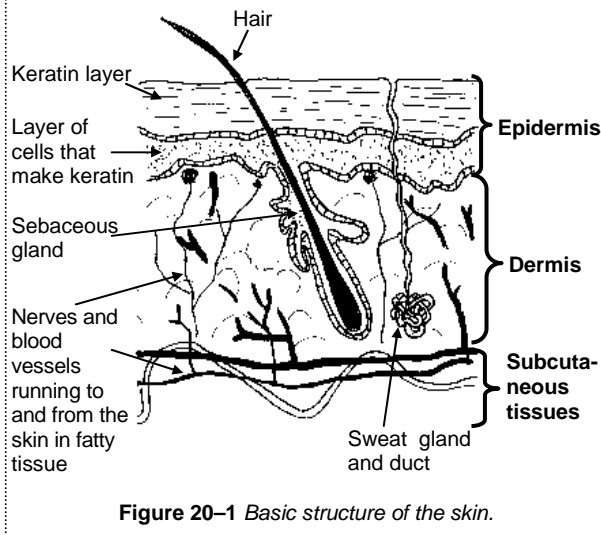


Figure 20–1 Basic structure of the skin.

How to assess skin problems

It is a great temptation just to look briefly at a skin lesion and to reach a speedy (often incorrect) diagnosis instead of taking a careful history and perform a systematic examination. However, to diagnose skin lesions correctly, you need to follow a systematic approach.

Take a history

- ‘What is your problem?’
- ‘When did it start?’ (Duration)
- ‘Where did it start and how did it start?’ ‘Has it spread?’ ‘Is it getting better or worse?’
- ‘Did you have a problem like that before?’
- ‘Do you know of anyone in your family who has got a similar problem?’
- ‘Is it itching?’ ‘Do you have fever or other problems?’
- ‘What treatment have you already tried?’
- ‘How does the skin problem affect your life?’

Examine the patient

Examine the whole skin including hair, nails and mucosal surfaces. You examine skin lesions best in natural

light. First look at the lesion and then feel it. If you find the answers to the following questions, you will get all relevant information:

- **Where are the lesions?** (Each skin disease has its own special places where you find most of the lesions)
- **How many lesions are there?** Are there only a few or do they cover a whole area or the whole body?
- **Are the lesions symmetrical?** Symmetrical means they are similar on each side of the body (for example eczema or psoriasis)

After you have determined the general distribution of the lesions, look at them closely:

- **What type of lesions can you see?** (See figure 20–2 on the next page)
- **What colour are the lesions?** For example pale (hypopigmented) or bright red (acute inflammation)

Feel the lesions:

- **Does the skin feel warm or is it tender?** (Signs of inflammation)
- **When you rub the lesion, do you find scales?**
- **Do the lesions itch?**
- **Can you find signs of a general illness?**

How to reach a diagnosis

1. Decide first to which group the patient belongs:

- Patients with a condition, which only affects the skin (for example warts)
- Patients with a generalised illness in which the skin is also affected (for example measles)

2. In localized conditions, decide whether there are signs of a **skin infection**, which is a common and possibly dangerous problem.

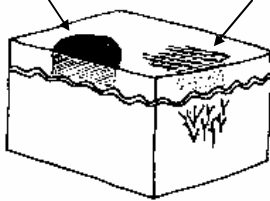
3. Then **decide about the main feature** (for example itching or ulcer). A variety of problems can cause the same type of lesion but each condition has its own typical features (for example a typical distribution) that help you to distinguish it from the other causes. The boxes in this chapter contain all common skin conditions that may be responsible for a certain main feature. If none of the problems fits your patient, refer to a skin specialist because it may be a rare condition.

In this chapter, you find boxes or explanations for the following common differential diagnostic groups:

- Generalised rash
- Bleeding into the skin (petechia or purpura)
- Bacterial skin infections (red, hot, tender, yellow crusts or pustules)
- Fluid-filled skin lesions (vesicles and blisters)

LOCALIZED CHANGE OF SKIN COLOUR:

- **Macule** (increased skin pigment)
- **Erythema** (redness due to dilated blood vessels)



- **Petechia or purpura** (bleeding into the skin)

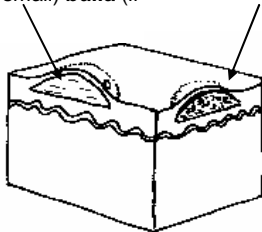
Press on the lesion.



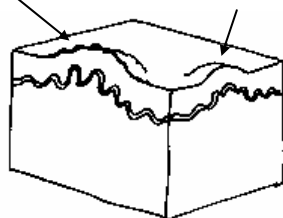
An **erythematous lesion** disappears while you press on it
A **petechial or purpuric lesion** does not disappear

FLUID FILLED LESIONS:

- Filled with watery fluid: **vesicle** (if small) **bullae** (if large)
- Filled with pus: **pustule**

**RAISED LESION WITH A WELL-DEFINED EDGE:**

- **Nodule** (if large)
- **Papule** (if small)

**EPIDERMIS OR DERMIS DESTROYED:**

- **Ulcer** (if deep)
- **Erosion** (if superficial)

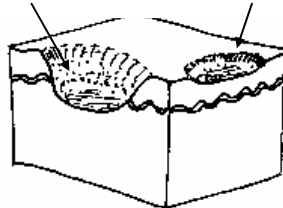
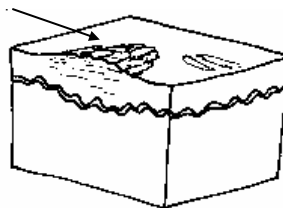
**PLAQUE:**

Figure 20-2 Different types of skin lesions.

- Papules and nodules
- Skin ulcers
- Plaques and scaling
- Urticaria, allergy and drug eruptions
- Hypopigmentation
- Itching (pruritus)
- Hair changes
- Skin signs pointing to systemic disease

Causes of bleeding into the skin (petechia or purpura)

- Meningococcal septicaemia
- Bleeding disorder (for example in aplastic anaemia, leukaemia or chronic liver disease)
- Congo-crimean haemorrhagic fever
- Allergic vasculitis
- Too high dose of anticoagulant medicines

Generalised rash

If skin lesions cover a large area or the whole body this is called a rash. An acute rash that is associated with fever is usually a viral infection like measles or chickenpox. If the patient has had a similar rash previously, the rash is often caused by an underlying constitutional condition like eczema or psoriasis. If there is more than one family member who has got a similar problem at the same time, the rash is usually caused by a contagious condition like scabies. For other causes see box.

Causes of a generalised rash**ACUTE RASH WITH FEVER**

- Measles
- Chickenpox (itching)
- Other viral illnesses
- Scarlet fever (streptococcal infection, usually with tonsillitis)
- Erythema multiforme

RASH WITHOUT FEVER

- Pityriasis versicolor (usually upper chest)
- Pityriasis rosea (usually trunk)
- Scabies (itching, often other family members have a similar rash)
- Erythema multiforme
- Widespread eczema (itching, patient had it before)
- Widespread psoriasis (patient had it before)
- Drug reaction, urticaria (itching, acute onset)

CHICKENPOX

Chickenpox is a viral infection that usually affects young children. It is usually mild. However it can cause a severe pneumonia in newborn and adults, especially smokers and pregnant women. It is dangerous in immunosuppressed people (for example AIDS).

Clinical features

After one or two days with mild fever, the typical, very itchy rash appears. Red macules turn quickly into papules and then vesicles. The vesicles soon dry and crust. Typically, you find all the different stages of lesions at the same time (see figure 20–3). The crusts fall off after about 10 days without leaving scars, unless the patient has scratched.

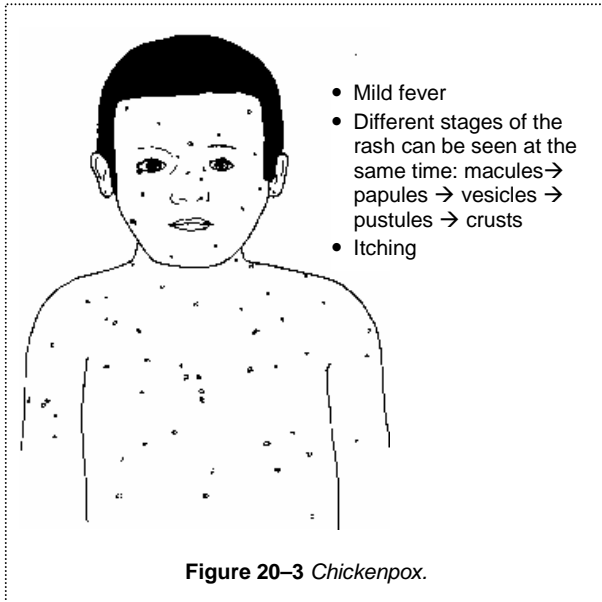


Figure 20–3 Chickenpox.

Management

1. Treat superinfected septic lesions with **gentian violet**.
2. To relieve the itching, apply **calamine** solution and, if severe, give an **antihistamine** (for example promethazine).
3. In **immunosuppressed patients** or adults with chest symptoms, give oral **aciclovir** for 7 days (children 20 mg/kg/24 hours divided into 4 doses; adults 800 mg 5 times daily).

PITYRIASIS ROSEA

Pityriasis rosea usually affects young people. A viral cause is suspected. The rash starts with a large patch (ovoid, red, scaly with a prominent edge) that the patient often does not notice. Later similar but smaller lesions develop. Usually trunk, neck and upper arms are affected (see figure 20–4).

The rash is harmless and no treatment is necessary. The rash will disappear by itself after a few weeks. Reassure the patient.

Bacterial skin infections (red, hot, tender, yellow crusts or pustules)

Bacterial skin infections are very common. Bacteria, usually staphylococcus or streptococcus bacteria, can enter healthy skin. More often they enter skin when the

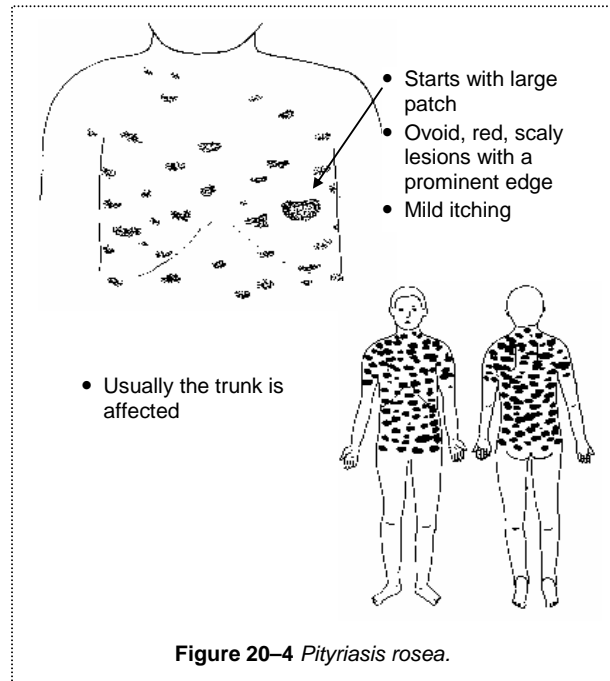


Figure 20–4 Pityriasis rosea.

protective skin surface is already broken. The bacteria multiply and inflammation develops. Inflammation is useful because it brings the defence cells to the infected part to fight the bacteria. Inflammation is responsible for the clinical signs of infection: the blood vessels dilate (**redness** and **heat**); the capillary walls become more porous to let defence cells through (**swelling**; and **pain** as result of swelling). Many organisms and white blood cells are killed. They are part of a liquid called **pus**. The body tries to build a wall around the pus. If this occurs, an **abscess** develops. If the abscess is near the skin, it presses up against the under side of the skin and finally breaks through, runs out and heals by leaving a scar. If the abscess is not able to go through the skin, it will continue growing.

Sometimes a skin infection spreads and invades the tissues. In **cellulitis**, the infection spreads diffusely through the tissues. In **lymphangitis**, it spreads along the lymph vessels. Clinical features of these infections are a lot of local pain. When the infection spreads, the patient develops a fever and becomes very ill. If not treated, he may die of **septicaemia** (see figure 20–5).

A **pustule** is a small vesicle filled with pus. A boil is a collection of pus at a place where a hair grows (hair follicle). For impetigo see below. For anthrax see page 221–222.

Causes of erythema

COMMONEST

- Localized bacterial infection

OTHERS

- Superficial burn
- Erythema nodosum

CHRONIC ERYTHEMA

- Lichen planus
- Subcutaneous lupus erythematosus (typical butterfly rash)

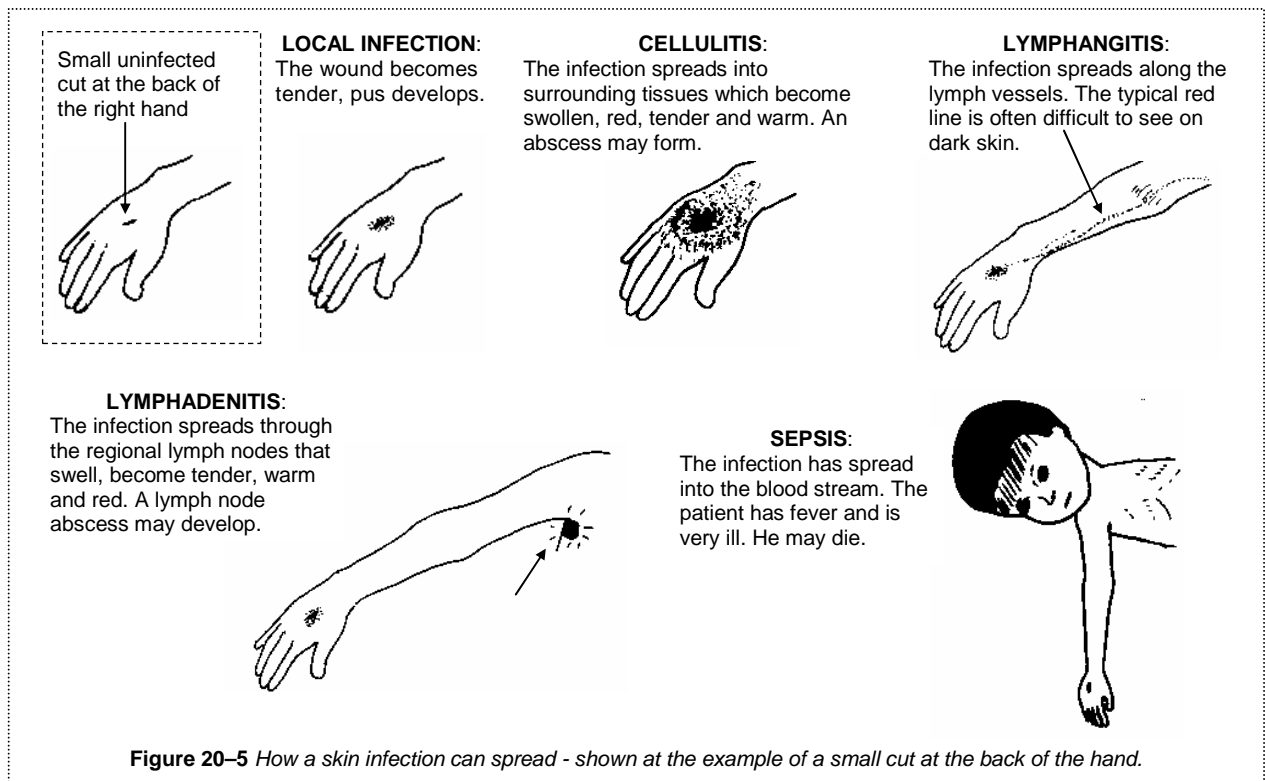


Figure 20-5 How a skin infection can spread - shown at the example of a small cut at the back of the hand.

In children, you sometimes find many infected skin lesions (pyoderma). These lesions are often secondary infected scabies or eczema. First treat the infection and then look for an underlying cause.

How to manage skin infections

The principles of managing skin infections are always the same:

1. *If the infection is localized*, clean crusts with soap water and apply gentian violet 2 times daily.
2. *If there are signs that the infection is spreading*, treat with antibiotics.

- Treat **cellulitis, lymphangitis or lymphadenitis** with oral **penicillin V**.
 - *If not improving*, add oral **cloxacillin**.
 - *If severe* give **benzylpenicillin + cloxacillin IV** or procaine penicillin IM.
 - *If penicillin-allergy*, give erythromycin.
- Treat **boils and pustules** with oral **cloxacillin**.

3. *If pus has developed*, let it out by the safest and quickest method (see figure 20-6).

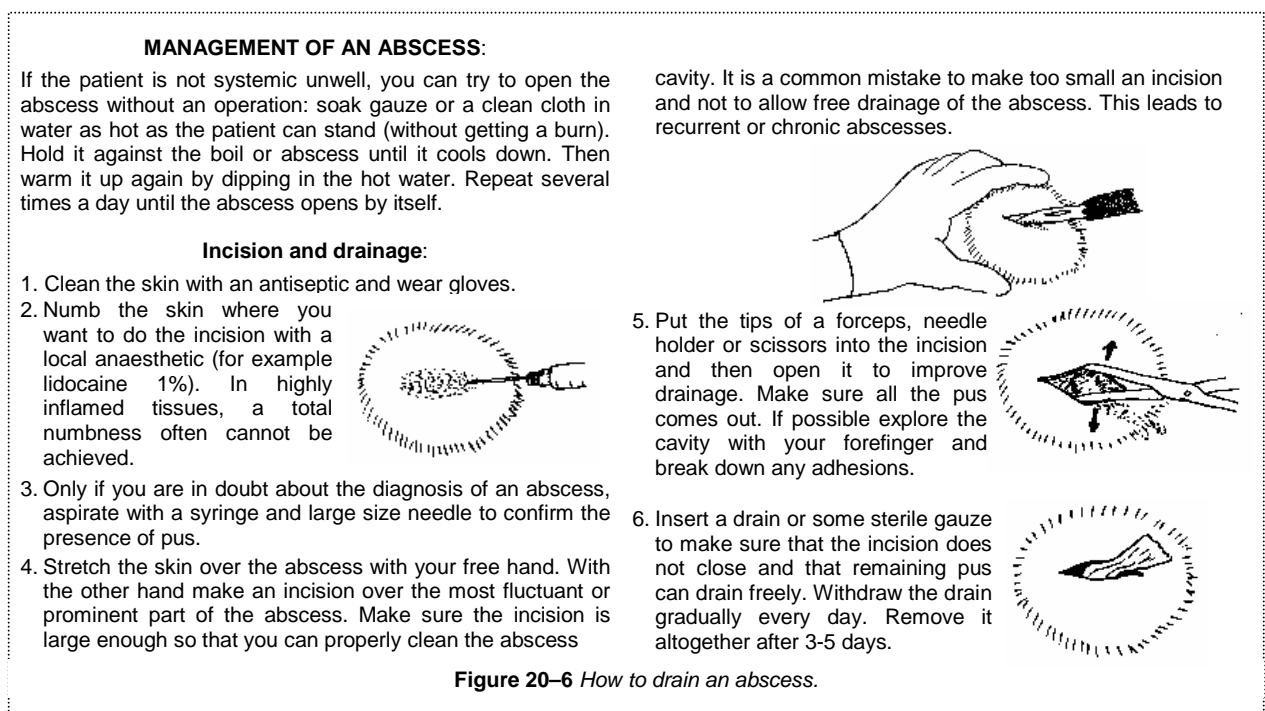


Figure 20-6 How to drain an abscess.

IMPETIGO

Impetigo is a superficial infection that often occurs in the face or around the nose of children. It is caused by staphylococcus or streptococcus. You find typical honey-coloured crusts on red skin (see figure 20–7). Sometimes fluid filled vesicles develop (staphylococcus).

1. Scrub off the crusts with soap and water.
2. Apply fusidic acid cream or *gentian violet*.
3. If the child is unwell or impetigo is widespread treat with *cloxacillin*. If *penicillin allergy*, give erythromycin.
4. Advise the family that impetigo is highly contagious and can easily spread from one person to another.

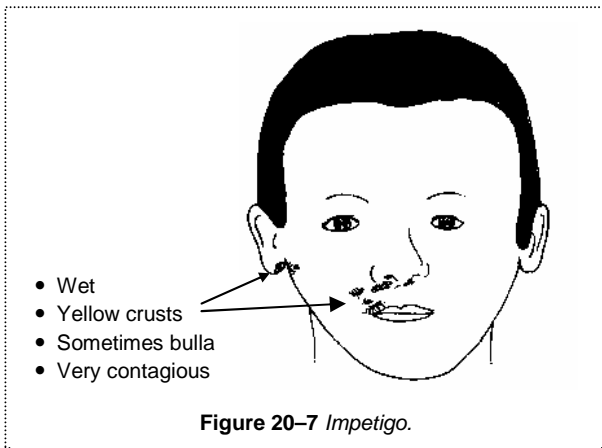


Figure 20–7 Impetigo.

- Wet
- Yellow crusts
- Sometimes bulla
- Very contagious

How to prevent skin infections

Skin infections are prevented by simple hygiene:

1. Wash the whole body at least twice a week with water and soap.
2. Cut the fingernails once a week.
3. Wear clean clothes.

Causes of pustules

- Bacterial infection
- Psoriasis

Causes of vesicles

SMALL

- Herpes zoster, herpes simplex and other viral infections
- Chickenpox
- Urticaria
- Insect bites
- Impetigo
- Eczema and contact dermatitis

Rare:

- Dermatitis herpetiformis

LARGE (BULLAE)

- Burns
- Pemphigoid
- Pemphigus
- Porphyria
- Urticaria

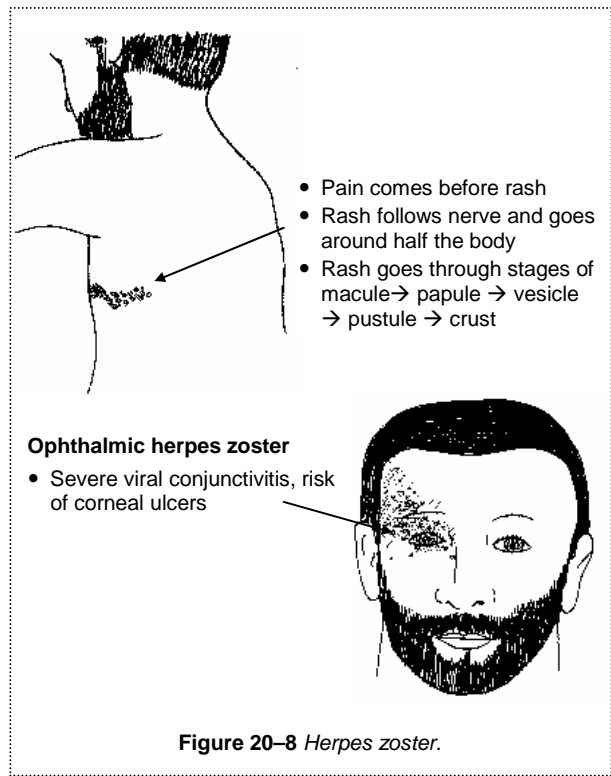


Figure 20–8 Herpes zoster.

- Pain comes before rash
- Rash follows nerve and goes around half the body
- Rash goes through stages of macule → papule → vesicle → pustule → crust

Ophthalmic herpes zoster

- Severe viral conjunctivitis, risk of corneal ulcers

Fluid-filled skin lesions (vesicles and blisters)

HERPES ZOSTER

Herpes zoster is caused by the same virus as chickenpox. After an infection with chickenpox, the virus remains in a nerve ganglion. Later, often for unknown reasons, the virus becomes reactivated and vesicles develop in the area (dermatome) that is innervated by that nerve ganglion (see figure 20–8). Typically, soreness, general weakness and sometimes fever

precede the eruption. The vesicles go through similar stages as chickenpox and heal without complications.

However, in some situations, herpes zoster is dangerous or causes complications:

- If it affects the nerve that innervates the eye it causes a severe viral conjunctivitis and possibly corneal ulceration.
- Some older people may develop recurrent nerve pain in the affected area. The pain sometimes continues for months or even years (*postherpetic neuralgia*).
- Immunosuppressed people may develop widespread and severe herpes zoster.

Management

1. If resources allow and the symptoms started less than 72 hours ago, give **aciclovir** as for chickenpox.
2. Patients with eye involvement refer to an eye specialist.
3. Treat *postherpetic neuralgia* with oral **aminotriptyline**.

HERPES SIMPLEX

Herpes simplex virus is a common infection that causes small crops of clear, tense blisters. They are usually around the lips, nose or genitalia but can be anywhere. Typically, there is a burning sensation before the blisters appear. They heal over a period of a week but tend to recur at the same place, often when the patient has a febrile illness. Treatment is usually not indicated.

In young children the first herpes infection often causes a gingivostomatitis with many mouth ulcers (see pages 61-62).

Active genital herpes in a pregnant woman at the time of delivery carries a high risk for the newborn.

PEMPHIGOID

Pemphigoid is an autoimmune disease of elderly people. You find an urticarial rash with tense blisters. Treat with steroid cream or oral prednisolone.

PEMPHIGUS

Pemphigus is an autoimmune disease affecting younger adults. You find flaccid blisters, which rupture easily. When they rupture, they leave widespread erosions. Lesions often start in the mouth. Treat with prednisolone long-term.

Papules and nodules

Causes of nodules and papules

- Warts
- Molluscum contagiosum
- Skin tumours (benign and malignant)
- Signs of systemic disease, for example rheumatoid arthritis or gout
- Erythema nodosum
- Papules as part of many generalised rashes

WARTS

Warts are a superficial viral infection (see figure 20-9) that causes thick papules. They often occur in children and can persist for many months or years but because

the infection is not dangerous, it is best to wait until the warts finally disappear by themselves.

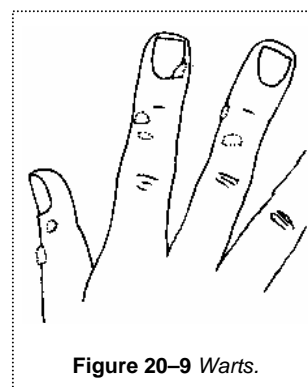


Figure 20-9 Warts.

MOLLUSCUM CONTAGIOSUM

Molluscum contagiosum is a viral infection that typically affects young children. You find round papules with a typical central depression. They may contain white material (see figure 20-10).

Reassure the family that it is a harmless condition and that the papules will go away by themselves after a few months.

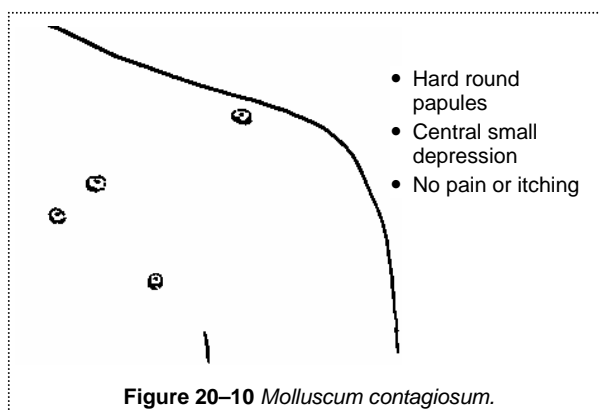


Figure 20-10 Molluscum contagiosum.

LICHEN PLANUS

The cause of lichen planus is unknown. It is rare in children. Typical lesions are flat-topped papules with white line marking on the surface. They itch severely. You find them at typical sites (see figure 20-11). Drug eruptions that look like lichen planus can occur with chloroquine and other anti-malaria drugs.

Apply steroid cream for the itching. The lesions disappear by themselves after 6-18 months.

SKIN CANCER

Skin cancer often develops at sites exposed to sunlight (face, ear lobes, back of hands - see figure 20-12). They occur in older people. Cigarette smoking is a risk factor for skin cancer of the lips.

Basal cell carcinoma looks like a pearly node with a round edge. When you observe it carefully, you will see some blood vessels on it. You find it in the faces of older people. It grows slowly and destroys the surrounding structures. It does not spread through metastases. If the whole node is excised, the patient is cured.

Suspect a **squamous cell carcinoma** when you find an irregular, ulcerated lesion that does not heal in an elderly person. Treatment is by excision. Metastases are rare.

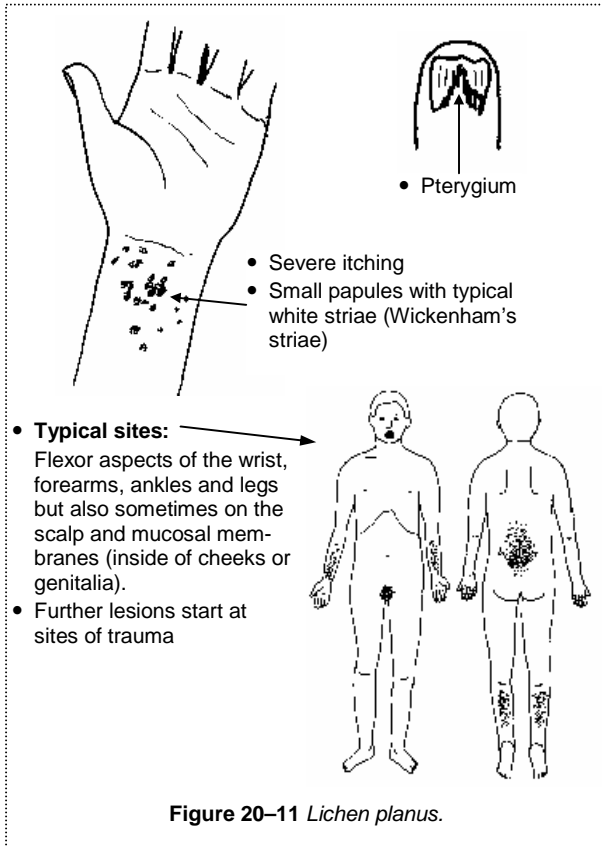
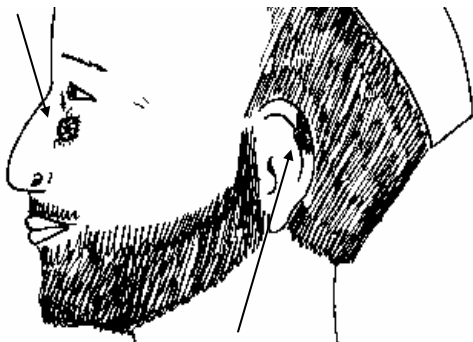


Figure 20-11 Lichen planus.

Melanomas are rare in people with dark skin. They can occur anywhere. Suspect melanoma if an adult has a single pigmented lesion with irregular edges that is larger than 0.5 cm and increases in size. There is often a variation of colour within the lesion. It sometimes itches or bleeds. Melanoma spreads by metastases. The prognosis is poor if it is not excised at an early stage.

BASAL CELL CARCINOMA

- Older patient
- On skin exposed to sunlight, usually in the face
- Firm nodule with raised edges and a central ulcer
- Not painful



SQUAMOUS CELL CARCINOMA

- Older patient
- On skin exposed to sunlight
- Thickening of skin with nodules or ulcers that do not heal
- Not painful

Figure 20-12 Skin cancer.

Skin ulcers

The first step to reach a diagnosis is to decide the location of the ulcer (see box).

Then find the answer to the question 'How did the ulcer start?' and examine the patient carefully. This will usually reveal the cause.

Causes of skin ulcer

EXPOSED PARTS OF BODY (FACE, ARMS, LEGS)

- Cutaneous leishmaniasis

GENITALIA

- Sexually transmitted infections

BREAST

- Breast abscess (usually breastfeeding woman)
- Breast cancer (usually older woman)

UNDER THE FEET

- Leprosy
- Diabetes

ANYWHERE

- Bacterial infection
- Osteomyelitis
- Pressure sores (bed bound or paralysed person)
- Skin tuberculosis
- Severe malnutrition (usually legs)
- Skin diphtheria
- Venous or arterial ulcer (usually legs)
- Skin cancer (usually areas exposed to sunlight)

CUTANEOUS LEISHMANIASIS

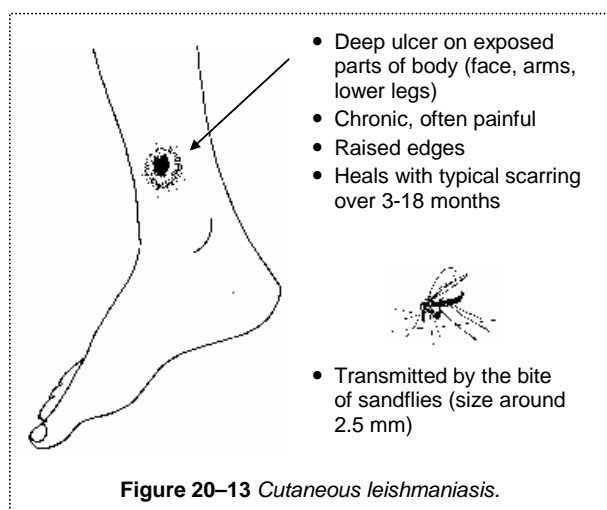
Cutaneous leishmaniasis is a common parasitic skin disease that is transmitted by the bite of sandflies. Sandflies usually bite from May to September.

Clinical features

- A red itchy papule develops some weeks or months after the bite. The papule grows slowly to a size of 1-5 cm and is covered with a crust. The crust then falls off and leaves a painless ulcer that looks like a volcano with a raised edge and a central crater. The ulcer can be painful or painless. The ulcer heals by itself after 3-18 months and leaves a scar (see figure 20-13). Then the person is immune to reinfection.
- Sometimes, satellite lesions develop and some patients have more than one ulcer.
- Sometimes, the regional lymph nodes enlarge.
- Ulcers are typically found on the exposed parts of the body: face, arms, and lower legs.

Investigations

Diagnosis is by the typical clinical features but it can be confirmed by finding the parasites in a tissue smear taken from the edge of active ulcers.



Management

1. **Do not treat simple lesions.**
 2. **Treat the following lesions:**
 - large lesions
 - multiple lesions
 - lesions with spread through the lymph vessels and
 - lesions that limit a person's ability to perform his daily activities (for example lesions over joints).
- Inject 1–5 ml *sodium stibogluconate* around and beneath the lesion at intervals of about 2-5 days.
 - Or give sodium stibogluconate 20 mg/kg/day for 10 (-20) days. Give it IM unless a large volume of the drug is required; in this case give it IV mixed with 50 ml of glucose 5% over 10 minutes.
- NOTE: thermotherapy using radio frequency waves is also effective.

Prevention

Cutaneous leishmaniasis can be prevented in the following ways:

- Advise sleeping under an insecticide-impregnated bed-net. Although the spaces in the mesh are large enough to admit sandflies, the insecticide will kill them.
- Spray the inside of houses with a residual insecticide to kill the sandflies (advised for places where many people are affected).
- Destroy the sandfly breeding places: damp spots, for example, in poor housing, ruins or household debris.

SKIN TUBERCULOSIS

Skin tuberculosis (TB) presents in different ways. It is not common but the diagnosis is often missed:

- **Primary skin infection:** TB bacilli enter the skin through a small wound (usually face, arms or lower legs). The original wound heals. Later a papule develops that breaks into a shallow ulcer. Meanwhile the local lymph nodes have swollen and may be the reason why the patient comes to you. Therefore examine every patient with swollen lymph nodes for skin TB. The TB focus in the skin may not be an ulcer but appear as thickening of the skin that is

surrounded by tiny yellowish spots inside the skin. You sometimes find a similar appearance at the site of a BCG scar.

- **Single large painless ulcers** on the hand or face. They are covered with scaly rough skin. Usually they remain unchanged for months before healing and leaving a scar.
- **TB abscess may rupture** and leave an ulcer with a very irregular edge and a clean base. **Scrofulderma** is scarring from breakdown of the skin from an underlying TB lesion, usually a lymph node.
- **Lupus vulgaris** usually affects the head and neck. Jelly-like nodules appear that sometimes ulcerate. It is a very chronic condition that may leave extensive scarring and destruction.

All forms of skin TB respond well to standard treatment for category III. Always remember that a patient with skin TB may also have TB lesions in other organs.

PRESSURE SORES AND ULCERS

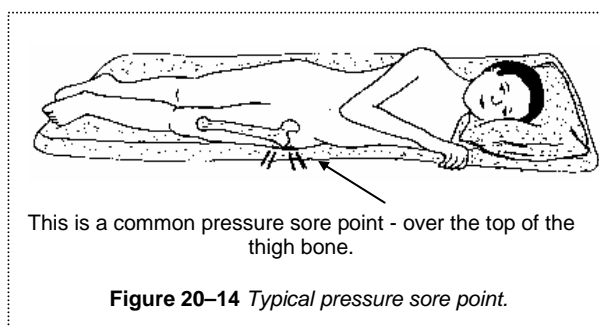
Pressure sores and ulcers develop over bony parts of the body when an ill or paralysed person lies or sits on that part of the body for too long without moving. Then the skin is pressed against the bed or chair and the blood supply is blocked (see figure 20-14). First a red or dark patch appears that later ulcerates. Pressure sores are very dangerous because they contain dead tissue and become infected easily. Pressure sores are one of the main causes of death in persons with spinal cord injuries. At risk of pressure sores are:

- Ill, weak and disabled people who cannot roll over by themselves.
- People who have no feeling in parts of their body and do not feel pain when the skin is damaged. People with spinal injury are especially at risk because they are unable to roll over and are also unable to feel pain in some parts of their body.
- People with a plaster cast that is not padded over bony places.

Prevention

It is easier to prevent than to treat pressure sores:

1. Explain the risks to the family and the patient.
2. Turn the patient into another position every 2 hours.
3. Pad bony areas to prevent pressure.



Treatment

1. **Watch for first signs of pressure sores** by examining the body of persons at risk every day. If you see a red or dark patch, use padding to protect that area from pressure.
2. **If a pressure sore has formed:**
 - Keep pressure off the sore area completely and continuously. Use padding but do not use a ring because this may cut off the blood supply around the sore and worsen the situation.
 - Keep the area completely clean. There is no evidence that any kind of dressing is better than the other. The essential part of management is not medicines. However, treat infection with antibiotics (for example *amoxicillin* + *cloxacillin*. Consider adding *metronidazole*).
 - Clean the sore 2-3 times a day. Remove dead tissue (see figure 20–15).
 - Make sure the patient eats good food and is not malnourished.

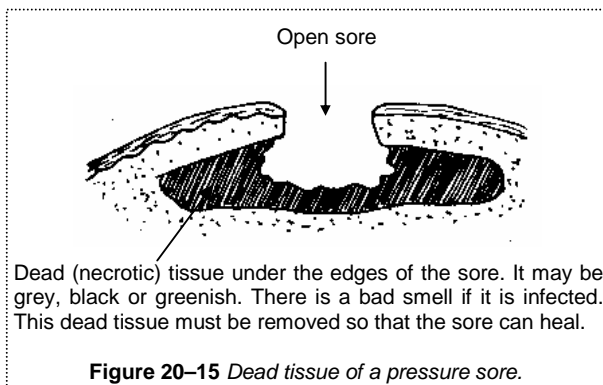


Figure 20–15 Dead tissue of a pressure sore.

SKIN DIPHTHERIA

The ulcer started as a vesicle that ruptured and quickly became a large ulcer. The ulcer is deep with grey exudate or a black crust. The surrounding skin is red or blue: **skin diphtheria** (see page 60-61).

Plaques and scales

Scales may only become noticeable when you rub a lesion. In lesions with plaques, look at the distribution: the distribution in psoriasis is symmetrical. In fungal infections, the distribution is asymmetrical and there are usually only one or a few lesions that slowly expand and itch. For eczema see below.

Causes of plaques or crusts

- Fungal infections
- Any wound
- Impetigo
- Eczema
- Cutaneous leishmaniasis
- Psoriasis
- Anthrax

Causes of lesions with scales

- Ringworm
- Seborrhoeic dermatitis
- Psoriasis
- Pityriasis versicolor (fine scales)
- Pityriasis rosea (fine scales)

FUNGAL INFECTIONS

Superficial fungal skin infections are common. They may be transmitted from animal to men or through soil. Scalp infections often occur when children's hair is shaven with unclean blades. Suspect a fungal infection if you see an isolated, dry, itchy, scaly lesion that occurs without any obvious reason (for example no history of eczema).

If the lesion has been treated wrongly with steroids, its appearance is very atypical. The itch gets better but the lesion gets worse.

Ringworm (tinea)

Ringworm can grow in different sites of the body: feet, groin, trunk, scalp or nails. It is called ringworm because the edges of the lesion remind of a worm. However, ringworm has nothing to do with worm infections.

The lesions are itchy and have sharply demarcated raised edges that extend. The centre of lesion is often normal. When you rub the lesions you find scales. If the fungus infects the scalp (tinea capitis), you find scaly patches with hair loss and sometimes inflamed boggy swellings (see figure 20–16).

Management of ringworm

1. Apply *clotrimazole* cream (or miconazole) 2 times daily.
2. For infections of the scalp and for other lesions that have not improved with 2 weeks of topical treatment, give oral *griseofulvin* for 6-8 weeks. The boggy scalp swellings are not an abscess. They improve with griseofulvin and surgery is not indicated.

Superficial candidiasis

In addition to oral and vaginal infections, candida can infect moist skin in skin folds (for example the nappy area of babies, skin folds under the breasts or in the groin). Infected skin is very red and moist. Often you find a few papules near the border of the rash (satellite lesions - see figure 20–16).

Management of candidiasis

1. Keep the affected area dry.
2. Apply *clotrimazole* cream (or Whitfield's ointment or miconazole) twice a day.

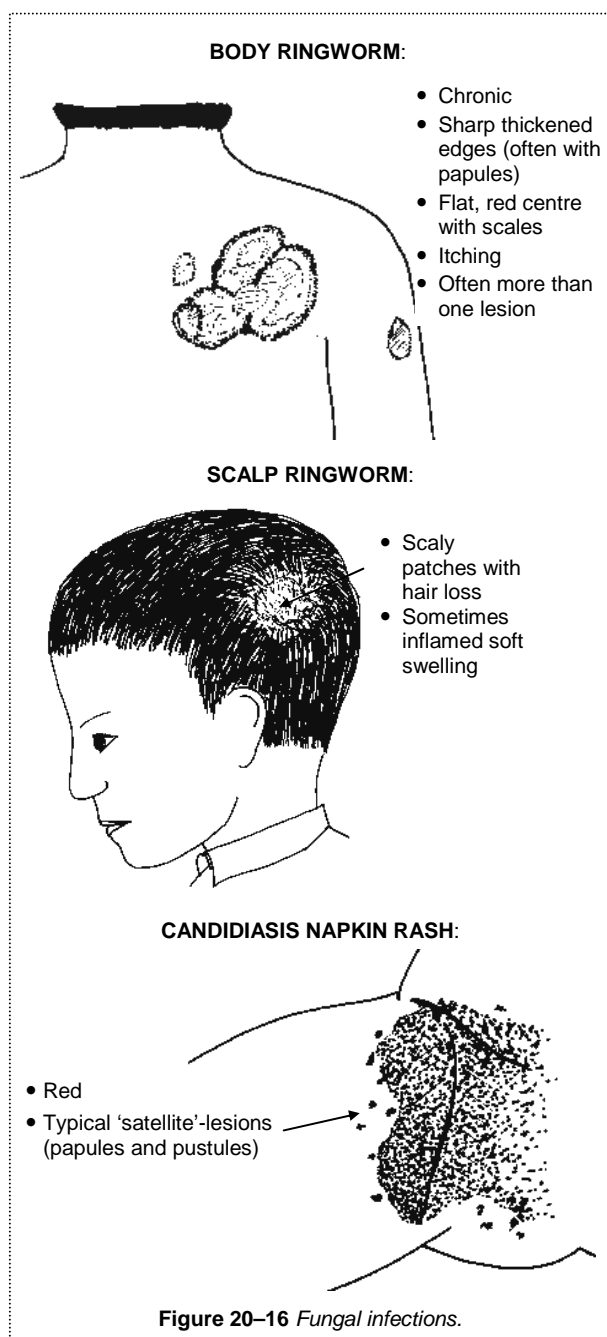


Figure 20-16 Fungal infections.

PSORIASIS

Psoriasis is a chronic inflammatory skin disease that often affects several family members. Its cause is unknown but stress, streptococcal infections, local trauma and drugs (for example antimalarial drugs or beta-blockers like atenolol) may trigger the eruption of lesions.

Clinical features

The typical psoriasis lesion is a well defined red-plaque with a silvery scale. The lesions have a typical distribution (see figure 20-17). Lesions get better with sunlight. Sterile pustules are sometimes found on the soles or palms. Psoriasis skin lesions are not dangerous but some patients develop a chronic arthritis.

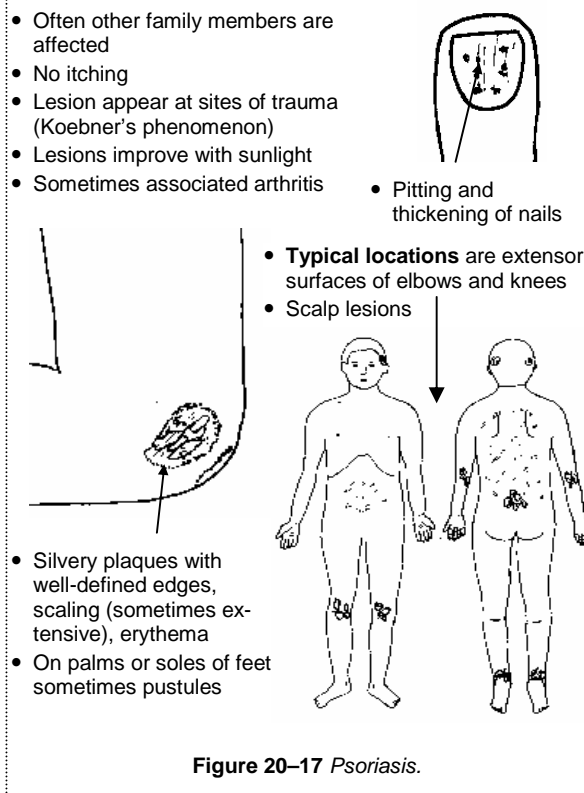


Figure 20-17 Psoriasis.

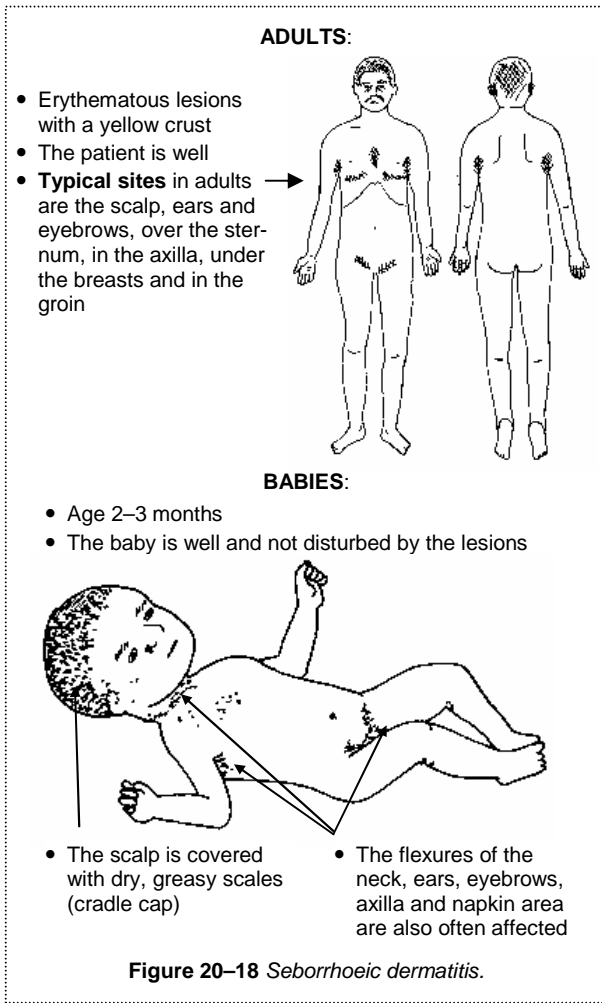
Management

1. **Avoid any factors that worsen the condition.** Explain to the patient that the cause of psoriasis is not known. The tendency to develop psoriasis is part of a person's constitution. The treatment aim is to control psoriasis.
2. Use *emollients* or bath oil.
3. **Coal tar** is effective and safe for stable lesions but will irritate acutely inflamed areas. Combine it with salicylic acid 20% for very thick lesions.
4. **Dithranol** can irritate the skin. Apply it carefully to the affected skin only and then wash it off after 20-30 minutes; start with a 0.1% concentration and increase to 0.25% → 0.5% → 1% if the patient tolerates it.
5. **Steroids** will improve the condition temporarily but avoid them for long-term use because psoriasis quickly relapses.
6. *If arthritis occurs*, refer to a specialist. Treatment is usually with methotrexate.

SEBORRHOEIC DERMATITIS

In seborrhoeic dermatitis, the scalp, eyebrows and flexures are covered with red dry lesions and scales. Seborrhoeic dermatitis is probably caused by an overgrowth of yeasts (see figure 20-18). It is a harmless condition. It also occurs in young babies and is sometimes mistaken for widespread impetigo.

1. Advise to apply emollients (for example bath oil) to the lesions and leave for a few hours before washing off.



2. Give a mild steroid cream together with clotrimazole cream. In adults, it is often necessary to repeat the treatment at intervals. Reassure parents that seborrhoeic dermatitis in babies improves when the child gets older.

Urticaria, allergy and drug eruptions

Urticaria is a rash caused by allergens (for example drugs, food, chemicals or insect bites). The allergens cause a release of histamine and other substances into the skin. These cause oedema in the dermis, which is seen as a typical acute itchy skin rash (wheals). The epidermis is normal. Sometimes the reaction may be accompanied by joint pains, stomachache and fever. Urticaria may be part of a life-threatening allergic reaction.

For management see page 245.

If urticaria lasts for several weeks, treat for worms, which may sometimes cause chronic urticaria (for example ascaris or hookworm). However, often the cause of chronic urticaria is unknown.

DRUG ERUPTIONS

Several side effects of drugs may cause skin lesions. Drug rashes are often symmetrical and reoccur at the same place whenever the drug is taken:

- Urticaria
- Erythema
- Erythema multiforme

Management

1. Stop all the drugs that are likely to be responsible for the reaction.
2. Restart those drugs that are essential one by one to identify the drug that has caused the reaction.

Hypopigmentation

Whenever you see a hypopigmented lesion, consider whether this could be leprosy. Skin lesions are often the obvious signs of leprosy but the damage occurs to the nerves. Therefore you find leprosy explained in chapter '15. Problems of the nervous system' on pages 175–176. For other causes of hypopigmentation see box.

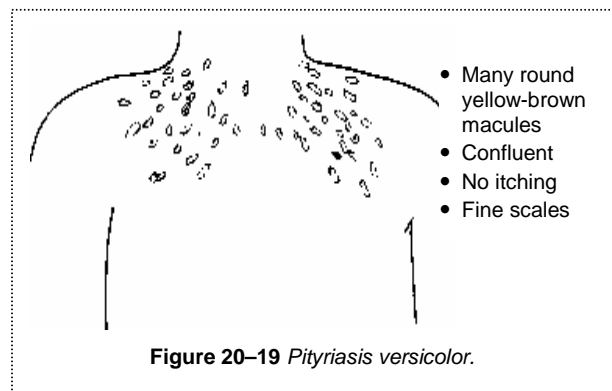
Causes of hypopigmentation

- After inflammation (scarring)
- Vitiligo
- Pityriasis versicolor
- Pityriasis alba
- Leprosy

PITYRIASIS VERSICOLOR

Pityriasis versicolor is common in warm and humid climates. It is not a fungal infection but an overgrowth of yeasts on the skin. The rash is usually located on the chest. It is made of many yellow-brown macules that rarely itch. You find some fine scales (see figure 20–19).

The disease is harmless. Advise the patient to wash his body regularly when he has sweated. If desired, apply clotrimazole cream twice a day.

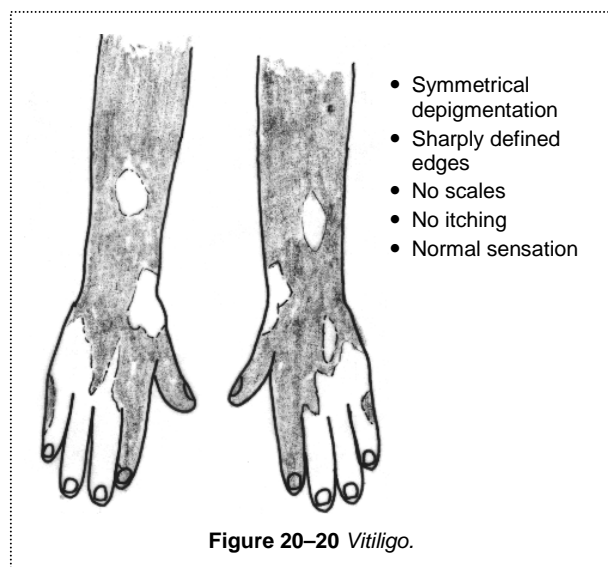


PITYRIASIS ALBA

Pityriasis alba presents as white dry patches on the face of children. It is a variant of atopic eczema. It is not a sign of worm infection. Treat with vaseline or hydrocortisone cream 0.5% for 5 days.

VITILIGO

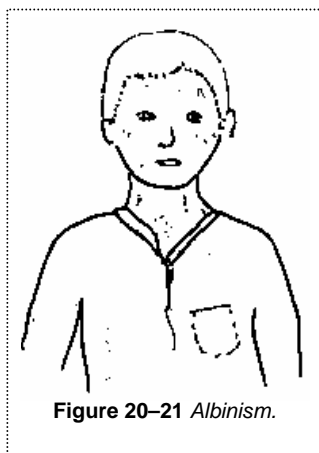
In vitiligo, the cells that produce the normal skin colour (pigmentation) do not function normally and this results in localised depigmentation. The depigmentation is symmetrical and macular with sharply defined edges. There is no itching and there are no scales, and sensation is normal (see figure 20–20). No treatment is available or needed.



ALBINISM

Albinism is an inherited condition. People who are born with albinism have a generalized total absence of pigmentation.

Albinism is very easy to recognize: people have a white-pink skin, white hair and a pink iris (see figure 20–21). They lack the skin pigment that protects the body from the dangerous affects of sunlight. Therefore, people with albinism are exposed to several dangers, especially in tropical or subtropical countries. Teach families from the birth of a child with albinism about the dangers and how to protect the child from them:



1. **The danger of sunburn and skin cancer:** do not expose the skin to sunlight. Wear long sleeves and a cap. Use protective skin lotions.

2. **The danger of eye damage and poor vision.** Wear sunglasses when you leave the house.

Itching (pruritus)

Differentiate between itching with skin changes and itching without skin changes (see box). If you cannot find skin changes, arrange for the following blood tests: Hb, WBC, GPT (ALT), glucose and creatinine. For drug reaction, urticaria and lichen planus see above.

Causes of itching

WITH SKIN LESIONS

- Scabies
- Urticaria, drug reaction
- Lice
- Insect bites
- Fungal infection
- Contacts with irritants
- Heat rash
- AIDS
- Dermatitis herpetiformis

WITHOUT SKIN LESIONS

- Drug reaction
- Chronic renal failure
- Chronic liver failure
- Diabetes mellitus
- Internal cancer (especially lymphoma)
- Iron deficiency anaemia

General management of itching

1. **Find and treat the underlying cause.**
2. **Advise a simple moisturising cream** to soothe the skin.
3. Give *calamine* lotion and oral *antihistamines* (for example promethazin) to ease the itching.

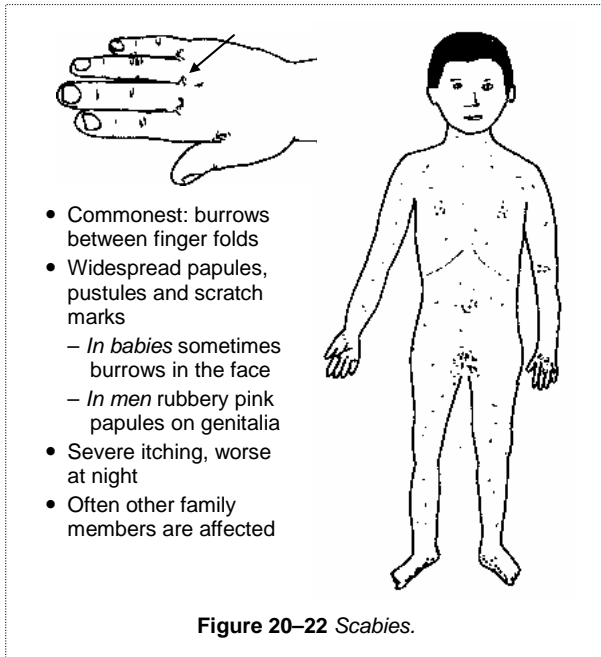
SCABIES

Scabies is caused by the scabies mite that lives in burrows in the skin. The mite is transmitted by close personal contact within families. There are no symptoms at first. A very irritating and itching widespread papular skin rash starts about 2–4 weeks later. This is a hypersensitivity reaction to the mite. The itching is worse at night.

The rash is widespread but you find papules and sometimes burrows, especially at the sites shown in figure 20–22.

Management

1. **Treat the whole family** at the same time otherwise reinfection will occur because some family members may be asymptomatic.



2. Everyone should wash his whole body well, and cut and clean his fingernails.
3. Give **permethrin** cream 5%. Apply over the whole body except the face. Then dress with clean clothes. Wash off the permethrin after 8-12 hours. Make sure armpits, wrists and pubic areas are included. In young children also apply to the scalp, neck, face and ears.

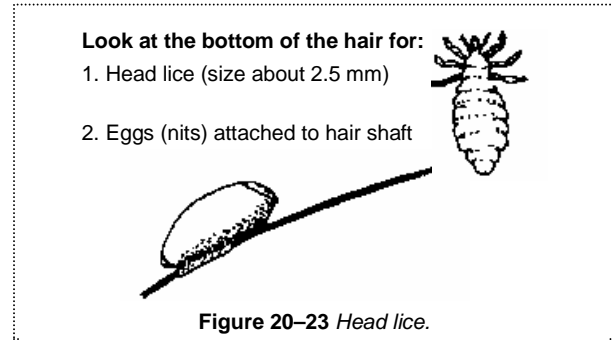
Or give *benzyl benzoate* lotion 25% (BBE), which may irritate the skin. Apply over the whole body but avoid contact with eyes and broken skin. If there is a secondary infection, treat it first before applying BBE. Leave BBE for 24 hours. Repeat the next day without bathing in between the applications. Then wash it off after 24 hours.

4. **Advise the family** either to wash and iron their bedding and clothes or to put them in a box or plastic bag for 3 days. The mite cannot survive for more than 72 hours without its host and will die.
5. **Explain to the patient** that itching and some papules (especially at the penis) may persist for several weeks after successful treatment.
6. **Treat itching** with antihistamines (for example promethazine) and calamine lotion.

LICE INFESTATION

There are 3 types of lice: the body louse lives in a person's clothes and passes onto the skin only to take a blood meal. The head louse and the pubic louse live directly on the skin (scalp hair and pubic area). They lay eggs (nits) that are firmly attached to the hair where you can see them (figure 20-23).

Lice cause severe itching and because of this the patient scratches. The scratching often damages the skin and the scratch marks can be an entry for infection.



Management of head or pubic lice

1. For head lice apply **permethrin** lotion 1% or cream 5% to the hair and leave for 12 hours or overnight. Then wash it off. For pubic lice apply permethrin to the whole body.
Alternatively, use benzyl benzoate lotion 25% (BBE).
2. **Repeat after 7 days.**

Management of body lice

The lice live in the clothes and not on the body. Advise the patient to wash and iron his clothes. The person himself does not need to be treated.

ECZEMA

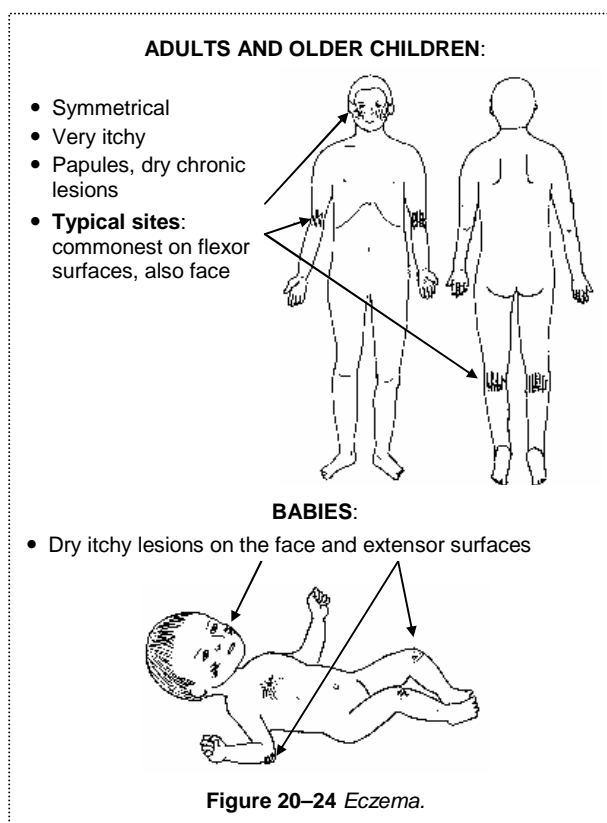
Eczema is common. It is caused by many different factors. It is an atopic disease like asthma or hay fever and runs in families. Usually it starts in young children who often grow out of it when they get older.

Clinical features

Eczema is usually symmetrical and has a characteristic distribution. Typical are a group of vesicles with a variable degree of exudate and scaling. Sometimes dryness is the main feature. Itching is severe and you often find scratch marks or secondary bacterial infection (see figure 20-24).

Management

1. **Explain to the family** that the tendency to develop eczema as a response to many different triggers is part of a person's constitution.
2. Explain that dry skin itches, and that they should moisturise the skin with **emollients** at least 2 times daily.
3. **Keep the finger nails short** so that scratching does not cause further irritation.
4. *If there are active lesions with a lot of itching*, apply steroid ointment (or steroid cream; but ointment is better because it is greasier). Do not use preparations stronger than hydrocortisone 1% in the face. Apply a stronger preparation on lesions that are not on the face for 7 days. Then reduce the strength. Do not use topical steroids long-term because it can lead to thinning of the skin. It is absorbed into the body and



may have the same side effects as oral steroids, including adrenal suppression, especially in children.

5. If the lesions are wet and inflamed, soak a clean cloth in boiled and cooled water and put it onto the lesions.
6. Give an antihistamine if itching is troublesome.

CONTACT DERMATITIS

Many substances may cause a localized allergic skin reaction or simply irritate the skin. Contact dermatitis is a common localized allergic reaction, for example to metals (for example earrings), chemicals (washing powder or cosmetics), topical drugs (for example antibiotic creams).

Usually the skin changes are limited to the area that has come in contact with the irritant. The margins are sharply demarked.

A similar troublesome rash may develop that only occurs on those parts of the body exposed to sunlight (photodermatitis). Suspect photodermatitis when a rash occurs mainly during the summer months. It can also occur in people while they take certain drugs (for example sulphonamides or tetracycline).

Management

1. Avoid the allergen.
2. Give *steroid* cream according to severity.

DERMATITIS HERPETIFORMIS

Dermatitis herpetiformis occurs in early and middle adult life. Typical are symmetrical, very itchy vesicles

on the trunk and extensor surfaces of the joints. Refer to a skin specialist.

Hair changes

For practical purposes, decide to which of the two groups of patients a person belongs (see box):

1. Patients **with** changes of the scalp skin.
2. Patients **without** changes of the scalp skin.

Causes of hair loss (alopecia)

WITH CHANGES OF SCALP SKIN

- Scalp ringworm (patchy alopecia with itching and boggy swelling)
- Lichen planus (leaves a scar)
- Severe eczema
- Severe psoriasis
- Inflammation
- Burns

WITHOUT CHANGES OF SCALP SKIN

- Alopecia areata
- Normal hair loss in males (androgenic alopecia)
- Hypothyroidism
- Severe malnutrition
- Diabetes mellitus
- Iron deficiency

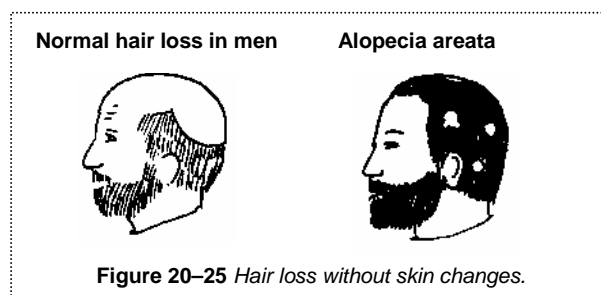
Hair loss with changes of the scalp

Commonest is tinea capitis. For further causes see box.

Hair loss without changes of the scalp skin

Hair loss is normal when men get older. Localized patchy hair loss is often caused by alopecia areata. The cause of alopecia areata is unknown. There is no proven treatment. Advise the patient to wait because usually the hair starts growing again after several months (see figure 20–25).

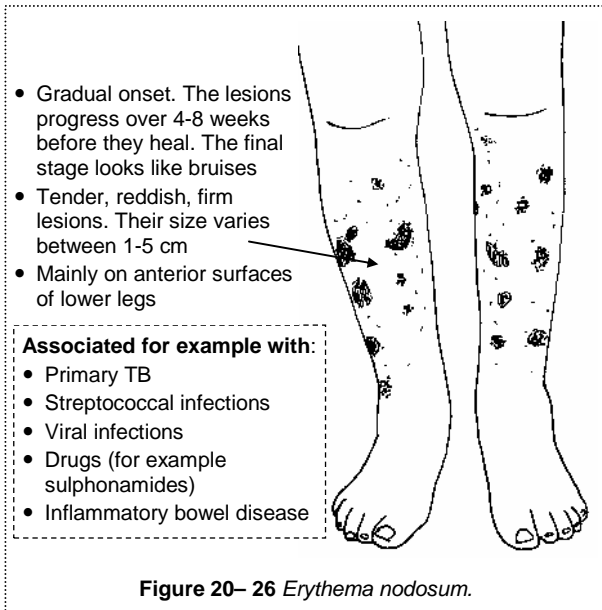
Hair loss occurs in hypothyroidism and in severely malnourished children.



Skin signs pointing to systemic disease

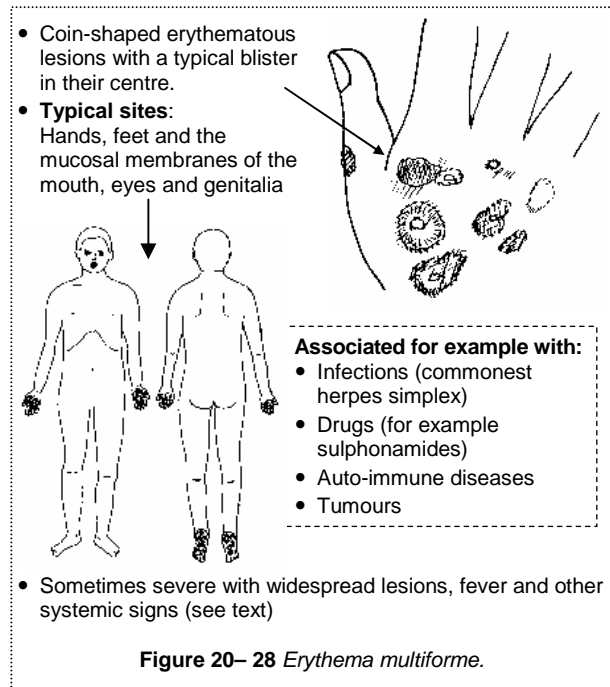
ERYTHEMA NODOSUM

Erythema nodosum are painful, reddish raised lesions on the front of the shin (see figure 20–26). Their cause is often unknown but it may be associated with • primary tuberculosis • streptococcal infections • inflammatory bowel disease or • sulphonamide drugs.



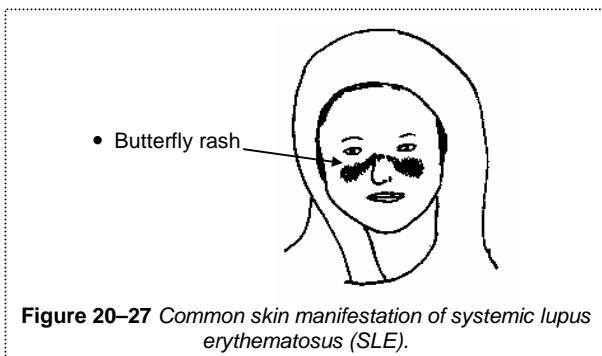
ERYTHEMA MULTIFORME

Erythema multiforme is a generalised rash as reaction to viral infections (herpes simplex virus), drugs (for example co-trimoxazole or other sulphonamides) or tumours. You find coin-shaped erythematous lesions with a typical blister in their centre. They are found especially on the hands and feet and on the mucosal membranes of the mouth, eyes and genitalia (see figure 20–28). Sometimes the reaction is severe (Stevens-Johnson-Syndrome) with fever, renal failure, joint pains and diarrhoea. If severe, give oral prednisolone.



LUPUS ERYTHEMATOSUS

Systemic lupus erythematosus (SLE) is an autoimmune disease. It most commonly affects women. A typical skin manifestation of SLE is a red rash over the nose and face that reminds of the shape of a butterfly. It is typically triggered by sunlight (see figure 20–27). SLE causes symptoms in many different organs, especially joints and muscles, kidneys, lungs and blood. It causes systemic symptoms like fever and weakness. For further details, refer to a textbook of internal medicine.



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21. Emergencies and injuries

Road traffic injuries are a major cause of death and disability. Most victims are pedestrians, passengers of buses and cyclists. Many people are aware of the risks of accidents, for example when using poorly maintained and overcrowded buses, but they have no other choice of transport. It is therefore not realistic to expect that traffic will become safer in the near future. However, there is a way to reduce the high death rate from injuries. This is the improvement of pre-hospital care (first aid) and safer transport of accident victims to hospital. It has been shown that these measures will save more lives than improving hospital facilities. Better first aid and safer transport could also save lives of other patients with injuries (for example mine victims) or life-threatening illnesses.

It is essential to know how to do first aid in an emergency. Teach first aid to others (for example at schools) because usually untrained people and not health professionals are the first ones who witness accidents.

First aid in emergencies

In first aid in accidents and other emergencies, always follow the same steps (see box).

Sometimes you are faced with several injured people (for example after a bus accident). In such a situation check the quietest victims first because they may be the most seriously injured.

Summary of first aid in emergencies

1. **Look out for danger.**
2. **Assess:** is the patient *conscious or not*?
3. **Follow the ABC of resuscitation:**
 - A = Airways - are his airways open?
 - B = Breathing - is he breathing well?
 - C = Circulation - is his circulation good?
 - (D = Drugs)
4. **Treat the most serious conditions first:**
 - Heavy bleeding
 - Shock
 - Serious burns
 - Broken bones
5. **Get help.** Ideally someone should get help while you take care of the injured person.
6. **Treat any minor injuries.**
7. *If the patient has to be transported to hospital, make sure that:*
 - A = His airway stays open.
 - B = He continues breathing.
 - C = His circulation is stable. Shock must be treated and prevented during transport.

1. Look out for danger

When you take care of a victim, make sure you do not put yourself at risk. For example when people try to save a person from a minefield, they often get injured themselves. At the end there are several victims and not just one.

Always take a moment to assess the situation and then help the victim. Move him only if he is exposed to further danger (for example in a burning house).

2. Assess: is the patient conscious or not?

Assess whether the patient is conscious or not. Carefully shake the patient's shoulders and ask the patient what happened:

- *If the patient is unconscious*, follow the ABC of resuscitation.
- *If he is conscious*, treat the most serious conditions first.

3. Follow the ABC of resuscitation

To live we need to have a regular supply of oxygen to all parts of our body. The brain in particular becomes severely damaged if it is without oxygen for more than a few minutes. Then the patient will become unconscious. Soon breathing and circulation will stop and the patient will die.

To keep the brain supplied with oxygen, three things are essential. Remember them by thinking of the first letters of the English ABC.

A = an open and clear AIRWAY through which air that contains oxygen can pass to the lungs.

B = a normal BREATHING that takes air into the lungs. Oxygen is then picked up in the lungs by the blood stream.

C = a normal CIRCULATION. This requires a pumping heart together with sufficient blood in the blood vessels to carry oxygen from the lungs round the body.

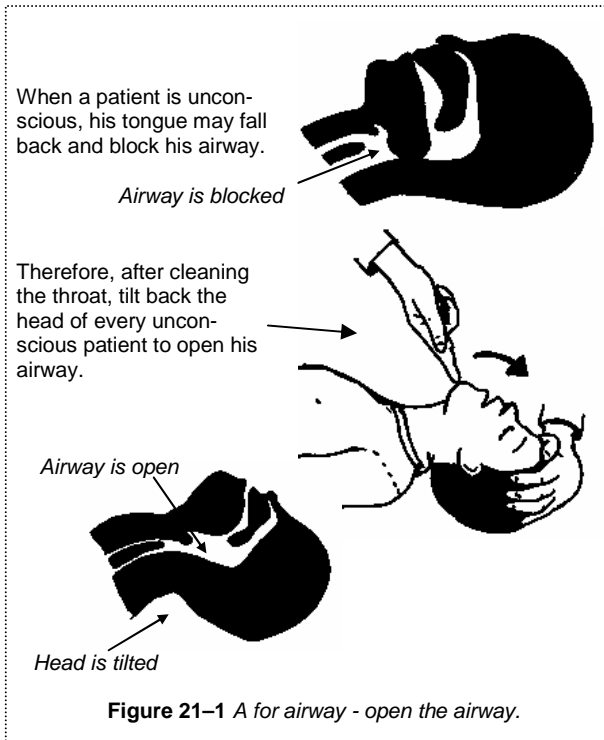
The aim of resuscitation is to maintain or restore these three essential things.

A for airway

Check that the airway is not obstructed. If a person is unconscious and lying on his back, the tongue may fall

back and block the airway. This is a preventable cause of death in unconscious patients:

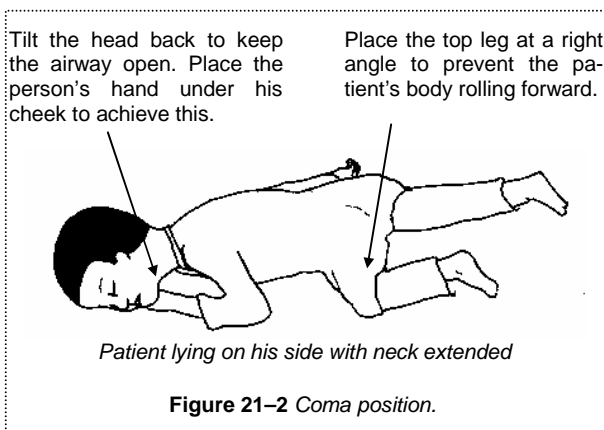
- Open the airway by *tilting the head back and lifting the chin forward* (see figure 21-1). Remove any blood or secretions from the patient's mouth.



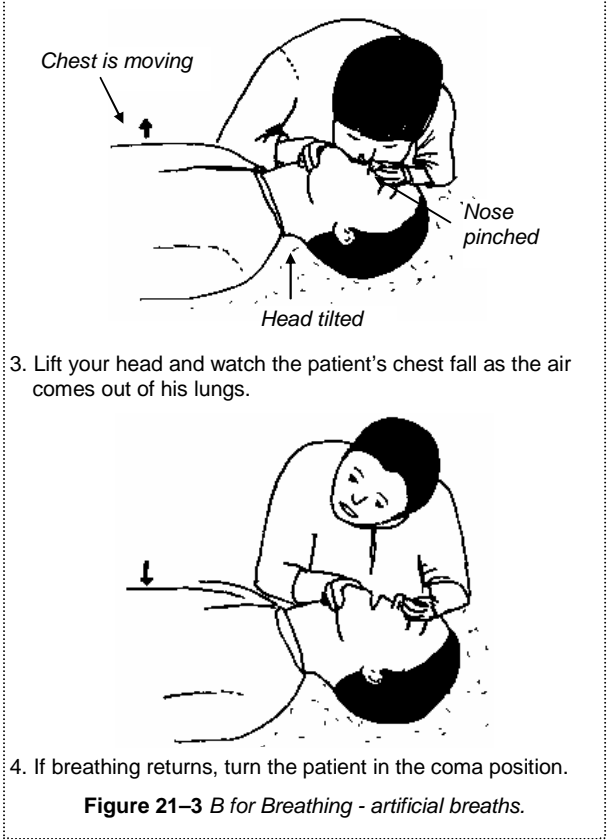
B for breathing

Check quickly whether the patient is breathing. Do not take more than 10 seconds to do this:

- *Look* for chest movements. Place one of your hands on the chest and the other on the abdomen and *feel* for signs of breathing (moving of chest and abdomen).
- Place your cheek as near the patient's mouth as possible. **Listen** for breath sounds and *feel* for breath on your cheek.
 - *If he is breathing*, turn him into the coma position (see figure 21-2).
 - *If he is not breathing*, give two effective artificial breaths (rescue breaths) (see figure 21-3).



1. Tilt the head back.
2. Take a deep breath, open your mouth and seal the person's mouth with your lips. Pinch his nose. Blow air firmly and steadily into his mouth until you see the chest rise. Your rescue breath should altogether take about 2 seconds. If the chest does not move, check that the patient's head is tilted back and that air does not escape through his nose.



C for circulation

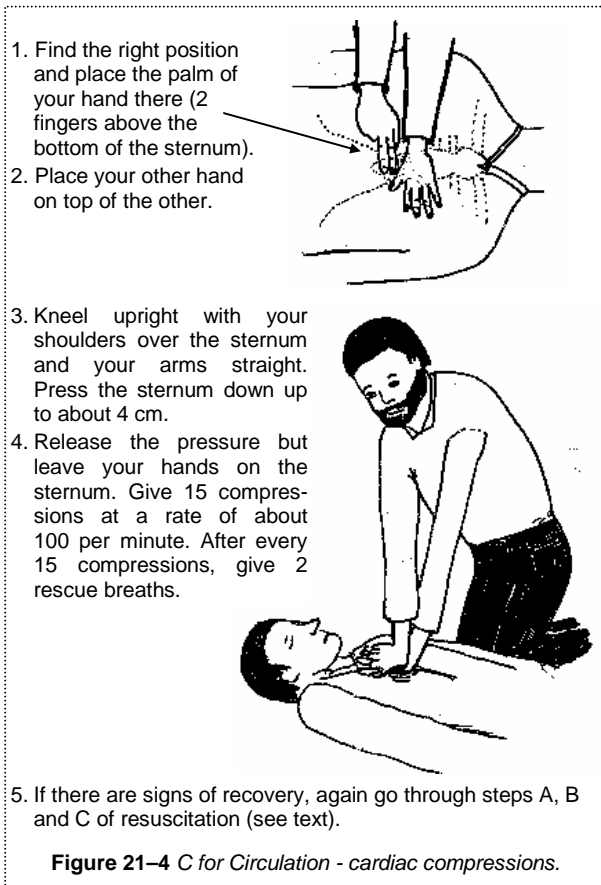
After you have given two rescue breaths, check quickly whether the person has normal circulation. Do not take more than 10 seconds to do this:

- Feel the carotid pulse.
- If you have not been trained to feel the carotid pulse, look for breathing, coughing or movement of the patient.
 - *If you detect signs of circulation*, continue breaths.
 - *If there are no signs of circulation*, start with chest compressions (see figure 21-4). Chest compressions are combined with artificial breaths (cardio-pulmonary resuscitation).

NOTE: in a situation outside a hospital with no organised ambulance service or intensive care unit, it is not realistic to continue with cardiac compressions for long. However always try to treat the underlying condition that has led to the cardiac arrest before giving up on a patient.

D for drugs

Replace fluid or blood loss and treat severe allergic reaction with adrenaline before giving up on a patient.



Drugs are also important in other medical emergencies such as severe asthma or acute heart failure.

Special case: resuscitation in pregnancy

In the third trimester of pregnancy, the uterus is large. When a woman lies on her back, the uterus may compress the large vein that carries the blood back to the heart (vena cava inferior). Therefore, during resuscitation of a pregnant woman, lay her on her left side, or have someone lift the uterus with his hands to the left and towards the patient's head. If you put a pregnant woman into the coma position, lay her on her left side.

4. Treat the most serious condition first

After you have made sure that the patient's airway is open and that he is breathing, control those serious conditions that may lead to a person's death.

HEAVY BLEEDING

If a large amount of blood is lost, shock and eventually death occurs. Blood can be lost visibly to the outside (external bleeding) or invisibly inside the body (internal bleeding).

First aid

1. **Stop the bleeding.** Press on a heavily bleeding wound with a clean piece of dressing or cloth. If the

bleeding is from an arm or leg, raise and support the limb above the level of the heart. Pressure and raising the limb will control almost every bleeding. To apply a tourniquet is usually more harmful than beneficial.

2. **Check and treat for shock.**
3. **Prevent infection.** Cover the wound, ideally with sterile dressing.
4. *If you refer the patient to hospital, make sure that pressure on the wound and treatment of shock are continuing during transport.*

Special cases:

- **Bullet wounds.** Treat severe bleeding as described above. Bullet wounds are also dangerous because they may cause infection or a fracture if the bullet has hit a bone. Therefore splint a limb during transport to hospital and, if the hospital is far away, clean the wound and give a first injection of procaine penicillin IM.
- **Mine injury.** Treat severe bleeding as described above and clean the wound as well as possible. If the hospital is far away, give a first injection of procaine penicillin IM.

SHOCK

Shock is another common cause of death that could often be prevented by good pre-hospital care and safe transport. Shock occurs when the circulation fails. The blood is then no longer able to transport enough oxygen to the brain and other vital organs. These may be permanently damaged if shock lasts for a prolonged time. In injuries, shock is usually caused by loss of blood, or in burns by loss of fluid. Other causes of shock are severe dehydration, severe allergy (dilatation of blood vessels), sepsis, heat exhaustion or severe heart failure.

Clinical features

- ✗ Pale, cold and damp skin
- ✗ Restlessness and feeling sick
- ✗ Fast, weak or not palpable radial pulse

Normal pulse rates:

Children over 1 year	70-120/minute
Adults	60-80/minute

- ✗ *Delayed refill time.* Press with your finger on the patient's fingernail so that the blood bleaches. Then take your finger away and measure the time it takes until the capillaries of the nail bed have been refilled with blood. A prolonged refill time of more than 2 seconds indicates impaired circulation and shock.

Late signs of advanced shock:

- ✗ Gradual loss of consciousness
- ✗ Low blood pressure
- ✗ No or only very little urine passed (acute renal failure)

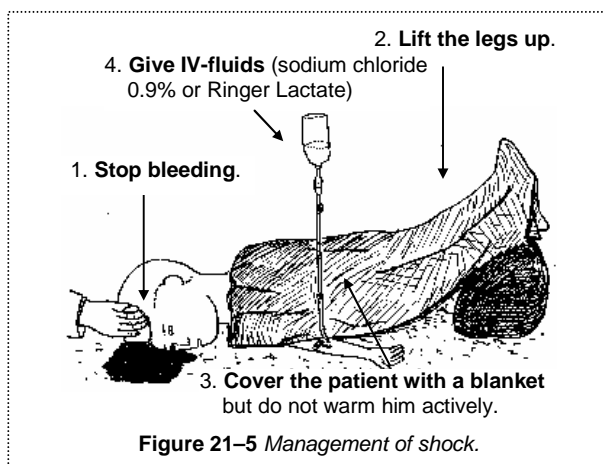
First aid

1. **Stop any major bleeding.** Treat any other cause of shock.
2. **Raise up the patient's legs** (shock position - see figure 21-5).
3. **Cover the patient** with a blanket and protect him from extreme cold or heat. Do not warm him actively.
4. **Replace the lost fluid** by giving *sodium chloride 0.9%* or *Ringer-Lactate solution* rapidly until you can feel a strong radial pulse. If IV access is not possible, do a venous cut-down in adults. In young children give by intraosseus infusion (see page 254).
5. *If you refer the patient to hospital*, make sure treatment of shock (shock position and IV fluids) continues during transport.

NOTE: there is no evidence that colloid preparations (haemaccel, gelatine, dextrans) have an advantage over sodium chloride 0.9% and Ringer-Lactate solution for treatment of shock. There is evidence that they may reduce survival. Glucose infusion is not used for treatment of shock.

Further management

1. *If shock is very severe* and clearly from blood loss, consider giving O rhesus negative whole blood 15ml/kg without cross-matching.
2. Give **oxygen**. NOTE: shocked patients often do not show cyanosis.
3. **Monitor urine output** closely because the patient may develop acute renal failure.



BURNS

Burns are associated with several risks:

- Widespread burns, even if only superficial may cause fluid loss and shock. Children are at particular risk because they have about 3 times the body surface of adults.
- A burn breaks the protective barrier of the skin so that germs can enter the body and cause infection.
- Burns may heal with extensive scarring, which may cause contraction of joints.

First aid

The aim of first aid is to limit the damage of the burn.

1. **Cool the burnt area as quickly as possible** with cold water for at least 10 minutes. This prevents the heat from reaching deeper tissue structures and reduces pain. Do not cool if extensive burns with shock.
2. **Assess, treat for shock and give strong analgesics.**
3. **Cover the burn with a clean dressing.** Never put any traditional medicine on burns.

Further management

Assess the patient and find answers to the following questions:

- **Time:** when did it happen? If the burn is old, are there signs of infection? (Redness, pus or fever)
 - **Location:** which part of the body is burnt? (Dangerous if face, genital area or over joints)
 - **Extent:** what percentage of the body surface is burnt? (Dangerous and risk of shock if more than 10% of a person's body surface are burnt)
- A simple estimate is based on the size of the patient's palm. One palm of the patient represents about 1% of burned body surface area. Alternatively use the 'rule of nine' (adults) or 'rule of seven' (children) - see figure 21-6 on the next page.
- **Depth of burn:** how deep is the burn? (See figure 21-7) Dangerous if it is a third degree burn because it will not heal spontaneously.

Management depends on the results of the assessment.

1. Refer the following patients at risk to hospital:

- All patients who have burnt *more than 10%* of their body surface because they are at risk of shock and secondary infection. If hospital treatment is not possible, manage the fluid balance as follows:
 - a. Set up IV access and replace fluid losses. Calculate the fluid needs for the first 24 hours:

$$4 \times \text{patient's body weight} \times \% \text{ of surface burnt} = \text{ml fluid needed during the first 24 hours}$$
 - b. Give half the fluid requirements during the first 8 hours. Give Ringer-lactate (sodium chloride). Check haemoglobin and monitor urine output. Risk of renal failure because of high fluid losses during the first 72 hours.
- Patients with *flame burns of their face* because they may also have burns of their airways.
- *Patients with 3rd degree burns* that have not healed after 3 weeks because the patient may need a skin graft.

2. Give tetanus prophylaxis.

3. Local treatment - always as sterile procedure:

- Always wash your hands before and after you examine burns. Wear sterile gloves.
- Clean the burnt area thoroughly. Give a strong painkiller before you do this. Use sodium chloride 0.9% to clean away any dirt or dead tissue.
- There are two methods for the initial dressing: (1) open method and (2) thick occlusive dressing.

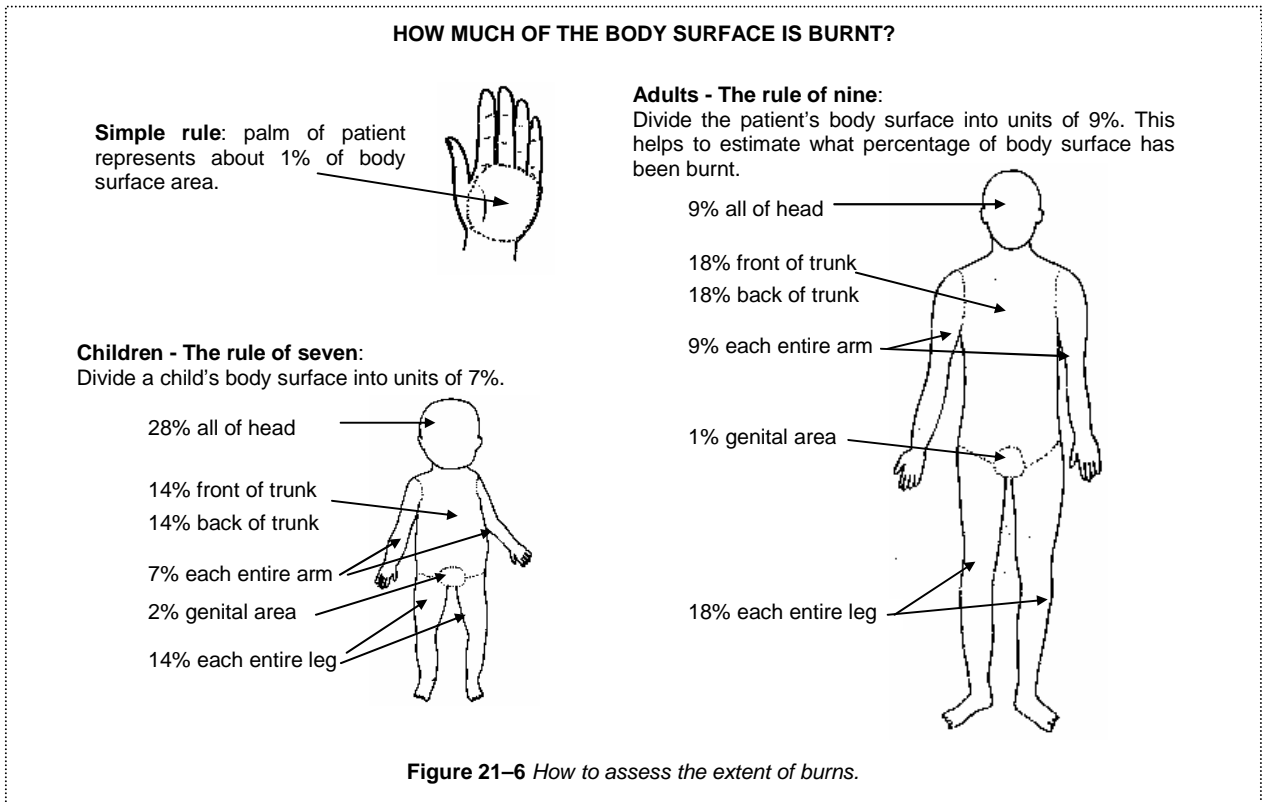
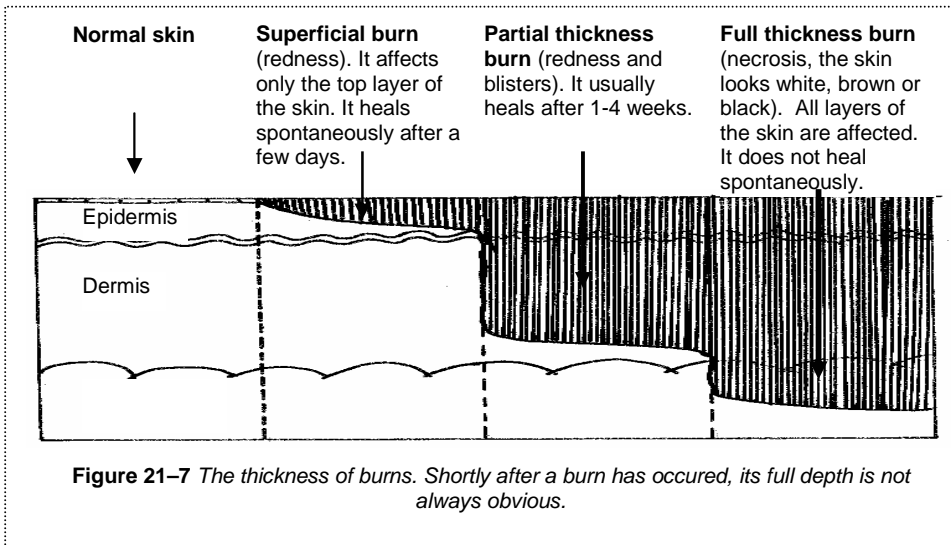


Figure 21-6 How to assess the extent of burns.

method
(for



example for burns of the body, genitalia, face and neck): let the air dry out the area and do not use any ointments or dressings. The patients should lay under a fine mosquito-net. *Monitor the burns daily and look for infection.*

b. Thick occlusive dressings (for example for burns of the hand or feet): always use sterile dressings only. The first layer of dressing close to the skin should contain an antiseptic (for example povidone iodine 10% or chlorhexidine). On this first layer place a thick layer of gauze and then sterile cotton to absorb fluid. The whole is held in place by a bandage. You may also apply silver sulphadiazine (flamazine) or paraffin. In burns of the hand, bandage each finger separately. *Positioning of*

joints is very important. If a deep burn is crossing a joint flexure (the site where the joint bends), there is the risk that contraction from scarring will develop after healing. Prevent it by splinting the affected joint in extension (see figure 21-8) and encouraging the patient to move the joints in the whole range of movements as much as possible.

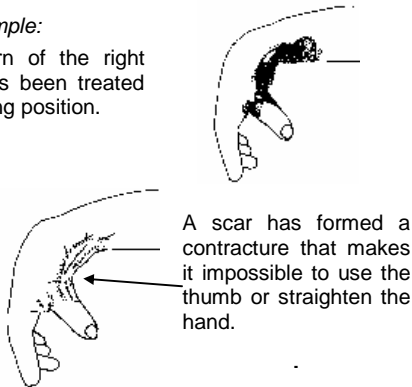
Change the initial dressing after 48 hours. Give analgesics before you do it. Then re-evaluate, clean and remove any dead tissue, and look for signs of infection. Change the dressing every 2-5 days. Change it earlier if it is soaked from exudate, if pain increases or if fever or regional lymphadenopathy develop.

- *If no spontaneous healing after 21 days, skin grafts are required.*

WHY SCAR TISSUE IS DANGEROUS:

Scar tissue that develops after a deep burn can be very dangerous. It may form a contracture that pulls a patient's body in an abnormal position. Children are at special risk because their body will grow but a scar will not grow.

For example:
This burn of the right hand has been treated in a wrong position.



Splinting the hand in this position could have easily prevented this disability.



CORRECT POSITIONING OF SOME IMPORTANT JOINTS:

Splint it in a position that will limit the risk of lasting disability:

- Burnt ankle: keep at 90°.



- Burnt axilla: keep at 90° and burnt elbow (flexor side) keep at 180°.



- Burnt hand and fingers see above.
- Burnt neck: keep in extension.
- Burnt hips and knees: keep in extension.

Figure 21-8 Correct positioning of burnt extremities and neck.

3. **Pain relief.** The choice of drug depends on the severity of pain (see box on page 251). Some patients develop chronic neuropathic pain later. Treat with amitriptyline and carbamazepine.
4. Give **antibiotics** only if there are signs of invasive infection. If infection develops, give **amoxicillin + clavulanic acid** (Augmentin), cloxacillin or gentamicin. If pseudomonas is suspected, give ciprofloxacin.

FRACTURES

See figure 21-9. It may be difficult to distinguish between a bone fracture, a joint injury (for example

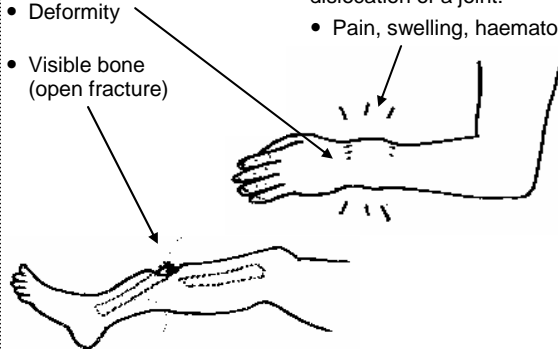
CLINICAL FRACTURE SIGNS:

Certain fracture signs:

- Abnormal mobility
- Deformity
- Visible bone (open fracture)

Uncertain signs that may also be caused by simple sprains, tendon injuries or dislocation of a joint:

- Pain, swelling, haematoma



COMPLICATIONS OF FRACTURES:

Acute:

- Damage to other structures (nerves or blood vessels)
- Bleeding (especially large bones such as the femur)
- Infection (open fractures)

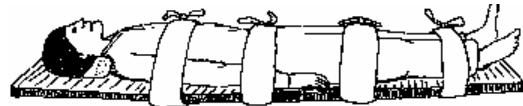
Long-term:

- Loss of function
- Bones are not healing together because of poor positioning

FIRST AID OF SUSPECTED FRACTURES:

The aim is to stabilise the fracture during transport so that the ends of the bones cannot move and cause further damage, and transport is less painful for the patient. Cover all open fractures with as clean a dressing as possible. Treat shock if needed.

- **Spinal fractures:** move the patient with great care. If necessary, move him on a board or strap him to a plank.



- **Leg fractures:** pad a piece of wood and tie this to the injured leg (in femur fractures make sure the splint extends beyond the pelvis); or put padding (soft clothes) between the legs of the patient.



- **Arm fractures:** put the arm in a sling and bandage it firmly to the body.

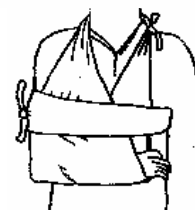


Figure 21-9 Bone fractures.

strained or torn ligaments) or a muscle injury. If in doubt and no x-ray is available, treat as a fracture.

Clinical features

Suspect a fracture if a patient complains about severe localised tenderness and pain at the site of the injury. Usually there is swelling and bruising and inability to

move the affected limb. The diagnosis is clear if a limb is twisted or deformed.

NOTE: traditional bonesetters often diagnose fractures when it is only a soft tissue injury or strain. They then claim afterwards that with their method the bones heal faster than with medical treatment. As a matter of fact, bonesetters may do a lot of harm to true fractures.

Investigations

Take x-rays from two different angles.

First aid

Bones have important blood vessels, nerves and organs that lie alongside them. Therefore, all fractures must be handled with extreme care.

The aim of first aid is to prevent further damage. You do this by keeping the bone in a fixed position:

1. **Cover any open wound** with clean dressing to prevent infection of the bone (osteomyelitis).
2. **Stabilise the fracture**, for example by using a splint. Always include the joint above and below the fracture.
3. **Check and treat for shock.** A fracture of a large bone (for example the femur) may cause severe internal bleeding.
4. *If you refer the patient to hospital*, make sure the fracture is well stabilised. This will reduce the risk of further damage to blood vessels, nerves or organs. It will also make transport less painful for the patient.

Further management

Further management depends on the type and site of the fracture. Sometimes an operation is necessary to bring bones back together. It is beyond the purpose of this book to explain details. Important general points are:

1. The fractured bone is fixed so that it can heal. The limb is rested in a so-called neutral position to prevent the development of contractures. The duration of stabilisation depends on the fracture but will usually be around 4-8 weeks. If you have applied a cast, check it the next day to make sure it is not too tight. It should not be painful and the distal parts of the limb should be well perfused and not white, blue or swollen.
2. Make sure that the patient does exercises to strengthen the weakened muscles and train the rested joints after removal of the cast. Physiotherapy is very important.

ALLERGIC REACTIONS

An allergic reaction may be mild or severe and life threatening.

Clinical features

Mild allergic reactions may present as an itchy, generalised urticarial rash, swelling, rhinitis, nausea or vomiting, abdominal pain or conjunctivitis.

Severe allergic reactions occur usually within minutes of a drug being given or for example after a bee sting. In addition to the symptoms of mild allergy, a severe allergic reaction is characterized by one or both of the following danger signs:

- ✘ Breathing difficulty due to laryngeal oedema or bronchospasm
- ✘ Collapse or loss of consciousness due to low blood pressure

Management

1. Remove the allergen (for example stop the drug).
2. Give an anti-histamine (chlorphenamine or promethazine) and corticosteroid (prednisolone) for 3-5 days.
3. *If severe allergic reaction*, treat as explained in the box.

5. Call for help

Treatment of a severe allergic reaction with breathing difficulty or collapse:

1. **Give adrenaline (epinephrine) IM.** Repeat after 10 minutes if necessary.

For children younger than 5 years dilute 1 ampoule adrenaline 1:1000 with 9 ml sodium chloride 0.9%.

1 month-1 year	0.05 mg	(= 0.5 ml diluted solution)
1-2 years	0.1 mg	(= 1 ml diluted solution)
2-5 years	0.2-0.4 mg	(= 2-4 ml diluted solution)
6-12 years	0.5 mg	(= 0.5 ml of ampoule adrenaline 1:1000)
Adults	0.5-1mg	(= 0.5-1 ml of ampoule adrenaline 1:1000)

2. **Give chlorphenamine**

1-5 years	2.5-5 mg	SC, not IM or IV
6-12 years	5-10 mg	IM
Adults	10-20 mg	IV or IM

Alternative: promethazine (adult dose 50 mg IV or IM)

3. **Give dexamethasone IV/IM**

Under 6 years	2-4 mg
6-12 years	4-8 mg
Adults	8-12 mg

Alternative: hydrocortisone (adult dose 200 mg IM or IV)

4. **Supportive treatment.** If necessary, give intravenous fluids to treat shock; or salbutamol or aminophylline to treat bronchospasm.

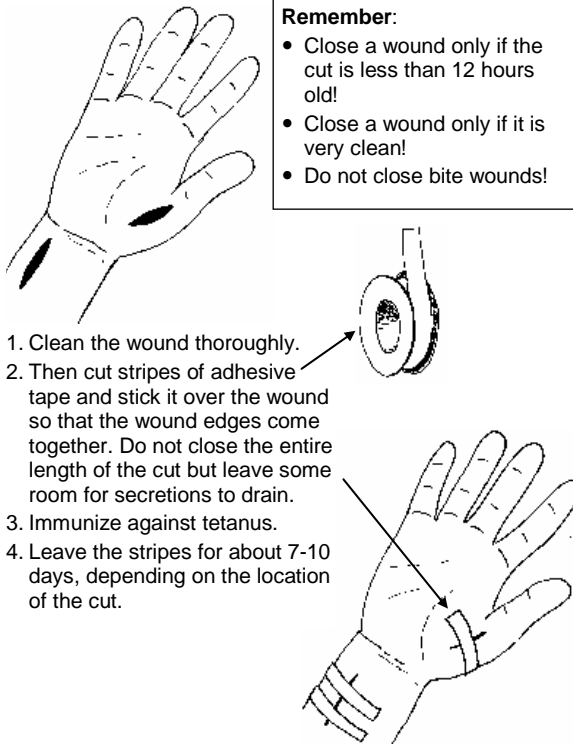
When you do first aid, get help after you have treated the life-threatening conditions. Ideally get someone else to get help while you take care of the injured person.

6. Treat any minor injuries

It is beyond the scope of this book to explain surgical procedures. However, every health professional should be able to take care of minor wounds:

1. Wash your hands with soap and water before and after treating wounds.

2. Wash the wound well with soap and clean water. When cleaning a wound make sure you remove all the dirt because even a little dirt may cause dangerous infections.
 3. Large cuts will heal faster if you bring the edges together so that the cut stays closed. This also prevents infection. You can close a cut by using butterfly bandages or with stitches (see figures 21–10 and 21–11).
- NOTE: only close cuts that are less than 12 hours old and that are very clean. Never close bite wounds. For management of infected wounds see pages 226–227.
4. Tetanus can be transmitted even through small wounds. Never forget to immunize people with wounds against tetanus.



Remember:

- Close a wound only if the cut is less than 12 hours old!
- Close a wound only if it is very clean!
- Do not close bite wounds!

1. Clean the wound thoroughly.
2. Then cut stripes of adhesive tape and stick it over the wound so that the wound edges come together. Do not close the entire length of the cut but leave some room for secretions to drain.
3. Immunize against tetanus.
4. Leave the stripes for about 7-10 days, depending on the location of the cut.

Figure 21–10 How to close wounds using adhesive tape.

Safer transport to hospital

Prevent death during transport. The aim of first aid is to stabilise a patient's condition so that it is safer to move him.

1. Make transport as safe as possible:
 - All unconscious patients must remain in the coma position.
 - Continuous pressure must be applied to all major bleedings.
 - All patients with shock or major bleeding must be transported in the shock position. IV fluids should be continued during transport.
 - All fractures must be stabilised to avoid further damage and to reduce pain.

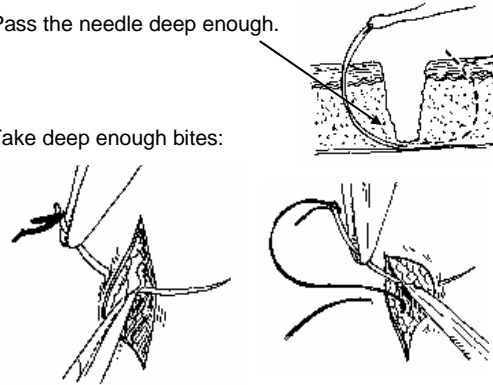
Remember:

- Close a wound only if the cut is less than 12 hours old!
- Close a wound only if it is very clean!
- Do not close bite wounds!

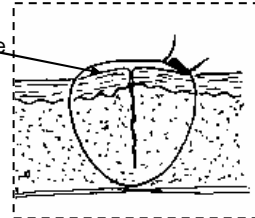
1. Clean the wound thoroughly and remove any dead tissue.

2. Pass the needle deep enough.

Take deep enough bites:



3. The skin edges have come together. The suture is not too tight.



Common problems if the suture is too superficial:

- The skin edges are inverted
- Blood is trapped in the wound (risk of infection)

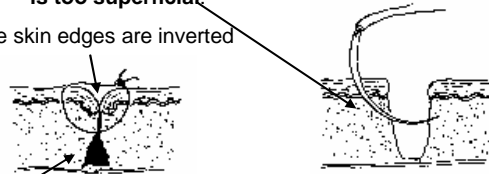


Figure 21–11 How to suture a wound. For how to tie knots refer to a surgical textbook, or best, ask a surgeon to teach you practically.

- All patients with difficult breathing should be transported in sitting position, except if they are in shock.

2. Give clear instructions where to take the patient.
3. Write a referral letter (see page 17).

Problems related to heat or cold

HEAT EXHAUSTION

Heat exhaustion is caused by an abnormal loss of salt and water through excessive sweating.

Clinical features

- Headache
- Pale skin, sweating

- Slightly raised body temperature
- Signs of shock - if severe, loss of consciousness

Management

1. First aid: lay the patient down in a cool place and put him in the shock position. Give him plenty of water to drink.
2. If severe, give sodium chloride 0.9% IV.

HEATSTROKE

Heatstroke occurs when the body is unable to cool itself by sweating due to illness or prolonged exposure to heat and humidity.

Clinical features

- Headache and feeling dizzy, later loss of consciousness
- Red and very hot skin, no sweat
- High fever (it may reach 40°C/104°F or higher)
- Fast strong pulse

Management

Lower the patient's body temperature as quickly as possible. Lie the patient down in a cool place and remove his clothes. Wrap him in a cold wet sheet and keep it wet (or continually sprinkle him with cold or tepid water, and fan him at the same time). Continue until the body temperature has fallen to a safe level (below 38°C/100.4°F).

HYPOTHERMIA

Hypothermia occurs when the body temperature drops below 35°C/95°F. Newborn and malnourished children are particularly at risk.

Clinical features

- Lethargy, possibly loss of consciousness
- Very cold skin and shivering
- Slow breathing, weak pulse

Management

For the management of hypothermia in newborn and malnutrition see pages 51 and 199.

1. Take any wet clothes off and replace them with dry clothes. Rewarm the patient by placing warm blankets round his trunk. If he is conscious, let him drink hot tea with sugar or other warm drinks.
2. Look for frostbite.
3. Monitor the patient, especially his pulse and blood pressure because he may develop arrhythmias.

FROSTBITE

Frostbite occurs when parts of the body become frozen due to severe cold. Frostbite may be accompanied by hypothermia.

Clinical features

- Prickling pain is followed by gradual loss of feeling in the affected area.
- The affected skin will feel hard and turn white, then blue and finally black.

Management

1. **First aid:** warm the affected area slowly. For example the patient could put his hands under his armpits or his feet under the armpits of a family member until colour and feeling returns to the skin. Then cover the affected part with a warm cloth. Do not put the affected body part in hot or cold water because this may cause further tissue damage.
2. Prevent infection and remove necrotic tissue.

Bites and poisoning

DOG BITES and RABIES

Dog bites can cause infection. The most dangerous infection is rabies. Rabies is a viral illness that is also transmitted by the bite of other animals. Often the animal shows some signs of the disease (for example strange behaviour, foaming at the mouth, inability to drink, or it goes wild and bites everyone). Affected animals usually die within 5-7 days.

Once the patient shows signs of the disease, there is no cure. In half of all patients, the first sign of rabies is pain at the site of the original bite. The pain appears usually 3-8 weeks after the bite. Later, swallowing becomes difficult and painful. Thick saliva drools out of the mouth of the patient who is alert but very fearful, irritable or over-excited. He may develop convulsions and paralysis. Finally he becomes comatose and dies.

Rabies is prevented (1) by controlling stray dogs and (2) by good treatment of all bite wounds.

Management of bite wounds

1. **Clean the wound thoroughly with soap and water.** Soap will destroy rabies virus. Remove any dead tissue. Afterwards clean with iodine solution or 40-70% alcohol. Do not close bite wounds with stitches.
2. **Give tetanus prophylaxis.**
3. **Give prophylactic antibiotics** to all people with bite wounds. If available, give **co-amoxiclav** (= amoxicillin + clavulanic acid; dosage is as for amoxicillin). Alternatively, give doxycycline + metronidazole for 5 days (both are contra-indicated in pregnancy, and doxycycline is contra-indicated in children) or procaine penicillin IM.
4. **Give rabies immunisation** as soon as possible after a person has been bitten by an unknown or possibly mad dog. Standard treatment is one dose IM into the deltoid muscle (upper arm) or upper lateral thigh in

children (but never into the buttock) on day 0, 3, 7, 14 and 28 after the bite. However, this is expensive. The following eight-site intradermal post-exposure regimen (for use with PCEC or HDCV vaccines) is cheaper and equally effective:

Day 0: inject 0.1 ml intradermally at eight sites (right and left: deltoid, suprascapular, thigh and upper abdominal area).

Day 7 (= 1 week): inject 0.1 ml intradermally at four sites (right and left deltoids and thighs).

Day 28 and 91 (= 4 weeks and 3 months after the bite): inject 0.1 ml intradermally at one site (deltoid).

SNAKE BITES

Poisonous snakes do not always inject their poison when they bite. Therefore not every snakebite is dangerous. Signs of poisoning are local pain and swelling. The swelling may spread and necrosis may develop. Systemic complications include bleeding disorders with shock, neurological problems causing swallowing or breathing difficulty and heart arrhythmia.

Management

1. First aid:

- Do not apply a tourniquet, do not incise the bite.
- Wipe the site of the bite with a clean cloth and cover it.
- Immobilize the whole limb.

2. Give tetanus prophylaxis.

3. Monitor the patient:

- If there is no local swelling after 2 hours, the bite was not poisonous. Discharge and reassure the patient.
- If there is local swelling after 2 hours, observe the patient for at least for 12 hours. Watch for and treat complications.
- If there is swelling or necrosis, keep the limb immobilized and raised. Give procaine penicillin IM for 5 days. If the swelling is massive, give a corticosteroid (for example dexamethasone).

POISONING

Poisoning may result from an attempt by the patient to cause self-harm (for example a 'cry for help' of a person with depression) or poisoning may occur when someone accidentally takes a poison. Poisons may be swallowed, inhaled injected or absorbed through the skin.

How to recognise poisoning

Poisons affect many parts of the body if a sufficient amount has been taken. Sometimes poisoning is obvious from the circumstances (for example the patient says he drank acid). In other situations, consider poisoning as a differential diagnosis if a patient shows any of the following symptoms, which depend on which kind of poison has been taken:

- Convulsions, confusion and loss of consciousness
- Vomiting, diarrhoea and abdominal pain
- Very small pupils (insecticide or opiate poisoning)
- Difficulty breathing (if poison has been inhaled) or respiratory arrest (opium overdose)
- Irregular heart beat, cardiac arrest, low blood pressure (less often high blood pressure)
- Liver or kidney failure
- Burnt lips, mouth and throat (if a corrosive poison was swallowed)
- Cherry red skin (carbon monoxide poisoning)

Management

- First aid.** Follow the ABC of resuscitation.
- Find out **when, what** and **how much** a patient has taken.
- Gastric lavage** (stomach washout) and **inducing vomiting** are no longer recommended for most cases of poisoning. Only if a patient has taken a large amount of poison within the last hour and is fully conscious with an effective cough and gag reflex, then consider gastric lavage or inducing vomiting by irritating the back of the throat with the finger. All these measure are contraindicated if a person has swallowed kerosene or a corrosive agent (for example acid).

Activated charcoal prevents much of the absorption of many poisons. Give activated charcoal orally if the patient has taken a large dose of a poison within the last 2 hours (give adults 50–100 g dissolved in one glass of water; children over 1 year 25–50 g). In cases of poisoning with carbamazepine, dapsone, phenobarbital, quinine and theophylline repeat the dose every 4 hours because this may help to eliminate these drugs. Treat vomiting with metoclopramide.

NOTE: there is no benefit in enemas, laxatives or forced diuresis with frusemide.

- Monitor the patient.** Treat symptoms and complications when they occur.

Prevention

To prevent accidental poisoning, never keep kerosene or other poisons in drinking bottles. Always label containers that contain poison very clearly. Keep poisons and drugs in a separate place out of the reach of children.

Additional clinical information about specific poisons

- **Benzodiazepines** (for example diazepam) may cause drowsiness, coma and respiratory depression. Treat symptoms.
- **Carbon monoxide** is usually due to inhalation of smoke, car exhaust or fuel gases. Its toxic effects are due to hypoxia (lack of oxygen): headache, vomiting, cherry red skin, fast breathing, fast pulse, convulsions and cardiac arrest). Remove the person to where he can breathe fresh air; give 100% oxygen.

- **Chloroquine poisoning** is very dangerous and difficult to treat. It may cause sudden cardiac arrhythmias and convulsions. Treat symptoms.
- **Drinking corrosives** (for example acids). Never induce vomiting. Let the patient drink plenty of water or milk but not so much that he starts vomiting. Be prepared to treat laryngeal oedema, shock, oesophageal or gastric perforation and infection. Long-term complications are scarring and stenosis of oesophagus or stomach.
- **Heavy metal poisoning (arsenic, mercury, zinc, lead, copper or gold)** may cause coma, convulsions and multiple organ failure. Give dimercaprol IM every 4 hours for 2 days, then 2-4 times for another 2 days. And then 1-2 times daily for 10 days or until recovery (adult dose is 3 mg/kg/dose = 100–200 mg; child dose also 3 mg/kg/dose).
- **Insecticides** may be swallowed, inhaled or absorbed through the skin. Poisoning causes nausea, vomiting, hypersalivation, very small pupils, muscle weakness, bronchospasm, respiratory arrest and convulsions. Wash the contaminated skin. Give atropine 2 mg IV every 10 minutes until the pupils dilate, the pulse becomes fast (120-140 beats/minute) and the skin becomes dry and flushed.
- **Iron poisoning** goes through different phases: the patient develops abdominal cramps and diarrhoea with blood 30 minutes-2 hours after ingestion. About 6-24 hours later he develops fever, shock, convulsions, coma or liver failure. Late complications are gastrointestinal strictures. Give deferoxamine 15 mg/kg/hour by slow IV infusion. Reduce the dose after 4-6 hours so that the total dose does not exceed 80 mg/kg in 24 hours.
- **Kerosene** ingestion may cause chemical pneumonia. Do gastric lavage if more than 1 ml/kg has been taken, but only if this happened within the last hour.
- **Opiates.** Give naloxone if there is coma or very slow breathing (give adults 0.8–2 mg IV/IM every 2-3

minutes up to 10 mg; give children 0.01 mg/kg, then 0.1 mg/kg if no response).

- **Paracetamol** overdose may cause severe liver damage. If adults have taken more than 12 g or children more than 150 mg/kg, give acetylcysteine by IV infusion. The dosage is the same for adults and children but give less volume of infusion fluid to children (start with 150 mg/kg in glucose 5% over 15 minutes, followed by 50 mg/kg in glucose 5% over 4 hours, then 100 mg/kg in glucose 5% over 16 hours).

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22. Palliative care and cancer

Every health professional is confronted with patients who cannot be cured and who are going to die. These are not only cancer patients but also, for example those with end-stage heart or liver failure. Often a doctor avoids admitting that a patient is dying. Instead he gives him a prescription and sends him away. He treats the patient as if he is going to get better; but he does not take time to help the family and the patient understand that there is no cure. This common practice causes several problems:

1. The dying patient may suffer unnecessary physical symptoms (for example pain).
2. The patient may not be aware that he is dying. Therefore he has no opportunity to come to terms with death. Instead he may travel to different doctors and spend a lot of money on useless medication.
3. The family is left without help in a very difficult situation and may experience feelings of despair, helplessness and guilt.

Palliative care has been defined as the active care of incurable patients. Active care means that symptoms and problems are actively treated. However, the aim is not a cure, but to improve the quality of the weeks or days until death for both the patient and his family. Palliative care does not only concentrate on physical symptoms but also on any psychological and social problems of the patient and his carers.

How to assess a terminally ill patient

When confronted with a terminally ill patient, look for (1) physical problems (2) emotional problems and (3) difficulties of the carers. Symptoms and problems may change rapidly depending on the speed with which the disease progresses. Therefore, reassess all three areas whenever you see the patient and his family.

Assess for physical problems

- Ask the patient about pain: 'Tell me about any pain you have.'
- Restlessness and confusion? Difficulty sleeping?
- Breathlessness or intractable cough?
- Nausea and vomiting? Constipation? Sore and dry mouth? Swallowing difficulties? Hiccup?
- Pressure sores?
- Convulsions?

Assess for emotional problems

- Depression?

- Anxiety?
- Guilt?
- Difficulty coming to terms with death?

Assess for difficulties of the carers

- What are their fears and concerns?
- Are they able to care for the patient? Where do they need more support?
- Have they difficulties coming to terms with the fact that the person is dying?

How to help a terminally-ill patient and his family

How to manage physical symptoms

- **Pain.** For each pain consider the possible cause (for example pain from an infected pressure sore needs different treatment than pain from bone metastases).

The three important principles of pain management in palliative care are:

1. *Continuous pain needs continuous pain relief.* It is illogical and wrong to give pain relief only when the patient asks for it. Instead painkillers must be given regularly at a fixed time (for example every 4, 6 or 8 hours).
2. *Increase the dose until the patient feels relief.*
3. *If one painkiller no longer provides sufficient pain relief, give a stronger painkiller.* In addition to the painkiller, it may be helpful to give an anti-depressant. Follow the so-called analgesic ladder (see box on the next page). It is called a ladder because when the pain is no longer controlled with one drug, you step up to the next strongest painkiller. This is like moving up a ladder.

Treatment of special types of pain:

- **Bone pain:** acetylsalicylic acid (Aspirin), ibuprofen (or another non-steroidal anti-inflammatory drug).
- **Pain from muscle spasm:** diazepam 5–10 mg 3 times daily.
- **Pain from bowel colic:** loperamide 2–4 mg 4 times daily.
- **Pain from stomach distension:** magnesium hydroxide (or another antacid) + metoclopramide 10 mg before meals.
- **Nerve pain:** oral amitriptyline 10–25 mg each night. Increase if necessary.
- **Inflammation or oedema contributing to the pain:** dexamethasone 4–8 mg in the morning.

Analgesic ladder

The dosages stated below are for adults:

MILD PAIN

- **Paracetamol** orally 500 mg–1 g every 6 hours
or
- **Ibuprofen** orally 400–800 mg every 8 hours
or
- **Naproxen** orally 500 mg 1-2 times daily
or
- **Acetylsalicylic acid (Aspirin)** orally 300–900 mg every 4-6 hours
or any other NSAIDs (see page 146)

NOTE: if a patient takes a high dose of acetylsalicylic acid or NSAIDs, or if he had gastric problems in the past, then give him, in addition to the painkiller a drug that reduces the risk of gastrointestinal complications (see page 146).

➤ **If pain is not controlled step up the treatment and give one of the drugs for moderate pain.**

MODERATE PAIN

- **Codeine phosphate** (or dehydrocodeine) orally 30 mg every 6 hours
or
- **Hydrocodeine/paracetamol** (tablets 15 mg/325 mg) orally 2 tablets every 6 hours
or
- **Tramadol** orally 50–100 mg every 4-6 hours

NOTE: preparations with codeine cause constipation. If you start any of them, start also a regular laxative (for example bisacodyl or lactulose).

➤ **If pain is not controlled, step up the treatment and give one of the drugs for severe pain.**

SEVERE PAIN

- **Morphine** orally 5–20 mg every 4 hours. The dose can be increased stepwise according to response to up to 100 mg or more. IM or subcutaneous doses are half the oral dose.

NOTE: morphine causes nausea and vomiting in 30% of all patients. To avoid this, give it together with oral metoclopramide 10 mg for the first 4-5 days. Morphine may also cause drowsiness, which gets better after 5-7 days. Morphine causes constipation. If you start it, also start a regular laxative.

Alternative analgesics for severe pain, if morphine is not available:

- **Pentazocine** orally 50–150 mg every 3-4 hours (maximum 600 mg/day); subcutaneously or IM 30–60 mg every 3-4 hours.
- **Pethidine** orally 50–150 mg every 4 hours; subcutaneously or IM 25–100 mg every 4 hours.

What to do if strong painkillers are not available?

If pain is severe but morphine or other strong painkillers are not available, combine the strongest available drug with a painkiller from another group. Do not combine two NSAIDs, or a NSAID with acetylsalicylic acid (Aspirin) because of the danger of gastrointestinal bleeding.

In addition to the painkiller, give an anti-depressant (for example amitriptyline).

See also 'Treatment of special types of pain' on page 250.

- **Restlessness and confusion:** give oral haloperidol 1–3 mg every 8 hours (or oral chlorpromazine 25–50 mg every 8 hours, but this causes more sedation).
- **Insomnia.** Give a benzodiazepine at night (for example temazepam 10–20 mg or lorazepam 1–2 mg).

- **Breathlessness** (for example from lung cancer). Give regular oral morphine. Begin with 5 mg every 4 hours. If there is bronchospasm, a steroid (prednisolone or dexamethasone) may also be helpful.
- **Intractable cough** (for example from lung cancer): advise boiling water and letting the patient inhale the steam. Give morphine 5 mg every 4-6 hours.
- **Nausea and vomiting** is common in patients with advanced cancer. As with pain, try to determine the cause (for example side effect of morphine, bowel obstruction or gastritis).
Give oral metoclopramide 10 mg 3 times daily (or oral promethazine 25 mg 2 times daily or oral chlorpromazine 25 mg 3-4 times daily). If none of these help, try dexamethasone. In end-stage bowel obstruction, give hyoscine butylbromide + promethazine IM/IV.
- **Constipation:** give a laxative regularly at night (for example bisacodyl 5–10 mg, occasionally up to 20 mg).
- **Swallowing difficulties** (for example from oesophageal carcinoma): oral prednisolone 15–30 mg once daily may give relief for a few weeks. Look also for oral thrush and treat with nystatin.
- **Sore or dry mouth:** teach the family about good oral hygiene (see under 'General management of mouth ulcers' on pages 61-62).
- **Intractable hiccup:** give oral metoclopramide 10 mg every 6-8 hours. If this does not help, give oral chlorpromazine 25–50 mg every 6-8 hours.
- **Pressure sores:** prevent and treat as described on pages 231-232.
- **Convulsions:** treat as described on pages 163-164. When oral medication is no longer possible, give phenobarbital 50–200 mg IM 2 times daily.

How to manage emotional symptoms

People with incurable terminal illness often spend a lot of money trying to become well. This may be because they have not been told that treatment will not make them well, or because they do not want to believe that there is no cure for their illness.

It is always difficult to talk about death with a person who is dying. There is often the fear of hurting them when you talk about death. However, it is important that a person who is dying comes to terms with his death. He needs the opportunity to think through his life. He may want to put things right with God and people so that he can die at peace. He may want to visit places or see family members and friends. If a person can do this, it will also be easier for the family after his death. The family will have the feeling that things have been completed. This helps their own grieving process.

How to help the carers

Caring for someone who is dying is very difficult. It is hard to see a family member or a friend suffering; and it

is hard to do the actual work of caring. The carer can easily become tired and depressed.

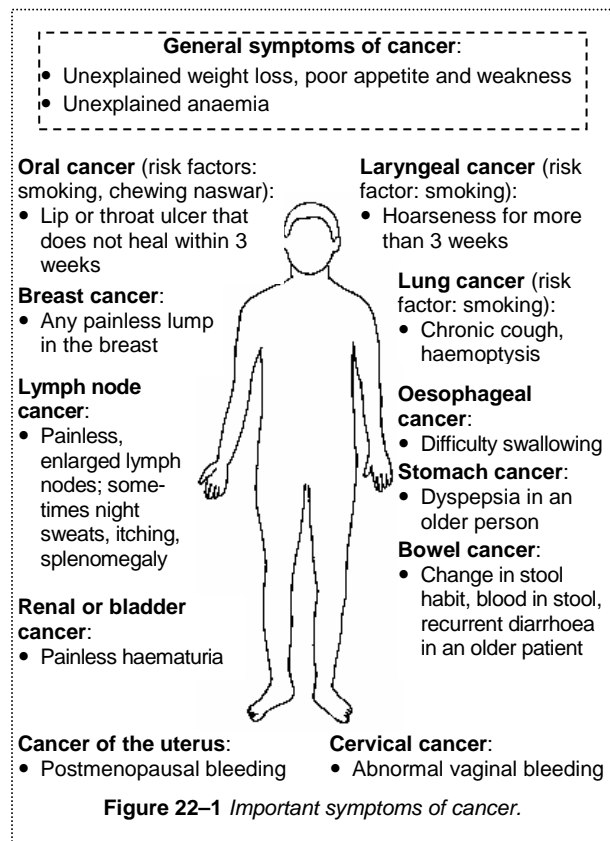
Talk to the carers about their feelings and encourage them by letting them know that they do a very good work in improving the last months or weeks of the ill person's life. It is helpful if the burden of caring is shared between different family members so that everyone can rest and gain new strength.

Cancer

Cancer may be cured if it is detected at an early stage. Sadly, around the world but especially in resource-poor countries, patients often present late with advanced cancer. It is important that you are aware of early warning signs of cancer so that it can be diagnosed and treated before it becomes incurable (see figure 22–1). Be aware that no symptom is specific for cancer. For example chronic cough is more likely to be tuberculosis or bronchiectasis than lung cancer. Many cases of cancer could be prevented if people did not smoke cigarettes.

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A. Practical procedures

In this chapter, you find explained how to perform the following essential procedures:

- How to give injections safely
- How to give emergency drugs and fluids if you cannot find a vein
- How to insert a nasogastric tube
- How to give oxygen
- How to drain a pleural effusion
- How to drain ascites
- How to aspirate joints
- How to do a lumbar puncture
- How to insert a urinary catheter

For how to drain an abscess and for how to take care of minor wounds see pages 226-227.

Avoid injuring yourself with a needle

Make sure you do not hurt yourself when you give an injection. Needle stick injuries can be dangerous and may transmit hepatitis B, C and HIV. Most needle stick injuries occur when health professionals put the cap back onto the needle. Never do that! Instead, discard the syringe and needle in a safe way, without putting the cap back onto the needle!

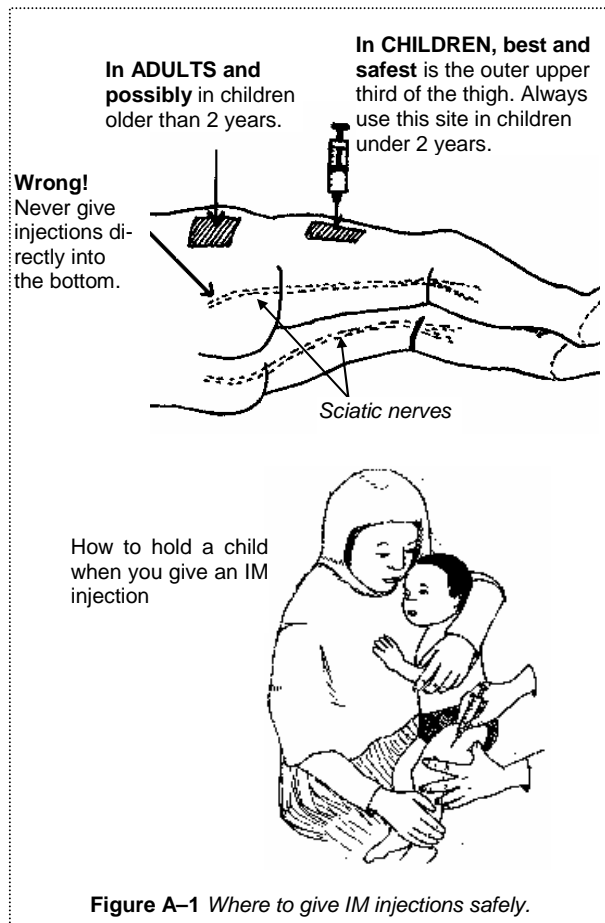


Figure A-1 Where to give IM injections safely.

Dispose of needles and other health waste so that no one can be harmed

Whenever you use needles, make sure you dispose of them in a safe way. The same applies to any other materials contaminated for example with blood or stool. It is disgraceful when you walk along a street and find used needles or bloodstained bandages being thrown away together with other rubbish. Many children have been harmed by this irresponsible behaviour of health professionals.

Build a **burial-pit** for needles and other health waste. This means, build a latrine like a pit latrine for a toilet, only with a small opening into which you can dispose used needles. Alternatively, put needles into a container (for example a metal tin with a small opening) and bury the container at a safe place in a deep hole when it is full. If hospitals and health workers do not use safe ways of disposing their medical waste, they will cause illness, instead of curing it. If you show responsible behaviour at your work place, others will hopefully follow your good example.

How to give drugs, fluids and oxygen

How to give injections safely

Intramuscular injection

Give IM injections only when clearly indicated. More than one third of all injections are given unnecessarily.

1. Always use a sterile needle and syringe.
2. Inject only at the places shown on figure A-1. Otherwise, you may cause a serious injury to nerves or other structures.
3. Clean the skin with antiseptic or with soap and water. About one third of all cases of hepatitis B and C are caused by using dirty needles and syringes.
4. Put the needle straight in.
5. Before injecting, pull the plunger:
 - If blood enters the syringe, the needle may have entered a blood vessel. If this happens, do not inject but take the needle out and put it in somewhere else nearby to avoid injecting directly into the blood stream.
 - If no blood enters, inject the drug slowly.

Intravenous injections and infusions

1. Search for the best vein. For drips try to avoid veins over joints. The best sites to find veins in young children are shown in figure A-2. It is generally better to feel for veins instead of looking for them.
2. Place a tourniquet around the arm and tap the vein to make it appear.
3. Clean the skin with an antiseptic, or soap and water.
4. Put the needle into the vein. You learn that by instructions at the bedside and not from a book.
5. Release the tourniquet. If you give IV drugs, pull the plunger first to make sure the needle is in the vein. Blood should come back.
If you want to set up a drip, fix the needle with tape and connect the drip.

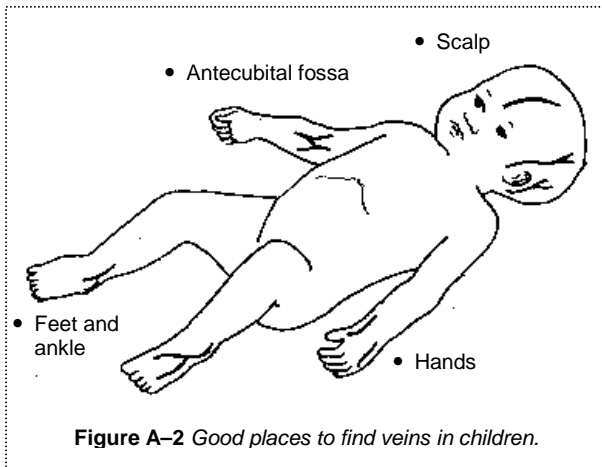


Figure A-2 Good places to find veins in children.

How to give emergency drugs and fluids if you cannot find a vein

In an emergency, it is sometimes not possible to find a vein to give drugs or infusions IV. In this case, there are three alternative ways of giving emergency drugs:

- In convulsions, give the drug into the **rectum** (see page 163). Giving resuscitation fluids per rectum is not very effective.
- In young children, give fluids or drugs through the **intraosseous route**.
- In adults do a **venous cut-down**.

Intraosseous cannulation technique

See figure A-3. This method only works in young children. Be aware of the risk of infection (osteomyelitis). Never use this route for routine procedures but only in emergencies.

1. Feel for the bony prominence (tuberositas tibiae).
2. Clean the skin thoroughly with antiseptic.
3. Push a large gauge needle into the proximal part of the tibia below the bony prominence at a 90° angle. You will feel a sudden lack of resistance when the needle enters the intraosseous space.

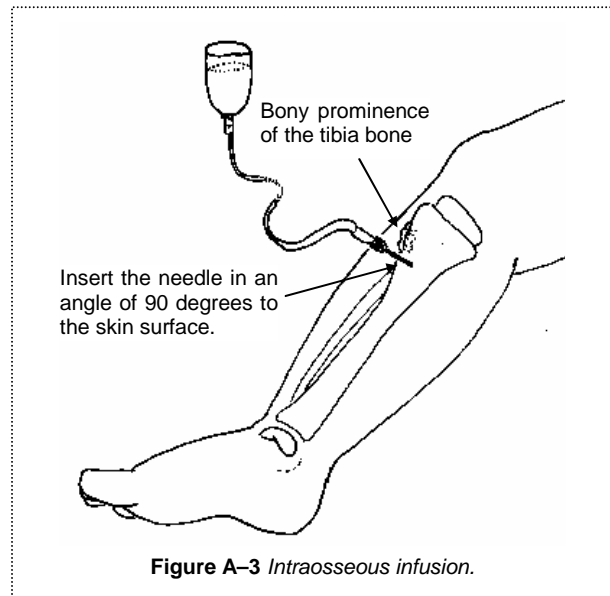


Figure A-3 Intraosseous infusion.

4. Draw some fluid back with a syringe to check that the needle lies correctly. You can infuse all IV fluids and IV drugs through the intraosseous route.
5. Remove the cannula as soon as you can get another access.

Venous cut-down

See figure A-4. Use only in emergencies because of the risk of infection.

1. Locate the long saphenous vein, which is two fingers above and in front of the medial ankle (malleolus).
2. Clean the skin with an antiseptic and wear sterile gloves. If the patient is conscious, infiltrate the skin with local anaesthetic.

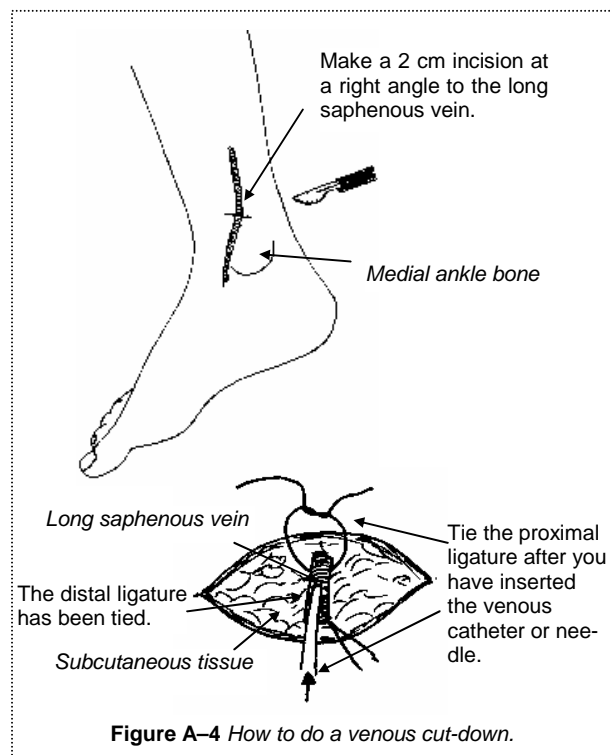


Figure A-4 How to do a venous cut-down.

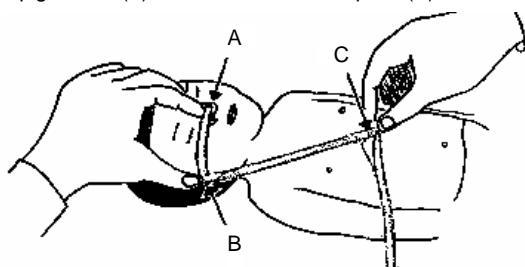
3. Make a 2 cm incision at a right angle to the vein.
4. Dissect the subcutaneous tissues with a blunt instrument parallel to the vein so that you have good access to the vein.
5. Pass a proximal and distal ligature around the vein. Tie only the distal ligature.
6. Make a small hole into the vein proximal to the tied ligature and pass the venous catheter or needle into the vein.
7. Aspirate blood. If no blood comes out, pull the catheter back a little.
8. Close the skin over the incision and cover with a dressing.
9. Remove the cannula as soon as possible.

How to insert a nasogastric tube

See figure A-5. A nasogastric tube for fluids or food can be passed into a patient's stomach. Indications are (1) to give fluids to a severely dehydrated patient who is NOT unconscious when IV access is not possible (2) to feed a severely malnourished child or low birth weight newborn who does not take enough food himself, and (3) in certain cases of acute abdomen (for example intestinal obstruction).

1. Measure the length of the tube that should be inserted: measure the distance from the tip of the nose to the ear lobe, then to the epigastrium. Mark the tube at that point.
2. Lubricate the tip of the tube with water and pass it into one nostril. Push it slowly in. It should pass easily down into the stomach without resistance.
3. When the measured distance is reached, fix the tube with tape at the nose.

Measure the length of the tube that should be inserted: measure the distance from the tip of the nose (A) to the ear lobe, then to the epigastrium (B). Mark the tube at that point (C).



Lubricate the tip of the tube and push it gently through one nostril until you have inserted it up to your mark C. See text.

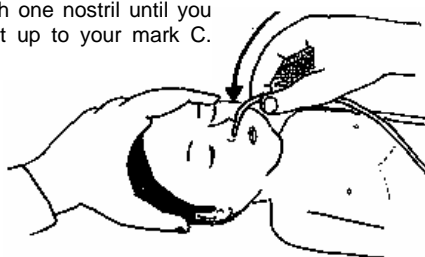


Figure A-5 How to insert a nasogastric tube.

4. Check that the tube is in the stomach. Aspirate a small amount of stomach contents with a syringe to confirm that the tube is in place (ideally check that the fluid turns blue litmus paper pink). If you cannot aspirate fluid, confirm the position by taking an abdominal x-ray or inject air down the tube and listen over the abdomen with a stethoscope. If the tube is in the stomach, you hear air entering the stomach.

If you have passed the tube through the trachea into the lung, the patient will cough and develop respiratory distress. If you pour fluid or feeds down the tube in this situation, the patient may die. Therefore, if you have the slightest doubt about the location of the tube, withdraw it and put it in again.

5. When the tube is in place:
 - If you use it for rehydration, attach an infusion bottle.
 - If you use it for feeding, attach a 20 ml syringe (without plunger!) to the tube and pour fluid or food into the syringe. It will flow into the stomach by gravity.

How to give oxygen

You can give oxygen through a nasal catheter, nasal prongs or a mask, which is less effective.

Nasal catheter

If a nasal catheter is not available, take the giving set of an infusion. Cut the rubber part as shown in figure A-6 on the next page, and attach it to the plastic tube coming from the oxygen bottle or to the bottle directly.

1. Measure the distance between one nostril to the inner side of the eyebrow and mark that distance.
2. Insert the catheter up to your mark. It should be in the position shown in figure A-6.
3. Secure with tape.
4. Start oxygen flow at 1-2 litres/minute.

Nasal prongs

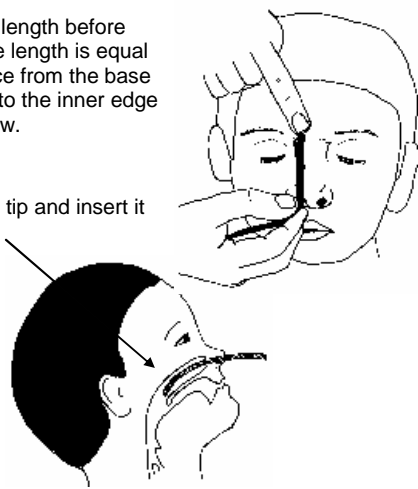
Place the prongs just inside the nostrils and secure them with tape.

Other procedures

All of the following procedures must be done under sterile conditions. This means:

1. Use sterile equipment.
2. Clean the skin with an antiseptic (for example chlorhexidine or iodine polyvidone). Take a sterile swab soaked in the antiseptic. Start cleaning the skin at the place where you want to insert a needle or make an incision. Clean from in circles outwards, away from

1. Measure the length before insertion. The length is equal to the distance from the base of the nostril to the inner edge of the eyebrow.
2. Lubricate the tip and insert it as shown.



If a nasal catheter is not available, take the giving set of an infusion. Cut the rubber part like this and attach it to the plastic tube coming from the oxygen bottle or to the bottle directly.

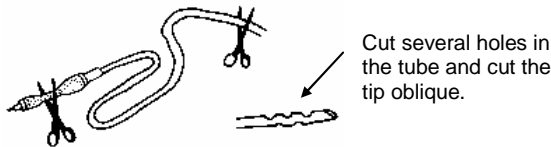


Figure A-6 How to insert a nasal catheter to give oxygen.

that place. Repeat with a second swab but clean a smaller area than the first time. Then take a third swab and only clean the site where you want to insert a needle.

3. Wash your hands thoroughly with an antiseptic or soap and clean water. Wear sterile gloves. Make sure that you only touch the inside of the gloves when you put them on.

How to drain a pleural effusion

See figure A-7.

1. Sit the patient up. Determine the top level of the effusion by percussion. Draw pleural fluid one intercostal space below the top level of the effusion. The best site for aspiration of pleural effusion is the 8th intercostal space in the so-called posterior axillary line.
2. Clean the skin thoroughly with an antiseptic. Wear sterile gloves and use sterile equipment.
3. Use a syringe with a long needle. Blood vessels and nerves run along the bottom of each rib. Therefore, push the needle into the chest above the rib. Push the needle in gently while you are pulling the plunger at the same time. You may feel a click as you go through the pleura and fluid will flow into the syringe.
4. Drain the fluid slowly. In adults, do not aspirate more than 700 ml per episode.
5. Aspirate while you remove the needle. Compress the puncture side with a sterile dressing to prevent air entering the pleural space and causing pneumothorax.
6. Examine the fluid.

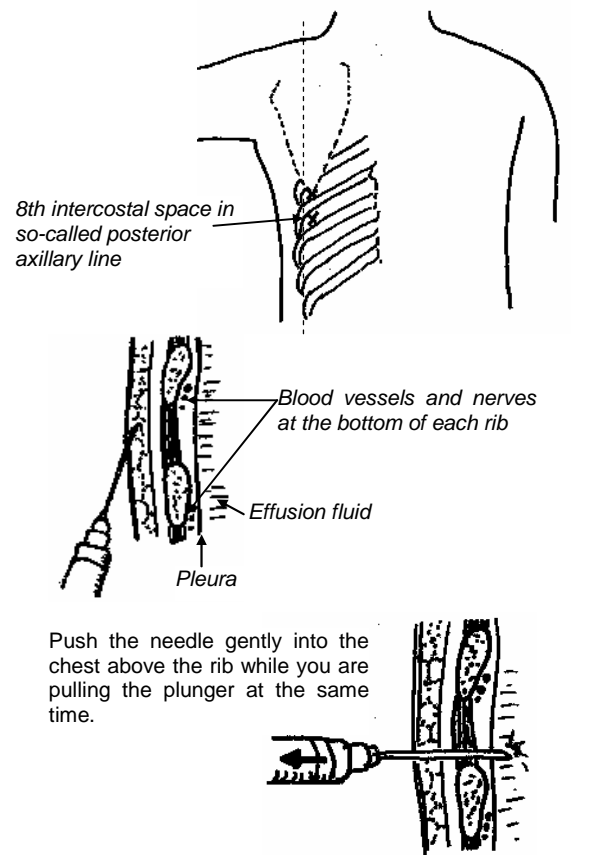


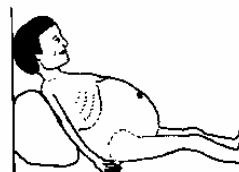
Figure A-7 How to drain a pleural effusion.

How to drain ascites

See figure A-8.

1. Tell the patient to empty his bladder.
2. Lie the patient down with his back supported so that the fluid collects in the lower abdomen.
3. Clean the skin thoroughly with an antiseptic. Wear sterile gloves and use sterile equipment.
4. Insert the needle either halfway between umbilicus and pubic bone, or halfway between umbilicus and iliac spine. Aspirate the fluid, but in adults not more than 1 litre each time.
5. Examine the fluid.

Sit the patient up like this:



Insert the needle in one of these places



Figure A-8 Peritoneal tap.

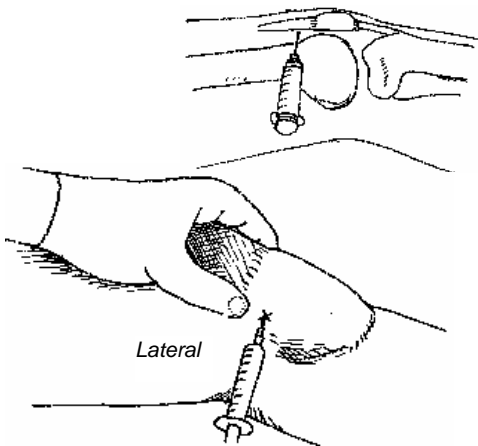
How to aspirate joints

Figure A-9 shows where you can put a needle into the various joints. However, do not aspirate the hip joint unless you have been properly trained how to do it. Always aspirate joints under sterile conditions. Otherwise you may introduce infection and cause septic arthritis.

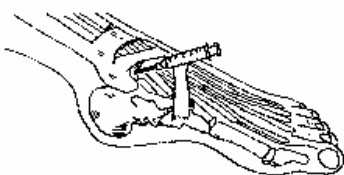
1. Clean the skin thoroughly with an antiseptic. Wear sterile gloves and use sterile equipment.
2. Suck out all fluid that is in the joint.
3. Put a sterile dressing over the needle hole.
4. Examine the fluid.

Always follow the rules of a sterile procedure (see text); otherwise you may induce a joint infection!

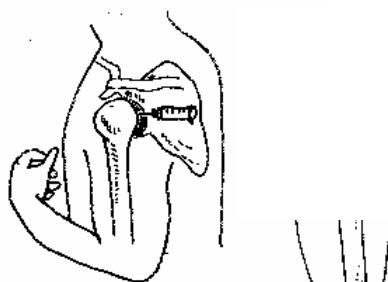
- Knee



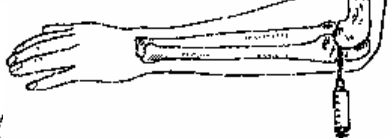
- Ankle



- Shoulder



- Elbow



- Wrist

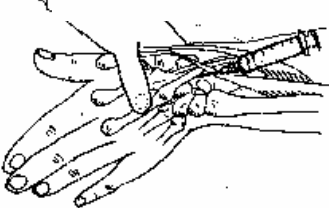


Figure A-9 How to aspirate joints.

How to do a lumbar puncture

See figure A-10. Do not do a lumbar puncture (LP) if you suspect raised intracranial pressure.

1. Correct positioning of the patient is essential. He should draw up his knees to the chest and bend his neck. This opens the spaces between the spinal bodies. In children, you need a helper to hold the child.
2. Clean the skin thoroughly with an antiseptic. Wear sterile gloves and use sterile equipment.
3. Identify the place to put the needle in: feel the iliac crests and follow a line across the patient's back.
4. Put a needle used for IM injections in any space between the lumbar spines below this line.

Do not touch the point of the needle with your finger or let the needle touch anything that is not sterile! Use a new needle if that happens.

Push the needle in straight while it points in the direction of the umbilicus. It will suddenly go in more easily when it gets into the space that contains the cerebral spinal fluid (CSF). CSF will come out as soon as the needle is in this space. Let about 2 ml drop in a clean bottle. Never use a syringe to actively draw CSF!

5. Remove the needle and cover the site with sterile dressing. Advise the patient to lie flat for 1 hour. Some patients complain about headache following the LP, this usually disappears after a few hours or days.
6. Examine the CSF.

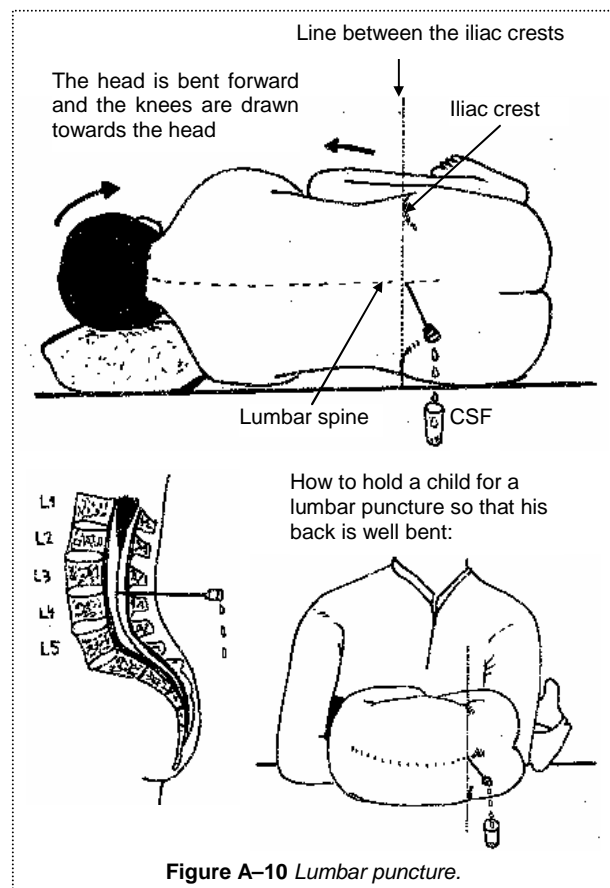


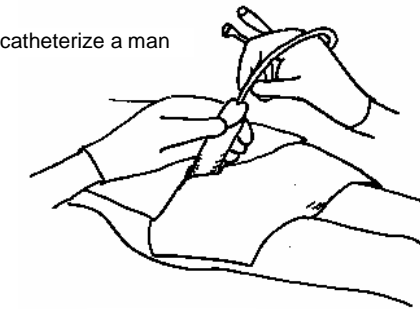
Figure A-10 Lumbar puncture.

How to insert a urinary catheter

Never use a catheter unless it is clearly indicated because you may introduce dangerous infection, or you may damage the urethra. Catheterisation must always be done under sterile conditions! You need a sterile catheter (Foleys No. 12 or 14), sterile gloves, a 10 ml syringe, antiseptic (for example chlorhexidine) and an ampoule of 5 ml water for injection.

1. The patient should lie on his back. Carefully clean the opening of the urethra (meatus) and in men the glans with an antiseptic. Wear sterile gloves.
2. Lubricate the catheter with chlorhexidine.
3. In men, hold the penis with your left hand and stretch it as shown in the figure A-11 to avoid folds in the urethra. The left hand should not touch the catheter!
4. With your right hand introduce the catheter carefully through the meatus and push it gently forwards. Never force it. If you cannot push it forward, use a smaller size catheter.
5. Insert the catheter into the bladder until you cannot push it any further and wait for urine to flow back.
6. If you want to leave the catheter, inflate the balloon by injecting 5 ml water for injection. Pull the catheter back so that it rests at the bladder neck. In uncircumcised men, retract the foreskin. Attach a sterile urine container to the catheter.
7. Clean the meatus every day with an antiseptic and watch for signs of urinary tract infection. Do not keep the catheter in for longer than necessary.

How to catheterize a man



Inflated balloon

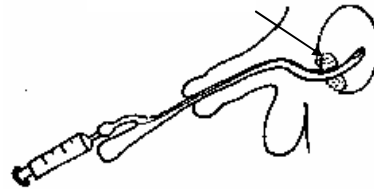


Figure A-11 Male catheterisation.

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B. Chest x-ray

Most of the common lung and heart diseases can be diagnosed without a chest x-ray. However, chest x-rays are examinations that are widely available. Therefore a brief guide of how to examine a chest x-ray systematically and what common conditions look like is included in this book. A radiologist will look for more details than described.

A chest x-ray is usually taken PA (from back to front) with the patient standing and having taken a deep breath in (full inspiration). Solid structures or fluid absorb the radiation while air lets it through. Therefore, the more solid tissues or fluids are between the radiation and the x-ray film, the whiter that area. The more air between the radiation and the x-ray film, the blacker that area.

Indications for a chest x-ray

When you consider arranging a chest x-ray for a patient, ask yourself two questions:

1. Why do I need a chest x-ray?
2. Will the x-ray result change my management?

Only arrange for a chest x-ray if you have a clear idea what you expect from it and if it will influence your management.

The following are *common indications* for a chest x-ray:

- Suspected complications of pneumonia
- Persistent pneumonia
- For diagnosis of chronic cough or chest pain when sputum testing for tuberculosis bacilli was negative and when there were no clear clinical features of asthma
- Suspected miliary tuberculosis
- To confirm pleural effusion or suspected pneumothorax and to define their size
- Suspected heart failure that is clinically difficult to differentiate from a lung problem
- Unclear prolonged fever

Remember: pulmonary tuberculosis is diagnosed by sputum testing, and pneumonia by clinical features.

How to examine a chest x-ray

When you examine a patient, you need to do it in a systematic way in order not to miss important information and not to make mistakes. The same is true when you examine a chest x-ray (see box). Always go through all the steps described, even if you think after a first look that the x-ray finding is obvious.

Summary: How to examine a chest x-ray

1. Check the quality:
 - a. Is the film well exposed, or is it exposed too much or too little?
 - b. Is the patient straight or rotated?
 - c. Was the x-ray taken during full inspiration?
2. What is your first impression?
3. Examine the trachea.
4. Examine the mediastinum.
5. Examine the heart.
6. Examine the diaphragm and pleura.
7. Examine the hila and the lung fields.
8. Examine the bones and soft tissues.

1. Check the quality

Check that the film is technically correct (see figure B-1).

1. Is the film well exposed, or is it too much or too little exposed?

How to check: if good quality, then you can just see the thoracic spine behind the heart shadow.

Problems: if the film is over- or underexposed, you may miss or wrongly interpret changes.

2. Is the patient straight or rotated?

How to check: if good quality, then both clavicles are the same distance away from the spinous processes of the cervical spine.

Problems: if the patient is rotated, the normal structures, especially of the mediastinum, are distorted.

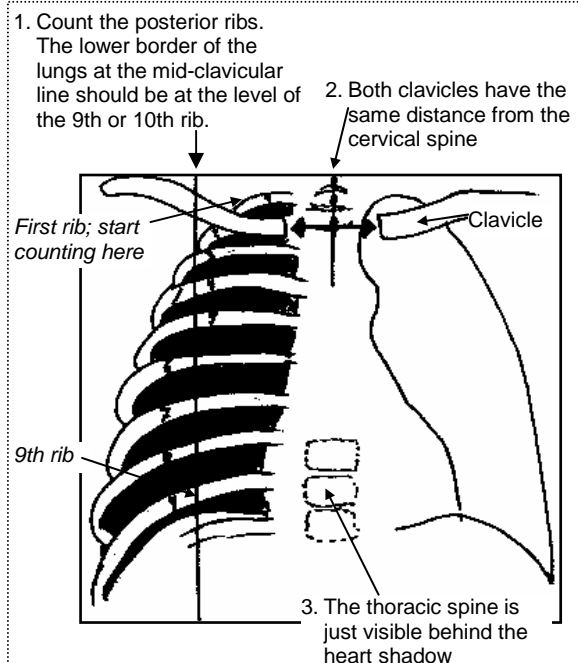


Figure B-1 How to check that the x-ray is technically correct.

3. Was the x-ray taken during full inspiration?

How to check: count the posterior ribs. The border of the lungs at the mid-clavicular line should be at the level of the 9th or 10th rib.

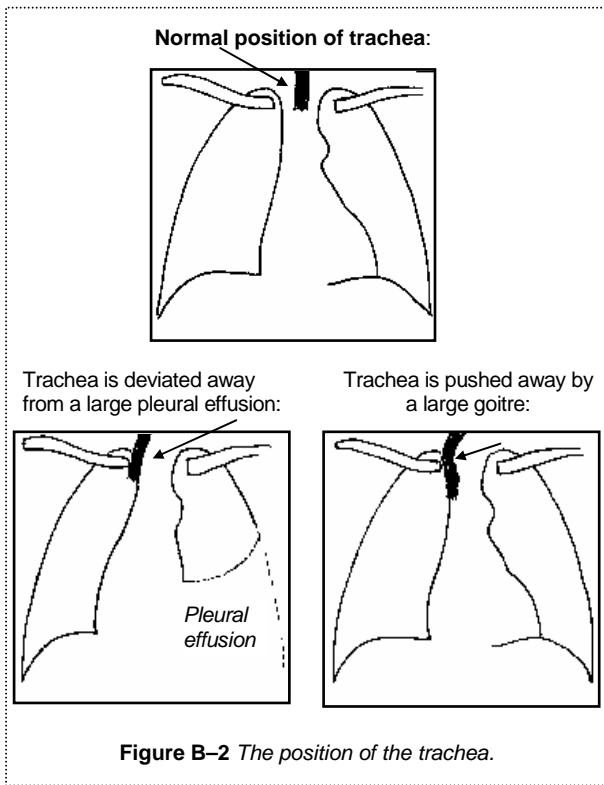
Problems: if the patient has not breathed in well, the border will be higher. Then there is less air in the lungs and the heart shadow will appear larger and the lung marking more obvious. This may lead to wrongly diagnosing an enlarged heart or lung pathology.

2. What is your first impression?

○ Can you see any obvious abnormality?

3. Examine the trachea

○ **What is the position of the trachea?** (See figure B-2) The trachea is normally central and may turn slightly to the right. It may be displaced by a mediastinal mass (for example goitre) or by conditions when the whole mediastinum is shifted to one side (for example a large pleural effusion). If you suspect mediastinal shift, look at the heart and the mediastinum to see whether they are shifted to the same side.

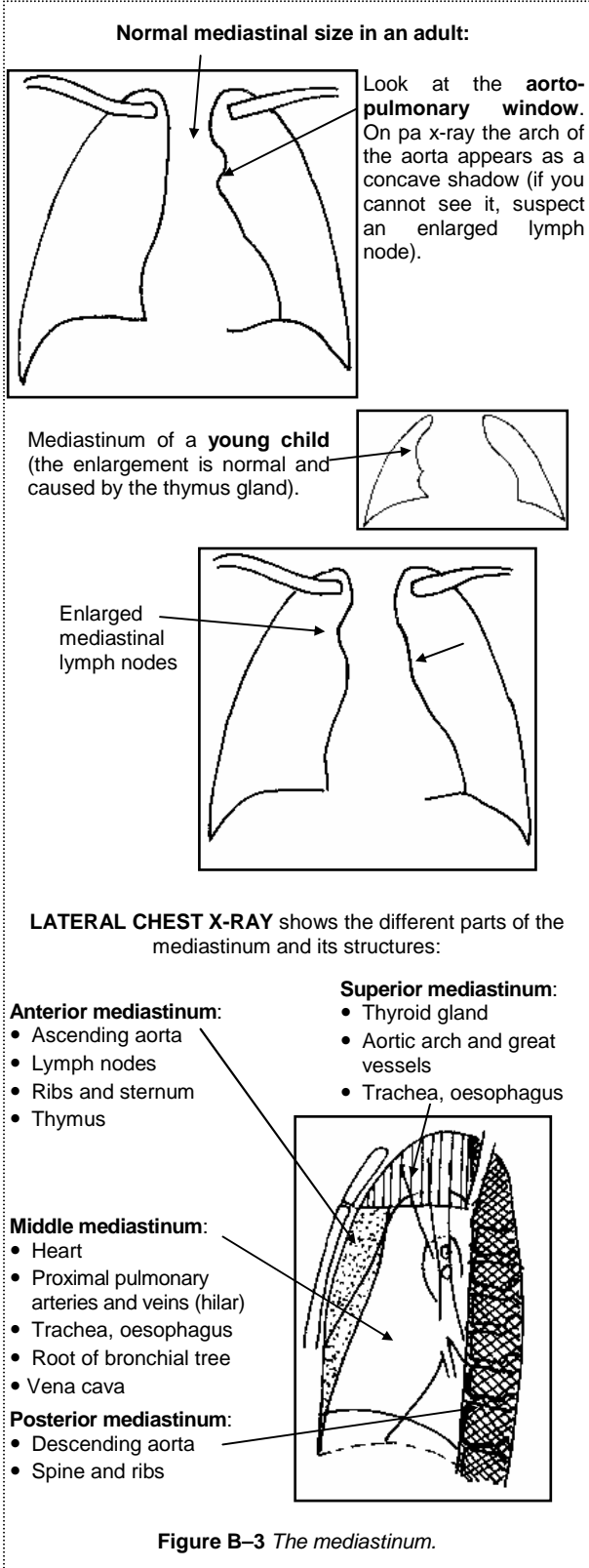


4. Examine the mediastinum (see figure B-3)

○ **Is the overall size of the mediastinum normal for the patient's age?**

NOTE: young children have a very wide mediastinum because of the thymus gland.

○ **Is the shape of the mediastinum normal?** The shape of the mediastinum in a PA film consists of different structures. Imagine the mediastinum as a

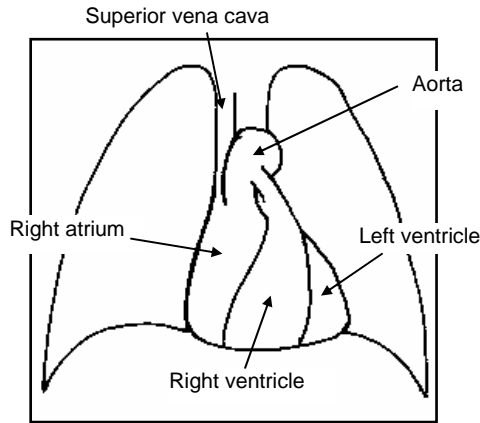


density that is surrounded by two air filled lungs. The shape of these tissue margins may be distorted by enlarged lymph nodes, tumours, thyroid gland or aortic dissection.

5. Examine the heart

○ **Is the heart size normal?** (See figure B-4) The width of the heart is normally less than half the size

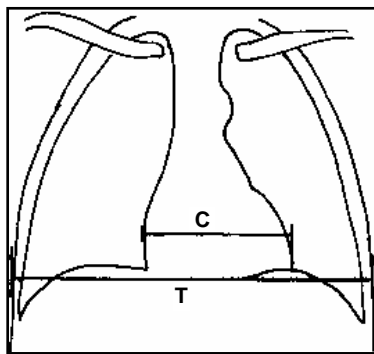
THE STRUCTURES OF THE HEART SHADOW:



HOW TO MEASURE THE HEART SIZE ON X-RAY:

Measure the largest diameter of the heart shadow (C) and the largest diameter of the thorax (T). This is called cardio-thoracic ratio:

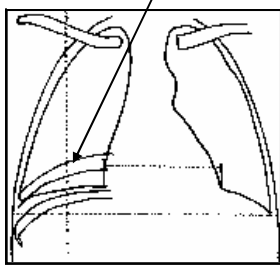
C is normally less than 55% of T



Why you can only judge the heart size on an x-ray taken during deep inspiration:

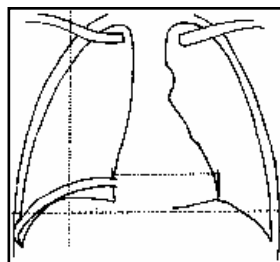
Wrong:

This x-ray was not taken during deep inspiration. You can see it because the lower border of the right lungs reaches only until the 8th rib.



Therefore, the heart appears to be enlarged, although it is normal. The x-ray below is taken only until the 8th rib but this time during full inspiration: the heart size is normal:

Correct:



HEART FAILURE:

- The heart is enlarged (C is greater than 55% of T)
- Prominent upper lobe vessels
- Pulmonary oedema
- Small pleural effusions on both sides

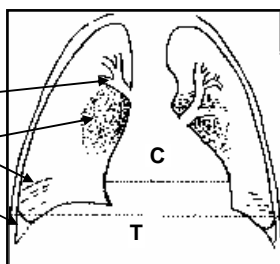


Figure B-4 The heart.

of the thorax (cardio-thoracic ratio): if it is more, than the heart is enlarged. Be aware that a heart may appear enlarged if the patient did not breath in fully, if the x-ray was taken AP (from front to back), or if the film was taken with the patient lying (supine).

6. Examine the diaphragm and pleura

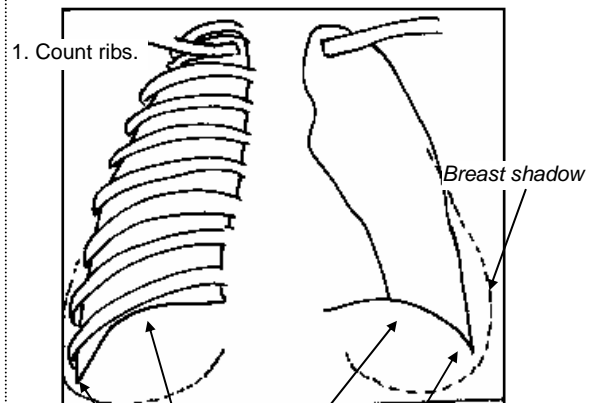
(See figure B-5)

○ **Are the heights of the diaphragms normal?** The right diaphragm is usually about 1-3 cm higher than the left. If one of the diaphragms is higher than normal, there may be less air in the lungs on that side, which could indicate a lung collapse.

If the lung-diaphragm border is lower than the 10th posterior rib, then there is more air than usual in the lungs (hyperinflation). It is a sign of asthma or chronic obstructive pulmonary disease.

○ **Are the shapes of the diaphragms normal?** The surface should be smooth and dome-shaped. If you see the shape of a bulging mass of the right diaphragm, suspect a mass in the liver. Arrange ultrasound of the liver to clarify.

NORMAL DIAPHRAGMS AND PLEURA:



2. Look at the shape of the diaphragms.

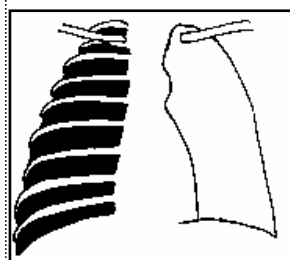
3. Are both costo-phrenic angles clear?

Normal:

Abnormal:

Hyperinflation:

- Ribs are parallel
- Less vascular marking visible



Pleural effusions:

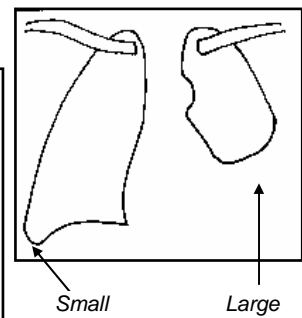


Figure B-5 Diaphragm and pleura.

- **Is the costophrenic angle normal?** If you cannot see the costophrenic angle because of whiteness, this means that there is fluid in the pleural space (pleural effusion).

7. Examine the hila and the lung fields

(See figure B-6 on the next page)

- **Are the density and position of the hila normal?**

The white shape made by the right and left hilum is sometimes confused with enlarged lymph nodes or consolidation. The hila shadows are formed by the pulmonary arteries and their branches and the pulmonary veins. The left pulmonary artery is usually a little higher than the right and never lower. The density of both sides should be the same. That means they should have the same whiteness on the x-ray film.

The hila may be pulled into abnormal positions by fibrosis, or their position may change as the result of reduced lung volume in lung collapse.

- **Follow the lines of the blood vessels:**

- Do they reach the edges of the lungs?
If there is a pneumothorax, vascular marking will be absent and you see the lung edge.
- Are the blood vessels abnormally wide?
In heart failure the blood vessels, especially of the upper lung fields will be abnormally wide.

- **Are the overall sizes of the left and right lung normal, or does one side look smaller?**

- **Look for any obvious areas of abnormal blackness (translucency) or whiteness (density, opacity)?** (See boxes) Train your eyes to look through the heart and upper abdomen to the lungs behind these areas.

Then look systematically for abnormal shades in the lung fields.

You will have already noticed large abnormalities. Now search carefully for small areas of abnormal whiteness (opacities) in the lung fields. Compare systematically opposite parts of the lungs. It is helpful to cover the part of the lung you are not looking at.

If there is no air in the lungs next to the heart, mediastinum or the diaphragm, the outline of that structure will no longer be visible. This helps to locate the lesion. Often a lateral film is needed to define the exact position of a lesion.

If you find an abnormal opacity, try to describe it as follows and look for further details to differentiate the lesion:

- *Round shadow:* • one or more lesions? • small, large or variable size? • solid white (coin lesion) or ring-like lesion? If ring lesion: filled with air or fluid?
- *Reticular shadowing.*
- *Alveolar filling pattern* (looks 'fluffy'). Air bronchogram?
- A combination of these three types of opacities.

Common additional findings:

- *Calcifications* (bone-white small lesions) are usually signs of old infection - for example tuberculosis.
- Bullets from war injuries.

NOTE: in female patients, the breasts will give additional shadows. Do not confuse them with abnormal density.

Causes of abnormal whiteness (density, opacity)

Consolidation - alveolar filling pattern

You see an ill-defined opacity with *air bronchogram*. Air bronchogram means that you see the larger airways as a black silhouette if there is pus or fluid in the small airways and alveoli because the larger airways still contain air.

- Pneumonia
- Pulmonary oedema (then the heart is enlarged)

One or a few larger coin lesions

- TB
- Hydatid cyst
- Lung tumour
- Metastases
- Many other less common causes

Many small coin lesions

- Miliary TB
- Metastases

Ring lesions

- Transverse section of bronchi (normal!)
- Bronchiectasis
- Cavitation (TB)
- Abscess (staphylococcal, amoebic, hydatid, fungal)
- Tumour

Reticular opacities

COMMON

- Scarring (fibrosis) of chronic infections (usually old non-active tuberculosis)

LESS COMMON

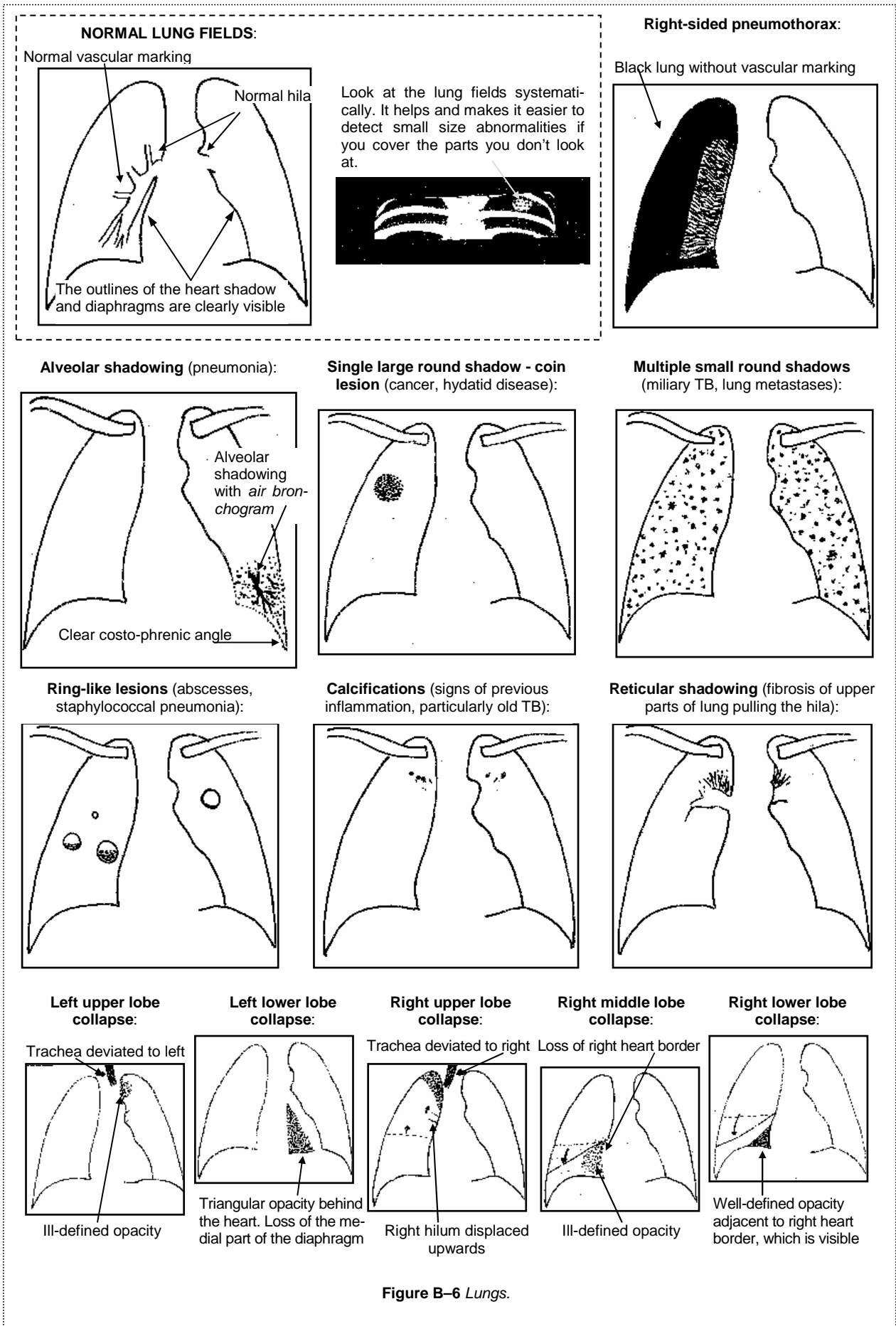
- Early left heart failure
- Cancer

Loss of lung volume

- Lung collapse (characteristic pattern depends on which lobe is collapsed. Do not mistake it for consolidation!)

Common causes of abnormal blackness (translucency)

- Pneumothorax
- Hyperinflation (COPD, acute asthma; children: bronchiolitis)
- Bulla



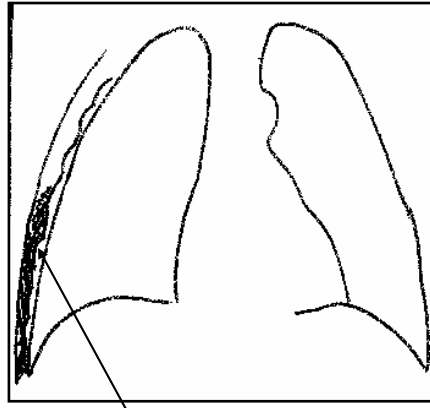
8. Examine the bones and soft tissues

(See figure B-7)

- Look at the shoulder joints, spine and ribs for **bone changes**. Particularly look at the spine at the height of the vertebral bodies and disc spaces. Are the margins of the spinal bodies clear? If you suspect changes of spinal tuberculosis, then get a lateral spinal x-ray (see page 155).
- Look at the chest wall for thickening or calcification.

References

1. Harvard Medical School. *Radiology for Second-Year Students. Module Chest Radiology*. Webpage www.brighamrad.harvard.edu/education/online as on 16.10.2003.
2. Longmore M, Wilkinson I, Török E. *Oxford Handbook of Clinical Medicine*. 5th edition. Oxford: Oxford University Press 2001.
3. Thompson BH. *Introduction to Clinical Radiology: Chest*. Virtual Hospital - a digital library for health information. www.vh.org/adult/provider/radiology/icmrad/chest as on 16.10.2003.



Pleural calcification and thickening (healed TB effusion, healed empyema following bacterial pneumonia, healed haemothorax following trauma)

Figure B-7 Chest wall.

C. Normal laboratory values

NOTE: the normal values stated are a guide only because the values may vary depending on the laboratory method used.

Haematology

Erythrocyte sedimentation rate (ESR)

Less than 15 mm/h

Haemoglobin (Hb)

At birth	14.5–21.0 g/dl
Children 2-12 months	11.0–12.5 g/dl
Older children	11.5–14.0 g/dl
Men	13.5–18.0 g/dl
Non-pregnant women	11.5–16.5 g/dl
Pregnant women	11.0–15.0 g/dl

Haematocrit (packed red cell volume, PCV)

Men	0.4–0.54 L/L
Women	0.37–0.47 L/L

Mean cell volume (MCV)

80–96 fl

White blood cell count (WBC)

At birth	5,000–24,000 /mm ³
Children	4,000–14,000 /mm ³
Adults	4,000–11,000 /mm ³ (= 4.0–11.0 x 10 ⁹ /L)

WBC differential count

Neutrophils	40–75 %
Lymphocytes	20–45 %
Eosinophiles	1–6 %
Basophils	0–1 %
Monocytes	2–10 %

Platelet count

150,000–400,000 /L

Reticulocyte count

0.8–2.0 % of red blood cells

Biochemistry

Alanine aminotransferase (ALT or GPT)

Children under 1 month up to 70 U/l
Adults and children over 1 month 5–35 U/l

Albumin

35–50 g/L (3.5–5.0 g/dl)

Alkaline phosphatase (AP)

Children 130–600 U/L
Adults 30–300 U/L

Aspartate aminotransferase (AST or GOT)

12–40 U/L

Alpha amylase

25–125 U/L

Bilirubin (total)

Less than 1.0 mg/dl (17 micromol/L)

Calcium (total)

2.1–2.6 mmol/L (8.4–10.4 mg/dl)

Cholesterol

3.5–5.2 mmol/L (120–200 mg/dl)

Creatine kinase (CK)

Men 25–195 U/L
Women 25–180 U/L

Creatinine

0.6–1.5 mg/dl (70–118 micromol/L)

Gamma-glutamyltransferase (gamma-GT)

Men 11–51 U/L
Women 7–33 U/L

Glucose

(Fasting-FBS) 70–110 mg/dl (3.8–6.1 mmol/L)
(Random) 70–140 mg/dl (3.8–7.8 mmol/L)

Glycosylated haemoglobin (HbA1c)

2.3–6.5 %

Lactate dehydrogenase (LDH)

240–480 U/L

Potassium

3.5–5.0 mmol/L

Protein (total)

60–80 g/L (6.0–8.0 g/dl)

Sodium

135–145 mmol/L

Thyroid-stimulating hormone (TSH)

0.5–5.7 micromol/L

Thyroxine (T4)

70–140 nmol/L

Uric acid (urate)

Men 3.5–8.1 mg/dl (210–480 micromol/L)
Women 2.5–6.5 mg/dl (150–390 micromol/L)

Urea

15–40 mg/dl (2.5–6.7 mmol/L)

References

1. Kumar P, Clark M. *Clinical Medicine*. 5th edition. Edinburgh: WB Saunders 2002.
2. Longmore M, Wilkinson I, Török E. *Oxford Handbook of Clinical Medicine*. 5th edition. Oxford: University Press 2001.
3. O'Callaghan C, Stephenson T. *Pocket Paediatrics*. Edinburgh: Churchill Livingstone 1992.
4. Southall D, Coulter B, Ronald C, Nicholson S, Parke S. *International Child Health Care: A practical manual for hospitals worldwide*. London: BMJ Books 2002.
5. Wheatherall DJ, Ledingham JGG, Warrell DA. *Oxford textbook of medicine*. 3rd edition. Volume 3. Oxford University Press 1996.

Inpatient record sheet

Name: _____ Family name: _____ Sex: _____ Age: _____ Date: _____
 Place of origin: _____

HISTORY

Main presenting complaint (PC):

History of presenting complaint (HPC):

Drugs (name, dosage, duration):

Allergies:

Smoking:

Immunizations (children):

BCG		DPT 1		DPT 2		DPT 3		Measles	
OPV 0		OPV 1		OPV 2		OPV 3		OPV 4	

(women age 15-45 years):

Tetanus toxoid 1		TT 2	
TT 3		TT 4	
TT 5			

Vitamin A and deworming (children): Vitamin A Mebendazole

Past medical history (PMH):

Systems enquiry:

General condition:			
Cardiovascular and respiratory system		Gastrointestinal system:	
Genito-urinary system		Nervous system	
Mental health		Musculo-skeletal system	
Ears and eyes		Skin	

Family and social history:

PHYSICAL EXAMINATION

General impression: Ill or well:

Weight:

Height:

		no	mild	severe		
Malnutrition					Fever	Difficult breathing
Jaundice					Cyanosis	Depression or strange behaviour

Head and neck:

Eyes:

Ears, nose, throat (ENT):

Lymph nodes:

Cardiovascular system: Pulse: _____ Blood pressure: _____ / _____ mmHg Apex beat _____

Respiratory system: Breathing rate: _____ /minute Chest indrawing: Yes No

Position of trachea: _____

Chest movements: _____

Percussion: _____

Auscultation: _____

Indicate abnormal findings:

Abdomen:

Inspection: _____

Tenderness: _____ Guarding: _____ Rebound: _____

Liver: _____

Spleen: _____

Kidneys: _____

Masses: _____

Genitalia: _____

Rectal examination: _____

Musculo-skeletal system:

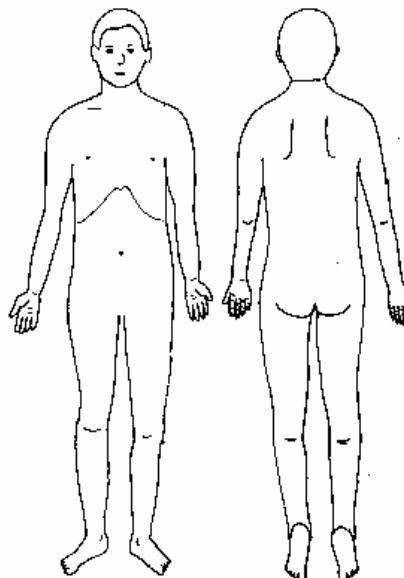
Skin:

Nervous system:

Conscious level: _____

Neck stiffness: _____

Coordination: _____



	Tone	Power	Reflexes	Sensation
Arm right				
left				
Leg right				
left				

PROBLEM LIST AND MANAGEMENT PLAN

Working diagnosis: _____

Differential diagnoses: _____

Other problems: _____

Investigations: _____

Management plan: _____

Relevant health education:






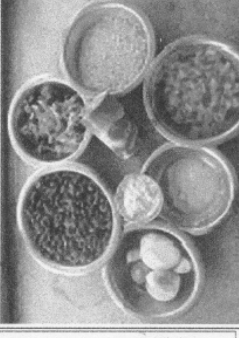
(What is the most important thing that the patient needs to learn?): _____

Your name and signature: _____

Mother card for Afghanistan

INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESSES

► Feeding Recommendations During Sickness and Health

<p>Up to 6 Months of Age</p>  <ul style="list-style-type: none"> • Breastfeed as often as the child wants, day and night, at least 8 times in 24 hours. • Do not give other foods or fluids such as: <ul style="list-style-type: none"> - <i>zouf/bartang</i>, - <i>sakodana</i>, - <i>floos</i>, - <i>tea</i>, - <i>water</i>, - <i>sugar water</i>, - <i>cow's milk</i>. • Do not use bottle or pacifiers 	<p>6 Months up to 9 Months</p>  <ul style="list-style-type: none"> • Breastfeed as often as the child wants, day or night, at least 8 times in 24 hours. • add complementary foods • Give these foods 3 times per day after breastfeeding: ✓ Shola: ✓ Lank bread porridge: ✓ Mash porridge ✓ Superflour 	<p>9 Months up to 12 Months</p>  <ul style="list-style-type: none"> • Breastfeed as often as the child wants • Add complementary foods • Give adequate servings of: <ul style="list-style-type: none"> ✓ <i>Shola</i> or ✓ <i>Lank bread porridge</i> or ✓ <i>Mash porridge</i> ✓ <i>Superflour porridge</i> - 2 times per day if breastfed; - 4 times per day if not breastfed. • Give once daily, family foods • Give once daily, "finger foods" such as half banana, grated apple or bread strips. 	<p>12 Months up to 2 Years</p>  <ul style="list-style-type: none"> • Breastfeed as often as the child wants. • Give once adequate servings of: <ul style="list-style-type: none"> ✓ <i>Shola</i> or ✓ <i>Lank bread porridge</i> or ✓ <i>Mash porridge</i> or ✓ <i>Superflour porridge</i> or • Give family food 5 times per day. • Give once daily, "finger foods" or snacks as 1/2 cup of yogurt (<i>mast</i>) with 1 teaspoon of honey, small piece of cheese (<i>Paneer</i>), or a handful of almonds or dried fruit such as raisins. 	<p>2 Years and Older</p>  <ul style="list-style-type: none"> • Give family foods at 3 meals each day such as: <ul style="list-style-type: none"> ✓ Three tablespoons of pulses (<i>mash, dal, liti, chickpeas, beans</i>) or ✓ One small piece of meat or fish or 1 egg + 3 tablespoons of (spinach, okra) or orange or (pumpkin, carrots) + 1 teaspoon of oil. With one cup of rice or boiled potato or <i>aash</i>. • Also, twice daily, give "finger foods" such as half banana, grated apple or bread strips. 	
--	--	--	--	--	--

Feeding Recommendations For a Child Who Has PERSISTENT DIARRHOEA

- If still breastfeeding, give more frequent, longer breastfeeds, day and night.
- If taking other milk:
 - replace with increased breastfeeding OR
 - replace with fermented milk products, such as yoghurt OR
 - replace half the milk with nutrient-rich semisolid food like cereals, pulses, eggs and oil.
- For other foods, follow feeding recommendations for the child's age and give extra two meals.

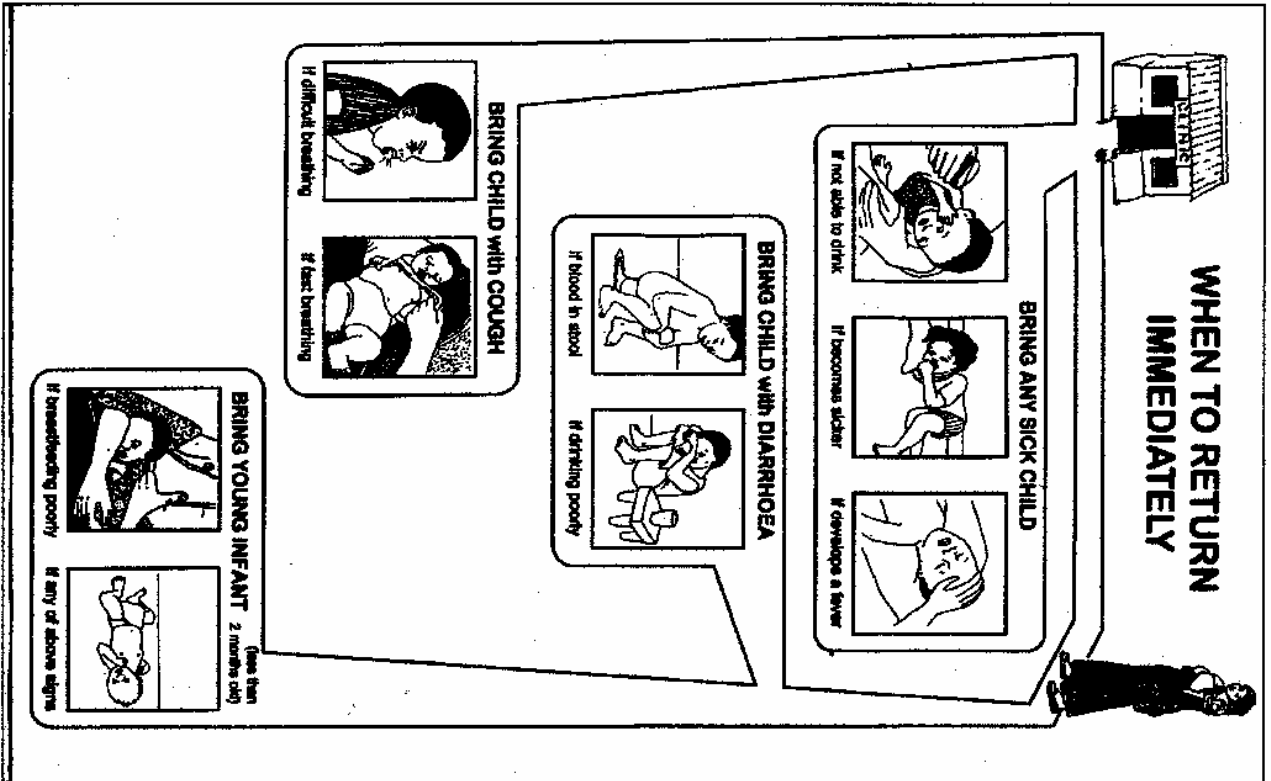
✓ **Superflour:**
(Toast separately, one cup of rice grains, one cup of corn grains and or cup of chickpeas or mash or lentils. Grind the grains separately. Mix half cup of toasted rice flour, half cup of toasted corn flour and half cup of toasted pulses flour (superflour). Mix half cup of the superflour and 1 and half cup of water and cook for 15 minutes. Add 1 teaspoon of oil or *ghee* at the end).

✓ **Mash porridge**
(Cook for 20 minutes 1 and half table spoons of *mash* or *paiti*. Once cooked, mash into porridge. Add 1/2 cup of wheat or rice or corn flour, 1 teaspoons of oil or *ghee* and half cup of water. Cook the mixture for 10 minutes).

✓ **Shola:**
half cup of rice flour, half cup of goat's or goat's milk & 1 cup of water. Boil & cook slowly for 15 minutes. Add 1 teaspoon oil or *ghee*

✓ **Lank bread porridge:**
mix half cup of wheat flour, half cup of cow's or goat's milk, 1 teaspoon of sugar, 1 teaspoon of oil or *ghee*. Bake the mixture. Ground the *lank bread* into powder. Boil 1 cup of water with half cup of milk. Add the powdered *lank bread* and stir for 2 minutes)

Source WHO. Used with permission.



FLUIDS

FOR ANY SICK CHILD

- Breastfeed frequently
- Increase fluids, Give soup, rice water, yogurt drinks, or clean water

FOR CHILD WITH DIARRHOEA

Giving more fluids can be life saving!
 • Give these extra fluids, as much as the child will take:

- ORS solution
- Food-based fluids, such as: soup, rice water, yogurt drinks, Clean water
- Breastfeed more frequently and longer at each feeding
- Continue giving extra fluids until diarrhoea stops

IMMUNIZATION:

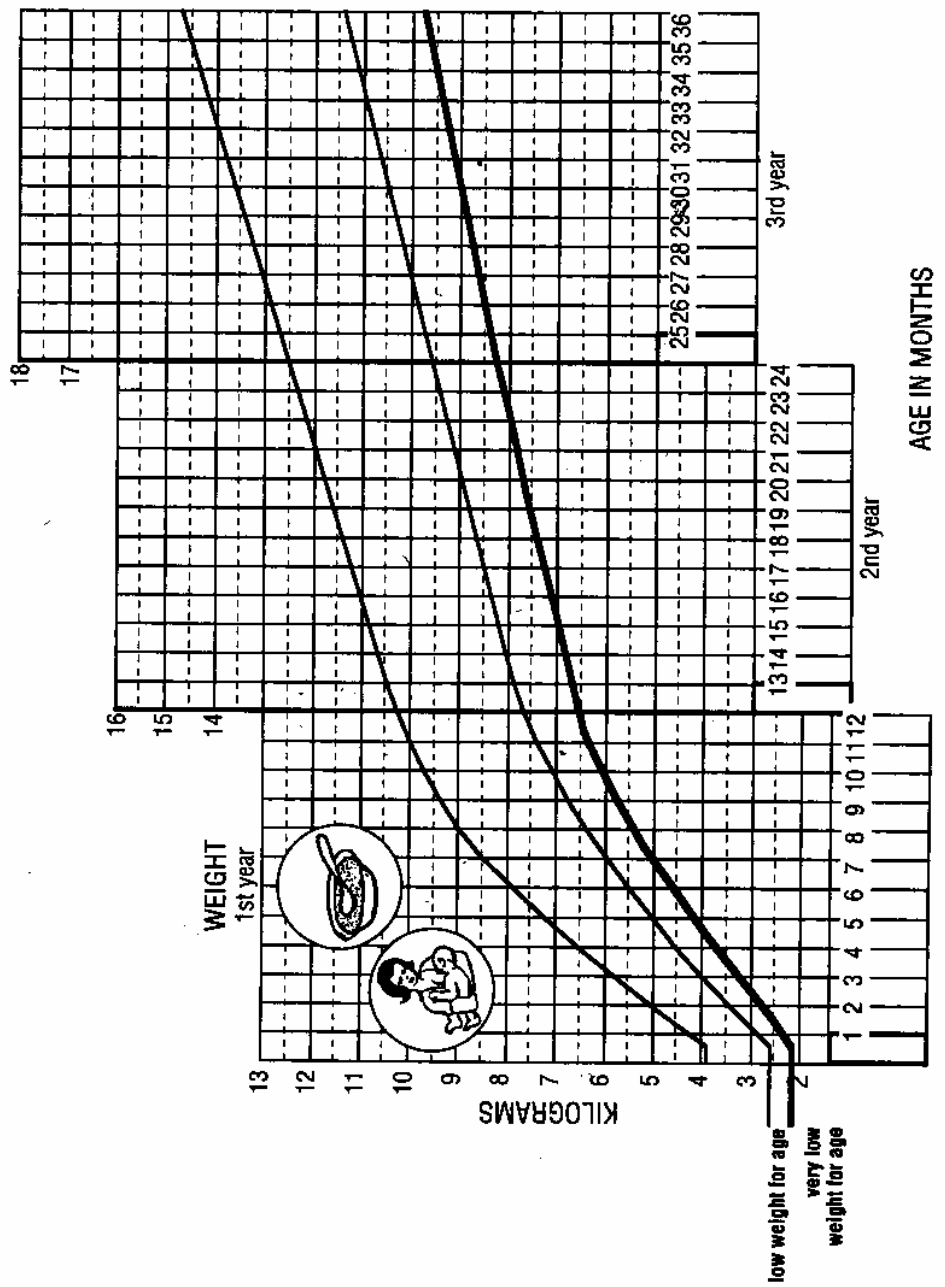
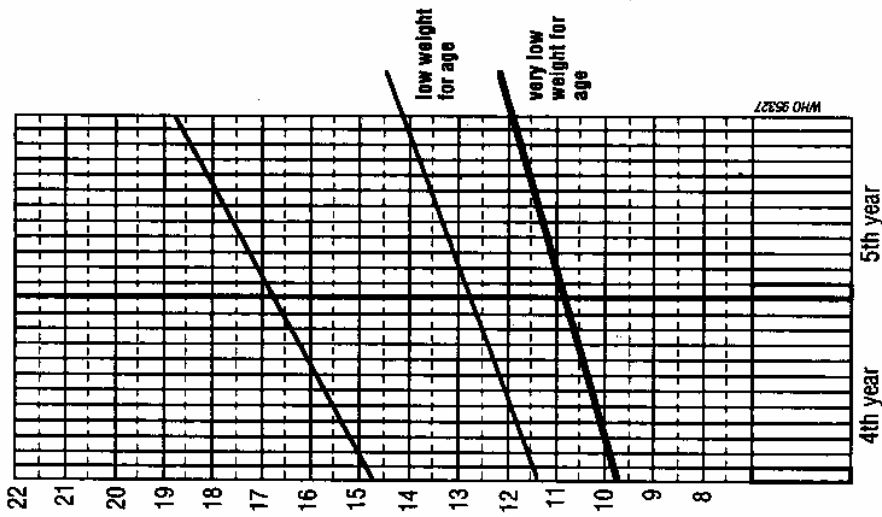
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BCG	DPT1	DPT2	DPT3		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OPV0	OPV1	OPV2	OPV3	OPV4	MEASLES

VITAMIN A

Return for next immunization on: _____

MEBENDAZOLE:

WEIGHT FOR AGE CHART



Source WHO. Used with permission.

Chart for simple vision testing. For how to use it refer to figure 19-4 on page 214.

E M E W M

Partograph

Name	Gravida	Para.	Hospital no.
Date of admission	Time of admission	Ruptured membranes	hours

Fetal heart rate	180 170 160 150 140 130 120 110 100	
------------------	---	--

Liquor Moulding	
-----------------	--

Cervix (cm) [plot X] Descent of head [plot O]	10 9 8 7 6 5 4 3 2 1	
Hours	0	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time		

Contractions per 10 mins	5 4 3 2 1	
--------------------------	-----------------------	--

Oxytocin U/L drops/min	
------------------------	--

Drugs given and IV fluids	
---------------------------	--

Pulse ● and BP	180 170 160 150 140 130 120 110 100 90 80 70 60	
--------------------------	---	--

Temp °C	
---------	--

Urine { protein acetone volume	
--------------------------------------	--

Source WHO. Used with permission.

List of essential drugs

This drug list contains all those drugs from the “National Essential Drug List of Afghanistan” that are needed for the treatment of common medical problems. This list is intended as a quick summary. Specific diseases may require a different dose. Check for that, and for the duration of treatment in the appropriate chapter of this book. Only very important contra-indications, side effects and interactions are mentioned.

Drug doses in children

Carefully calculate drug doses for children. Otherwise the dose may be too low and not effective, or too high and possibly harmful. Most drug doses in children are based on a child's weight in kilograms (kg). They are stated as a dose per day (24 hours) that is usually divided into several smaller doses. If a weighing scale is not available follow one of the two following methods to prescribe correct drug doses for children:

Method 1: memorize the average weight at 5 key points of a child's age. These points provide you with a good and practical base for estimating a child's weight:

AGE				
Birth	2 months	1 year	5 years	15 years
2.5 kg	4 kg	8 kg	15 kg	35 kg
WEIGHT				

Method 2: estimate the paediatric doses based on the adult dose:

Adults	adult dose
Children	
6-12 years	1/2 adult dose
1-5 years	1/4 adult dose
2-12 months	1/8 adult dose

Essential drug list

For drugs used in skin diseases, eye problems and vaccines see the relevant chapters. For more details about the use of the individual drugs and information about further drugs see the 2nd revised edition of our *Practical Drug Guide*, Kabul: IAM 2005.

Abbreviations: • ORAL = orally • SC = injected subcutaneously • IM = injected intramuscularly • IV = injected or infused intravenously.

Drug name and preparations	Route	Common dosage	Indications, use in pregnancy, during breastfeeding and important remarks
Acetazolamide Tablets 250 mg	ORAL	Adults 250–500 mg 2 times daily	Acute glaucoma ☞ Avoid in pregnancy and during breastfeeding.
Acetylsalicylic acid (Aspirin) Tablets 100, 300 and 500 mg	ORAL	Pain, fever, inflammation Adults 300–900 mg up to 4 times daily ☞ Double the dose in inflammatory disease. Prophylaxis of myocardial infarction and stroke 75–100 mg once daily	Mild pain, fever, inflammatory disease, prophylaxis of myocardial infarction and stroke ☞ Avoid in last trimester of pregnancy and during breastfeeding. ☞ Do not use in children younger than 12 years.
Aciclovir Tablets 200, 400, 800 mg	ORAL	Herpes zoster, chickenpox Children 20 mg/kg 24 hours divided in to 4 doses Adults 800 mg 5 times daily for 7 days Herpes simplex Adults 200 mg 5 times daily for 5 days	Herpes zoster, herpes simplex and chickenpox (immunodeficient patient) ☞ Avoid in pregnancy, and during breastfeeding; although it is probably safe there is limited experience. ☞ Only effective if given at onset of rash.
Adrenaline (Epinephrine) Ampoules (1:1000) of 1 ml, containing 1 mg	IM/SC IV	☞ For children younger than 5 years dilute 1 ampoule with 9 ml sodium chloride 0.9% or fluid for injection. 1-12 months 0.05 mg = 0.5 ml diluted solution 1-2 years 0.1 mg = 1 ml diluted solution 2-5 years 0.2–0.4 mg = 2–4 ml diluted solution 6-12 years 0.5 mg Adults 0.5–1 mg	IM/SC: asthma, severe allergic reaction IV: cardiac arrest ☞ No contraindications in an emergency.
Albendazole Chewable tablets 400 mg	ORAL	Worms Adults and children over 1 year 400 mg once only Hydatid disease See page 111.	Worms (except tapeworms), hydatid disease ☞ Do not use during first trimester of pregnancy, avoid during breastfeeding. ☞ Do not use in children under 1 year.

Drug name and preparations	Route	Common dosage	Indications, use in pregnancy, during breastfeeding and important remarks
Allopurinol Tablets 100 mg	ORAL	Adults 100–300 mg once daily	Prevention of gout ☞ Avoid during pregnancy and breastfeeding.
Aluminium hydroxide (+ magnesium hydroxide) Chewable tablets 500 mg (200 + 200 mg) Syrup different preparations	ORAL	Adults 1 tablet or 10–20 ml syrup when needed; or 30–60 minutes after a meal and before going to bed	Dyspepsia ☞ No contraindication in pregnancy or breastfeeding.
Aminophylline Tablets 100 and 200 mg Ampoules of 10 ml, containing 250 mg (=25 mg/ml)	ORAL IV	Children 12–15 mg/kg/day divided into 3–4 doses 1–5 years 25–50 mg 3 times daily 6–12 years 50–150 mg 3 times daily Adults 100–300 mg 3 times daily Children 5 mg/kg in 5 % glucose very slowly over 20 minutes followed by 0.9 mg/kg/hour continuous infusion Adults 250–500 mg very slowly over 20 minutes followed by 0.5 mg/kg/hour continuous infusion ☞ If continuous infusion is not possible, repeat the initial dose after 8 hours. ☞ If the patient took aminophylline or theophylline in the last 24 hours, inject only half the dose.	Asthma, severe bronchospasm ☞ Avoid during last trimester of pregnancy; avoid high doses during breastfeeding. ☞ During treatment, watch out for signs of toxicity (see page 79). ☞ Do not combine with erythromycin.
Amitriptyline Tablets 25, 50, 75 mg	ORAL	Depression, anxiety Start with 50 mg at night (elderly 25 mg). Increase gradually to up to 200 mg by adding an extra 25 mg every week. ☞ Treat at least for 3 months. Neuropathic pain, postherpetic neuralgia Give 10–25 mg each night. Increase to up to 75 mg if needed.	Moderate to severe depression, some cases of anxiety, neuropathic pain, postherpetic neuralgia ☞ No contraindication in pregnancy or during breastfeeding. ☞ Do not use in children. ☞ Do not use after recent myocardial infarction or closed-angle glaucoma.
Amoxicillin Tablets/Capsules 250 and 500 mg Powder for oral suspension 125 mg/5 ml and, 250 mg/5 ml	ORAL	0–12 month 62.5–125 mg 3 times daily 1–5 years 125 mg 3 times daily 6–12 years 250 mg 3 times daily Adults 250–500 mg 3 times daily ☞ Double the dose in severe infections.	Pneumonia and other lower respiratory tract infections, otitis media, sinusitis, typhoid fever, urinary tract infections, oral follow-up of IV/IM ampicillin therapy, endocarditis prophylaxis (see page 142) ☞ No contraindication in pregnancy or during breastfeeding. ☞ Do not use in penicillin allergy.
Amoxicillin + clavulanic acid (Co-amoxiclav) (Augmentin) Tablets/Capsules 500 mg Powder for oral suspension 125 mg/5 ml	ORAL	0–12 month 62.5–125 mg 3 times daily 1–5 years 125 mg 3 times daily 6–12 years 250 mg 3 times daily Adults 250–500 mg 3 times daily ☞ Double the dose in severe infections.	Reserve antibiotic for infections in which amoxicillin resistance is likely (for example respiratory infections or skin infections that could be caused by staphylococcus) ☞ No contraindication in pregnancy or during breastfeeding. ☞ Do not use in penicillin allergy.
Ampicillin Tablets/Capsules 250 and 500 mg Vials 500 mg and 1 g	ORAL IM/IV	☞ Use amoxicillin instead of oral ampicillin because it is better absorbed. The dose of oral ampicillin is double the dose of oral amoxicillin. Under 7 days 200 mg 2 times daily 1–4 weeks 200 mg 3 times daily 2–12 months 250 mg 3–4 times daily 1–5 years 250–500 mg 3–4 times daily 6–12 years 500 mg– 1 g 3–4 times daily Adults 1–2 g 3–4 times daily ☞ Double the dose in severe infections.	IM/IV: sepsis, severe newborn infections, meningitis ☞ No contraindication in pregnancy or during breastfeeding. ☞ Do not use in penicillin allergy. ☞ In severe newborn infections, always combine with gentamicin.
Artemether Ampoules of 1 ml containing 20 mg or 80 mg	IM	Give 3.2 mg/kg as one single dose on day 1, and then 1.6 mg/kg on the following days. Day 1: 1–5 years 40–60 mg once daily 6–12 years 60–120 mg once daily Adults 150–200 mg once daily From day 2 onwards: 1–5 years 20–30 mg once daily 6–12 years 30–60 mg once daily Adults 75–100 mg once daily	Severe malaria ☞ Do not use during the first trimester unless for life-saving indications. No contraindication during breastfeeding.

Drug name and preparations	Route	Common dosage			Indications, use in pregnancy, during breastfeeding and important remarks
Artesunate Tablets 50 and 250 mg	ORAL	1-3 years 4-5 years 6-12 years Adults	50 mg 100 mg 150 mg 200 mg	once daily once daily once daily once daily	Falciparum malaria ☞ Do not use during the first trimester unless for life-saving indications. No contraindication during breastfeeding.
Ascorbic acid (Vitamin C) Tablets 50 and 250 mg	ORAL	2-12 months 1-12 years Adults	50 mg 100 mg 250 mg	3 times daily 3 times daily 3 times daily	Vitamin C deficiency (Scurvy) ☞ No contraindication in pregnancy or during breastfeeding.
Atenolol Tablets 25, 50 and 100 mg	ORAL	High blood pressure Adults Angina Adults	25-50 mg 100 mg 100 mg	once daily once daily	High blood pressure, angina, after myocardial infarction ☞ Avoid in pregnancy and during breastfeeding. ☞ Do not give to asthma patients or to patients with bradycardia.
Atropine Ampoules of 1 ml containing 1 mg	IV/IM	Children Adults	0.01-0.02 mg/kg 0.5-1mg		Bradycardia, organophosphate poisoning (see page 249), spasm of gastrointestinal tract, ureter or gallbladder (if no better drug is available) ☞ Avoid, particularly towards the end of pregnancy and during breastfeeding.
Azithromycin Tablets 500 mg Oral suspension 200 mg/5 ml	ORAL	Children over 6 months Adults	10 mg/kg 500 mg	once daily once daily	See Erythromycin. ☞ Duration of treatment is usually 3 days.
Beclomethasone Spray 50, 100, 200 microgram	INH	Children Adults	50-200 micrograms 100-400 micrograms	2 times daily 2 times daily	Prevention of asthma ☞ Benefit is greater than risks in pregnancy, no contraindication during breastfeeding. ☞ Only helpful if taken on a regular base every day.
Benzathine benzylpenicillin Vials 1.2 M IU (= 0.72 g) and 2.4 M IU (= 1.44 g)	IM only	2-12 months 1-5 years 6-12 years Adults	300,000 IU 600,000 IU 1.2 million IU 2.4 million IU		Streptococcal tonsillitis, prevention of recurrence of rheumatic fever, syphilis ☞ No contraindication in pregnancy or during breastfeeding. ☞ Do not use in penicillin allergy.
Benzylpenicillin (Penicillin G, Crystalline Penicillin) Vials 1 and 5 M IU (1 M IU = 600 mg)	IM/IV	Under 1 week 1 week-12 months 1-5 years 6-12 years Adults	150,000-200,000 IU 200,000-400,000 IU (=120-240 mg) 400,000-750,000 IU (=240-450 mg) 750,000 IU-1.5 M IU (=450-900 mg) 1-4 M IU (= 600 mg-2.4 g)	every 12 hours every 6 hours every 6 hours every 6 hours every 6 hours	Severe acute infections including severe pneumonia, sepsis, meningitis, anthrax, endocarditis, tetanus ☞ No contraindication in pregnancy or during breastfeeding. ☞ Do not use in penicillin allergy.
Bisacodyl Tablets 5 mg	ORAL	6-12 years Adults	5 mg 5-10 mg	at night at night	Constipation ☞ The tablets show their effect after 10-12 hours.
Captopril Tablets 25 mg	ORAL	Adults	Start with 6.25-12.5 mg Maintenance dose is 25 mg	2 times daily 2 times daily (maximum 50 mg 3 times daily).	High blood pressure, heart failure ☞ Do not use in pregnancy and during breastfeeding.
Carbamazepine Tablets 100, 200, 400 mg	ORAL	2-12 months 1-5 years 6-12 years Adults	50-100 mg 100-200 mg 200-300 mg 300-600 mg	2 times daily 2 times daily 2 times daily 2 times daily	Epilepsy ☞ Avoid in pregnancy. However, the risks linked to epilepsy are usually greater than the risks linked to the drug. To reduce the risks, give folic acid during pregnancy and vitamin K to the baby after birth. ☞ No contraindication during breastfeeding.
Cefotaxime Vials of 500 mg and 1 g	IM/IV	Newborn Children 2-12 months 1-5 years 6-12 years Adults	50 mg/kg/day divided into 2-4 doses 100-150 mg/kg/day divided into 2-4 doses 150-250mg 250 mg 500 mg 1 g	every 6-12 hours every 6-12 hours every 6-12 hours every 6-12 hours	Reserve antibiotic for severe infections (sepsis, meningitis, severe pneumonia, severe typhoid fever) ☞ No contraindication in pregnancy or breastfeeding.

Drug name and preparations	Route	Common dosage	Indications, use in pregnancy, during breastfeeding and important remarks
Ceftriaxone Vials of 500 mg and 1 g	IM/IV	Children 20-50 mg/day 2-12 months 200–500 mg once daily 1-5 years 500 mg–1 g once daily 6-12 years 1–2 g once daily Adults 2–4 g once daily ☞ Give IV slowly over 3-4 minutes.	Reserve antibiotic for severe infections (sepsis, meningitis, severe pneumonia, severe typhoid fever), STIs (see page 123) ☞ No contraindication in pregnancy or during breastfeeding. ☞ If you give more than 1 g IM, give it at more than one site.
Charcoal, activated Powder to prepare oral solution/Tablets 25 and 50 g	ORAL	2-12 months 10 g 1-12 years 25–50 g Adults 50–100 g ☞ Give as soon after ingestion of poison as possible. For further details see page 248.	Reduces absorption of poisons ☞ No contraindications in pregnancy or during breastfeeding. ☞ Never use in unconscious patients or those with impaired cough or gag reflex ☞ Not indicated for diarrhoea.
Chloramphenicol Capsules 250 mg Syrup 125 mg/5 ml Vials 500 mg, 1 g	ORAL/ IM/IV	50 mg/kg/day divided into 3-4 doses ☞ In very severe infections, start with a high dose of 100 mg/kg/day and give every 6 hours. Reduce it after 2 days. 0-1 month Do not use. 2-12 months 62.5–125 mg 3 times daily 1-5 years 125–250 mg 3 times daily 6-12 years 500 mg 3 times daily Adults 750 mg 3 times daily	Severe infections including typhoid fever, severe pneumonia, meningitis ☞ Do not use in pregnancy and during breastfeeding. ☞ Only use for life-threatening infections. ☞ Do not give for longer than 10 days except in typhoid fever. ☞ Change to ORAL as soon as possible. ORAL is as effective as injections. ☞ Feared side effect: aplastic anaemia.
Chloroquine Tablets 100 mg base (=150 mg phosphate) Tablets 150 mg base (=250 mg phosphate) Syrup 50 mg/ml	ORAL	☞ Doses are stated for chloroquine base. Day 1+2: 10 mg base/kg; day 3: 5 mg base/kg Day 1 + 2: 2-12 months 50–75 mg base 1-5 years 100–150 mg base 6-12 years 300 mg base Adults 600 mg base Day 3: 2-12 months 37.5–50 mg base 1-5 years 50–100 mg base 6-12 years 150 mg base Adults 300 mg base	Malaria (vivax malaria, in combination with sulfadoxine + pyrimethamine for clinically diagnosed malaria) ☞ No contraindication in pregnancy or during breastfeeding. ☞ Do not doses that are higher than recommended.
Chlorphenamine (Chlorpheniramine) Tablets 4 mg, Ampoules of 1 ml, containing 10 mg	ORAL SC/IM IV	1-5 years 1 mg 3 times daily 6-12 years 2 mg 3 times daily Adults 4 mg 3 times daily 1-5 years 2.5–5 mg (SC only, not IV or IM) one single dose 6-12 years 5–10 mg one single dose Adults 10–20 mg one single dose	Allergy, hay fever, itching ☞ Avoid in pregnancy and during breastfeeding. ☞ Do not give to children under 1 year.
Chlorpromazine Tablets 100 mg Syrup 25 mg/5 ml Ampoules of 2 ml, containing 25 mg (= 12.5 mg/ml)	ORAL IM	Children 6-12 years, give half or one third of the adult doses that are stated below. Acute psychosis or violent behaviour <i>Very disturbed adult:</i> ORAL 100 mg 3 times daily or IM 50 mg 3 times daily ☞ As soon as his condition has improved, reduce the dose to 50 mg orally 3 times daily. <i>Less disturbed adult:</i> ORAL 25–50 mg 3 times daily Severe vomiting, intractable hiccup (oral) Adult ORAL 25–50 mg 3-4 times daily IM 25 mg every 4 hours	Symptoms of psychosis, sedation for violent or very agitated psychotic patients, confusion and restlessness, intractable hiccup, severe vomiting (in terminal illness or when other anti-emetics have failed) ☞ It can be given in pregnancy and during breastfeeding to treat psychosis. Avoid for the other indications.
Cimetidine Tablets 400, 800 mg	ORAL	Adults 800 mg at night or 400 mg 2 times daily	Peptic ulcer, reflux oesophagitis ☞ Avoid in pregnancy and during breastfeeding.
Ciprofloxacin Tablets 250, 500 mg Vials of 50 ml, containing 100 mg (=2 mg/ml)	ORAL IV	Children (if the benefit outweighs the risks): ORAL 10–30 mg/kg/day divided into 2 doses IV 7.5–15 mg divided into 2 doses Adults ORAL 250–750 mg 2 times daily IV 200–400 mg 2 times daily ☞ Give IV as slow infusion over 60 minutes.	Restricted indication: typhoid fever, dysentery, urinary tract infections, STIs (see pages 123-124) ☞ Do not use in pregnancy or breastfeeding unless for life-saving indication. ☞ Do not give to children under 12 years unless the benefit clearly outweighs the risks.

Drug name and preparations	Route	Common dosage	Indications, use in pregnancy, during breastfeeding and important remarks
Clindamycin Tablets 75, 150 mg	ORAL	Children 12-18 mg/kg divided into 3-4 doses Adults 150-450 mg 3-4 times daily Endocarditis prophylaxis see page 142.	Staphylococcal joint or bone infections, endocarditis-prophylaxis in penicillin-allergy ☞ Severe side effects, especially serious antibiotic-induced diarrhoea. ☞ Avoid in pregnancy and breastfeeding.
Cloxacillin Capsules 250, 500 mg Powder for oral suspension 125 mg/5 ml, and 250 mg/5 ml Vials 500 mg Sometimes only available in combination with ampicillin (Ampiclox)	ORAL IM/IV	50-100 mg/kg/day divided into 3-4 doses Under 1 week 125 mg 2 times daily 1 week-12 months 125 mg 3 times daily 1-5 years 125-250 mg 3 times daily 6-12 years 250-500 mg 3 times daily Adults 500 mg-1 g 3 times daily IM: give the above doses every 6 hours. IV: give double the above doses by slow injection every 6 hours.	Staphylococcus infections including skin, bone and joint infections ☞ No contraindication in pregnancy or breastfeeding. ☞ Do not use in penicillin allergy.
Codeine phosphate Tablets 30 mg	ORAL	1-5 years 7.5 mg 3 times daily 6-12 years 15 mg 3-4 times daily Adults 30-60 mg every 4-6 hours	Moderate pain ☞ Do not use during the last trimester of pregnancy. Avoid during breastfeeding. ☞ Only use for moderate pain, do not use as cough suppressant in respiratory infections because of possible serious side effects. ☞ Do not use in children under 1 year.
Colchicine Tablets 0.5 mg)	ORAL	Initially 1 mg, then 0.5 mg every 3 hours up to a total dose of 6 mg (12 tablets) until pain is relieved or vomiting and diarrhoea occurs.	Acute gout ☞ Avoid in pregnancy and during breastfeeding.
Colecalciferol (Vitamin D ₃) Capsules 50,000 units Oral drops 10,000 units/ml, Ampoules of 1 ml, containing 600,000 IU	ORAL IM	Treatment Give a single dose that you repeat after 3 weeks: Children under 5 years 100,000 units Adults and older children 300,000 units Prevention Give the same dose as above, young children every 3 months, older children and adults every 6 months.	Rickets, osteomalacia ☞ Avoid high doses in pregnancy, no contraindication during breastfeeding.
Co-trimoxazole (Sulfamethoxazole + trimethoprim) Tablets 120, 240 and 480 mg Syrup 240 mg/5 ml	ORAL	2-12 months 120 mg 2 times daily 1-5 years 240 mg 2 times daily 6-12 years 480 mg 2 times daily Adults 960 mg 2 times daily ☞ Double the dose in acute respiratory infections in children under 5 years.	Acute respiratory infections, bacillary dysentery, urinary tract infections, typhoid fever, cholera, STIs (see pages 123-124) ☞ Do not use during the first and third trimester in pregnancy. Avoid during breastfeeding. ☞ Do not use in babies under 6 weeks who are jaundiced or premature.
Dexamethasone Tablets 0.5 mg Ampoules of 1 ml, containing 4 mg	ORAL IM/IV	Children 0.01-0.1 mg/kg once daily Adults 0.5-10 mg once daily Children 0.2-0.5 mg/kg per day 0-6 years 2-4 mg one single dose 6-12 years 4-8 mg one single dose Adults 4-12 mg one single dose Repeat after 6-8 hours if necessary.	Allergy, severe asthma, upper airway obstruction, severe typhoid fever (see page 31), cerebral oedema (see page 162) ☞ Avoid during first trimester and during breastfeeding. ☞ 0.75 mg dexamethasone is equivalent to 5 mg prednisolone
Diazepam Tablets 5 and 10 mg Ampoules of 2 ml, containing 10 mg (= 5 mg/ml)	ORAL IV RECTAL	Children 0.15 mg/kg/day divided into 2-3 doses or once at night Adults 2-5 mg 2-3 times daily or 5-10 mg once at night 0.2 mg/kg; rectally 0.4 mg/kg one single dose 0-1 month 2 mg rectally or 1 mg IV 2-12 months 2.5mg 1-3 years 5 mg 4-12 years 10 mg Adults 10-20 mg ☞ Repeat after 10 minutes if convulsions continue.	ORAL: muscle spasm, short-term treatment of severe anxiety or panic attacks IV/ RECTAL: convulsions ☞ Avoid during pregnancy unless life-saving indication. Avoid during breastfeeding. ☞ Prolonged use can cause addiction. ☞ Rectal administration is as fast acting as IV. Give diazepam with a syringe without needle into the rectum (see page 163). ☞ Give IV very slowly over 3 minutes because of the risk of respiratory depression.
Diclofenac Tablets 25, 50 mg; Ampoules of 1 ml, containing 75 mg	ORAL IM only	Adults 25-50 mg 3 times daily Adults 75 mg 1-2 times daily ☞ Avoid prolonged courses of injections.	Pain (renal colic), inflammatory disease (rheumatoid arthritis) ☞ Avoid in pregnancy, especially during the last trimester, and during breastfeeding
Digoxin Tablets 0.125 mg (=125 microgram), 0.25 mg (=250 microgram)	ORAL	Children 0.01 mg/kg/day (= 10 microgram/kg/day) divided into 2 doses - maximum 0.25 mg/day Adults 0.125-0.5 mg once daily ☞ Divide into 2 doses if daily dose is greater than 0.25 mg	Heart failure ☞ No contraindication in pregnancy or during breastfeeding. ☞ Watch out for signs of overdose, see page 137.

Drug name and preparations	Route	Common dosage	Indications, use in pregnancy, during breastfeeding and important remarks
Diloxanide Tablets 500 mg, often only available in combination with metronidazole	ORAL	6-12 years 250 mg 3 times daily Adults 500 mg 3 times daily	Amoebic liver abscess after metronidazole treatment has been completed ☞ Avoid during pregnancy and during breastfeeding. ☞ It is not effective in acute amoebic dysentery.
Doxazosin Tablets 1, 2, 4 mg	ORAL	Adults: start with 1 mg once daily, increase after 1 week to 2 mg and then, if needed, to 4 mg (maximum daily dose 16 mg)	High blood pressure (particularly for men with prostate hypertrophy) ☞ Avoid during pregnancy and breastfeeding.
Doxycycline Tablets 100 mg	ORAL	Adults 100 mg once daily Give 200 mg on the first day.	Brucellosis, exacerbations of chronic obstructive lung disease, STIs (see pages 123-124) ☞ Do not use in children, in pregnancy and during breastfeeding.
Enalapril	ORAL	Adults: start with 2.5–5 mg once daily; usual maintenance dose is 10–20 mg once daily.	High blood pressure, heart failure ☞ Do not use in pregnancy and breastfeeding.
Ergometrine Ampoules of 1 ml containing 0.5 mg	IM	Postpartum or post-abortion bleeding 0.5 mg IM or 0.2–0.5 mg IV Prevention of postpartum bleeding 0.5 mg immediately after delivery of the baby	Bleeding from incomplete abortion, prevention and treatment of postpartum bleeding ☞ Do not use in pregnancy.
Erythromycin Tablets 250, 500 mg Syrup 125 mg/5 ml	ORAL	Children 25–45 mg/kg/day divided into 2-4 doses 0-1 month 62.5 mg 2-3 times daily 2-12 months 125 mg 3-4 times daily 1-5 years 125–250 mg 3-4 times daily 6-12 years 250–500 mg 3-4 times daily Adults 250–500 mg 3-4 times daily ☞ Alternatively, give in 2 dosages, for example, adults 1 g 2 times daily	Newborn conjunctivitis (chlamydia), whooping cough, atypical pneumonia, skin infections, cholera, STIs (see pages 123-124) ☞ No contraindication in pregnancy or during breastfeeding. ☞ Alternative to penicillin for patients with penicillin allergy.
Ethambutol Tablets 400 mg	ORAL	See pages 41-42.	Tuberculosis ☞ No contraindication in pregnancy or during breastfeeding. ☞ Do not use in children younger than 6 years. ☞ Always combine with other anti-tuberculosis drugs according to standard guidelines.
Ethinylestradiol + levonorgestrel (or + norethisterone)	ORAL	See pages 203-204.	Family planning, menstrual abnormalities
Ferrous sulphate Tablets 200 mg (100 mg ferrous sulphate = 30 mg element iron)	ORAL	Treatment of iron deficiency Children 10–15 mg/kg ferrous sulphate/day divided into several doses 2-6 months 50 mg once daily 7-12 months 50 mg 2 times daily 1-5 years 100 mg 2 times daily 6-12 years 200 mg 2 times daily Adults 200 mg 3 times daily Prevention of iron deficiency Children 5 mg/kg ferrous sulphate once daily Adults 200 mg once daily	Prophylaxis and treatment of iron deficiency anaemia ☞ No contraindication in pregnancy or during breastfeeding.
Ferrous sulphate + folic acid Tablets 200 + 4 mg	ORAL	Pregnant women who are not anaemic 1 tablet daily throughout pregnancy.	Prophylaxis of anaemia in pregnancy ☞ No contraindication in pregnancy or during breastfeeding.
Fluphenazine	IM	Start with a test dose of 12.5 mg, and then give 25 mg after one week, then 25 mg every 3-4 weeks.	Chronic psychosis ☞ Can be given in pregnancy and during breastfeeding, watch the baby for drowsiness.
Folic acid Tablets 5 mg	ORAL	1 month-12 years 5 mg once daily Adults 5–10 mg once daily	Prophylaxis and treatment of folate deficiency anaemia ☞ No contraindication in pregnancy or during breastfeeding.
Furosemide (Frusemide) Tablets 20 and 40 mg Ampoules of 2 ml, containing 20 mg (= 10 mg/ml)	ORAL IM/IV	Children 0.5–2 mg/kg once daily in the morning, maximum 40 mg/day Adults 20–40 mg once daily Children 0.5–1 mg/kg single dose Adults 20–40 mg	Acute heart failure, oedema, renal failure (see page 120) ☞ Avoid in pregnancy and during breastfeeding unless vital indication. ☞ Do not give for the oedema of kwashiorkor.

Drug name and preparations	Route	Common dosage	Indications, use in pregnancy, during breastfeeding and important remarks
Gentamicin Ampoules of 2 ml, containing 40 mg (20 mg/ml) or 80 mg (40 mg/ml)	IM/IV	Newborn under 1 week: 5 mg/kg once daily = about 15 mg once daily Children older than 1 week 7.5 mg/kg in one single daily dose; adults 5 mg/kg 1-3 weeks 20 mg once daily 2-12 months 20-60 mg once daily 1-5 years 60-100 mg once daily 6-12 years 100-200 mg once daily Adults 180-360 mg once daily ☞ Calculate the dose carefully to reduce the risk of serious side effects. ☞ Do not give for longer than 7-10 days. ☞ If IV give slowly over 30 -60 minutes.	Severe infections, including urinary tract infections, septicaemia, osteomyelitis, severe newborn infections, peritonitis ☞ Avoid in pregnancy and during breastfeeding. ☞ Do not use in renal failure. Gentamicin is usually combined with another antibiotic, often ampicillin.
Glibenclamide Tablets 5 mg	ORAL	Start with 5 mg (elderly 2.5 mg) with breakfast. If needed increase gradually to up to 15 mg. If you give the maximum dose, give 10 mg with breakfast and 5 mg in the afternoon.	Diabetes mellitus ☞ Do not use in pregnancy and during breastfeeding.
Glucose (Dextrose) Ampoules of 10 ml, containing 50% glucose	IV	Adults give glucose 50% 25 ml. Children give 5 ml/kg of a glucose 10% solution. ☞ Prepare a 10% glucose solution by taking one part of a 50% glucose solution. Mix it with 4 times that amount of sodium chloride 0.9% or water for injection.	Severe hypoglycaemia when the patient is unable to swallow or is unconscious
Glyceryl trinitrate Sublingual tablets 0.5 mg Spray 0.4 mg/dose	Sublingual	Give under the tongue 0.4-1 mg. ☞ Repeat if required.	Treatment and prophylaxis of angina, treatment of acute heart failure ☞ Avoid in pregnancy and during breastfeeding.
Griseofulvin Tablets/Capsules 125, 250 and 500 mg	ORAL	2-12 months 62.5 mg once daily 1-5 years 125-190 mg once daily 6-12 years 250-375 mg once daily Adults 500-750 mg once daily	Fungal infections, except candidiasis ☞ Do not use in pregnancy and during breastfeeding.
Haloperidol Tablets 2, 5 mg Ampoules of 1 ml containing 5 mg	ORAL IM	Acute psychosis or violent behaviour <i>Very disturbed adult</i> ORAL 3-5 mg 2-3 times daily ☞ Increase according to response, max. 30 mg/day) IM 2-10 mg every 4-8 hours ☞ Increase according to response, max. 8 mg/day) ☞ As soon as the condition has improved, reduce. <i>Less disturbed adult</i> ORAL 1.5-3 mg 2-3 times daily Confusion and restlessness in adults ORAL 1-3 mg 3 times daily Severe vomiting, intractable hiccup in adults ORAL 1.5 mg 1-2 times daily	Psychosis symptoms, sedation for violent or very agitated psychotic patients, confusion and restlessness, severe vomiting, intractable hiccup ☞ Avoid in pregnancy and during breastfeeding.
Hydralazine Tablets 25, 50 mg Vials 20 mg	ORAL IV/IM	Adults 25-50 mg 2 times daily ☞ Increase gradually (maximum 100 mg/day). For IV/IM treatment of eclampsia see page 190.	High blood pressure (not first choice drug), eclampsia
Hydrochlorothiazide Tablets 25, 50 mg	ORAL	High blood pressure Adults 12.5-50 mg once daily Heart failure Adults 25-50 mg once daily ☞ Increase to up to 100 mg if needed.	High blood pressure, heart failure ☞ Do not use in pregnancy and during breastfeeding.
Hydrocortisone Vials 100 mg	IM/IV	2-4 mg/kg one single dose 2-12 months 25 mg one single dose 1-5 years 50 mg one single dose 6-12 years 100 mg one single dose Adults 100-500 mg one single dose	See Dexamethasone
Hydroxocobalamin Amp. of 1ml containing 1 mg	IM	See page 131.	Vitamin B₁₂ deficiency ☞ Do not give as a 'tonic'.
Hyoscine butylbromide Tablets 10 mg; ampoules of 1 ml, containing 20 mg	ORAL IV/IM	6-12 years 10 mg 3 times daily Adults 10-20 mg 3 times daily Adults 20 mg ☞ Repeat if needed up to a maximum of 100 mg/day.	Spasm of the uro-genital or gastrointestinal tract ☞ Avoid in pregnancy unless benefit outweighs the risks. No contraindication during breastfeeding.

Drug name and preparations	Route	Common dosage	Indications, use in pregnancy, during breastfeeding and important remarks
Ibuprofen Tablets 200 and 400 mg	ORAL	20–30 mg/kg per day divided into 3-4 doses 1-5 years 100 mg 3 times daily 6-12 years 200 mg 3 times daily Adults 400–600 mg 3-4 times daily	Fever, pain and inflammation in rheumatic disease and other musculoskeletal problems, acute gout ☞ Avoid during pregnancy. No contraindication during breastfeeding. ☞ Do not use if a child weighs less than 7 kg.
Imipramine Tablets 10, 25 mg	ORAL	Start with 50 mg at night (elderly 10 mg). Increase gradually to up to 200 mg (elderly 50 mg) by adding an extra 10–25 mg every week. The total dose can be divided into several daily doses (maximum single dose 150 mg).	Moderate to severe depression ☞ Imipramine is less sedating than amitriptyline. ☞ Do not use in children for depression.
Indometacin Tablets 25 mg	ORAL	Adults 25–50 mg 3 times daily	Pain, moderate to severe inflammation in rheumatic disease and other musculoskeletal problems, acute gout ☞ Do not use in pregnancy and avoid during breastfeeding. ☞ Side effects are common.
Iodine Capsules 200 mg Ampoules of 1 ml containing 240 mg, 480 mg iodized oil	ORAL IM	Under 1 year 200 mg every year 1-5 years 400 mg every year Over 5 years and adults 600 mg every year Under 1 years 240 mg every 2 years Over 1 year and adults 480 mg every 2 years	Prevention of iodine deficiency
Iron dextran Ampoules of 2 ml containing 100 mg (=50 mg/ml)	IV	See page 129.	Iron deficiency anaemia when oral treatment is not successful because of severe side effects or malabsorption ☞ Do not use in children.
Isoniazid Tablets 100 and 300 mg Isoniazid + thioacetazone Combined tablets 100+ 50 mg and 300+ 150 mg	ORAL	See pages 41-42.	Tuberculosis ☞ No contraindication in pregnancy or during breastfeeding. ☞ For treatment of tuberculosis, always combine with other anti-tuberculosis drugs according to standard guidelines.
Isosorbide dinitrate Tablets 5, 10, 20 mg	ORAL	Acute treatment 5–10 mg under the tongue (sublingual) Prevention of angina 15–60 mg 2 times daily	Treatment and prophylaxis of angina, treatment of acute heart failure ☞ Avoid in pregnancy and during breastfeeding.
Ketoprofen Tablets 50, 100 mg	ORAL	Adults 50 mg or 100 mg 3 times daily 2 times daily	Pain and mild inflammation in rheumatic disease and other musculoskeletal problems, dysmenorrhoea ☞ Avoid in pregnancy and during breastfeeding.
Levamisole Tablets 50, 150 mg	ORAL	2-12 months 25 mg one single dose 1-5 years 50 mg one single dose 6-12 years 75 mg one single dose Adults 150 mg one single dose	Worms ☞ No contraindication in pregnancy or during breastfeeding.
Levothyroxine Tablets 25, 50, 100 micrograms	ORAL	See pages 208-209.	Hypothyroidism ☞ No contraindication in pregnancy or during breastfeeding.
Lidocaine Vials/Ampoules 1 % (=10 mg/ml); 2 % (= 20 mg/ml); Lidocaine + adrenaline		Dose depends on the area to be anaesthetised. Maximum dose 4 mg/kg lidocaine within 2 hours. The anaesthesia takes about 5 minutes to set in and lasts 1-1.5 hours.	Local anaesthesia ☞ No contraindication in pregnancy or during breastfeeding. ☞ Never use lidocaine that contains adrenaline (epinephrine) for anaesthesia of the penis, fingers, toes, ears or nose.
Magnesium hydroxide Syrup 550 mg/10 ml	ORAL	Adults 25 ml when needed	Constipation ☞ No contraindication in pregnancy or during breastfeeding.
Magnesium sulphate Ampoules of 2 ml, containing 1000 mg (= 500 mg/ml)	IV	See page 190.	Pre-eclampsia, eclampsia
Mannitol Vials 10% (1g=10 ml), 20% (1 g=5 ml)	IV	Cerebral oedema 1 g/kg (= 5 ml/kg of mannitol 20% or 10 ml/kg of mannitol 10%) over 15 minutes IV	Cerebral oedema, acute glaucoma (see page 217) ☞ No contraindication for life-saving indications.

Drug name and preparations	Route	Common dosage	Indications, use in pregnancy, during breastfeeding and important remarks
Mebendazole Chewable tablets 100 mg	ORAL	Children above 1 year and adults 500 mg as one single dose or 100 mg 2 times daily for 3 days	Worms (except tapeworms) ☞ Do not use during first trimester of pregnancy, no contraindication during breastfeeding. ☞ Do not use in children under 1 year.
Medroxyprogesterone Ampoules of 150 mg in 1 ml	IM only	See pages 203-204.	Family planning ☞ See pages 203-204.
Metformin Tablets 500 mg	ORAL	Adults 500 mg 2-3 times daily (maximum 2 g/day)	Diabetes mellitus ☞ Avoid in pregnancy and during breastfeeding.
Methotrexate Tablets 2.5, 10 mg	ORAL	See page 150.	Rheumatoid arthritis
Methyldopa Tablets 250 mg	ORAL	Adults 250 mg 2-3 times daily ☞ Increase every 2 days if necessary up to 3 g/day; in elderly patients up to 2 g/day.	High blood pressure ☞ No contraindication in pregnancy. Avoid during breastfeeding.
Metoclopramide Tablets 10 mg Ampoules of 2 ml, containing 10 mg (= 5 mg/ml)	ORAL IM/IV	Children 0.3 mg/kg/day divided into 3 doses 6-12 years 2-5 mg 3 times daily Adults 5-10 mg 3 times daily	Vomiting ☞ No contraindication in pregnancy. Avoid during breastfeeding. ☞ Avoid in young children because of extrapyramidal side effects (tremor, abnormal body and face movements).
Metronidazole Tablets 200, 250 and 400 mg Syrup 200 mg/5 ml	ORAL	Usual dose for most infections 1-12 months 50 mg 3 times daily 1-5 years 100 mg 3 times daily 6-12 years 200 mg 3 times daily Adults 400 mg 3 times daily Amoebic dysentery Double the above dose and give for 5-10 days. Giardiasis 1-5 years 500-750 mg once daily 6-12 years 1 g once daily Adults 2 g once daily ☞ Give for 3 days. Alternatively give the usual dose for infections for 10 days.	Amoebic dysentery, amoebic liver abscess, anaerobic infections, giardiasis, dental infections, bacterial vaginosis (see page 124) ☞ Avoid in the first trimester of pregnancy and during breastfeeding.
Morphine Tablets 10 mg Ampoules of 1 ml, containing 10 mg	ORAL SC/IM IV	Pain relief 2-12 months 0.5-1.5 mg every 4-6 hours 1-5 years 2.5-5 mg every 4-6 hours 6-12 years 5-10 mg every 4-6 hours Adults 7.5-15 mg every 4-6 hours ☞ Start with the doses given and increase if necessary. As a rule, an ORAL dose is about double the SC/IM dose. Acute pulmonary oedema or myocardial infarction Adults 5-10mg	Severe pain, pulmonary oedema ☞ No contraindication in pregnancy. Do not use during delivery and avoid during breastfeeding. ☞ Give morphine together with an antiemetic such as metoclopramide because nausea and vomiting are common side effects.
Nalidixic acid Tablets 250, 500 mg	ORAL	Children 50 mg/kg/day divided into 4 doses 2-12 months 62.5-125 mg 4 times daily 1-5 years 250 mg 4 times daily 6-12 years 500 mg 4 times daily Adults 1 g 4 times daily	Bacillary dysentery, lower urinary tract infections ☞ Do not use in pregnancy and during breastfeeding.
Naproxen Tablets 500 mg	ORAL	Children 10 mg/kg/day divided into 2 doses Adults 500 mg 1-2 times daily	See Ibuprofen.
Niclosamide Chewable tablets 500 mg	ORAL	Under 2 years 500 mg one single dose 2-12 years 1 g one single dose Adults 2 g one single dose ☞ For hymenolepis nana give half of the first dose for 6 more days.	Tapeworms, including Hymenolepis nana ☞ No contraindication in pregnancy and during breastfeeding.
Nifedipine Tablets, various retard and long-acting preparations	ORAL	Adults 10-40 mg 2 times daily (depending on the preparation)	High blood pressure, angina pectoris ☞ Avoid in pregnancy and during breastfeeding. ☞ For treatment of hypertension only use longer-acting preparations.
Nitrofurantoin Tablets 50, 100 mg	ORAL	Treatment 6-12 years 50 mg 3 times daily Adults 100 mg 3 times daily Prevention Children older than 3 months 1 mg/kg at night 1-5 years 12.25-25 mg at night 6-12 years 25-50 mg at night Adults 50-100 mg at night	Lower urinary tract infections, prevention of recurrent urinary tract infections ☞ Avoid in pregnancy shortly before expected delivery. Avoid during breastfeeding.

Drug name and preparations	Route	Common dosage	Indications, use in pregnancy, during breastfeeding and important remarks
Nystatin Tablets 100,000; 500,000 IU Suspension 30 ml (100,000 IU/ml) Vaginal tablets 100,000 IU	ORAL	Oral candidiasis 100,000 IU 4 times daily after food Vaginal candidiasis 1-2 vaginal tablets inserted into the vagina at night for 14 nights	Oral, gastrointestinal and vaginal candidiasis. ☞ <i>If no suspension is available, crush one tablet to give to small children. Older children should suck a tablet.</i>
Ofloxacin Tablets 200, 400 mg	ORAL	Adults 200–400 mg 2 times daily	Reserve antibiotic (see Ciprofloxacin) ☞ <i>See Ciprofloxacin.</i>
Omeprazole Capsules 20, 40 mg	ORAL	Adults 20 mg once daily ☞ <i>Only in severe cases give 20 mg 2 times daily or 40 mg once daily.</i>	Peptic ulcer, reflux oesophagitis, ulcer prophylaxis while taking NSAIDs (see page 146) ☞ <i>Avoid in pregnancy and during breastfeeding.</i>
Oral rehydration salts (ORS) Powder for 1 litre glucose-electrolyte solution	ORAL	See pages 85-88.	Prevention and treatment of dehydration ☞ <i>No contraindications in pregnancy and during breastfeeding.</i>
Oxytocin Ampoules of 1 ml containing 10 units	IV	Postpartum or post-abortion bleeding 5 units slowly IV Prevention of postpartum bleeding 5 units slowly IV or 10 units IM immediately after delivery of the baby	Prevention and treatment of postpartum haemorrhage, treatment of incomplete abortion ☞ <i>For induction of labour, it should only be used by specialists.</i>
Paracetamol (Acetaminophen) Tablets 100, 325 and 500 mg Syrup 120 mg/5 ml	ORAL	40 mg/kg/day divided into 3-4 doses 0-1 month Avoid 2-12 months 50–125 mg up to 4 times daily 1-5 years 120–250 mg up to 4 times daily 6-12 years 250–500 mg up to 4 times daily Adults 500 mg–1 g up to 4 times daily	Fever, pain ☞ <i>No contraindication in pregnancy or during breastfeeding.</i> ☞ <i>Paracetamol has no anti-inflammatory effect.</i>
Penicillamine		See page 150.	Rheumatoid arthritis
Penicillin V (Phenoxymethylpenicillin) Tablets 250 and 500 mg Powder for oral suspension 125 mg/5 ml and 250 mg/5 ml	ORAL	50 mg/kg/day divided into 3-4 doses 2-12 months 125 mg 3 times daily 1-5 years 250 mg 3 times daily 6-12 years 250–500 mg 3 times daily Adults 500–750 mg 3 times daily	Streptococcal tonsillitis, skin infections ☞ <i>No contraindication in pregnancy or during breastfeeding.</i> ☞ <i>Poor absorption, do not use for severe infections.</i>
Pentazocine Tablets 50 mg; ampoules of 1 ml containing 30mg or 50 mg	ORAL SC/IM/ IV	Adults 25–100 mg every 4 hours Adults 30–60 mg every 4 hours	Severe pain ☞ <i>Do not use in pregnancy and during delivery</i> <i>Avoid during breastfeeding.</i>
Phenobarbital Tablets 15, 30 50 and 100 mg Ampoules of 2 ml, containing 200 mg (= 100 mg/ml)	ORAL IV	Long-term treatment of convulsions 5–8 mg/kg once daily at night 0-1 month 7.5–15 mg once daily at night 2-12 months 15–45 mg once daily at night 1-5 years 30–100 mg once daily at night 6-12 years 50–150 mg once daily at night Adults 60–up to 300 mg once daily at night To stop an acute convulsion 10 mg/kg slowly IV over 10-15 minutes (not faster than 100 mg/minute, children 30 mg/minute) 0-1 month 25 mg one single dose 2-12 months 50 mg one single dose 1-5 years 100 mg one single dose 6-12 years 100–250 mg one single dose Adults 200–500 mg one single dose	Epilepsy, to stop convulsion if diazepam is not effective, sedation in tetanus ☞ <i>Avoid in pregnancy. However, the risk linked to epilepsy is usually greater than the risks linked to the drug. To reduce the risks, give folic acid during pregnancy and vitamin K to the baby after birth. No contraindication during breastfeeding.</i> ☞ <i>Never stop long-term treatment abruptly.</i> ☞ <i>IV-doses for acute treatment can be higher according to weight (adults maximum 1 g) but be aware of the risk of respiratory depression and monitor the patient carefully.</i>
Phenytoin Tablets/capsules 25, 50 and 100 mg Ampoules of 5 ml, containing 250 mg (= 50 mg/5 ml)	ORAL IV	Long-term treatment of convulsions 3–8 mg/kg/day divided into 2 doses 2-12 months 12.5–50 mg 2 times daily 1-5 years 25–100 mg 2 times daily 6-12 years 50–150 mg 2 times daily Adults 150–300 mg 2 times daily ☞ <i>Start with a low dose and increase the dose slowly every 2 weeks. For example, in adults start with 150–300 mg once daily.</i> To stop an acute convulsion Children and adults 15 mg/kg slowly IV as infusion in sodium chloride 0.9% over 10-30 minutes (adults not faster than 50 mg/minute).	Epilepsy, to stop convulsions ☞ <i>Avoid in pregnancy. However, the risk linked to epilepsy is usually greater than the risks linked to the drug. To reduce the risks, give folic acid during pregnancy and vitamin K to the baby after birth. No contraindication during breastfeeding.</i> ☞ <i>Never stop abruptly.</i> ☞ <i>IV infusion may cause cardiac arrhythmia, low blood pressure and collapse. Monitor the patient carefully.</i>

Drug name and preparations	Route	Common dosage	Indications, use in pregnancy, during breastfeeding and important remarks
Phytomenadione (Vitamin K) Ampoules of 0.5 ml, containing 1 mg	IM	Prevention of haemorrhagic disease of the newborn Newborn 1 mg after delivery	Prevention and treatment of haemorrhagic disease of the newborn, bleeding in liver failure (see page 111) ☞ No contraindication in pregnancy or during breastfeeding.
Piroxicam Tablets 10, 20 mg	ORAL	Adults 10–30 mg once daily	See Ibuprofen.
Potassium chloride (KCL) Tablets 470 mg (=12 mmol) Ampoules of 10 ml containing 1.5 g (=20 mmol) Strength varies with manufacturer	ORAL	Prevention Adults 2–4 g (25–50 mmol) once daily Treatment of mild hypokalaemia Adults 2–4 g (25–50 mmol) 2-3 times daily	Hypokalaemia, preparation of ReSoMal in severe malnutrition (see page 50) ☞ No contraindication in pregnancy or during breastfeeding. ☞ Never give directly IV because it can cause fatal cardiac arrhythmia. ☞ Do not give routinely when giving furosemide. ☞ Reduce dose in renal failure.
	INF	Treatment of severe hypokalaemia (less than 2.5 mmol/l) and patient cannot tolerate oral treatment Mix potassium chloride thoroughly with 500 ml sodium chloride 0.9% and give slowly as infusion over 2-3 hours.	
Prednisolone Tablets 5 mg	ORAL	Children 1–2 mg/kg per day 2-12 months 5 mg once daily in the morning 1-5 years 5–10 mg once daily in the morning 6-12 years 10–30 mg once daily in the morning Adults 20–40 mg once daily in the morning	Allergy, severe inflammation, asthma ☞ Avoid in the first trimester of pregnancy and during breastfeeding ☞ The doses vary with indication. ☞ See also page 212.
Procaine penicillin Vials 1 million IU, 3 million IU	IM only	Children 50,000–100,000 IU/kg once daily 2-12 months 300,000–500,000 IU once daily 1-5 years 1,000,000 (1 Million) IU once daily 6-12 years 1,500,000 IU once daily Adults 1–4 Million IU once daily	Moderately severe infections including pneumonia, skin infections, lymphangitis, tetanus ☞ Never give IV. ☞ Procaine penicillin is also available mixed with benzylpenicillin, often called PPF (procaine penicillin forte). This combination has the advantage of combining immediate with delayed action.
Promethazine Tablets 25 mg Syrup 5 mg/5 ml Ampoules of 2 ml, containing 50 mg (= 25 mg/ml)	ORAL	Children 1 mg/kg/day divided into 1-3 doses Allergy and vomiting 2-5 years 2.5–7.5 mg 2 times daily 6-12 years 5–12.5 mg 2 times daily Adults 25 mg 2 times daily ☞ For prevention of travel sickness , give 1-2 hours before travel. Sedation 2-5 years 15 mg one single dose 6-12 years 25 mg one single dose Adults 25–50 mg one single dose	Allergy, vomiting, sedation, prevention of travel sickness ☞ Avoid in the first trimester of pregnancy and before the expected date delivery. Avoid during breastfeeding. ☞ Do not use in children under 2 years.
	IM/IV	Severe allergic reaction 6-12 years 12.5–25 mg one single dose Adults 25–50 mg one single dose	
Propranolol Tablets 10, 20, 40 mg	ORAL	High blood pressure Adults 80–160 mg 2 times daily Angina Adults 40–120 mg 2 times daily Migraine prophylaxis Adults 10–80 mg 2 times daily Anxiety with tremor Adults 40–80 mg 2 times daily ☞ In all conditions start with the low dose and increase if needed.	High blood pressure, angina, migraine prophylaxis, anxiety with tremor ☞ No contraindication in pregnancy, avoid during breastfeeding. ☞ Do not give to asthma patients and patients with bradycardia.
Pyrantel Chewable tablets 125, 250 mg	ORAL	10 mg/kg per day as one single dose 7-12 months 62.5 mg 1-5 years 125 mg 6-12 years 250 mg Adults 500 mg	Worms (only effective against ascaris and pinworm; some effect against hookworm) ☞ Do not use in the first trimester of pregnancy. No contraindication during breastfeeding.
Pyrazinamide Tablets 500 mg	ORAL	See pages 41-42.	Tuberculosis ☞ No contraindication in pregnancy and during breastfeeding. ☞ Always combine with other anti-tuberculosis drugs according to standard guidelines.

Drug name and preparations	Route	Common dosage	Indications, use in pregnancy, during breastfeeding and important remarks
Pyridoxine Tablets 25, 50 mg	ORAL	Prophylaxis Under 12 years 12.5–25 mg once daily Adults 25–50 mg once daily Treatment Under 12 years 25–50 mg once daily Adults 100 mg once daily	Prevention and treatment of Vitamin B6 deficiency ☞ No contraindication in pregnancy and during breastfeeding. ☞ Give prophylactic dose to all pregnant women on anti-epileptics or isoniazid.
Quinine Tablets 200, 300 mg Ampoules of 2 ml, containing 300 mg (= 150 mg/ml)	ORAL IM IV	2-12 months 50 mg 3 times daily 1-5 years 100–150 mg 3 times daily 6-12 years 150–300 mg 3 times daily Adults 600 mg 3 times daily Start with 10–20 mg/kg diluted in glucose 5% over 4 hours (maximum adults dose 1.4 g). Then continue with 10 mg/kg over 4 hours every 8-12 hours until the patient can take quinine orally.	Severe malaria ☞ No contraindication in pregnancy and during breastfeeding. ☞ Never give directly IV but always dilute in a glucose solution and continue a glucose infusion in between the quinine infusions.
Ranitidine Tablets 150, 300 mg	ORAL	Adults 300 mg at night or 150 mg 2 times daily	Peptic ulcer, reflux oesophagitis, dyspepsia ☞ Avoid in pregnancy and during breastfeeding.
Retinol (Vitamin A) Capsules 200,000 IU	ORAL	0-6 months 50,000 IU 7-12 months 100,000 IU Over 1 year 200,000 IU Prophylaxis of vitamin A deficiency ☞ Give the above dose to every child with chronic diarrhoea, measles, malnutrition or another serious disease, if the child had not received a dose within the last 4 months. ☞ Give 200,000 IU to women within 4 weeks after delivery Treatment of vitamin A deficiency ☞ Give the above doses on the day you diagnose vitamin A deficiency, on the next day, and then after 2 weeks. Repeat one single dose after 4 months.	Prevention and treatment of vitamin A deficiency ☞ High doses of more than 10,000 IU per day are contraindicated in pregnancy. No contraindication during breastfeeding ☞ 2 drops of a 200,000 IU capsule are about 50,000 IU and 4 drops are about 100,000 IU.
Rifampicin Tablets/Capsules 150, 300, 450 mg ; Syrup 100 mg/5 ml	ORAL	Tuberculosis See pages 41-42. Brucellosis See page 32.	Tuberculosis, brucellosis, leprosy ☞ Not contraindicated in pregnancy or during breastfeeding. ☞ Always combine with other drugs according to standard guidelines.
Salbutamol Tablets 2, 4 mg Syrup 2 mg/5 ml Nebulizer solution 1 mg/ml Spray 100 micrograms/puff Ampoules of 5 ml containing 0.25 mg = 250 microgram (=50 microgram/ml)	ORAL INH SC/IM	1-5 years 1–2 mg 3-4 times daily 6-12 years 2 mg 3-4 times daily Adults 2–4 mg 3-4 times daily Children and adults Spray 1-2 puffs when needed Nebulizer 2.5–5 mg up to 4 times daily Adults 0.5 mg (= 500 microgram). ☞ Repeat after 4 hours if needed.	Asthma, bronchospasm ☞ Not contraindicated in pregnancy or during breastfeeding.
Sodium stibogluconate Ampoules of 100 mg antimony/ml	IM Intra-lesional	20 mg/kg/day for 20 days ☞ If the dose is very large, give it in dextrose 5% infusion over at least 10 minutes. Inject 1–5 ml around and beneath the lesion at intervals of about 2-5 days.	Cutaneous leishmaniasis ☞ Do not use in pregnancy.
Spirolactone Tablets 25, 50, 100 mg	ORAL	Children 3 mg/kg per day divided into 2-3 doses 1-5 years 12.5–25 mg once daily 6-12 years 25–50 mg once daily Adults 100–200 mg once daily ☞ Give these doses for 6 days, and then reduce them to half.	Ascites and oedema, ascites in liver failure, oedema in nephrotic syndrome (see page 119), severe heart failure (see page 137) ☞ Do not use in pregnancy or during breastfeeding.
Streptomycin Vials 1 g	IM only	Tuberculosis See pages 41-42. Brucellosis See page 32.	Tuberculosis, brucellosis ☞ Do not use in pregnancy or during breastfeeding. ☞ In tuberculosis, always combine with other anti-tuberculosis drugs according to standard guidelines.
Sulfadiazine Tablets 500 mg	ORAL	5-12 years 500 mg once daily Adults 1 g once daily	Prophylaxis of rheumatic fever ☞ Avoid during the last trimester of pregnancy and during breastfeeding if an alternative is available.

Drug name and preparations	Route	Common dosage	Indications, use in pregnancy, during breastfeeding and important remarks
Sulfadoxine + pyrimethamine (Fansidar) Tablets sulfadoxine 500 mg + pyrimethamine 25 mg	ORAL	Under 1 year ½ tablet 1-5 years 1 tablet 6-12 years 2 tablets Adults 3 tablets ☞ Give one single dose.	Malaria treatment (if clinically diagnosed, combine with chloroquine; if falciparum malaria combine with artemether) ☞ <i>In pregnancy and breastfeeding are the risks of malaria usually greater than the risks associated with the drug.</i>
Sulfasalazine Tablets 500 mg	ORAL	See page 150.	Rheumatoid arthritis
Tetracycline Capsules or tablets 250 mg	ORAL	Adults 250–500 mg 4 times daily	See Doxycycline.
Thioacetazone	see Isoniazid + thioacetazone		
Tinidazole Tablets 500 mg	ORAL	Giardiasis, trichomoniasis Children 50 mg/kg one single dose Adults 2 g one single dose Amoebic dysentery Children 50 mg/kg once daily for 3 days Adults 2 g once daily for 3 days	Giardiasis, amoebic dysentery, trichomonas ☞ <i>See metronidazole.</i>
Tramadol Tablets, capsules 50, 100 mg	ORAL	Adults 50–100 mg every 4-6 hours	Severe pain ☞ <i>Do not use in pregnancy or during breastfeeding.</i>
Trihexyphenidyl Tablets 2 mg	ORAL	Treatment and prevention in adults Start with 1 mg once daily. Increase gradually. The usual maintenance dose is 5–15 mg divided into 3-4 doses. Maximum 20 mg/day. Acute extrapyramidal reaction in adults Give 4 mg orally, and then continue as above.	Parkinsonism, prevention or treatment of drug-induced extrapyramidal symptoms ☞ <i>Can be used in pregnancy but start with half the recommend dose. No contraindication during breastfeeding.</i>
Verapamil Tablets 40, 80 mg	ORAL	Angina Adults 80–120 mg 3 times daily High blood pressure Adults 120–240 mg 2 times daily	High blood pressure, angina ☞ <i>Do not use together with beta-blockers.</i> ☞ <i>Do not use in patients at risk of heart failure.</i>
Vitamin A	see Retinol		
Vitamin B₆	see Pyridoxine		
Vitamin B₁₂	see Hydroxocobalamin		
Vitamin C	see Ascorbic acid		
Vitamin D	see Colecaliferiol		
Vitamin K	see Phytomenadione		

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د افغان ماشومانو لپاره د جرمني کمیټې او د هغې له مشر ډاکټر ایروس څخه ډېره مننه کوو چې د دغه کتاب د چاپ لگښت یې ورکړي دي دوی په تیرو کلونو کې هم د ننګرهار د طب پوهنځی د ۴۰ عنوانه طبي کتابونو د چاپ لگښت پر غاړه درلود.

په ځانګړي توګه د جې آی زیت (GIZ) له دفتر او CIM (Center for International Migration & Development) چې زما لپاره یې په تېرو څلور کلونو کې په افغانستان کې د کار امکانات برابر کړي دي هم د زړه له کومې مننه کوم.

د لوړو زده کړو له محترم وزیر ښاغلي پوهاند ډاکټر عبیدالله عبید، علمي معین ښاغلي پوهنوال محمد عثمان بابري، مالي او اداري معین ښاغلي پوهنوال ډاکټر گل حسن ولیزی، د ننګرهار پوهنتون رییس ښاغلي ډاکټر محمد صابر، د ننګرهار طب پوهنځی رییس ښاغلي ډاکټر خالد یار، د ننګرهار طب پوهنځی علمي مرستیال ښاغلي ډاکټر همایون چارديوال، د پوهنتونو او پوهنځیو له ښاغلو ریيسانو او استادانو څخه هم مننه کوم چې د کتابونو د چاپ لړۍ یې هڅولې او مرسته یې ورسره کړې ده.

همدارنگه د دفتر له همکارانو احمد فهیم حبیبی، سبحان الله او حکمت الله عزیز څخه هم مننه کوم چې د کتابونو د چاپ په برخه کې یې نه ستړې کیدونکې هلې ځلې کړې دي.

ډاکټر یحیی وردګ، د لوړو زده کړو وزارت

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ننگرهار طب پوهنځی لپاره د ۲۰ نورو طبي کتابونو د چاپ چارې روانې دي. د يادونې وړ ده چې نوموړي چاپ شوي کتابونه د هيواد ټولو طب پوهنځيو ته په وړيا توگه ویشل شوي دي.

ټول چاپ شوی طبي کتابونه کولای شي د www.ecampus-afghanistan.org ويب پاڼې څخه ډاونلوډ کړي.

کوم کتاب چې ستاسې په لاس کې دي زمونږ د فعاليتونو يوه بېلگه ده. مونږ غواړو چې دې پروسې ته دوام ورکړو، ترڅو وکولای شو د درسي کتابونو په برابرولو سره د هيواد له پوهنتونو سره مرسته وکړو او د چپټر او لکچر نوټ دوران ته د پای ټکی کېږدو. د دې لپاره دا اړينه ده چې د لوړو زده کړو د موسساتو لپاره هر کال څه نا څه ۱۰۰ عنوانه درسي کتابونه چاپ کړل شي.

د لوړو زده کړو د وزارت، پوهنتونونو، استادانو او محصلينو د غوښتنې په اساس په راتلونکې کې غواړو چې دا پروگرام غير طبي برخو لکه ساينس، انجنيري، کرهڼې، اجتماعي علومو او نورو پوهنځيو ته هم پراخ کړو او د مختلفو پوهنتونونو او پوهنځيو د اړتيا وړ کتابونه چاپ کړو.

له ټولو محترمو استادانو څخه هيله کوو، چې په خپلو مسلکي برخو کې نوي کتابونه وليکي، وژباړي او يا هم خپل پخواني ليکل شوي کتابونه، لکچر نوټونه او چپټرونه ايډېټ او د چاپ لپاره تيار کړي. زمونږ په واک کې يې راکړي، چې په ښه کيفيت چاپ او وروسته يې د اړوندې پوهنځۍ استادانو او محصلينو په واک کې ورکړو. همدارنگه د يادو شويو ټکو په اړوند خپل وړاندیزونه او نظريات زمونږ په پته له مونږ سره شريک کړي، ترڅو په گډه پدې برخه کې اغيزمن گامونه پورته کړو.

له گرانو محصلينو څخه هم هيله کوو چې په يادو چارو کې له مونږ او ښاغلو استادانو سره مرسته وکړي.

د يادونې وړ ده چې د مولفينو او خپروونکو له خوا پوره زيار ايستل شوی دی، ترڅو د کتابونو محتويات د نړيوالو علمي معيارونو په اساس برابر شي، خو بيا هم کيدای شي د کتاب په محتوی کې ځينې تيروتنې او ستونزې وجود ولري، نو له درنو لوستونکو څخه هيله مند يو ترڅو خپل نظريات او نيوکې مولف او يا مونږ ته په ليکلې بڼه را وليږي، ترڅو په راتلونکې چاپ کې اصلاح شي.

د درسي کتابونو د چاپ پروسه

قدرمنو استادانو او گرانو محصلينو!

د افغانستان په پوهنتونونو کې د درسي کتابونو کموالی او نشتوالی له لویو ستونزو څخه گڼل کېږي. یو زیات شمیر استادان او محصلین نوي معلوماتو ته لاس رسی نه لري، په زاړه میتود تدریس کوي او له هغو کتابونو او چپترونو څخه گټه اخلي چې زاړه دي او په بازار کې په ټیټ کیفیت فوتوکاپي کېږي.

د دې ستونزو د هوارولو لپاره په تېرو درو کلونو کې مونږ د طب پوهنځیو د درسي کتابونو د چاپ لړۍ پیل او تر اوسه مو ۱۳۶ عنوانه طبي درسي کتابونه چاپ او د افغانستان ټولو طب پوهنځیو او نورو ادارو لکه عامې روغتیا وزارت، د علومو اکاډمي، روغتونونو او نورو... ته استولي دي.

دا کړنې په داسې حال کې تر سره کېږي چې د افغانستان د لوړو زده کړو وزارت د (۲۰۱۰-۲۰۱۴) کلونو په ملي ستراتیژیک پلان کې راغلي دي چې:

"د لوړو زده کړو او د ښوونې د ښه کیفیت او زده کوونکو ته د نویو، کره او علمي معلوماتو د برابرولو لپاره اړینه ده چې په دري او پښتو ژبو د درسي کتابونو د لیکلو فرصت برابر شي د تعلیمي نصاب د ریفورم لپاره له انگریزي ژبې څخه دري او پښتو ژبو ته د کتابونو او درسي موادو ژباړل اړین دي، له دې امکاناتو څخه پرته د پوهنتونونو محصلین او استادان نشي کولای عصري، نویو، تازه او کره معلوماتو ته لاس رسی پیدا کړي".

د افغانستان د طب پوهنځیو محصلین او استادان له ډېرو ستونزو سره مخامخ دي. نویو درسي موادو او معلوماتو ته نه لاس رسی، او له هغو کتابونو او چپترونو څخه کار اخیستل چې په بازار کې په ډېر ټیټ کیفیت پیدا کېږي، د دې برخې له ځانگړو ستونزو څخه گڼل کېږي. له همدې کبله هغه کتابونه چې د استادانو له خوا لیکل شوي دي باید راټول او چاپ کړل شي. د هیواد د اوسني حالت په نظر کې نیولو سره مونږ لایقو ډاکترانو ته اړتیا لرو، ترڅو وکولای شي په هیواد کې د طبي زده کړو په ښه والي او پرمختگ کې فعاله ونډه واخلي. له همدې کبله باید د طب پوهنځیو ته لا زیاته پاملرنه وشي.

تراوسه پورې مونږ د ننگرهار، خوست، کندهار، هرات، بلخ او کاپیسا د طب پوهنځیو او کابل طبي پوهنتون لپاره ۱۳۶ عنوانه مختلف طبي تدریسي کتابونه چاپ کړي دي. د



د لوړو زده کړو وزارت پیغام

د بشر د تاریخ په مختلفو دورو کې کتاب د علم او پوهې په لاسته راوړلو کې ډیر مهم رول لوبولی دی او د درسي نصاب اساسي برخه جوړوي چې د زده کړې د کیفیت په لوړولو کې مهم ارزښت لري. له همدې امله د نړیوالو پیژندل شویو ستندردونو، معیارونو او د ټولني د اړتیاوو په نظر کې نیولو سره باید نوي درسي مواد او کتابونه د محصلینو لپاره برابر او چاپ شي.

د لوړو زده کړو د مؤسسو د بناغلو استادانو څخه د زړه له کومي مننه کوم چې ډېر زیار یې ایستلی او د کلونو په اوږدو کې یې په خپلو اړوندو څانگو کې درسي کتابونه تألیف او ژباړلي دي. له نورو بناغلو استادانو او پوهانو څخه هم په درنښت غوښتنه کوم تر څو په خپلو اړوندو برخو کې نوي درسي کتابونه او نور درسي مواد برابر کړي څو تر چاپ وروسته د گرانو محصلینو په واک کې ورکړل شي.

د لوړو زده کړو وزارت دا خپله دنده بولي چې د گرانو محصلینو د علمي سطحې د لوړولو لپاره معیاري او نوي درسي مواد برابر کړي.

په پای کې د افغان ماشومانو لپاره د جرمني کمیټې او ټولو هغو اړوندو ادارو او کسانو څخه مننه کوم چې د طبي کتابونو د چاپ په برخه کې یې هر اړخیزه همکاري کړې ده.

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(انگليسي)

ډاکټر مالتې ايل وان بلو مرودر

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