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Foreword

Achieving long term improvements in rational use of medicines and care of the sick requires building the competences of the health care professionals. This second edition of the Standard Treatment Guidelines is an update of the earlier version contributing to rational and cost effective health care designed under the aspirations and spirit of increasing efficacy of decision making and precision in prevention, diagnosis, treatment, alleviation of disease and improved quality of life for the Zambian people as cited in the National Drug Policy.

I commend the Rational Pharmaceutical Management Plus and Strengthening Pharmaceutical Systems Programs of MSH for technical and financial assistance to the Zambia National Formulary Committee for developing and producing these Standard Treatment Guidelines as an educational strategy for managing the common conditions afflicting the Zambian people. As usual, the book has been improved to make it more user-friendly, pocket size, with information on disease conditions definitions, diagnoses and on how to develop therapeutic interventions. The Committee upheld the original intent of making the document a reference material for all health care providers, particularly medical doctors, pharmacists, dentists, nurses, clinical officers and all those with a primary responsibility for prescribing, dispensing and administration of medicines.

The first edition proved to be a very popular reference document to medical students and other health care workers contracted to provide health services in Zambia. This book is designed to augment that erstwhile intent. I recommend that you read and use the information herein to serve better those most in need. Whether you work at the University Teaching Hospital, Lukulu, Monze, Chama or Chinyama Litapi, the information will help you provide good quality, safe, effective and affordable health care.

Dr. Simon Miti,

Permanent Secretary

MINISTRY OF HEALTH
Acknowledgments

The Zambia National Formulary Committee is grateful to the Ministry of Health for the support given to review and produce the second edition of the Standard Treatment Guidelines, Essential Medicines List, and Essential Laboratory Supplies for Zambia. The committee is indebted to the USAID-supported Rational Pharmaceutical Management Plus (RPM Plus) and Strengthening Pharmaceutical Systems (SPS) Programs that collaborated with the Antimicrobial Resistance Advocacy Working Group (AWG) for the technical and financial support towards the development of this book.

It is the spirit of the physicians' workshop on the implementation of the 2004 Standard Treatment Guidelines to support the antimicrobial resistance (AMR) containment in Zambia, June 27-29, 2005, that inspired the AWG for continued support to the Zambia National Formulary Committee to review the STG, particularly on the management of infectious diseases to promote rational use of antimicrobials to preserve their effectiveness. Drug resistant microbes causing public health diseases such as TB, Malaria, and HIV/AIDS now threaten successful treatment of infectious diseases. Health gains achieved by priority health programs - including tuberculosis (TB), malaria, acute respiratory infections (ARI), diarrheal diseases, sexually transmitted infections (STIs) and HIV/AIDS - are increasingly threatened by the growing worldwide problem of antimicrobial resistance (AMR). If we do not preserve our heritage of current antimicrobials, in few years we are going to have hospitals filled with patients with resistant infections.

Finally we thank the untiring efforts and commitment provided by the Committee members and those co-opted to contribute. This book was written by interdependent team of reviewers and editors who worked together on all aspects of reviewing, writing, editing and producing the book. Each member brought a wealth of knowledge, talent and experience in health care. Together the committee members met several times and at different venues, critically analyzed the revisions and shared their experiences with evidence to produce this document with a power to improve the alleviation, provide relief to ailments and care of the people.

We also thank individuals and groups of professionals who offered constructive critique of the first edition that enabled improvements on this document.
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Introduction

The Standard Treatment Guidelines were developed after wide consultations and discussions with healthcare providers at three tiers of the health delivery system – practitioners, program managers and health economists. While most of the key information has been retained, extensive revisions were carried out on some of the chapters such as HIV and AIDS, psychiatric conditions, STI, and eye conditions. While some of the changes to treatment strategies were motivated by the dynamism of the conditions and availability of more effective medicines and conformity with national disease specific guidelines, some of them were influenced by the new treatment strategies as guided by the World Health Organization and evidence from clinical studies. Antiretroviral therapy of HIV infections in adults, adolescence, infants and children were adopted from WHO guidelines as recommended for public health approach. The guidelines are based on a comparison between various drug therapies and on consideration of value for money and the most effective, affordable and current practices that produce health outcomes of improved quality of life and alleviation of suffering. They are also based on the essential drugs and medical supplies concepts to meet the basic health needs of the Zambians as close to the family as possible as visionised from the National Drug Policy.

The essential medicines and laboratory supplies listed in the Essential Medicines and Essential Laboratory Supplies Lists are linked to the standard treatment guidelines as indicative of public health priorities for the pharmaceutical systems. The lists are based on national clinical choices that the Government of the Republic of Zambia makes available and accessible to its citizens at all times. The medicines and supplies selection was also based on sound and adequate information of efficacy from clinical settings, evidence of performance from different health care settings, availability in a form in which quality, stability in the Zambian weather and storage settings, bioavailability and users are assured. In addition total cost of treatment and methodology of administration were also considered.

The Drugs and Therapeutic Committees and hospital and district health management teams are mandated to use these Guidelines and Lists as management tools to improve the quality of the health care delivery and meet the public health responsibility of transparency and accountability. Individual health care professionals are encouraged to use the guidelines as a companion in the course of health care delivery provision.

Arrangement of information

The guideline text divisions into chapters according to a particular system of the body or an aspect of medical care has been retained.

Chapters are divided into sections providing introductory notes for health care providers who include doctors, pharmacists, nurses and other heath professionals. This information is intended to assist with decision making and selection of appropriate treatment.

Descriptive information about the disease or condition is outlined in the following manner:

- Definition of disease or condition
- Clinical features
- Complications
- Treatment
  - Supportive
  - Drugs
- Prevention

GENERAL TREATMENT OF POISONING
This chapter deals with the management of cases of poisoning or suspected poisoning in general and specific poisoning health facilities.

ZAMBIA ESSENTIAL MEDICINES LIST

This list contains an appropriate range of essential medicines for the various levels of health care delivery institutions in the country.

ESSENTIAL LABORATORY SUPPLIES & REAGENTS

This list contains the most essential laboratory supplies and reagents for laboratory use.

APPENDIX

This part deals with three appendices, i.e. drug use in pregnancy and during lactation as well as a haematological appendix.

INDEXES

Two indexes have been included; one lists the drugs in alphabetical order by approved name or INN, and the other lists the diseases and conditions dealt with in the guidelines.

PRESCRIBER CONTROL AND DRUG AVAILABILITY

No prescriber categories are provided in the text of this edition. Drugs and Therapeutics Committees are expected to control the prescribing practices of respective institutions:

i. Drugs and Therapeutic Committees should actively define policies for prescribing within a hospital, health centre, clinic or district.

ii. The range of availability of drugs in any institution should be restricted according to the level of institution and to the categories of staff prescribing.

Prescribers are advised to follow rational prescribing practices, outlined in these standard treatment guidelines which emphasise the public priority use of essential medicines and laboratory supplies and economic treatment regimes.

REVISION OF STANDARD TREATMENT GUIDELINES CONTENTS

The Zambia National Formulary Committee recognises the fact that the field of treatment regimens and drugs is dynamic, thus revision of the guideline contents will be continuous. Contributions are encouraged and should be submitted for consideration by the Zambia National Formulary Committee through the Ministry of Health.

Professor C. Chintu

Chairman, Zambia National Formulary Committee
I.0 GASTRO-INTESTINAL CONDITIONS

1.1. Abdominal Pains

Abdominal pains include gastritis and peptic ulcer disease

1.1.1 Gastritis

This is divided into acute and chronic gastritis. In acute gastritis there is inflammation of the superficial gastric mucosa. It can occur as a result of ingestion of drugs such as acetyl salicylic acid and other non-steroidal anti-inflammatory drugs (NSAID) and alcohol.

Chronic gastritis is divided into 3 categories:

Type A (autoimmune) gastritis seen in pernicious anaemia and also in other autoimmune diseases.

Type B (bacterial) gastritis, which is associated with *Helicobacter pylori*.

Type C (chemical) gastritis, which is due to repeated injury with bile reflux or chronic ingestion of NSAIDs.

**Clinical features**

- Indigestion
- Vomiting
- Gastrointestinal haemorrhage
- Epigastric pain

Most chronic gastritis is asymptomatic

**Diagnosis**

- Endoscopy

**Treatment**

- Remove offending cause

1.1.2 Chronic Peptic Ulcer Disease

Most peptic ulcers occur in the stomach or proximal duodenum but can also occur in the oesophagus (with oesophageal reflux).

**Clinical features**

- Epigastric pain
- Indigestion
- Flatulence
- Heartburn
- Anorexia; weight loss may occur
I.0 GASTRO-INTESTINAL CONDITIONS

Diagnosis

- Endoscopy
- Barium meal

Many patients, particularly the young presenting with indigestion, can be treated symptomatically for 4-5 weeks without investigation.

Complications

- Reflux oesophagitis may be complicated by peptic stricture which is characterised by intermittent dysphagia over a long period.
- Change of the oesophageal mucosa (Barrettes oesophagus) which is pre-malignant.
- Anaemia and frank haemorrhage
- Recurrent aspiration pneumonia when stricture formation is present
- Perforation of peptic ulcer
- Pyloric stenosis

Treatment

Drugs

Antacids: Antacids often relieve symptoms. They are best given when symptoms occur or are expected usually between meals and at bedtime

- Magnesium trisilicate compound, 250-500mg to chew when required or
- Aluminium hydroxide 500mg-1g to chew when required or
- Magnesium trisilicate suspension 250mg with dried aluminium hydroxide 120mg 10ml orally 3 times daily or
- Aluminium hydroxide (dried aluminium hydroxide 500mg) 5-10ml orally 4 times daily; children 6-12 years 5ml orally 3 times daily or
  Adults 1-4 tablets to be chewed 4 times daily between meals and at bed time or as required

1. Ulcer healing drugs

a) $H_2$-receptor antagonists

  Cimetidine 400mg tablets twice daily (with breakfast and at night) or 800mg at night for at least 4 weeks. Maintenance 400mg at night or 400mg morning and night.

  - Reflux oesophagitis:
    Cimetidine 400mg 4 times daily for 4 – 8 weeks.

    Ranitidine150mg tablets twice daily (with breakfast and at night) or 300mg at night for 4 – 8 weeks, up to 6 weeks in chronic episodic dyspepsia. Maintenance 150mg at night.

    - Reflux oesophagitis:
      Ranidine 150mg twice daily or 300mg at night for up to 8 weeks or if necessary 12 weeks.

b) Proton pump inhibitors
• Omeprazole 20mg tablets daily for 4 weeks followed by a further 4 – 8 weeks if not fully treated.

Long term management of acid reflux disease. Omeprazole 10mg daily increasing up to 20mg if symptoms return. Not recommended for children.

Tripotassium dicitratobismuthate (Bismuth chelate) Liquid 12mg/5ml. 10ml twice daily or 5ml 4 times daily for 28 days followed by a further 28 days if necessary. Not recommended for children.

Tablets 120mg. 2 tablets twice daily or 1 tablet 4 times daily for 28 days followed by a further 28 days if necessary.

Triple therapy regimens

1 week regimen:

• Amoxycillin, 500mg 3 times daily
  Plus
• Metronidazole, 400mg 3 times daily
  Plus
• Omeprazole, 20mg twice daily or 40mg once daily for 7 days

Or

• Clarithromycin, 500mg daily twice daily
  Plus
• Metronidazole, 400mg (or tinidazole 500mg) twice daily
  Plus
• Omeprazole, 20mg twice daily or 40mg once daily for 7 days

1.3 Diarrhoea

Definition
Diarrhoea is an increase in the frequency and volume of stools with an alteration in the consistency, mainly due to increased water content. There are two types of diarrhoea:

• Acute
• Chronic

1.3.1 Acute diarrhoea

This is diarrhoea of sudden onset, often short-lived and is self-limiting. It requires no investigation or treatment. It is often seen after dietary indigestion. It may also be as a result of infections.

1.3.2 Acute diarrhoea in children
I.0 GASTRO-INTESTINAL CONDITIONS

This is commonly of viral origin (rotavirus, Norwalk virus, adenoviruses or enterovirus), but may also be caused by bacteria or other parasitic infections.

Clinical features

In addition to diarrhoea, there may be fever, abdominal pain and vomiting. If the diarrhoea is particularly severe, dehydration can be a problem.

With mild dehydration there may be no signs. With moderate dehydration, the child may present with the following:

- Irritability, restlessness
- Sunken eyes
- Dry mouth and tongue
- Absence of tears
- Thirst
- Skin pinch goes back slowly

With severe dehydration, the child may present with:

- Lethargy or loss of consciousness
- Absence of tears
- Very dry mouth and tongue
- Thirst associated with poor drinking
- Skin pinch that goes back very slowly

Treatment

Investigations are necessary if diarrhoea has lasted more than 1 week. In the mean time supportive treatment should be given.

Stools should be sent for microscopy and culture; any infective causes should be treated appropriately.

Fluid management - See section on cholera.

In addition, the child should continue to feed on breast milk or other feeds.

Anti-diarrhoeal drugs are not recommended

Prevention

✓ Provision of clean water/sanitation
✓ Good disposal of feacal matter
✓ Boiling drinking water
✓ Chlorination of drinking water
✓ Personal hygiene - hand washing preferably with soap:
  - after use of toilet
  - when preparing food
  - before eating

1.3.3 Acute diarrhoea in adults
Clinical features

In addition to diarrhea, there may be fever, abdominal pain and vomiting. Dehydration can also be a problem if the diarrhoea is severe. This may be mild, moderate or severe in nature.

- **Mild dehydration:** The patient does not show enough signs to classify as moderate or severe dehydration.
- **Moderate dehydration:** The patient has two or more of the following signs:
  - Restlessness
  - Irritability
  - Sunken eyes
  - Dry mouth and tongue
  - Absence of tears
  - Thirsty, drinks eagerly
- **Severe dehydration:** The patient is classified as having severe dehydration if there are two or more of the following signs:
  - Lethargic or unconscious; floppy
  - Absence of tears
  - Very dry mouth and tongue
  - Very thirsty, drinks poorly or unable to drink
  - Pinched skin goes back very slowly

Other signs in adults and children above 5 years are absent radial pulse and low blood pressure.

Diagnosis

Investigations are necessary if the diarrhoea lasts more than one week, i.e., stool microscopy, culture and sensitivity.

Treatment

1. **Fluid replacement**

   Fluid therapy (see section on cholera)

2. **Drug treatment**

   In chronic diarrhoea and HIV related diarrhoea where the cause has not been found:
   - Loperamide 2mg three times daily
   - Codeine phosphate 30mg 4 times daily

   Any infective causes should be treated according to sensitivity patterns.

Prevention

- As for acute diarrhoea in children

1.3.4. **Chronic/Persistent Diarrhoea**
This generally is diarrhoea lasting more than 2 weeks. Causes include:

- Infections such as giardia, cryptosporidium, *Isospora belli* and microsporidia in AIDS patient.
- Colonic lesions such as carcinoma, Crohn's disease and ulcerative colitis
- Coeliac disease
- Tropical sprue
- Chronic pancreatitis
- Pseudomembranous colitis
- Thyrotoxicosis
- Diabetes

**Clinical features**

Clinical features may include

- Diarrhoea, bloody diarrhoea or steatorrhoea
- Abdominal pain and vomiting
- Weight loss
- Anaemia

**Diagnosis**

Investigations

- Stool microscopy, culture and sensitivity
- Special tests may be needed for certain parasites such as cryptosporidium, isospora and microsporidia
- Rectal/jejunal biopsy
- Barium enema
- Full blood count

**Treatment**

*Treat infective causes of the chronic diarrhoea.*

- Fluid therapy - Oral fluid use should be stressed except for patients presenting with severe dehydration in whom intravenous fluids should be used. However, even with severe dehydration, oral fluids should be given concurrently. Fluid management is as for cholera.

**Drug treatment**

Antidiarrhoeal agents

- Loperamide 2mg three times daily
- Codeine phosphate 30mg four times daily
- Nitazoxanide 100mg suspension; Child 1-3 years 5ml 2 times a day with food for 3 days; 4-11 years 10ml 2 times a day with food for 3 days; 12 years and above, 500 mg tablets 3 times a day with food for 3 days.

Treat specific causes such as:
• Giardia – Metronidazole, 400mg 8 hourly orally for 7 days  
Child: Metronidazole 100mg 3 times daily for 5 days  
• Isospora belli - Co-trimoxazole, 960mg four times daily orally for 10 days. Give pyrimethamine for sulpha allergic patients. Recurrences tend to occur.  
• Cryptosporidia - Albendazole, 400mg twice daily orally for one month may help although HAART with immune reconstitution is the main line of management

Prevention

As for acute diarrhoea.
• Prevention of HIV infection

1.4. Dysentery

Definition:

Dysentery is the passage of bloody diarrhoea or mucus or both in stool. There are two types of dysentery

- Bacillary
- Amoebic

1.4.1. Bacillary Dysentery

Bacillary dysentery is caused by the bacteria Shigella which has a short incubation period, usually being 2 days.

Clinical features

- Acute onset
- Malaise
- Fever
- Watery diarrhoea
- Bloody diarrhoea with mucus
- Faecal urgency
- Severe cramping abdominal pain
- Nausea
- Vomiting
- Headache
- Convulsions (in children)
- Tenesmus
- Mild or moderate dehydration

Diagnosis

- Microscopy may show leukocytes
- Stool culture

Treatment

Drugs
I.0 GASTRO-INTESTINAL CONDITIONS

- The first drug of choice is Nalidixic Acid.
  - Adult: 1g orally 4 times a day for 7 days
  - Child: 50mg/kg body weight orally in 4 divided doses for 7 days

Or

- Ciprofloxacin -- children, 15mg/kg; adults, 500mg twice daily for 3 days.
  Use of Ciprofloxacin in children is contra-indicated except where benefit outweighs risk.

Complications of Shigella type 1 infection
- Arthritis
- Conjunctivitis
- Colonic perforation
- Septicaemia
- Haemolytic uraemic syndrome
- Metabolic disorders
- Encephalopathy
- Toxic mega colon and
- Rectal prolapse in children

Prevention:
- ✔ Drink clean, boiled/chlorinated water
- ✔ Good sanitation
- ✔ Good personal hygiene

1.4.2. Amoebic Dysentery

Amoebic Dysentery is caused by the parasite *Entamoeba histolytica*.

Clinical Features
- Bloody diarrhoea with mucus
- Low grade fever
- Dehydration is unusual

Diagnosis

- Stool microscopy
- Sero diagnosis

Treatment

Drugs
- Metronidazole
  - Adult: 800mg orally 3 times daily for 5 days followed by diloxanide furoate 500mg TDS for 10 days (for eradication of cysts)
I.0 GASTRO-INTESTINAL CONDITIONS

- Child: 1 – 3 years, 200mg orally 8 hourly for 5 days;  
  3 – 7 years, 200mg orally 6 hourly for 5 days;  
  7 – 10 years, 400mg orally 8 hourly for 5 days

Or

- Tinidazole
  - Adult: 2g daily for 2 – 3 days.
  - Child: 50 – 60 mg/kg orally for 3 days.

**Avoid use of anti-diarrhoea agents**

**Supportive**
- ✓ Fluid replacement – Refer to chapter 1.5
- ✓ Analgesia

**Complications**
- Fulminant colitis
- Colon perforation
- Peritonitis
- Chronic infection
- Stricture formation
- Severe haemorrhage
- Amoebic liver abscess
- Amoeboma

**Prevention**
- ✓ Good disposal of excreta – good pit latrines, flush toilets
- ✓ Provision of clean water
- ✓ Boiling water. This kills amoeba cysts if water is boiled for at least 10 minutes.
- ✓ Chlorination of water – effects variable on amoeba.
- ✓ Personal hygiene – washing of hands after use of toilet, when preparing food and before eating.

1.5. Cholera

**Definition**

Cholera is an illness characterized by excessive diarrhoea and vomiting caused by the organism *Vibrio cholerae*. It is transmitted by the faecal–oral route.

**Clinical features**

The incubation period varies from a few hours to 6 days. Cholera may be present as a mild illness indistinguishable from diarrhoea due to other causes. Classically, however, it has three phases:
- Evacuation phase characterised by abrupt onset of painless, profuse watery diarrhoea associated with vomiting in severe forms. Stools may be rice–water.
Collapse phase is reached if appropriate treatment is not given. This is characterised by features of circulatory shock (cold clammy skin, tachycardia, hypotension and peripheral cyanosis) and dehydration (sunken eyes, hollow cheeks and diminished urine output. There may also be muscle cramps.

Children may also have convulsions due to hypoglycaemia. Complications such as renal failure and aspiration of vomitus may occur.

Recovery phase occurs if the patient survives the collapse phase.

**Diagnosis**

- Largely clinical
- Stool and rectal swabs for culture

**Treatment**

1. **Rehydration:**

Patients should be assessed for degree of dehydration.

**Management of mild dehydration**

Give Oral Rehydration Salt (ORS) solution or any fluids after each loose stool.

**ORS Dose:**

<table>
<thead>
<tr>
<th>Age</th>
<th>Amount after each loose stool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 24 months</td>
<td>50 – 100ml after each loose stool</td>
</tr>
<tr>
<td>2 – 5 years</td>
<td>100 - 200ml</td>
</tr>
<tr>
<td>10 years and above</td>
<td>As much as the patient wants</td>
</tr>
</tbody>
</table>

ORS and other fluids should be continued until diarrhoea stops. Breast-fed children should continue to breastfeed normally. Encourage the patient to eat.

**Management of moderate dehydration (some dehydration in children)**

Give ORS in the first 4 hours as follows:

<table>
<thead>
<tr>
<th>Age</th>
<th>Less than 4 months</th>
<th>4 – 11 months</th>
<th>12 – 23 months</th>
<th>24 - 59 months</th>
<th>5 - 14 years</th>
<th>15 years and above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Less than 5kg</td>
<td>5 – 10kg</td>
<td>10 – 12kg</td>
<td>12 – 19kg</td>
<td>16 – 29 kg</td>
<td>30kg and above</td>
</tr>
<tr>
<td>Amount in ml (approximately)</td>
<td>150ml per hour</td>
<td>400ml per hour</td>
<td>600ml per hour</td>
<td>1500ml per hour</td>
<td>2000ml per hour</td>
<td>3800ml per hour</td>
</tr>
</tbody>
</table>

- Monitor the patient frequently
I.0 GASTRO-INTESTINAL CONDITIONS

- Reassess the patient after 4 hours using the classification of dehydration. If signs of (moderate) dehydration are still present, repeat the same management. If patient shows signs of severe dehydration change management to that of severe dehydration.
  - Patients should be encouraged to eat and drink as much as they want.
  - If child vomits, wait 10 minutes and then continue giving ORS slowly, i.e. every 2 – 3 minutes.
  - Encourage mother to continue breastfeeding.
  - For infants less than six months who are not breastfed also give 100 – 200ml clean water during this period.

**Management of severe dehydration:**

Start intravenous drip with Ringers Lactate or Sodium Chloride 0.9% w/v (normal saline) immediately (give ORS while drip is being set).

**Patients below 1 year:**

- Give 100ml/kg in 6 hours as follows:
  - 30ml/kg in the first 1 hour then
  - 70ml/kg in the next 5 hours

Reassess the patient very frequently.

- If the patient can drink, give about 5ml/kg per hour of ORS in addition to the IV fluid.
- Assess state of re-hydration after six hours using the classification of dehydration level chart; classify and manage accordingly.
- If the patient shows no sign of dehydration after treatment with IV fluids or ORS, continue ORS as follows
  - Less than 24 months old = 100ml after each loose stool
  - 2 – 9 years old = 200ml after each loose stool
  - 10 years or more = as much as patient wants (at least 300ml)

**Patients 1 year and above**

- Give IV fluids, 100ml/kg in 3 hours as follows:
  - 30ml/kg as rapidly as possible (within 30 minutes), then
  - 70ml/kg in the next 2 ½ hours

Reassess the patient very frequently.

- If the patient can drink, give about 5ml/kg per hour of ORS in addition to the IV fluid.
- Assess state of rehydration after 3 hours using the classification of dehydration on treatment charts; reclassify and manage accordingly.
- If the patients show no sign of dehydration after treatment with IV fluids or ORS continue ORS as follows:
  - 24 months old = 100ml after each loose stool
  - 2 – 9 years old = 200ml after each loose stool
  - More than 9 years = as much as patient wants (at least 300ml)
2. Drugs

Medicines should only be given according to the sensitivity patterns

**Recommended Antibiotics**

<table>
<thead>
<tr>
<th>ANTIBIOTICS</th>
<th>CHILDREN</th>
<th>ADULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doxycycline</td>
<td>One single dose</td>
<td>-</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>4 times daily for 3 days</td>
<td>(For children &gt;12 years) 12.5mg/kg</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>Adults: 4 times daily for 3 days</td>
<td>10mg/kg</td>
</tr>
<tr>
<td>Children: 3 times daily for 3 days</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Doxycycline is WHO antibiotic of choice for adults (except pregnant women) because only one dose is required.
- Erythromycin may be used when the other recommended antibiotics are not available, or where *V. cholerae* is resistant to them.

**Prevention**

- Drink clean boiled/chlorinated water
- Good sanitation
- Good personal hygiene and sanitation

1.6. Helminthes Infestation

**Definition**

Helminthic infestation is infection with worms, which belong to several different classes, i.e. Nematodes, Cestodes and Trematode or flukes.

These affect various parts of the body such as the skin, muscles, lymphatics, blood or gastrointestinal tract. Trematodes or flukes will be presented under schistosomiasis.

1.6.1. Nematodes

1.6.1.1 Non-intestinal

1.6.1.1.1 Filariasis

The adult worms are threadlike. The large females give birth to lavae known as microfilaria. These require two hosts to complete their lifecycle. The first host is the mosquito culex, aedes, anopheles or other type of flies such as simulium.

**Clinical features**

*Wuchereria bancrofti*
Adult worms are found in the lymphatics and lymph nodes. Larvae grow and mature in the regional lymph nodes for up to 18 months. The patient then presents with fever ranging 39° - 41°C accompanied by lymphangitis, both of which subside in 3 – 5 days. The involved lymphatics appear as red streaks on the skin, are tender and cord-like. The lymphatics of the epididymis, testes and spermatic cord may be involved. The obstruction phase follows if treatment is not given. This presents with oedema of the lower limbs and scrotum. Long standing oedema produces thick rough skin which may ulcerate.

Complications
Tropical eosinophilia is characterized by either lymphadenopathy, splenomegaly or cough, bronchospasm and asthma like picture.

**Loa loa**

Clinical Features are caused by adult worms which prefer the subconjunctival and periobital tissues. The main features are calabar swellings – painless, localised, transient, hot soft tissue swellings often near joints. They last from a few hours to several weeks. Urticaria, pruritis, lymphoedema, arthritis and chorioretinitis may occur. A meningoencephalitis like picture may occur during treatment.

**Onchocerciasis**

The incubation period averages 1 year. Initially a papular, reddish, itchy rash occurs. After repeated infection subcutaneous nodules develop. The nodules may be associated with genital elephantiasis, hydrocele and ocular lesions. Ocular lesions are serious and may cause blindness. Initially there is excessive tear production, photophobia and the sensation of a foreign body in the eye. Then conjunctivitis, iridocyclitis, chorioretinitis, secondary glaucoma and optic atrophy may occur.

**Treatment**

**Wuchereria bancrofti**

- Diethylcarbamazine 2 – 6mg/Kg daily in divided doses for 2 – 3 weeks. The course is repeated after 6 weeks. Supportive care is antihistamines or steroids for allergic reactions that can occur. Also associated bacterial infections should be treated and reconstructive surgery can be done on unsightly tissue.

**Loa loa**

- Diethylcarbamazine, 2 - 6mg/kg daily for 2 – 3 weeks

**Ochocerciasis**

- Ivermectin 150mcg/kg orally as a single dose. Annual retreatment must be given until adult worms die. In endemic areas not all patients need treatment. Indications for treatment are the threat of eye damage and severe pruritis.

**Prevention**

- Primary prevention is aimed at vector control and protection of humans from vectors.
Mass chemotherapy with diethylcarbamazine has been found to be effective in bancroftian filarasis and loasis.

1.6.1.2. Nematodes – Intestinal

Clinical features:

1.6.1.2.1. Ascaris lumbricoides (roundworm)

Infection is acquired by ingesting contaminated food. Infection may be asymptomatic but heavy infections are associated with nausea, vomiting, abdominal discomfort and anorexia. Worms may obstruct the small intestine. Heavy infections in malnourished children may worsen the malnutrition.

1.6.1.2.2. Strongyloides stercoralis

Infection occurs by penetration of the skin by larvae. After penetration of the skin, a local reaction occurs with itching, erythema, oedema and urticaria. This subsides within 2 days. A week later migration of adolescent worms causes irritation of the upper airways, producing cough and occasionally severe respiratory symptoms. After about 3 weeks intestinal colonization occur leading to abdominal discomfort, intermittent diarrhoea and constipation.

Heavy infection may lead to persistent diarrhoea, nausea, anorexia and steatorrhea.

1.6.1.2.3 Hookworm: Necator americanus

Local irritation occurs at the site of larval entry in the skin. 2 weeks later mild and transitory pulmonary symptoms appear. Usually patients are asymptomatic. Once larvae reach the small intestine with heavy infections there may be symptoms and signs of anaemia.

1.6.1.2.4 Trichuris trichiura (whipworm)

Most infections are asymptomatic. Heavy infection is associated with bloody diarrhoea and mucus, abdominal discomfort, anorexia and weight loss. It may also cause appendicitis and rectal prolapse in children.

1.6.1.2.5 Enterobius vermicularis (threadworm)

Intense anal pruritis which is usually nocturnal. Scratching results in dissemination of eggs.

Treatment:

Ascaris lumbricoides (roundworms)
- Mebendazole 100mg twice daily for 3 days.
**Strongyloides stercoralis**

- Thiabendazole 1.5g twice daily for 2 days or Albendazole. In the hyper-infected patient with disseminated disease therapy should be for 5 days or longer. As there may be gram negative septicaemia in this group treatment should include intravenous broad spectrum antibiotics.

**Hookworm – Necator americanus**

- Mebendazole 100mg twice daily for 3 days. A repeated course may be necessary.

**Trichuris trichura** (whipworm)

- Mebendazole 100mg twice daily for 3 days.

**Enterobius vermicularis**

- A single dose of Mebendazole 100mg followed by a second dose 2 weeks later. Family members should also be treated.

**Prevention**

- Personal hygiene, good sanitation and good living conditions.

### 1.6.2 Cestodes or Tapeworms

**Clinical features:**

*Taenia saginata* is prevalent in humans in all beef eating countries. *Taenia solium* is found in pork eating areas. Symptoms are mild with vague epigastric and abdominal pain and occasional diarrhoea and vomiting. Weight loss is unusual. Appendicitis and pancreatitis rarely occur. Proglottids may be found in the faeces, bed or underclothing.

**Treatment**

- Praziquantel, 10mg/kg as a single dose.

**Prevention**

- Careful inspection of beef or pork for cysticerci (encysted larval forms)
- Refrigeration of beef at -10° for 5 days or cooking at 57°C for a few minutes.

### 1.6.3 Trematodes or Flukes

#### 1.6.3.1 Schistosomiasis (Bilharziasis)

This is caused by blood flukes (trematodes).
1.0 GASTRO-INTESTINAL CONDITIONS

Human infestations occur after penetration of the skin or mucous membranes by cercaria, the infective form of the host released by the intermediate snail host into fresh water.

The female fluke produces several hundred eggs a day which penetrate the venous walls, creating small bleeding into the urine (Schistosoma haematobium) or stool (Schistosoma mansoni).

Clinical features

The first clinical sign is a local inflammatory response – swimmer's itch. Within a week or more there is a more generalised allergic reaction with fever, urticaria and malaise. Nausea, vomiting and profuse diarrhoea as well as respiratory symptoms namely cough is common.

Complications

Chronic Schistosomiasis with S. mansoni may lead to portal hypertension with marked hepatosplenomegaly. In S. haematobium infestation there is development of dysuria and haematuria. Later there may be development of obstructive uropathy, chronic pyelonephritis, renal failure and bladder carcinoma.

Treatment

- Praziquantel tablet

  Dose: For Schistosomiasis caused by all species, the usual dosage for adults and children older than 4 years is 60mg/kg body weight given in three equally divided doses in intervals of 4 – 6 hours on the same day.

  Some clinicians recommend a lower dosage of 40 mg/kg as a single dose or in 2 equally divided doses on the same day, which has been effective in the treatment of schistosomiasis in some patients.

Prevention:

- Use of latrines
- Preventing children from playing in infected water
- Washing with water from a protected well or boiling for 1 – 2 minutes or else use water that has been left to stand for more than 48 hours (this kills the sarcaria)

1.7. Giardiasis

Definition

An intestinal disease caused by infection with Giardia lamblia. Prevalence is high in the tropics. Spread is faecal-oral and person to person. The infective form is the cyst.

Clinical features

Many individuals are asymptomatic and are carriers. Others develop diarrhoea, nausea, anorexia, abdominal discomfort and distension. Stools may become pale. If the illness is prolonged, weight loss may develop.

Complication:

Growth retardation in children.
I.0 GASTRO-INTESTINAL CONDITIONS

Treatment

- Adult: Metronidazole, 2g as a single dose for 3 successive days.

- Children: Sometimes a second or third course may be necessary.

Prevention

- Personal hygiene

- Improvement of water quality

- Boiling water for at least 10 minutes.

- The effects of chlorination are variable.
2.0 CENTRAL NERVOUS SYSTEM CONDITIONS

2.1 Mental Health and Psychiatric Illnesses

Introduction

The current etiological formulation of mental disorder is based on the biopsychosocial model meaning symptomatology is as a result of the interaction of 3 domains: biological, psychological and social. The treatment approach therefore must consist of the same model.

Psychiatric Disorders

Anxiety Disorders
Generalized anxiety disorder
Obsessive compulsive disorder
Social anxiety disorder
Post-traumatic stress disorder
Panic attack disorder

Mood Disorders
Bipolar mood disorder
Bipolar 1 disorder
Depressive disorder
Major depressive disorder

Psychotic Disorders
Brief psychotic disorder
Schizophrenia
Paranoid disorder
Delusion disorder

Diagnosis for the psychiatric disorders is based on Diagnostic and Statistical Manual (DSM) IV or International Classification of Diseases (ICD)

2.1.1 Anxiety Disorders

INTRODUCTION
The essential feature about these disorders is that a patient has episodic subjective experiences of false alarm of impending danger when objectively none exists.

2.1.1.1 Generalised Anxiety Disorder

Definition
Generalized anxiety disorder is characterized by excessive level of anxiety and worry almost all the time and the patient has great difficulties in controlling the worry. Patients usually present with somatic complaints.
Clinical Features
- Excessive worry about all activities in life
- Anticipation of doom in all undertakings
- Restlessness
- Insomnia
- Tremors
- Muscle tension
- Poor concentration and memory

Differential Diagnosis
The differential diagnosis is extensive because worry and anxiety are seen in many conditions.

Psychiatric
- Major depressive disorder
- Social anxiety disorder
- Post-traumatic stress disorder
- Panic attack disorder
- Anaemia

Medical
- Hyperthyroidism
- Chronic obstructive airways disorders (asthma, emphysema)
- Seizure disorders
- Drug intoxication/withdrawal
- Cardiac arrhythmias

Management

Investigation
- FBC
- TSH (T3, T4)
- Blood glucose
- CXR
- EEG
- ECG

Treatment
Treatment can either be by psychological (counselling and psychotherapy) or Psychopharmacological. The two treatment approaches can be used singly or in combination depending on the etiological factors at play.

Short Term
1. Psychopharmacology
   - Alprazolam 0.25 mg (250 mcg) given 2 or 3 times daily. If required, increases may be made in 0.25 mg (250 mcg) according to the severity of symptoms and patient response. It is recommended that the evening dose be increased before the daytime doses. Very severe manifestations of anxiety may require larger initial daily doses. The optimal dose is one that permits symptomatic control of excessive anxiety without impairment of mental and motor function. Exceptionally, it may be necessary to increase the dosage to a maximum of 3 mg daily, given in divided doses.
Elderly and Debilitated Patients:
The initial dosage Alprazolam is 0.125 mg (125 mcg) 2 or 3 times daily. If necessary, this dosage may be increased gradually depending on patient tolerance and response.

Short courses of treatment should be the rule for the symptomatic relief of excessive anxiety and the initial course of treatment should not last longer than 1 week without reassessment. If necessary, drug dose can be adjusted after 1 week. Prescriptions should be limited to short courses of therapy.

- Lorazepam is given as a second-line drug of choice. Initial adult daily oral dose is 2 mg in three divided doses of 0.5 mg, 0.5 mg and 1 mg, or two divided doses of 1 mg and 1 mg. The daily dose should be carefully increased or decreased by 0.5 mg depending upon tolerance and response. The usual daily dose is 2 to 3 mg. The optimal dose may range from 1 to 4 mg daily in individual patients. Usually, a daily dose of 6 mg should not be exceeded.

The initial daily dose in elderly and debilitated patients should not exceed 0.5 mg and should be very carefully and gradually adjusted, depending upon tolerance and response.

- Diazepam 2mg 3 times daily increased if necessary to 10-15mg daily in divided doses may be used in the absence of the above-mentioned drugs.

- Sertraline 50 mg once per day is recommended as the initial dose. A gradual increase in dose may be considered if no clinical improvement is observed. Dose changes, if necessary, should be made at intervals of at least 1 week. Do not exceed a maximum of 200 mg/day. The full antidepressant effect may be delayed until 4 weeks of treatment or longer.

Administer with food once daily preferably with the evening meal, or, if administration in the morning is desired, with breakfast. Used with caution in patients with renal and/or hepatic impairment.

Maintenance: When a satisfactory clinical response has been obtained, the dose should be reduced (within the 50 to 200 mg range) to the minimum that will maintain relief of symptoms.

Psychotherapy – supportive therapy.

Long Term

\[\checkmark\] Cognitive behaviour therapy

Note

Due to the potential for dependence, benzodiazepines must be given for 2-6 weeks followed by tapering over a period of 1-2 weeks.

2.1.1.2 Obsessive Compulsive Disorder

Definition

The essential feature is the symptom of recurrent obsessions or compulsions or both. Obsessions are defined as recurrent, persistent ideas, images or impulses. Compulsions are behaviours or mental acts that are repetitive, purposeful, and intentional that are performed in response to the obsession in a stereotyped fashion.
Clinical Features

Obsessions
Recurrent and persistent ideas, thoughts, impulses, or images that are experienced as intrusive and senseless and cause marked anxiety or distress

Thoughts, impulses are not simply excessive worries about problems. The person attempts to ignore or suppress such thoughts or to neutralize them. The person recognizes that the obsessions are the product of his or her own mind.

Compulsions
Repetitive behaviours or mental acts performed in response to an obsession or rigidly applied rules. Behaviours are designed to neutralize or prevent distress or some dreaded event or situation, but are excessive or not realistically connected with what they are meant to neutralize. The person recognizes his or her behaviour is excessive or unreasonable (except children). Obsessions/compulsions cause marked distress, are time-consuming (more than 1 hr/day), or significantly interfere with the person’s normal routine. If another axis 1 disorder is present, the content of the obsessions or compulsions is not restricted to it. Disturbance is not due to the direct physiologic effects of a substance or general medical condition.

Differential Diagnosis
1) Obsessive compulsive personality.
2) Obsessive compulsive disorder spectrum. Bear similarities with OCD.

Trichotillomania
Body dysmorphic syndrome
Tourette disorder
Olfactory reference syndrome

Treatment

Short Term

Drugs
- Fluoxetine 20 mg/day to 60 mg/day is recommended and total dose should not exceed a maximum of 80 mg/day
- Clomipramine Adults: Initiate with daily doses of 25 mg. Dosage may be increased by 25 mg, as tolerated, at 3 to 4 day intervals up to a total daily dose of 100 or 150 mg by the end of 2 weeks. Thereafter, the dose may be gradually increased over a period of several weeks to 200 mg. Doses in excess of 200 mg/day are not generally recommended for outpatients. However, in the treatment of severe cases of Obsessive Compulsive Disorder, daily doses of up to 250 mg may be required.

Children and Adolescents:
In children aged 10 to 17 years, an initial dose of 25 mg/day is recommended. This may be increased by 25 mg, as tolerated, at 3 to 4 day intervals. By the end of 2 weeks, patients may be titrated up to 100 to 150 mg/day or 3 mg/kg, whichever is lower. Thereafter, the dose may be gradually increased to 200 mg or 3 mg/kg whichever is lower. A total daily dose above 200 mg should not be used in children or adolescents.

Elderly and Debilitated Patients:
Initially, 20 to 30 mg daily in divided doses is suggested, with very gradual increments, depending on tolerance and
response. Blood pressure and cardiac rhythm should be checked frequently, particularly in patients who have unstable cardiovascular function.

**Psychological**

- Cognitive behaviour therapy
- Exposure and response prevention

**Long Term**

- Cognitive behaviour therapy (exposure and response prevention).

### 2.1.1.3 Social Anxiety Disorder

#### Definition

The essential feature of social anxiety disorder is excessive and persistent fear of being in a given social situation where the person might be exposed to scrutiny of others. The exposure to or anticipation of the feared situation causes marked anxiety and the person either avoids the situations or endures it with significant distress.

#### Clinical Features

- Tremors,
- Palpitation
- Sweating
- Restlessness

These occur in social settings in which patients are pre-occupied with feelings of being negatively evaluated by others.

#### Differential Diagnosis

1) Shyness
2) Avoidant personality disorder
3) Panic attack

#### Treatment

**Short Term**

*Drugs*

- Alprazalam 250-500 micrograms 3 times daily or
- Lorazepam or 1-4 mg daily in divided doses as in generalized anxiety disorders above.
- Fluoxetine 20 mg administered once daily in the morning. A gradual dose increase should be considered only after a trial period of several weeks if the expected clinical improvement does not occur

**Long Term**

- Cognitive behaviour therapy.

### 2.1.1.4 Post Traumatic Stress Disorders (PTSD)

#### Definition
Post Traumatic Stress Disorders are caused by a severe psychic-trauma. A psychic-trauma is defined as an inescapable event that overwhelms an individual’s existing coping mechanisms.

**Clinical Features**
The clinical features fall into 3 domains.

1. **Re-experiencing**
   The trauma is re-experienced in the following ways:
   a) Frequent intrusive memories of the event
   b) Nightmares of the event
   c) Flash backs
   d) Low self-esteem

2. **Avoidance**
   All reminders of the events are persistently avoided

3. **Autonomic Hyperactivity**
   a) Insomnia
   b) Irritability
   c) Hypervigilance

**Diagnosis**

**Differential Diagnosis**
   a) Acute stress disorder
   b) Adjustment disorder
   c) Obsessive compulsive disorder
   d) Schizophrenia
   e) Drug/alcohol use disorder (intoxication)

**Investigation**
   None

**Treatment**

The principle treatment modality for PTSD is psychotherapy, such as supportive, psychodynamic cognitive behavioral, and with medication used to augment the psychotherapy and help reduce the symptoms.

The goals of treatment are:

- To help patients regain self-esteem.
- To again feel in control of themselves and their lives (the opposite of the feelings of helplessness experienced in the trauma).
- To re-work their shattered assumptions.

Phase oriented models are used to conceptualize treatment,

**Phase I** *(Supportive psychotherapy)*
Establishing safety, stabilization, symptom reduction and the therapeutic alliance.
Phase II  (Cognitive behavioral therapy)
Dealing with traumatic event; e.g., through remembering, desensitization, de-conditioning and mourning.

Phase III  (Insight-oriented psychotherapy)
Restructuring personal schema and integrating the trauma into a meaningful life narrative; i.e., putting the trauma into perspective and moving forward in developing a positive life.

Drug Therapy

The best approach is to choose a medication based on the more problematic target symptoms. This may require a combination of medications, e.g., an SSRI to decrease numbing (withdrawal from society and becoming emotionally indifferent) and depression, and a benzodiazepine (Lorazepam) and a beta blocker (Propranolol) (titrate the dose) to decrease autonomic hyperarousal.

2.1.1.5  Panic Attack Disorder

Definition
A panic attack is referred to as a recurrent unexpected discrete episode of intense discomfort or fear.

Clinical features
Palpitations, pounding heart, or accelerated heart rate, sweating, trembling or shaking, sensations of shortness of breath or smothering, feeling of choking, chest pain or discomfort, nausea or abdominal distress, feeling dizzy, unsteady, lightheaded, or faint, derealization (feelings of unreality) or depersonalization (being detached from oneself), fear of losing control or going crazy, fear of dying, paresthesias (numbness or tingling sensations), chills or hot flushes.

Diagnosis
It must meet the ICD 10/DSM IV diagnostic criteria.

Differential Diagnosis
a)  All types of anxiety disorders
b)  Anaemia
c)  Angina
d)  Asthma
e)  Hyperventilation
f)  Epilepsy
g)  Cocaine
h)  Myocardial infarction
i)  Migraine
j)  Transient ischemic attack
k)  Pheochromocytoma
l)  Hallucinogens

Treatment

Short Term

1.  Drugs
• Lorazepam 2mg Initial adult daily oral dosage in three divided doses of 0.5 mg, 0.5 mg and 1 mg, or in two divided doses of 1 mg and 1 mg. A daily dose of 6 mg should not be exceeded. Initial daily dose in elderly and debilitated patients should not exceed 0.5 mg and should be very carefully and gradually adjusted, depending upon tolerance and response.
• Fluoxetine: 10mg ; initial dosage is 20 mg administered once daily in the morning. A gradual dose increase should be considered only after a trial period of several weeks if the expected clinical improvement does not occur.

Long Term

2.2 Psychotherapy

a) Behaviour therapy
   - Applied relaxation
   - Deep breathing exercise
   - In-vivo exposure

2.2.1 Mood Disorders

Introduction
Mood disorders are mental disorders whose primary psychopathology is the disturbance of mood. The mood disturbances can either be low (depressed) or high manic/hypomanic.

2.2.1.1 Bipolar Mood Disorders

This is a spectrum of disorders which is characterized by cyclical disturbance of mood, cognition and related behaviours. It can either present with maniac/hypomania symptoms or as depression alternating with mania/hypomania. It consists of:
   - Bipolar disorders
   - Cyclothymia
   - Mood disorder due to general medical condition
   - Drug/alcohol induced mood disorder

2.2.1.2 Bipolar 1 Disorder

Definition
It is a sub type of Bipolar Spectrum of Disorders characterized by episodes of manic presentation or alternating episodes of mania and major depressive disorder.

Clinical Features

It is subdivided into 3 domains:

1. Biological
   - Too busy to eat or sleep
   - (Good appetite and sleep)
   - High energy
2. Psychological
   □ confidence
   Over familiarity, high self-esteem, grandiose ideas, freely expressed over-

3. Social
   □ Impulsive, disinhibited (unstoppable) and hyperactive

**Diagnosis**

Bipolar mood disorder is a spectrum of disorder. It is critical to make a definite diagnosis because of treatment implication.

*NOTE: Mania is a cluster of signs and symptoms with a variety of underlying psychopathology. It is not a diagnosis.*

**Differential Diagnosis**
- Major depressive disorder
- Schizoaffective
- HIV
- Syphilitic encephalitic
- Alcohol/drug induced mood disorder

**Investigation**
- FBC, U&E, LFT, EEG, TSH, B12
- Pregnancy test
- Pre-treatment Evaluation

A general medical assessment, including history, physical examination, and laboratory evaluation focusing on organ systems potentially affected by each agent, is important prior to starting these medications.

**Treatment**

Treatment selection depends on illness severity, associated features such as rapid cycling or psychosis, and, where possible, patient preference.

<table>
<thead>
<tr>
<th>Severity</th>
<th>Treatment</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>(Monotherapy) Mood stabilizer</td>
<td>Lithium – 300mg 3 times a day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carbamazepine – 200 – 600mg/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sodium valproate 250mg 3 times/day</td>
</tr>
<tr>
<td>Moderate</td>
<td>Monotherapy Mood stabilizer</td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>Mood stabilizer and Antipsychotic</td>
<td></td>
</tr>
<tr>
<td>Severe with psychosis</td>
<td>Mood stabilizer and Antipsychotic</td>
<td></td>
</tr>
</tbody>
</table>

**Short Term**

**Intermediate**
During intermediate phase, doses will be titrated according to the side effects, therapeutic effect and drug blood level.

**Long Term**

Patients will be maintained on the mood stabilizer which resulted into their recovery. Antipsychotic must be tapered down slowly over a period of two – three weeks and finally withdrawn.

**Note:** A blood level of Lithium 0.8-1.2 mEq/L generally is required to treat acute onset of episodes of bipolar mood disorders. (A steady-state, stable blood level the morning before the first dose of the day). Changes in dosage require monitoring of lithium levels at least every 5-7 days after the change. Some patients require (and tolerate) levels up to 1.5mEq/L, although higher levels are not advisable because of the risk of toxicity. Treatment with lithium alone may have a relatively slow response rate (up to 2 weeks after a therapeutic blood level) is established. Lithium should only be used where blood levels of Lithium can be monitored.

### 2.3 Depressive Disorders

**Definition**

A spectrum of disorders which is characterized by a low or depressed mood. They consist of:

- Major depressive disorder single episode
- Major depressive disorder record
- Dysthmia
- Adjustment disorder with depressed mood
- Mood disorder due to general medical condition
- Substance induced mood disorder

It is therefore vital to make a definitive diagnosis because of management implications. They have different treatment, course and prognosis.

#### 2.3.1. Major Depressive Disorder

**Definition**

This is one of the depressive spectrum of disorders (loss of interest in all general life activities).

**Clinical Features**

Clinical presentation falls into 3 domains

- **Biological:** Insomnia/Hyperinsomnia/hi fatigue, weight loss/gain, Agitation/retardation (psychomotor retardation)
- **Psychological:** Depressed mood, loss of interest in pleasure (anhedonic), sense of guilt, worthlessness, hopelessness, helplessness and sometimes suicidal
- **Cognitive:** Poor attention, concentration and memory

**Diagnosis**
Differential Diagnosis
Bipolar mood disorder with depressive episode  
Schizoaffective  
Adjustment disorder with depressed mood  
Substance induced mood disorder  
Mood disorder due to general medical condition  
Sad mood  
Bereavement

Investigations
FBC, VDRL, TSH, LFT, Drug Screen.  
Hamilton depressive scale  
Becks depression inventory

Treatment
The treatment of major depressive disorder consists of antidepressant, psychotherapy and ECT (electroconvulsive therapy) or a combination of these.

Acute Phase

<table>
<thead>
<tr>
<th>Severity of Major Depressive Episode</th>
<th>Pharmacotherapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>Antidepressants if preferred by patient</td>
</tr>
<tr>
<td>Moderate to severe</td>
<td>Antidepressants are treatment of choice (unless electroconvulsive therapy (ECT) is planned)</td>
</tr>
<tr>
<td>With psychotic Features</td>
<td>Antidepressants plus antipsychotics or ECT</td>
</tr>
</tbody>
</table>

Intermediate Phase
Titrte the medication according to side effect and clinical response.

Long Term Phase
1. Continue with antidepressants  
2. Psychotherapy (cognitive behaviour therapy)  
3. Taper the antipsychotic and discontinue over the period of three to four weeks

2.3.2. Psychotic Disorders

Psychosis refers to loss of contact with reality (impairment in reality testing). It is not a diagnosis but a symptom of mental disorders with a variety of underlying etiological factors. It is characterized by delusions, hallucinations and thought disorders.

2.3.2.1 Brief Psychotic Disorder

Definition
2.0 CENTRAL NERVOUS SYSTEM CONDITIONS

An acute transient psychotic episode of abrupt onset. Although it can follow a stressful life event, it may be the first clinical feature of a primary mental disorder in a predisposed person.

Clinical Features
1) Delusions
2) Hallucinations
3) Disorganized speech (e.g. frequent derailment or incoherence)
4) Grossly disorganized or catatonic behaviour

Investigations
FBC, U/E, LFT, TSH, EEG, CXR, ECG, Drug Screen.

Differential Diagnosis
1. Schizophreniform
2. Major depressive disorder
3. Bipolar mood disorder
4. Drug/alcohol induced psychotic disorder
5. Delirium

Treatment

Short Term
1. Hospitalisation:
   For diagnostic evaluation and monitoring signs and symptoms
2. Psychopharmacotherapy:
   - Antipsychotic - See Table 2.4.2 1st episode schizophrenia algorithm
   - Adjunctive (Benzodiazepine) - Diazepam, Lorazepam

Long Term
The clinical presentation of brief psychotic disorder is polymorphic. A long term follow up is advisable to establish the underlying primary mental disorder.

2.4.2. Schizophrenia

Definition
It is a spectrum of disorders which share similar etiological factors but differ in clinical presentation, course and prognosis.

Clinical Features
- Delusions
- Hallucinations
- Disorganized speech (e.g., frequent derailment or incoherence)
- Grossly disorganized or catatonic behaviour
- Negative symptoms, i.e., affective flattening, alogia, or avolition

Differential Diagnosis
2.0 CENTRAL NERVOUS SYSTEM CONDITIONS

- All psychotic disorders including Substance induced psychotic disorder (i) Intoxication (ii) Withdrawal states and Psychotic disorder due to general medical condition

Table 2.4.2 : 1st episode schizophrenia algorithm

2.5. Epilepsy

Definition

This is a recurrent abnormal paroxysmal neuronal discharge. Patients may present in several forms, i.e. from simple seizures which will only bring about headache, bad smell or loss of posture and of consciousness to generalized tonic, clonic seizures (grandmal seizures).

Clinical features

These vary depending on the type of seizure involved.

Generalised tonic to clonic seizures (grand mal)

These may occur with or without the initial warning aura, characterized by outcry, loss of consciousness, falling and jerking of the limbs, trunk and head. Urinary or fecal incontinence may occur. The attack usually lasts 2 to 5 minutes and will be followed by any of the following - deep sleep, muscle soreness or headache.

Petit mal attacks

Characterized by clouding of consciousness, which could last from 1 - 30 seconds with or without loss of muscle tone. The patient will suddenly stop all activity and have a blank stare. Activity will only be resumed after the attack is over. Commonly occurs in children.

Myoclonic seizures

This is characterised by jerking of one or more muscles in any part of the body with or without consciousness. The jerking may start in one part of the body and spread.

Diagnosis

Diagnosis is mainly clinical.

Management

The objective is to control the seizures and prevent reoccurrence.

- A detailed history should be taken and should include
- An eyewitness account of the seizure (if possible)
- Prior trauma, infection, alcohol or other drug involvement will call for review of need for continued treatment
2.0 CENTRAL NERVOUS SYSTEM CONDITIONS

- If it is status epilepticus, establish if the patient has been taking medication regularly in the last 2 weeks before the seizure (including dosage and frequency). Record of other medication used recently
- History of family seizures or other neurological disorders

Treatment

Drugs
Most patients will respond favourably to single drug treatment provided in table: 2.5 Commonly Used Anticonvulsants (i.e. phenobarbitone, carbamazepine or phenytoin). Patients who do not respond favourably to maximum doses of these drugs should be referred for specialist treatment.

Patients who have not had seizures for two or more years, neurological signs or symptoms, unacceptable behavioural change or adverse reaction to drugs should all be referred to a specialist for possible discontinuation of drugs.

Supportive

Counseling is necessary for both the patient and caregivers.

Take blood for
  ✓ Urea and electrolytes,
  ✓ Glucose
  ✓ Ca+, Mg ++
  ✓ Full blood count
  ✓ Arterial gases, and
  ✓ Anticonvulsant concentrations

Investigate and exclude possible underlying causes of seizures, e.g. drugs, alcohol, meningitis, hypoglycaemia, trauma, etc.

2.6 Febrile Convulsions

These are convulsions occurring mostly among children between six months and five years. They occur during a bout of fever, which is due to an underlying infection.

In general, the seizures follow the pattern of clonic–tonic seizures seen in grand mal epilepsy or generalised seizures, but may be atypical and involve only one side of the body.

Management

Prolonged febrile convulsions of 15 or more minutes or those occurring in a child of known risk e.g. a child with ventricular peritoneal shunt must be treated actively.

Drugs
- Diazepam orally or rectally or intravenously 0.6 – 0.8mg/kg in 24 hours in divided doses is effective in reducing further febrile seizures in children.
- Paracetamol 10mg/kg 4 times a day as required
Supportive
- Tepid sponging
- Use of antipyretics
- Caregivers will need counseling about treatment of recurrences

2.7. Rabies

Definition
This is a disease caused by a virus that affects brain cells. This virus is usually found in animals and is transmitted to man.

Animals, which may carry rabies virus, include:

<table>
<thead>
<tr>
<th>Domestic</th>
<th>Wild</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dogs</td>
<td>Hyenas</td>
</tr>
<tr>
<td>Cats</td>
<td>Foxes</td>
</tr>
<tr>
<td></td>
<td>Wild dogs</td>
</tr>
<tr>
<td></td>
<td>Bats</td>
</tr>
</tbody>
</table>

Clinical features
Fulminant encephalitis with convulsions, circulatory and respiratory failure. Hydrophobia (fear of water) occurs in advanced stages of the disease.

Investigation
- Taking a good history
- Laboratory investigation by means of immunofluorescent microscopy of smear from the cornea or of a skin biopsy
- Brain examination of dead animals or sacrificed animals

Treatment
Standardised treatment of all animal bites and scratches; these should be thoroughly cleansed and flushed with soap and water. Antibiotics and tetanus toxoid should also be administered. Administration of antirabies vaccine as soon as possible after exposure. The human diploid vaccine may be used as follows:

<table>
<thead>
<tr>
<th>Condition of animal</th>
<th>Treatment in case of Bite</th>
<th>Treatment in case of Lick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy, vaccinated with valid certificate</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Healthy, not vaccinated</td>
<td>Vaccine</td>
<td>None</td>
</tr>
<tr>
<td>Unknown or escaped</td>
<td>Vaccine + serum</td>
<td>Vaccine</td>
</tr>
</tbody>
</table>
Rabid or suspected

Vaccine + serum

Vaccine + serum

**Recommended regimen:**

1 dose to be given on day 0; day 3; day 7; day 14 and day 28.

If the animal is proved to be healthy after the tenth day, no more vaccine is necessary.

All bites by rabid dogs should be reported to the Veterinary Office.

**Prevention**

Veterinary precautions, which include vaccination of domestic animals, eradication of stray dogs and surveillance control of the epidemiological situation in the wildlife population.

**Pre-exposure vaccination:** This is administered to high-risk population groups, e.g. veterinary staff and wildlife department personnel. Two doses of human diploid vaccine with one month's interval, followed by a booster after one year. Repeat booster after every three years.
3.0 INFECTIONS

3.1 Malaria

Definition

Malaria is a protozoal infection of the genus *Plasmodium*. It is transmitted through the bite of an infected female mosquito belonging to the genus *Anopheles*. It is characterised by paroxysms of chills, fever and sweating, and may lead to anaemia and splenomegaly.

Malarial parasites comprising four species, each one with a different biological pattern may affect man—*Plasmodium vivax*, *Plasmodium falciparum*, *Plasmodium malariae* and *Plasmodium ovale*. In Zambia *Plasmodium falciparum* is the most prevalent.

Clinical features

Diagnosis

- Take a good history and include all the physical examination and make a differential diagnosis.
- Confirm the presence of parasites and complications by laboratory methods.

3.2 Uncomplicated malaria

Prodromal symptoms are usually non-specific and are often characterised by intermittent febrile illness. Fever is the most common symptom. Headache, aching joints, back pain, nausea and vomiting and general discomfort usually accompany the fever.

The patient may not present with fever but may have had a recent history of fever. This is due to the natural malaria cycle. A history of fever during the previous two days along with other symptoms of malaria is a critical basis for suspecting malaria.

It is equally important to note that fever is a common symptom for other infections besides malaria, such as ear infections, measles and pneumonia. Malaria has been nicknamed “the Great Imitator” because of this. The possibility of other infections, either co-existing with malaria or as the sole cause of fever, should always be borne in mind in arriving at the diagnosis. It is therefore important to carry out a differential diagnosis.

In children, the onset of malaria may be characterized, in the early stages, only by symptoms like poor appetite, fever, restlessness, cough, diarrhoea, malaise and loss of interest in the surroundings.

3.3 Severe Malaria

*P. falciparum* infection in the presence of any life-threatening condition is considered as severe malaria. All life-threatening conditions and the presence of any danger signs in the presence of an acute febrile illness should be considered as possible severe malaria. Some of the danger signs include:

- Excessive vomiting
- Inability to drink or breast feed
- Extreme weakness
- Convulsions
- Drowsiness
- Loss of consciousness
Abnormal breathing

Severe headache, sleepiness and loss of consciousness are some of the commonest indications of severe malaria. Jaundice is another early sign.

A patient in whom malaria is suspected and is severely ill requires urgent attention and should be referred to an appropriate health facility, where applicable. Severe malaria particularly in pregnant women and children under five should be managed as an emergency situation.

Other symptoms and signs of severe malaria include:
- Convulsions (> 2 episodes within 24 hours)
- Coma or altered level of consciousness
- Drowsiness/lethargy
- Prostration (inability to seat or stand without support)
- Respiratory distress
- Pulmonary oedema
- Shock (cold moist skin, low blood pressure, collapse)
- Severe vomiting (vomiting everything)
- Severe anaemia (Hb<5g/dl or Hct<15%)
- Haemoglobinuria
- Hypoglycaemia (blood glucose <2.2mmol/L or <40mg/dl)
- Splenomegaly
- Hepatomegaly
- Abnormal bleeding (spontaneous prolonged bleeding from puncture sites)

Table 1: Signs and symptoms of malaria

<table>
<thead>
<tr>
<th>Uncomplicated Malaria</th>
<th>Moderately severe Malaria</th>
<th>Severe and complicated malaria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever (≤37.5 °C)</td>
<td>Nausea</td>
<td>Severe anaemia (Hb&lt;5g/dl)</td>
</tr>
<tr>
<td>Headache</td>
<td>Vomiting</td>
<td>Jaundice</td>
</tr>
<tr>
<td>Sweats and chills</td>
<td>Dehydration</td>
<td>Drowsiness</td>
</tr>
<tr>
<td>Body pains</td>
<td>Diarrhoea</td>
<td>Shock</td>
</tr>
<tr>
<td>Acute gastroenteritis</td>
<td>Extreme weakness</td>
<td>Convulsions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Respiratory distress</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unconsciousness/coma</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change in behaviour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hyperparasitaemia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prostration, i.e., generalized weakness, inability to stand or walk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abnormal bleeding</td>
</tr>
</tbody>
</table>

Treatment

**Uncomplicated Malaria**
1. The first line of treatment for malaria is artemisin based combination therapy. For instance, Artemether 20mg + Lumefantrine 120mg tablets

Table 2: First-treatment of Malaria

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Weight (kg)</th>
<th>Number of tablets per dose 0h, 8h, 24h, 36h, 48h, 60h</th>
<th>Artemether (A) + Lumefantrine (L) per dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>&lt;5</td>
<td>Not recommended</td>
<td>20mg A + 120mg L</td>
</tr>
<tr>
<td>1-5</td>
<td>5-14</td>
<td>1</td>
<td>40 mg A + 240mg L</td>
</tr>
<tr>
<td>6-8</td>
<td>15-24</td>
<td>2</td>
<td>60mg A + 360mg L</td>
</tr>
<tr>
<td>9-12</td>
<td>25-34</td>
<td>3</td>
<td>80mg A + 480mg L</td>
</tr>
<tr>
<td>Over 12</td>
<td>&gt;35</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Artemether 20mg + Lumefantrine 120mg is not recommended in pregnancy and lactating mothers. Where there is no suitable alternative drug, it should be used.

2.0 For those weighing 5kg body weight and below, the drug of choice is Sulphadoxine 500mg + Pyrimethamine 25mg for simple uncomplicated malaria.

The dosage for Sulphadoxine 500mg + Pyramethamine 25mg is a single treatment of half a tablet.

Table 3 Child below 5kg/body wt treatment

<table>
<thead>
<tr>
<th>Wt (kg)</th>
<th>Age (years)</th>
<th>Number of Tablets</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-10</td>
<td>2-11 months</td>
<td>0.5</td>
</tr>
<tr>
<td>10.1-14</td>
<td>1-2</td>
<td>0.75</td>
</tr>
<tr>
<td>14.1-20</td>
<td>3-5</td>
<td>1</td>
</tr>
<tr>
<td>20.1-30</td>
<td>6-8</td>
<td>1.5</td>
</tr>
<tr>
<td>30.1-40</td>
<td>9-11</td>
<td>2</td>
</tr>
<tr>
<td>40.1-50</td>
<td>12-13</td>
<td>2.5</td>
</tr>
<tr>
<td>&gt;50</td>
<td>14+</td>
<td>3</td>
</tr>
</tbody>
</table>

For unconscious, persistently vomiting, convulsing or severely ill patients treat as for complicated malaria, resuscitate and refer.

Severe malaria

Children: By intramuscular injection: Quinine 10mg/kg body weight diluted in saline or water for injection (to a concentration of 60-100mg salt/ml), repeated after 4 hrs and then 12 hourly. A loading dose is not recommended by this route.
By intravenous injection: Quinine loading dose of 20mg/kg body weight diluted in 10ml of 5% or 10% dextrose (or isotonic fluid if hypoglycaemia is excluded) per kg body weight by intravenous infusion over 4 hours. After 12 hours maintenance dose of 10mg/kg body weight given over 2 hours, repeated 12 hourly until patient can swallow, then oral quinine 10mg/kg body weight 8 hourly to complete 7 day course of treatment.

Adults: By intramuscular injection: Quinine 10mg/kg body weight diluted in saline or water for injection (to a concentration of 60-100mg salt/ml), repeated after 4 hours and then 8 hourly. A loading dose is not recommended by this route.

By intravenous injection: loading dose of Quinine 20mg/kg body weight diluted in 10ml of 5% or 10% dextrose (or isotonic fluid if hypoglycaemia is excluded) per kg body weight by intravenous infusion over 4 hrs. After 8 hours maintenance dose of 10mg/kg body weight given over 4 hours, repeated 8 hourly, until patient can swallow or after coma resolution, then oral quinine 10mg/kg body weight 8 hourly to complete 7 day course of treatment.

Table 4: Oral Quinine 300mg tablet dosage schedule

<table>
<thead>
<tr>
<th>Age Years</th>
<th>Number of tablets per dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>0.25</td>
</tr>
<tr>
<td>1-3</td>
<td>0.5</td>
</tr>
<tr>
<td>4-6</td>
<td>0.75</td>
</tr>
<tr>
<td>7-11</td>
<td>1</td>
</tr>
<tr>
<td>12-15</td>
<td>1.5</td>
</tr>
<tr>
<td>15+</td>
<td>2</td>
</tr>
</tbody>
</table>

Quinine is sometimes used in combination with Tetracycline or Clindamycin or Doxycycline in places where there is reduced sensitivity to Quinine. In Zambia, Quinine sensitivity is still very high and there is no justification for using the combination.

Malaria in Pregnancy

Intermittent presumptive treatment (IPT) – Sulphadoxine + Pyrimethamine (SP) is the drug of choice for prevention of malaria in pregnancy. Three tablets of Sulphadoxine + Pyrimethamine are given after 16 wks
following the last menstrual period (LMP). Two more doses are given at least 4 weeks apart during the second and third trimester. A total of 3 doses should be given during the entire duration of pregnancy.

Individuals who are intolerant to SP should be counselled about personal preventive measures to reduce contact with mosquitoes.

**Summary of management of Malaria**

1. Take and record a confirmatory history
2. Do a confirmatory clinical assessment including body temperature
3. Make a differential diagnosis on clinical basis
4. Do a lumbar puncture if there is need to exclude meningitis
5. Prepare a thick and thin blood smear
6. Do a full blood count
7. Decide on treatment and method of administration
8. Keep treatment, follow-up and referral records. Record treatment failures and adverse events.
9. Give oral, subcutaneous or intramuscular medications
10. Decide on the need for referral

**Supportive therapy**

- Monitoring of fluid and electrolyte balance
- Correction of fluid and electrolyte imbalance
- Correct management of anaemia
- Management of hypoglycemia
- Management of any other complications

**Referred Patients**

Patients referred from the community need to have a thorough clinical examination to exclude other causes of fever.

**Criteria for Referral from Health Centre to Hospital**

The following are criteria for referral from the Health Centre to Hospital:

- Neurological manifestation e.g. convulsions and altered/disturbed consciousness
- Persistent vomiting
- Hyperpyrexia (> 39°C)
- Hypothermia (< 35.7°C)
- Severe Anaemia
- Jaundice
- Pregnancy with fever
3.0 INFECTIONS

- Failure to respond to treatment after 2 days
- Reaction to drugs interfering with normal daily activity e.g. severe rash, severe itch, sulphonamide sensitivity
- Conditions that cannot be managed locally
- Rapidly deteriorating condition of the patient
- Conditions that cannot be managed locally

Prevention
- Get rid of mosquito breeding sites near residential areas
- Use impregnated mosquito nets, repellents and sprays
- Give public health education on the dangers of malaria and how to prevent it
- Counselling Points:
  - Provide health education information on malaria i.e. personal protection measures e.g. bed nets, repellents, general sanitation around the house and in the community, such as reducing breeding sites and clearing of vegetation.
  - Advise carer on the need for growth monitoring, feeding, Vitamin A supplementation and immunisation in children.
  - Prophylaxis in sickle cell anaemia and post splenectomy use Pyrimethamine 25mg once weekly.

Zambia has no prophylaxis policy for visitors. Recommendations are provided from their country of origin. Some countries e.g. United Kingdom are using Mefloquine. Sulphadoxine/Pyrimethamine is not recommended for this purpose.

The use of other drugs like amodiaquine, dapsone-pyramethamine (Maloprim) and mefloquine for prophylaxis needs further evaluation and is not therefore recommended.

3.4 Tuberculosis

Definition

Tuberculosis is an infectious disease that is caused by tubercle bacillus, *Mycobacterium tuberculosis*. The principal route of infection is the respiratory tract through the inhalation of infected air-droplet nuclei. Infection may rarely occur through the gastrointestinal tract from the ingestion of infected unpasteurised milk. Exposure to infection may lead to infection which may be latent. Subsequent progression to active disease occurs in approximately 10% during the life time in people with a latent infection and an intact immune system. Progression of a latent infection occurs at a higher rate in individuals infected with the Human Immuno-deficiency Virus. In HIV-infected patients pulmonary tuberculosis is the commonest form of tuberculosis.

Clinical features

Pulmonary Tuberculosis accounts for approximately 80% of the cases of tuberculosis, with smear positive tuberculosis being the major source of infection. Extra-pulmonary tuberculosis may involve many sites of the body such as the pleura, pericardium, lymph nodes, meninges, bones, gastro-intestinal tract, genito-urinary system, epididymis, eyes and skin.
3.0 INFECTIONS

3.4.1 Pulmonary tuberculosis
Pulmonary tuberculosis classically presents with symptoms of prolonged cough (> 2 weeks duration), which is usually productive; and with or without a history of haemoptysis, fever, night sweats and loss of weight. Radiological changes that occur include cavitation, parenchymal infiltrates and lymphadenopathy. Sometimes Xrays may not show any abnormality. Radiological findings in HIV-infected individuals depend on the degree of immunosuppression. Atypical findings are more common in these patients.

3.4.2 Pleural tuberculosis
Pleural tuberculosis may present with a cough which may be non-productive, pleuritic chest indent pain, systemic symptoms of fever and night sweats.

3.4.3 Pericardial tuberculosis
Pericardial tuberculosis may present with chest pain or with features of tamponade such as dyspnoea, tachycardia, hypotension, pulsus paradoxus and sudden collapse of patient.

3.4.4 Lymph node tuberculosis
Lymph node tuberculosis may affect any site though it is more common in the cervical region. Lymph nodes are usually painless. Where caseation with liquefaction and sinus formation occurs, they may be painful.

3.4.5 Meningeal tuberculosis
Meningeal tuberculosis is usually of insidious onset with symptoms of headache, neck stiffness, vomiting and disordered consciousness.

3.4.6 Bone tuberculosis
Bone tuberculosis may affect any bone though it is more common in the thoraco-lumbar spine leading to gibbus formation due to vertebral collapse and may result in paraplegias. Osteomyelitis and cold abscess formation may also occur.

3.4.7 Gastrointestinal tuberculosis
Gastrointestinal tuberculosis may affect any part of the gastrointestinal tract, though intestinal involvement presenting as diarrhoea, malabsorption, intestinal obstruction and ascites are common.

3.4.8 Genito-urinary tuberculosis
Genito-urinary tuberculosis involving the kidneys may be asymptomatic, causing symptoms such as haematuria and sterile pyuria with extensive renal involvement. Infertility, salpingitis and tubal abscess are presentations of infection of the fallopian tubes while epididymal tuberculosis may present as painless swellings. Phlyctenular conjunctivitis, iritis and choroiditis are manifestations of eye infection.

3.4.9 Dermal tuberculosis
Dermal tuberculosis may include lupus vulgaris and erythema nodosum.

3.4.10 Adrenal tuberculosis
Adrenal tuberculosis may cause Addisons disease.
### Complications

Complications of pulmonary tuberculosis include pneumothorax, empyema or pyopneumothorax and laryngitis with advanced disease. Respiratory failure and right ventricular failure may develop as a late complication due to extensive pulmonary destruction and fibrosis. Colonization of cavities with *Aspergillus fumigatus* may occur resulting in haemoptysis.

Constrictive pericarditis is a complication of TB. Meningeal tuberculosis as a result of TB of the spine may result in permanent neurological deficits. Gastrointestinal tuberculosis may lead to the development of ascites and malabsorption.

### Diagnosis

Take good history, chest x-ray, sputum smear, ESR and Hb. You may need to do a tuberculin test to make an informed decision.

### Treatment

Treatment of tuberculosis should be based on demonstration of the mycobacteria by both sputum smear histology and culture. Clinical and radiological findings of dual HIV/TB infection have changed. Identification of smear positive cases should form the basis for treatment as these are cases responsible for continued transmission of infection. In the presence of clinical picture, treatment may be started using standard treatment Directly Observed Therapy (DOTs). The basic principle underlying the treatment of tuberculosis is the use of multi-drug treatment for a prescribed period to avoid the development of drug resistance. There is no place for the use of monotherapy in the treatment of tuberculosis nor for a trial of treatment.

### Drugs

Treatment for tuberculosis is provided free of charge in all public health institutions. The basis of treatment for tuberculosis is the use of multi-drug treatment for 8 months. Directly Observed Treatment (DOTs) is the mechanism by which the supervision of each dose of drug occurs, ideally by a member of the health care staff or by family, friends or community health workers.

Treatment is divided into an **Intensive phase** in which the patient should visit the clinic daily for review and medication for the first two months, followed by a **Continuation phase** of 6 months whereby the patient visits the clinic once every 4 weeks to collect drugs.

A pyridoxine supplement of 50mg daily should be given throughout treatment and especially so in lactating and pregnant women.

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**Treatment of tuberculosis has been classified into two categories.**

<table>
<thead>
<tr>
<th>Adults</th>
<th>Paediatric Age Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category I</td>
<td>Category II</td>
</tr>
</tbody>
</table>

43
New smear positives (+) 
Smear negative (-) and extra pulmonary

Smear + re-treatment cases including treatment failure, treatment after default, and relapses for smear positive cases

New uncomplicated cases of TB

Re-treatment cases and severe, complicated TB. i.e., TB meningitis, miliary TB, spinal TB

a) **Recommended Adult Treatment Dosage**

**Fixed Dose Combinations (FDCs) for TB treatment available in the following tablet dosage forms**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Form</th>
<th>Drug strengths for daily use</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHZE</td>
<td>Tablet</td>
<td>R (150 mg) + H (75 mg) + Z (400 mg) + E (275 mg)</td>
</tr>
<tr>
<td>RHZ</td>
<td>Tablet</td>
<td>R (150 mg) + H (75 mg) + Z (400 mg)</td>
</tr>
<tr>
<td>RH</td>
<td>Tablet</td>
<td>R (60 mg) + H (30 mg) + Z (150 mg) for paediatrics</td>
</tr>
<tr>
<td>RH</td>
<td>Tablet</td>
<td>R (300 mg) + H (150mg)</td>
</tr>
<tr>
<td>RH</td>
<td>Tablet</td>
<td>R (150 mg) + H (75 mg))</td>
</tr>
<tr>
<td>EH</td>
<td>Tablet</td>
<td>R (60 mg) + H (30 mg) for paediatrics</td>
</tr>
<tr>
<td>EH</td>
<td>Tablet</td>
<td>H (150 mg) + E (400 mg)</td>
</tr>
</tbody>
</table>

i. Category I New smear positive patients

<table>
<thead>
<tr>
<th>Weight in Kg</th>
<th>Intensive phase 2 months</th>
<th>Continuation Phase 6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RHZE</td>
<td>EH</td>
</tr>
<tr>
<td>30-37</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>38-54</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>55-70</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>&gt;70</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>


ii. Category II smear positive re-treatment patients

<table>
<thead>
<tr>
<th>Weight</th>
<th>Intensive Phase 3 months</th>
<th>Continuation Phase 5 months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 months</td>
<td>1 month</td>
</tr>
<tr>
<td></td>
<td>RHZE</td>
<td>RHZE</td>
</tr>
<tr>
<td></td>
<td>+ S</td>
<td>RHE</td>
</tr>
</tbody>
</table>
b) Recommended Paediatric Treatment Dosage

i. Category I. New uncomplicated

<table>
<thead>
<tr>
<th>Weight in Kg</th>
<th>Intensive phase 2 months</th>
<th>Continuation phase 4 months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RH + Z</td>
<td>RH</td>
</tr>
<tr>
<td>6 – 11</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>12 – 18</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>19 – 26</td>
<td>1 1/2</td>
<td>1</td>
</tr>
<tr>
<td>27 – 37</td>
<td>2</td>
<td>1 1/2</td>
</tr>
<tr>
<td>&gt; 38</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

ii. Category II Re-treatment and severe, complicated

<table>
<thead>
<tr>
<th>Weight</th>
<th>Intensive Phase 3 months</th>
<th>Continuation Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 moths</td>
<td>10 months</td>
</tr>
<tr>
<td></td>
<td>RHZE + Z + S</td>
<td>RHE</td>
</tr>
<tr>
<td>6 -11</td>
<td>1/2</td>
<td>0.1g</td>
</tr>
<tr>
<td>12 - 18</td>
<td>1</td>
<td>0.2g</td>
</tr>
<tr>
<td>19 - 26</td>
<td>1 1/2</td>
<td>0.5g</td>
</tr>
<tr>
<td>27 - 37</td>
<td>2</td>
<td>0.5g</td>
</tr>
<tr>
<td>&gt;38</td>
<td>3</td>
<td>0.5g</td>
</tr>
</tbody>
</table>

When recommending Paediatric FDCs dosage forms, weight bands should be used to determine the number of tablets to be given to children.

Pregnancy and Breast Feeding:
The standard regimen (above) may be used during pregnancy and breast-feeding; pyridoxine supplements are advisable. Streptomycin should not be given in pregnancy.

In exceptional circumstances, ethambutol can be used in young children (e.g. drug resistance).

3.4.11 Multidrug-resistant TB (MDR-TB),

Multidrug-resistant tuberculosis (MDR TB) is a form of tuberculosis that is resistant to two (Isoniazid and Rifampicin) or more of the primary drugs used for the treatment of tuberculosis. In Zambia, the Chest Diseases Laboratory reported Multi- drug resistant (MDR) was 1.8% for new cases and 2.3% for previously treated cases 2003

All suspected MDR-TB specimen should be referred to the National TB Reference Laboratory.
Recognized earlier in 2006 in South Africa, extensively drug resistant TB (XDR-TB) is MDR-TB that is also resistant to three or more of the six classes of second-line drugs. Currently there is no documented evidence of XDR-TB in Zambia.

3.4.12 TB and Immunocompromised Patients:

All TB diagnosed patients should be counselled and tested for HIV. Immunocompromised patients may develop tuberculosis owing to reactivation of previously latent disease or due to new infection. Multi-resistant *Mycobacterium tuberculosis* may be present or the infection may be caused by other mycobacteria, e.g. *M. avium* complex in which case specialist advice is needed. Culture should always be carried out and the type of organism and its sensitivity confirmed. A minimum duration of treatment of 9 months is currently recommended for *M. tuberculosis* infection as re-infection is a common feature in these patients.

**Monitoring:** Since isoniazid, rifampicin and pyrazinamide are associated with liver toxicity, hepatic function should be checked before and during treatment with these drugs. Patients on dual treatment of HIV and TB are likely to have liver/renal toxicity and should therefore be monitored closely.

**Supportive**

- Non-adherence is the major reason for the failure of otherwise effective drug regimens to achieve high cure rates in the management of tuberculosis. Both patient-related and service-related factors contribute to poor patient compliance. Hence education of both health care staff and patients is an important part of the management package.
- An adequate system of defaulter-tracing would also contribute to higher cure rates. In areas with high rates of dual HIV/TB, nutritional support and integration of Home Based Care units and the treatment of tuberculosis is important to ensure that supervision of treatment occurs.
- Hospitalization during the first two months of treatment is not routinely done and is reserved for those who are severely ill or who have complications of the disease.

**Prevention**

- The most effective method for preventing the spread of tuberculosis is the identification and effective treatment of the infectious cases, i.e. the smear positive cases. The effectiveness of vaccination using BCG is controversial with results of efficacy studies varying from 0% to 80%. The current WHO recommendation is that BCG should be given at birth to infants in high prevalence areas but avoided where the HIV disease is symptomatic.
- Poor hygiene, malnutrition and overcrowding in places such as prisons, orphanages, boarding schools and others facilitate the spread of tuberculosis. Hence the fight against tuberculosis should involve the improvement of socio-economic factors. In case of childhood TB, contact tracing of an adult should be made, as well as drug treatment.

**Prophylaxis**

- If a child is exposed to positive pulmonary TB, particularly under 5 years of age, provide prophylactic treatment with Isoniazid 5mg/Kg orally once daily for 6 months.

3.5 Meningitis

**Definition**
This is inflammation of the meningeal covering of the brain or spinal cord. Both brain and meninges can be involved. This inflammation could be caused by bacterial, viral or fungal infections, malignancies, chemical reaction, and intrathecal infections and also due to injury or trauma.

**Clinical Features**

Clinical presentation is the same despite different causative agents; but the commonest causative agents are bacteria and these include, Gram negative organisms i.e. *E. coli* in children, *H. influenzae* type b, group B *Streptococcus*, *Streptococcus pneumoniae*, *Neisseria meningitidis* and *Cryptococcus* in immune compromised patients. Factors such as age, head trauma, and compromised immunity may be helpful in predicting causative agents.

The relative incidence of meningitis for children remains high in the first 2 years of life. The incidence of meningitis is high during the 1st month of life with most infections being due to gram negative organisms i.e. *E. Coli* and group B *Streptococcus*.

Presentation of patients with meningitis varies according to age group.

**In Adults and older children**
- Headache
- Neck stiffness/ache
- Fever
- Vomiting
- Seizures
- Confusion
- Drowsiness
- Loss of consciousness
- Vascular collapse (Waterhouse – Friderichsen syndrome)

**In infants –**
- Fever
- Vomiting
- Irritability
- Convulsions
- High-pitched cry and
- Bulging of the anterior fontanel are commonly present
- Stiffness of the neck may be absent
- There may be enlarging of head size

**Signs of Meningitis**

Other signs elicited during physical examination that suggest meningitis include:
- Neck stiffness
- Positive Kernig’s sign
- Brudzinski’s sign
- Cranial nerves abnormality may occur (facial nerve palsy, oculomotor nerve palsy and occasional deafness).

**Complications**
These include:-
- seizures
- loss of consciousness
- hydrocephalus, thrombophlebitis
- cranial palsies
- hemiplegia
- death

Long term complications include mental retardation, hearing loss, sometimes blindness, epilepsy.

**Diagnosis**

This is confirmed by laboratory investigations. Perform a lumbar puncture for gram stain culture and sensitivity for glucose and protein. Cerebral spinal fluid may be cloudy, indicating bacterial meningitis.

### 3.5.1. Bacterial Meningitis

Initial therapy should be guided by the patient’s age, the clinical circumstances, and suspected pathogen and later by the CSF results. Antibiotics are the mainstay of therapy and should be instituted parenterally at the initial stage. Benzyl penicillin or ampicillin is given I.V.

- Benzyl penicillin: Adults, 4 mega units I.M or Ampicillin 100mg - 200mg/kg I.V. 6 hourly
  
  The Penicillin is usually given with Chloramphenicol injection at a dosage of 50 – 100mg/kg every 6 hours.

Intravenous antibiotic injection should be put in place for the first 72 hours or for as long as the patient is unconscious and then changed to the oral form. Treatment should generally be continued for at least 1 week after the fever subsides and the CSF returns towards normal.

The various antibiotics and combinations used in bacterial meningitis include:

In infants:
- Ampicillin, 100 – 150mg /kg I.V. (0 – 7 days old) 8 – 12 hourly
  
  150 – 200mg/kg I.V. (> 7 days old) 6 – 8 hourly plus

  Cefotaxime, 200mg/kg I.V. every 6 hours.

- Ampicillin, as above plus

  Gentamicin, 7.5mg/kg I.V. (0 – 7 days old) 8 hourly
  
  5mg/kg I.V. (> 7 days old) 12 hourly

In children > 1 month old Cefotaxime, as above or

- Ceftriaxone, 20 -50mg/kg daily as a single dose can be increased up to 80mg/kg as a single dose in severe infection or

- Ampicillin, 100 – 200mg/kg I.V. 6 hourly

  Chloramphenicol, 50 – 75mg/kg I.V 6 hourly

### 3.5.2. Fungal Meningitis

Fungal meningitis is usually caused by *Cryptococcal neoformans*. This is commonly seen in immunocompromised individuals such as people with HIV/AIDS or individuals with malignancies or on immunosuppressant drugs.
3.0 INFECTIONS

- The drug of choice is amphotericin B. It is given by slow intravenous injection starting with 1mg test dose, and gradually increasing doses up to 1mg/kg as tolerated. The dose is 0.25mg gradually increasing to 1mg/kg daily.

Caution

- Amphotericin B the daily dosage should not exceed 1mg/kg for adults or children.
- Flucytosine is added at 150mg/kg/day every 6 hours for 6 weeks.
- Fluconazole is also effective for cryptococcus infection.
- Dose: 400mg on the first day then followed by 200mg to 400mg once a day for 10 to 12 weeks.

After the CSF becomes negative, a maintenance oral dosage of 200mg/day can be given to prevent relapses (e.g. in AIDS patients). Children can be treated with 3 to 6mg/kg/day.

Tuberculous meningitis may complicate pulmonary tuberculosis especially in patients with immunodeficiency, also in children between 1 and 5 years and in the elderly. These should be treated with anti-tuberculosis therapy, which should be prolonged for an extra 3 months.

Supportive

✔ Fever, dehydration, and electrolyte disorders require correction. Care must be taken not to over hydrate patients with cerebral oedema. Convulsion and status epilepticus are treated appropriately. All patients with presumed bacterial meningitis (of unknown aetiology) should be isolated for the first 24 hours of therapy.

Viral meningitis may complicate viral infection in other parts of the body e.g. herpes meningitis. This should be treated with antiviral agents but at the following dose:

✔ Acyclovir Tablets 400mg -800mg
✔ Children 5 mg / kg 8 hrly

Prevention

✔ Avoid overcrowding
✔ Immunisation against Meningococcal meningitis.

3.6 Anthrax

Definition

This is a highly infectious disease of animals especially ruminants, transmitted to man by contact with the animal or animal products (carcasses) or faeces. The causative organism, *Bacillus anthracis* is a large gram-positive, facultatively anaerobic, encapsulated rod. The spores are resistant to destruction, remaining viable in soil and animal products for decades.

Human infection is usually through the skin, but has occurred following ingestion of contaminated meat. Inhalation of spores under adverse conditions (e.g. the presence of an acute respiratory infection) may result in pulmonary anthrax (woolsorters disease) which is often fatal.

Clinical Features
3.0 INFECTIONS

The occupational history of the patient is often important. The incubation period varies from 12 hours to 5 days.

The cutaneous form: 
begin as a red-brown papule that enlarges with considerable peripheral erythema, vesiculation, and induration. Central ulceration follows, with serosanguineous exudation and formation of a black eschar. Local lymphadenopathy may be seen; occasionally fever, malaise, nausea, vomiting, myalgia and headache.

Pulmonary Anthrax: 
This follows rapid multiplication of spores in the mediastinal structures. Serosanguineous transudation, pulmonary oedema, and pleural effusion occur. Initial symptoms are insidious and resemble influenza. Fever increases, within a few days and severe respiratory distress develops. Chest – x-ray may show diffuse patchy infiltration; the mediastinium is widened because of enlarged haemorrhagic lymph nodes.

Treatment
Treatment is mainly by antibiotic;

- Penicillin is the antibiotic of choice – procaine penicillin G 600,000 unit I.M twice daily for 7 days prevents systemic spread and induces gradual resolution of the pustule.

Or

- Tetracycline 2gm per day in 4 divided doses for seven days.

Or

- Erythromycin at 500mg 6 hourly is a good alternative in children or pregnancy for seven days.

For Pulmonary anthrax: Early and continuous i.v. therapy of benzyl penicillin 20 mega units per day may be life saving. If treatment is delayed (usually because the diagnosis is missed), death is likely to occur.

Prevention

✓ A vaccine is available for those at high risk (veterinarians, laboratory technicians, butchers and employees of textile mills processing goat hair); advocating use of personal protective equipment, gloves, overalls, boots should be encouraged.

3.7 Sexually Transmitted Infections (STI)

Sexually Transmitted Infections (STIs) are among the most common causes of all Out Patient Department (OPD) attendances in Zambia.

There are three approaches to management of STIs:

- Aetiological; where one collects specimens for laboratory identification of causative agent prior to treatment
- Clinical; where one depends on past experience and own knowledge, and
- Syndromic; where one identifies on the basis of symptoms and signs and treats to cover the majority of organisms that may cause those symptoms.
3.0 INFECTIONS

The syndromic approach to managing Sexually Transmitted Infections has been adopted by the Ministry of Health for the management of STIs in public health institutions in Zambia. Syndromic case management is based on identifying consistent groups of symptoms and easily recognized signs and providing treatment which will deal with the majority of organisms responsible for producing each syndrome. Using syndromic approach, a diagnosis is made by taking a client's history and examining them to verify their STI problem. There are 8 common syndromes namely:

- urethral discharge
- vaginal discharge
- genital ulcer
- genital growth,
- lower abdominal pain,
- inguinal bubo
- scrotal swelling and
- neonatal conjunctivitis

3.7.1 Urethral Discharge

This is a condition in which there is dysuria coupled with often copious, mucoid discharge from the urethral meatus. Two common conditions presenting with urethral discharge are

a) Gonococcal urethritis
b) Non–gonococcal urethritis

3.7.2 Gonococcal urethritis

Definition

This is an acute inflammatory condition of the columnar epithelial lining of the urethra. It is caused by a gram-negative intracellular diplococcus, *Neisseria gonorrhoeae*.

Clinical Features

The incubation period is 3 to 7 days and the patient will present with dysuria (difficulty in micturition), followed by urethral discharge of copious, mucoid fluid, which is sometimes pussy. Frequency and urgency may develop as the disease spreads to the posterior urethra. Examination of the discharge shows a purulent, yellowish green urethral discharge. The lips of the meatus may be red and swollen.

Complications

These include:

- Acute epididymo-orchitis: This is an important complication, which is usually unilateral swelling and tenderness of the testis and epididymis. Bilateral epididymo-orchitis may result in sterility
- Urethral strictures: This is a late complication occurring in cases which are treated inadequately or not at all. This could occur 10 to 25 years after an initial infection or in cases of recurrent infections

Disseminated Gonococcal Infection: This is an arthritis-dermatitis syndrome in which the patient presents with a mild febrile illness, malaise, migratory polyarthralgia or polyarthritis and a few pustular skin lesions.
3.7.3 Non-Gonococcal Urethritis

**Definition**
The term non-gonococcal urethritis is used to describe other causes of urethritis apart from *Neisseria gonorrhoeae*. The organisms commonly responsible are *Chlamydia trachomatis* and *Ureaplasma urealyticum* among more than 20 known organisms.

**Clinical Features**
Symptoms usually occur 7 to 28 days after intercourse; usually mild dysuria and discomfort in the urethra and a clear to purulent mucoid discharge. Although the discharge may be slight and the symptoms mild, they are frequently more marked in the morning when the lips of the meatus are often stuck together with dried secretions. On examination the meatus may be red, with evidence of dried secretion on underwear. Occasionaly the onset is more acute, with dysuria, frequency and a copious purulent discharge.

**Diagnosis**
- This is based on bacteriological examination of the discharge to exclude gonorrhoea.
- Complications
- These include epididymitis and urethral stricture. Perihepatitis could also occur.

**Treatment**

**Table 3.1 Recommended Syndromic Treatment Urethral Discharge**

<table>
<thead>
<tr>
<th>Syndrome</th>
<th>Causal Pathogens</th>
<th>Recommended regime</th>
<th>Recommended regime for children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urethral Discharge</td>
<td><em>Neisseria gonorrhoeae</em></td>
<td>Ciprofloxacin 500mg stat Plus</td>
<td>Spectinomycin 40mg/kg IM stat (maximum 2g stat)</td>
</tr>
<tr>
<td></td>
<td><em>Chlamydia</em></td>
<td>Doxycycline 100 bd X 7/7</td>
<td>&gt;8years old Erythromycin 50mg/kg/day in 4 doses for 14 days</td>
</tr>
</tbody>
</table>

Persistent urethral discharge one week after treatment: consider *Trichomonas vaginalis*, for which the treatment is Metronidazole 2g PO stat for adults; Metronidazole 5mg/kg body weight for children.

**Prevention**
- Avoiding multiple sexual partners and unprotected casual sexual intercourse. Condom use is advised

3.8 Gonorrhoea in Neonates
3.0 INFECTIONS

3.8.1 Ophthalmia Neonatorum

Definition

Ophthalmia Neonatorum is inflammation of the conjunctiva in the neonatal period (day 1 to day 28) due to infection with \textit{Neisseria gonorrhoeae}. The gonococcus produces a toxin which dissolves the cornea and can lead to blindness. The infection is acquired during birth when passing through the birth canal. The incubation period is 3 to 5 days.

Non-gonococcal conjunctivitis is due to \textit{Chlamydia trachomatis}, \textit{Staphylococcus aureus} and \textit{Streptococcus pneumoniae}.

Clinical features

It commonly presents with purulent, copious eye discharge usually in both eyes. Itching and redness are also present. The neonate may also present with septicaemia with fever, rash and joint swelling.

Diagnosis

This is confirmed by taking an eye swab for culturing for gonorrhoea pathogen.

Treatment

\textbf{Note:} The use of antibiotic eye ointments in gonococcal conjunctivitis is of no documented benefit. Systemic treatment is recommended for all symptomatic cases.

\textbf{NOTE:} The baby's mother and partner(s) should receive syndromic treatment for Gonorrhoea and Chlamydia. Breastfeeding mothers should be given Gentamicin and not Ciprofloxacin for gonorrhoea but for Chlamydia give Erythromycin.

\textbf{Table 3.2 Recommended Treatment for Neonatal Conjunctivitis}

<table>
<thead>
<tr>
<th>Neonatal Conjunctivitis</th>
<th>Gonorrhoea</th>
<th>Chlamydia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plus Spectinomycin 50mg/kg IM stat</td>
<td>Plus Erythromycin 50mg/kg PO QID X 7 days.</td>
<td></td>
</tr>
<tr>
<td>Normal Saline lavage of the affected eye</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Prevention

Women with pelvic inflammatory disease or urinary tract infection in pregnancy should be treated promptly before delivery. Every child's eyes should be swabbed with cotton wool soaked with povidone-iodine or normal saline immediately after birth. Apply any of the following

- Povidone-iodine
- Silver nitrate 1% aqueous solution stat
- Erythromycin 0.5% ophthalmic ointment stat
- Tetracycline ophthalmic ointment 1% stat
- Normal Saline

3.8.2 Vaginal Discharge and Lower Abdominal Pain in Women
There are various gynaecological conditions that could present with vaginal discharge and lower abdominal pain. These include:

a) Pelvic Inflammatory Disease (PID)
b) Vulvovaginitis
c) Urinary Tract Infection (UTI)

### 3.8.3 Pelvic Inflammatory Disease

**Definition**

Pelvic inflammatory disease is a condition involving the pelvic organs i.e. cervix (cervicitis), uterus (endometritis), salpinx (salpingitis) and ovaries (oophoritis). Organisms that may be responsible for this disease are - *Neisseria gonorrhoeae*, and *Chlamydia trachomatis*. Endogenous aerobic bacteria such as *E. coli*, *Klebsiella*, *Proteus* and *Streptococcus* species and endogenous anaerobes such as *Bacteroides*, *Peptostreptococcus* and *Peptococcus*; *Mycoplasma hominis* and *Actinomycetes israelii* affect predominantly the vagina presenting as vaginal discharge but ascend through the cervical tract to cause Pelvic Inflammatory Disease (PID).

PID is a disease of the young woman.

Some of the predisposing factors are:

- Sexual intercourse
- Induced abortion
- Dilatation and curettage or endometrial biopsy
- Intrauterine device (IUD) insertion or use
- Hysterosalpingography
- Laparoscopy
- Radium insertion into the endometrial cavity

**Clinical Features**

**Symptoms**

- Lower abdominal pain
- Copious purulent vaginal discharge may be present or absent
- High-grade fever is an indicator for admission
- Nausea
- Vomiting
- Painful sexual intercourse (dyspareunia)

**Signs**

- Occasional diarrhoea
- Lower abdominal tenderness with rebound is an indicator for admission
- Adnexia tenderness
- Cervical excitation

**Complications**

- Peritonitis
3.0 INFECTIONS

- Tubo-ovarian abscess
- Hydrosalpinx
- Ectopic Pregnancy
- Chronic Pelvic Pain
- Infertility
- Mortality

Indications for immediate referral to gynaecology or surgery
- missed/overdue period
- recent delivery or abortion
- abdominal guarding or rebound tenderness
- abnormal vaginal bleeding
- abdominal mass
- temperature above 38 degrees Celsius

Treatment

Parenteral Regimen A
- Cefotetan 2 g IV every 12 hours
- Cefoxitin 2 g IV every 6 hours
  PLUS
  Doxycycline 100 mg orally or IV every 12 hours

Parenteral therapy may be discontinued 24 hours after a patient improves clinically, and oral therapy with doxycycline (100 mg twice a day) should continue to complete 14 days of therapy. When tubo-ovarian abscess is present, many health-care providers use clindamycin or metronidazole with doxycycline for continued therapy, rather than doxycycline alone, because it provides more effective anaerobic coverage.

Oral Treatment
- Ceftriaxone 250 mg IM in a single dose or Ciprofloxacin 500mg start
  PLUS
- Doxycycline 100 mg orally twice a day for 14 days
  WITH or WITHOUT
  Metronidazole 500 mg orally twice a day for 14 days

3.8.4 Vulvovaginitis

Definition
Vulvovaginitis is an inflammatory condition affecting the vulva and the vagina. The causes include Candida albicans, Chlamydia trachomatis, Trichomonas vaginalis, and Bacterial vaginosis.

Clinical Features

Symptoms
- Vaginal itching
- Burning sensation

Signs
3.0 INFECTIONS

- A watery, thick or mucoid, foul-smelling and yellowish or brown vaginal discharge is sometimes present.

**Diagnosis**

Insert a speculum into the vagina and using a swab take two specimens one from the cervical area for gram stain and culture on Gonococcal media for gonorrhoea, the second for wet mount and microscopy for Candida, Trichomonas.

**Complications**

- Secondary bacterial infection
- Skin excoriation
- Dermatitis

**Treatment**

Table 3.3 Recommended Treatment of Vaginal Discharge and Lower abdominal Pain

<table>
<thead>
<tr>
<th>Vaginal Discharge and lower Abdominal Pain</th>
<th>Neisseria gonorrhoeae</th>
<th>Adults: Ciprofloxacin 500mg PO stat</th>
<th>Children: Spectinomycin 40mg/kg IM stat (maximum 2g stat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlamydia</td>
<td></td>
<td>Doxycycline 100 bd PO X 7/7</td>
<td>&gt;8 years old Erythromycin 50mg/kg/day in 4 doses for 14 days</td>
</tr>
<tr>
<td>Trichomoniasis</td>
<td></td>
<td>Plus</td>
<td>Metronidazole 5mg/kg body weight</td>
</tr>
<tr>
<td>Bacterial Vaginosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal Candidiasis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.8.5 Urinary Tract Infection (refer to STI)

3.8.6 Genital Ulceration

**Definition**

Genital Ulceration is the loss of continuity in the epithelial surface covering the genital area. Ulcerative lesions of the genitalia are common outpatient problems. Men are more commonly affected than women.

There are many causes including:
3.0 INFECTIONS

Chancroid
- Granuloma inguinale (Donovanosis)
- Herpes genitalis
- Lymphogranuloma venereum
- Syphilis

3.8.7 Syphilis

Definition
This is an infection caused by spirochaetes called Treponema pallidum, a corkscrew shaped organism with an incubation period of 9 to 90 days

Clinical Features

Primary syphilis presents with a painless papule at the site of inoculation which then ulcerates. The ulcer called chancre, is often solitary with a firm, indurated base and is therefore often referred to as hard sore. Oral and vulva lesions may be subtle. In men the chancre could be found on the glans penis, shaft, anus and rectum whereas in women it is found on the vulva, cervix and perineum. Chancres may also be found on the skin or mucous membrane of the anogenital area as well as the lips, tongue, buccal mucosa, tonsils or fingers. Rarely chancres can be found on other parts of the body, often producing such minimal symptoms that they are ignored. There may be bilateral inguinal lymphadenopathy. Without treatment the ulcer heals in 3-6 weeks.

Secondary syphilis presents 6 to 12 weeks after infection with cutaneous rashes which may be generalized and also affect the soles and palms. The rash can mimic any skin disease ranging from circular plaques like psoriasis, or light copper coloured scaly macules like pityriasis rosea. Patchy hair loss is a common presentation. In the mouth are found snail track ulcers which are slimy superficial erosions. Condylomata lata are flat warty papules and plaques found on the genitalia and perineal skin. Generalised enlarged lymph nodes may occur. Other areas may be involved as well such as eyes (uveitis), bones (periostitis), joints, meninges, kidneys (glomerulitis), liver and spleen.

Tertiary syphilis presents 10 to 25 years after initial infection. The patient may present with cardiovascular complications. These include dilated aneurysm of the ascending aorta, narrowing of the coronary artery or aortic valvular insufficiency. The central nervous system complications include dementia and psychosis and meningovascular neurosyphilis.

Congenital syphilis presents with clinical features like those of secondary syphilis in adults. Mild constitutional symptoms of malaise, headache, anorexia, nausea, bone pains and fatigability are present as well as fever, anaemia, jaundice, albuminuria and neck stiffness.

Diagnosis
Collect blood specimen and allow to clot, send to the laboratory for identification of antibodies to Treponema pallidum using screening methods like VDRL (Venereal Disease Research Laboratory), RPR (Rapid Plasma Reagin).

Treatment
Adult:
- Benzathine Penicillin 2.4M.U. IM weekly for a total 3 doses
- Alternatively give Procaine Penicillin 1.2M.U. IM daily for 10 days
3.0 INFECTIONS

Or

• Erythromycin 500mg 4 times a day for 14 days in penicillin allergy and children (50mg/Kg body weight)

Or

• In non-pregnant adults Doxycycline 100mg twice daily for 14 days

Child:

• Benzathine Penicillin 50 000units/kg IM weekly for a total of 3 doses

Treatment of Genital Ulcers

Most patients with primary or secondary syphilis infection have Jarisch - Herxheimer reaction within 6 hours to 12 hours of initial treatment. The reaction is manifested by generalized malaise, fever, headache, sweating rigors and a temporary exacerbation of syphilitic lesions. This usually subsides within 24 hours and poses no danger other than the anxiety it produces.

3.8.8 Chancroid

Definition

This is an acute, localized, contagious disease characterised by painful genital ulcers and suppurative inguinal lymph nodes. The causative organism is Haemophilus ducreyi a short, slender, gram-negative bacillus with rounded ends and usually found in chains or groups.

Clinical Features

The incubation period is 3 to 7 days. Small, painful papules rapidly break down to become shallow ulcers with ragged undermined edges. The ulcers, which vary in size and often coalescing, are shallow, non-indurated, painful and surrounded by a reddish border. The inguinal lymph nodes become enlarged, tender and matted, forming a fluctuant abscess (Bubo) in the groin. The skin over the abscess becomes red and shiny and may break down to form a sinus. Chancroid may coexist with other causes of genital ulcer.

Complications

- Phimosis
- Urethral stricture
- Urethral fistula
- Severe tissue destruction leading to phagedenic ulcer which may grow rapidly and cause auto amputation of the penis. Biopsy the ulcer to distinguish from squamous cell carcinoma

Treatment

• Ciprofloxacin 500mg twice daily orally for three days

Or

• Erythromycin 500mg orally 6 hourly for 7 days

3.8.9 Lymphogranuloma Venereum
Definition

This is characterized by transitory primary ulcerative lesion followed by suppurative lymphadenitis. It is caused by serotypes of *Chlamydia trachomatis* L1, L2, L3 which are distinct from those causing trachoma, urethritis, cervicitis and inclusion conjunctivitis.

Clinical Features

The incubation period is 3 to 12 days. A small, transient, non-indurated vesicular lesion is formed that rapidly ulcerates, heals quickly and may pass unnoticed. Usually the first symptoms are unilateral, tender enlarged inguinal lymph nodes, enlarging above and below the inguinal ligament giving rise to the characteristic groove sign. They progress to form a large, tender fluctuant mass that adheres to the deep tissues and inflames the overlying skin. Multiple sinuses may develop and discharge purulent or bloodstained material. Healing eventually occurs with scar formation. The patient may have constitutional symptoms of fever, malaise, joint pain, anorexia, and vomiting. Backache is common in women in whom the initial lesion may be on the cervix or upper vagina resulting in the enlargement and suppuration of perirectal and pelvic lymph nodes. This results in formation of rectovesical and rectovaginal fistulas. Aspirate suppurating glands with a wide bore needle through intact skin. Avoid incision and drainage through fluctuant area which results in chronic sinus formation.

Treatment

Drugs

- Doxycycline 100mg orally twice daily for 14 days or
  - Alternative and/or in pregnancy
  - Erythromycin 500mg orally 6 hourly for 14 days.

All sexual partners should be examined. The patient should be kept under observation for 6 months after apparently successful treatment.

Table 3.4 Recommended treatment of Inguinal Bubo Disease

<table>
<thead>
<tr>
<th>Inguinal Bubo</th>
<th>Chancroid</th>
<th>Lymphogranuloma Venereum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ciprofloxacin 500mg PO BDX3 days</td>
<td>Doxycycline 100 BD X 14days</td>
</tr>
</tbody>
</table>

3.8.10 Herpes Genitalis

Definition

Herpes Genitalis is an infection of the genital or anogenital area by herpes simplex virus (herpes virus hominis type 2). Type 1 (HSV-1) is the most common cause of genital ulceration in developed countries. It is moderately contagious and usually spreads by sexual contact. Lesions usually develop 4 to 7 days after sexual contact. The condition tends to recur because the virus establishes a latent infection of the sacral sensory nerve from which it reactivates and re-infacts the skin.
Clinical Features

The primary lesions are more painful, prolonged and widespread than those of recurrent infections. Itching and soreness usually precede a small patch of erythema on the skin or mucous membrane. A small group of painful vesicles develops, they erode and form several superficial, circular ulcers with a red areola, which coalesce. The ulcers become crusted after a few days and generally heal with scarring in about 10 days.

The inguinal lymph nodes are usually slightly enlarged. Tender lesions in men may occur on the prepuce, glans penis, and penile shaft whereas in women may occur on the labia, clitoris, perineum, vagina and cervix.

In addition to pain, in primary infection, the patient may experience generalized malaise, fever, difficulty in micturition or difficulties in walking.

Diagnosis

This is mainly clinical but can be confirmed by tissue culture. Scrape the roof of the blister and make a smear. Stain with Papanicolou stain. Giant multinucleated cells are diagnostic.

Complications

- Asceptic meningitis
- Transverse myelitis
- Autonomic nervous dysfunction involving the sacral region leading to urinary retention

Drugs

- Acyclovir 200mg orally 5 times daily for 7 days for initial infection
- Acyclovir 200mg orally 5 times daily for 5 days for recurrent infection

Table 3.5 Recommended Treatment of Genital Ulcer Disease

<table>
<thead>
<tr>
<th>Genital Ulcer Disease</th>
<th>Syphilis</th>
<th>Chancroid</th>
<th>Herpes Genitalis</th>
<th>Lympho granuloma Venereum</th>
<th>Benzathine Penicillin 2.4M.U IM weekly X 3 doses</th>
<th>Ciprofloxacin 500mg PO BDX3 days</th>
<th>Acyclovir 400mg TDS X 7 days</th>
<th>Doxycycline 100 BD X 14days</th>
<th>Benzathine Penicillin 500units/kg IM weekly X 3 doses</th>
<th>Acyclovir 20mg/kg 8 hourly for CNS and disseminated disease; extend therapy to 21days; for disease limited to skin and mucous membranes for 14 days</th>
</tr>
</thead>
</table>
3.8.11 Granuloma Inguinale (Donovanosis)

Rare in Zambia

Definition
This is a chronic granulomatous condition usually involving the genitalia and spreads by sexual contact. It is common in the tropical and subtropical climate and is caused by gram-negative, *Calymmatobacterium granulomatis* an intracellular bacillus found in mononuclear cells.

Clinical Features
The initial lesion is a painless, beefy-red nodule. Multiple nodules appear and coalesce to form a large elevated, velvety, granulomatous mass. The incubation period is 1 to 12 weeks. The sites of infection in men are penis, scrotum, groin and thighs, whereas in women the vulva, vagina and perineum are the common sites, with the face being affected in both sexes. In homosexual men the anus and buttocks are affected. There is no lymphadenopathy. The infection may involve other parts of the body. Progress is slow but the eventual lesion may cover the whole external genitalia, the deep seated ulcers causing lymphatic obstruction and elephantiasis of the genitalia. Healing is also slow and often leads to scar tissue formation. Secondary infection is common and can cause gross tissue destruction.

Complications
- Anaemia
- Weight loss

Diagnosis
Do a punch biopsy of the lesion and crush between two glass slides. Stain with Wright's or Giemsa Stain to show gram negative rods within macrophages.
Secondly, send the biopsy for histopathology to rule out squamous cell carcinoma.
Thirdly, diagnosis can be based on clinical findings that are often characteristic i.e. bright, beefy- red granulomatous lesions.

Treatment

Drugs
- Erythromycin 500mg orally 6 hourly for 14 to 21 days

Prevention:
- Condom use is advisable

3.8.12 Genital Growth (Condylomata Acuminata)

Definition
This is a fleshy growth found around the anogenital region caused by *Human papilloma virus* infection HPV6 and 11 but HPV 16 and 18 are associated with cancer of the cervix.
Clinical Features
Lesions can be subclinical (not visible to the naked eye) or overt anogenital warts. Visual inspection of overt disease (fleshy growth of the lower genital tract) detects obvious lesions, which are often multifocal in distribution. However, the appearance and size depends on their location, the trauma to which they are subjected and the degree of irritation.

| Table 3.6 Recommended Treatment for Genital Growths |
|---------------------------------|---------------------------------|---------------------------------|
| Genital growths                 | Genital warts                  | Podophylline 25% topically by physician weekly till resolved |
|                                 | Condylomata Acuminata          | Benzathine Penicillin 2.4 MU IM weekly for 3 doses |
|                                 | Condylomata lata               | Cauterisation                     |
|                                 |                                 | (i) 5- fluorouracil cream         |
|                                 |                                 | (ii) Trichloroacetic acid         |
|                                 |                                 | (iii) Cryosurgery                 |
|                                 |                                 | (iv) Electro cautery               |
|                                 |                                 | (v) Laser vapourisation           |
|                                 |                                 | (vi) Surgical removal             |
|                                 |                                 | Benzathine Penicillin 50 000iu/kg IM weekly for3 doses |

For Cervical Warts DO NOT CAUTERISE

Diagnosis
This is based on direct inspection. If uncertain, confirmation can be done by biopsy. May predispose to cancer of the cervix.

Treatment
Podophyllin paint compound (Podophyllin resin 15% in compound benzoin tincture) - applied every week until lesions disappear. The application should not be left on for more than 4 hours. Where possible, application should be done in the clinic.

Or

• Silver nitrate crystals 5 % daily until lesions disappear

Recurrence is common.

Prevention
✓ Avoid multiple sexual partners.
✓ Condom use is advised

Special Considerations pertaining to syndromic management

Pregnant women
• Vaginal discharge syndrome: for Neisseria gonorrhoeae give Spectinomycin 2g IM stat; for Chlamydia give Erythromycin 500mg QID for 7days
• Genital Ulcer Disease: for Chancroid give Erythromycin 500mg QID X 7 days; for LGV give Erythromycin 500mg QID for 7 days; for Herpes Genitalis give Acyclovir as in the non pregnant.
the event of an outbreak during labour, consult a gynaecologist to consider an emergency Caesarian Section; for Donovanosis give Erythromycin 500mg QID for 3 weeks until all lesions have completely healed

- Genital Growths: Genital warts, **LEAVE ALONE**, wait until delivery, then decide on surgical management. During labour, if the pelvic outlet is obstructed, or vaginal delivery would result in excessive bleeding, Caesarian Section is indicated. For cervical warts, refer to gynaecologist for pap smear to rule out CIN, because cauterization can lead to vaginal fistulas or perforation. For anal warts, refer to surgeon because cauterization could lead to fistula formation. For urethral-meatal warts, refer to surgeon

**HIV Infected**
- Genital Ulcer Disease: in Chancroid, since the ulcers heal slower, it is recommended that the courses of treatment take longer; give Erythromycin 500mg QID for 7 days

**Children**
- For children treated with erythromycin, follow up for symptoms of pyloric stenosis which present with vomiting and abdominal discomfort/distention

### 3.8.13 Hepatitis

**Definition:**
Acute inflammation of the liver caused by primarily human viruses from A to E; B and C

**Mode of transmission**
- Cutaneous
- Mucous membrane exposed to contaminated blood
- Unprotected sex by infected partner
- Through contaminated needle by injection
- Perinatal transmission

The clinical features of acute hepatitis are common to all of them and these are:
- Malaise
- Nausea
- Abdominal pain
- Anorexia
- Jaundice
- Dark urine
- Fever
- Rash
- Athralgia

<table>
<thead>
<tr>
<th></th>
<th>Hepatitis B</th>
<th>Hepatitis C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incubation</td>
<td>60 – 180 days</td>
<td>15 – 180 days</td>
</tr>
</tbody>
</table>
3.0 INFECTIONS

<table>
<thead>
<tr>
<th>Transmission</th>
<th>Blood borne</th>
<th>Blood borne</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sexual</td>
<td>Sexual</td>
</tr>
<tr>
<td>Progression to chronicity</td>
<td>Occasionally varies by age</td>
<td>Usually</td>
</tr>
<tr>
<td>Etiologic agent</td>
<td>Hepatitis B Virus</td>
<td>Hepatitis C Virus</td>
</tr>
<tr>
<td>Comments</td>
<td>Vaccine available</td>
<td>Not available</td>
</tr>
<tr>
<td>Serologic diagnosis</td>
<td>HBsA, IgM anti-HBc</td>
<td>HCV RNA; anti HCV</td>
</tr>
</tbody>
</table>

**Treatment**
- Counsel patient for HIV AIDS and if negative give Lamivudine 150mg twice a day.
- If positive refer to ART Clinic

**Prevention**
- Hepatitis B vaccine is available for children, but no vaccine for Hepatitis C
- Safe sex
- Avoid use of contaminated needles

**3.8.14 Acute Epididymoorchitis**

This is an inflammation of the epididymis and the testes. It is usually a complication of urethritis which is not treated at all or which was improperly treated.

**Clinical Features**

Presentation is mucoid, pussy urethral discharge, painful scrotal swelling usually unilateral but could be bilateral, the pain is gradual and dull. Milking of the urethra produces pussy discharge. Diagnosis is confirmed by culture of urethral discharge. Complications include atrophy of the testes, infertility.

**Supportive**
- Bed rest
- Scrotal support or elevation
- Scrotal ice packs,
- Analgesics

The causative organism in men less than 35 years of age is usually *Neisseria gonorrhoeae*, or *Chlamydia trachomatis*.

**Treatment**

**Drugs**
The best antibiotics are those that are sensitive to the above organisms.

- Ciprofloxacin 500mg stat oral + Doxycycline 100mgs OD for 7 days
  Or
- Ceftriaxone 1gm (I.M.) once + Doxycycline 100mg 12 hourly for 7 days
- Erythromycin may be substituted for Tetracycline or doxycycline at 500mg every 6 hours for 7 days
- In men older than 35 years of age, cause is mostly due to coliform gram –negative bacilli. Gentamicin 80mg 8 hourly for 7 days or a 3rd generation cephalosporin as above may be used until sensitivity is determined.
3.0 INFECTIONS

Prevention

✓ Avoiding multiple sexual partners
✓ Usage of condoms

3.9 Acute Testicular Torsion

This is the twisting of the testis on its cord, but could also be defined as twisting of the testis along its vertical axis resulting in compromised vascular supply to the testis and the adjoining spermatic cord. It may be spontaneous or following strenuous activity, it may also result from anomalies in development of the tunica vaginalis and the spermatic cord.

Clinical Features

The immediate symptoms of torsion include:

Severe local pain
- Nausea
- Vomiting
- Scrotal swelling (oedema) + darkish discoloration
- Fever

Torsion must be differentiated from inflammatory conditions within the scrotum, trauma and testicular tumour.

Signs

- Elevation and rotation of testis

Treatment

- Immediate surgical intervention is advised if torsion is suspected, surgical exploration within a few hours offers the only hope of testicular salvage. Fixation of the contralateral testis is performed to prevent torsion on that side

3.10 Acute Strangulated Hernia

This a condition in which the incarcerated bowel that protrude through the inguinal canal cannot be reduced and the vascular supply to that part of the bowel is cut off i.e. necrosis of herniated bowel.

Clinical Features

The patient presents with an acute painful inguinal swelling usually extending into the scrotum. There is usually a previous history of a reducible inguinal hernia with strangulation now occurring as a complication. Symptoms include:

Painful inguinoscrotal area
- Fever
- Vomiting
- Irritability and restlessness
3.0 INFECTIONS

- Hernia must be differentiated from hydrocele; in the former, the examiner cannot palpate the cord above the mass, whereas with hydrocele normal cord structures are usually palpable above the mass.

- In strangulated hernia there is a previous history of a swelling. A hydrocele is often cystic and can be trans-illuminated using a torch.

Treatment

The basic line of management is immediate surgical intervention and relieving the obstruction. It is mandatory to inspect the bowel if emergency resection is done and also anastomosis of the viable segments.

3.11 Testicular Tumours

These are malignant growths arising from the testis. Testicular tumours accounts for the majority of solid malignancies in males older than 30 years of age.

Pathology

Most malignant testicular tumours arise from the primordial germ cell and are classified as seminoma, teratoma, embryonal carcinoma, teratocarcinoma and chorio-carcinoma in order of increasing malignancy.

Clinical Features

The usual presenting sign is a scrotal mass, increasingly progressive in size and sometimes associated with pain. Many patients relate the mass to minor trauma indicating the time when the mass, was first discovered. Haemorrhage into a rapidly expanding tumour may produce exquisite local pain and tenderness. A firm mass arising from the testis is cause for immediate clinical suspicion of testicular tumour.

Diagnosis

- Physical examination
- Ultrasound may localise the lesion to the testis
- Exploration, exposing and clamping the cord through an inguinal incision before mobilizing the tumour
- Chest X-ray and IVU is done to rule out metastasis
- Prognosis depends on the histological finding and the extent of the tumour

Treatment

Inguinal orchidectomy must be performed and transabdominal retroperitonel lymph node dissection is usually recommended for terato and embryonal carcinoma and adult teratoma.

Irradiation may be effective in seminoma, using 30 to 50ay (3000 to 5000 rads) to abdominal and mediastinal lymphatics as well as left supraclavicular areas, depending on the staging.

3.12 Hydrocele

Definition
3.0 INFECTIONS

This is a condition characterised by accumulation of fluid in tunica vaginalis presenting as a cystic scrotal mass. The fluid is accumulated as a result of over production or reduced absorption of lymphatics or venous obstruction in the cord or retroperitoneal space.

Clinical Features

Usually patients present with an intrinsic scrotal mass, often cystic and painless but occasionally may be painful when severely distended and unilateral. It is transilluminable. In hydrocele the cord can be palpated above the cystic mass.

Treatment

This is surgical, hydrocelectomy – opening the sac and draining the fluid, then everting the testis, although aspiration with needle may produce temporary relief.

3.13 Acute Mumps Orchitis

This is an inflammatory condition of the testis caused by the mumps virus. It is paramyxovirus. About 20% of post-pubertal male patients have testicular inflammation, usually unilateral.

Clinical Features

There is testicular swelling associated with inflammation in other organs – parotid gland, pancreas, meninges, etc. Testicular atrophy may ensue.

Treatment

This is symptomatic – analgesics may be used for pain and generalised malaise.

3.14 Varicocele

This is a collection of large veins, usually occurring in the left scrotum and feeling like a “bag of worms”. It is present in the upright position and should empty in the supine position.

Clinical Features

May produce pain or feeling of scrotal fullness.

Treatment

Surgical correction (Varicocoelectomy)

3.15 Urinary Tract Infection

Definition

This is an infection, often bacterial, of the ureters, bladder and urethra. Urinary tract infection occurs much more frequently in women than in men, especially in pregnancy.

Most urinary tract infections are commonly caused by gram-negative bacteria, including E.coli, Klebsiella species, and Proteus species. Less commonly caused by gram positive cocci such as Staphylococcus species (especially non-coagulase Staphylococcus, and Enterococci).
Clinical Features
In general, symptomatic urinary tract infections are characterised by irritative symptoms of the urinary bladder i.e.
- Frequency
- Urgency and
- Dysuria (pain on passing urine)

Urinary tract infections may also be asymptomatic and diagnosis is coincidental on testing the urine and possibly culture of the urine.

Predisposing factors to urinary tract infections include catheterisation, colposcopy, cystoscopy and following intravenous urogram (I.V.U).

Complications
These include:
- Chronic pyelonephritis
- Prostatitis in men
- Acute epididymo-orchitis

Diagnosis
This is made by history, physical examination and laboratory investigations. Mid stream specimen of urine (MSSU) is collected for microscopy, culture and sensitivity. The diagnosis is based on colon count of bacteria of more than 10/5/ml on culture.

Treatment
This should be instituted based on the common cause of UTI. Treatment should be reviewed as soon as the sensitivity results are ready.

Drugs
Based on sensitivity.
- Nitrofurantoin  50 – 100mg 12 hourly for 5 to 7 days
 OR
- Nalidixic Acid  250mg 8 hourly for 5 days
If there are complications these drugs are used for at least 14 days or more.
Refer repeated infections to higher level.

Supportive
Increase water intake, prophylactic antibiotic therapy for those who have multiple repeated urinary tract infections or those who have congenital abnormality of the urinary tract predisposing them to multiple repeated infections before surgical correction of such abnormality.

3.16 Acute Pyelonephritis

Definition
3.0 INFECTIONS

This is bacterial infection of the kidney and renal pelvis, often bilateral. *Eschericia coli* are the commonest bacteria isolated; others include *Klebsiella* sp, *Proteus mirabilis*, *Enterobacter*, and also *Enterococcus* and *Staphylococcus aureus*.

**Clinical Features**

Pyelonephritis is especially common in girls or in pregnant women and after bladder catheterization or instrumentation. It is not common in men who are free from urinary tract abnormalities. Typically, the onset is rapid and characterised by chills, fever, loin pains, nausea, and vomiting. Symptoms of lower urinary tract infection, including frequency and dysuria occur concomitantly in a third of patients. Physical examination reveals some abdominal rigidity especially in the loin of the infected side. In children, symptoms often are slight and less characteristic.

**Diagnosis**

Diagnosis is made by urinalysis, microscopy, culture and sensitivity. On urinalysis, the pH may be alkaline because of urea-splitting organism, proteinuria is minimal. White blood cells (WBC) greater than 10/ml are usually found in fresh uncentrifuged urine; and haematuria is common. Culture usually shows greater than 10⁴ colony forming units (CFU)/ML. On microscopy presence of microscopic casts, WBC greater than 10/ml are usually found per High Power Field (HPF).

**Complications**

These include chronic pyelonephritis, chronic renal failure.

**Treatment**

Initial treatment can be oral for those less ill, but will be parenteral for most patients. After 24 to 48 hours without fever, most patients receiving I.V. therapy can be switched to oral regimes.

In uncomplicated cases a single agent may be used:

- Amoxycillin, tablets 250mg – 500mg 8 hourly Adult
- Ciprofloxacian, tablet 500mg – 1gm 12 hourly Adult for 14 days.
- Cefotaxime, 1g 12 hourly for 14 days
- Ceftriaxone, I.V., 1gm once daily for 14 days

Most treatments are used for 2 weeks, but up to 6 weeks may be required to prevent relapse.

3.17 The Plague

**Definition**

This is an acute, severe infection appearing in bubonic, septicemic or pneumatic form, but pharyngeal and meningeal could also be found. This is caused by a bacterium called *Yersinia pestis*; a short bacillus that often shows bipolar staining (especially with Giemsa stain). Plague often occurs primarily in rodents, e.g. rats. Plague is transmitted from rodent to man by the bite of an infected flea vector. Man to man infection occurs
through inhalation of droplets in pneumonic plague. Septicaemia and meningeal plague are due to haematological spread.

Clinical Features

Symptoms
- Headache
- Severe malaise
- Vomiting
- Chills
- Muscle pain
- Cough
- Abdominal pain
- Chest pains

3.17.1 Bubonic Plague

Bubonic plague is the commonest form of the bacterial disease plague, caused by the bacterium Yersinia pestis. Bubonic plague is often used synonymously for plague, but it does in fact refer specifically to an infection that enters through the skin and travels through the lymphatics, as is often seen in flea-borne infections. Patients This is the commonest form. The incubation period varies from a few hours to 12 days, but is usually 2 to 5 days. Bubonic Plague kills about 70% of the patients.

Clinical Features

Symptoms

Onset is abrupt often associated with chills, fever and rapid pulse. Low blood pressure (hypotension) may occur. Enlarged lymph nodes (buboes) appear very shortly before the fever.

Signs

The femoral and inguinal lymph nodes are most commonly involved; followed by axillary, cervical or multiple nodes. Typically the nodes are extremely tender and firm, surrounded by considerable oedema. The liver and the spleen may be palpable. The mortality rate of untreated patient is about 60%.

Treatment
(see section 3.17.2)

3.17.2 Primary Pneumonic Plague

Clinical Features

Symptoms

This has 2 to 3 days incubation period, followed by abrupt onset of high fever, chills, tachycardia and headache, often severe. Cough is not prominent initially. Cough develops within 20 to 24 hours with sputum. The sputum is mucoid at first, but rapidly becomes bloody.

Investigations
3.0 INFECTIONS

- Appropriate specimens should be examined for evidence of plague if a person resides in, or has a recent travel history to, plague-infected areas; has been bitten by fleas; and presents with symptoms suggestive of plague (fever, lymphadenopathy). Microscopy tests could be done using more specific fluorescent-antibody (FA) test or by detection of Y. pestis DNA.
- Chest X-ray shows progressive pneumonia. Most untreated patients die within 48 hours of onset of symptoms.

Diagnosis

Diagnosis is based on recovery of the organisms which may be isolated from blood, sputum or lymph node aspirate. Needle aspiration of bubo is preferable since surgical drainage may disseminate infection. Inject sterile phosphate buffered saline in the bubo and aspirate the pus.

Treatment

Drugs

Uncomplicated plague
Treatment in Adults
- Streptomycin, 15mg/Kg 12 hourly for 10 days or Gentamicin 5mg/Kg IM or IV qid or
- Doxycycline, 100mg po bid or
- Tetracycline, 250mg -1g orally 6 hourly for 7 to 10 days or
- Chloramphenicol, 25mg/kg I.V or orally 6 hourly for 7 to 19 days

Treatment in pregnancy
- Gentamicin, 5mg/Kg IM
- Doxycycline, 100mg po bid

Treatment in children
- Streptomycin, 15mg/Kg IM BID
- Gentamicin, 2.5mg/Kg IM
- Doxycycline, 2.2mg/Kg IV BID
- Chlorampenicol, 25mg/Kg IV QID

Prevention

- This is based on rodent populations control
- Use of insecticide repellent to minimize fleabites.
- Watching for plague cases in rodents and humans in the area
- Treating pets for fleas
- Immunization with standard killed plague vaccine gives protection to at risk individuals e.g. veterinary doctors

3.10 HIV and AIDS

Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS)

Definition
HIV: Human Immunodeficiency Virus. This is the virus that causes HIV infection and AIDS.

AIDS: Acquired Immune Deficiency Syndrome. AIDS is the severest stage of the clinical spectrum of HIV infection. It occurs when the immune system of a person who is HIV-infected becomes so suppressed that they are vulnerable to a variety of illnesses.

Clinical Features

The WHO clinical staging is for use when HIV infection has been confirmed. It is informative for assessment as baseline on entry into HIV care and can be used to guide decisions when to start co-trimoxazole prophylaxis and when to start and switch ART in situations where CD4 testing is not available.

3.10.1 Clinical Staging of HIV disease in Adults and Adolescents

CLINICAL STAGE 1

- Asymptomatic
- Persistent generalized lymphadenopathy

CLINICAL STAGE 2

- Moderate unexplained weight loss (under 10% of presumed or measured body weight) (Assessment of body weight among pregnant women needs to consider the expected weight gain of pregnancy)
- Recurrent upper respiratory tract infections (sinusitis, tonsillitis, otitis media, pharyngitis)
- Herpes zoster in last 5 years
- Angular cheilitis
- Recurrent oral ulceration
- Papular pruritic eruptions
- Seborrhoeic dermatitis
- Fungal nail infections

CLINICAL STAGE 3

- Unexplained severe weight loss (over 10% of presumed or measured body weight) (Assessment of body weight among pregnant women needs to consider the expected weight gain of pregnancy)
- Unexplained chronic diarrhoea for longer than one month
- Unexplained persistent fever (intermittent or constant for longer than one month)
- Persistent oral candidiasis
- Oral hairy leukoplakia
- Pulmonary tuberculosis
- Severe bacterial infections (e.g. pneumonia, empyema, pyomyositis, bone or joint infection, meningitis, bacteraemia)
- Acute necrotizing ulcerative stomatitis, gingivitis or periodontitis
- Unexplained anaemia (below 8 g/dl), neutropenia (below 0.5 x 10⁹/l) and/or chronic thrombocytopenia (below 50 x 10⁹/l)

CLINICAL STAGE 4
3.0 INFECTIONS

(Some additional specific conditions can also be included in regional classifications, such as trypanosomiasis (meningoencephalitis and/or myocarditis)

- HIV wasting syndrome
- *Pneumocystis* pneumonia
- Recurrent severe bacterial pneumonia
- Chronic herpes simplex infection (orolabial, genital or anorectal of more than one month’s duration or visceral at any site)
- Oesophageal candidiasis (or candidiasis of trachea, bronchi or lungs)
- Extrapulmonary tuberculosis
- Kaposi sarcoma
- Cytomegalovirus infection (retinitis or infection of other organs)
- Central nervous system toxoplasmosis
- HIV encephalopathy
- Extrapulmonary cryptococcosis including meningitis
- Disseminated non-tuberculous mycobacteria infection
- Progressive multifocal leukoencephalopathy
- Chronic cryptosporidiosis
- Chronic isosporiasis
- Disseminated mycosis (extrapulmonary histoplasmosis, coccidiomycosis)
- Recurrent septicemia (including non-typhoidal *Salmonella*)
- Lymphoma (cerebral or B cell non-Hodgkin)
- Invasive cervical carcinoma
- Atypical disseminated leishmaniasis
- Symptomatic HIV-associated nephropathy or HIV-associated cardiomyopathy

**Diagnosis**

Should be confirmed by the HIV test.

- Standard ELISA (screening test)
- Standard ELISA (confirmatory test)
- Standard ELISA (tie breaker test)
- CD4 antigen T-lymphocyte counts

**Viral Load**

- PCR (infant diagnostics)

**Clinical Management**

**Full History**

- General health status
- Drug history
- HIV Risk factors
- Reproductive history
- Physical Exam
- Laboratory investigations

**Eligibility Criteria For Antiretroviral Therapy (ART)**

Zambian Recommendations for initiating antiretroviral therapy in adults and adolescents with documented HIV infection
### 3.0 INFECTIONS

<table>
<thead>
<tr>
<th>Clinical Stage</th>
<th>CD4 available</th>
<th>CD4 not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>CD4 guided</td>
<td>Do not treat</td>
</tr>
<tr>
<td>II</td>
<td>CD4 guided</td>
<td>Total Lymphocyte Count &lt;1200*</td>
</tr>
<tr>
<td>III</td>
<td>Treat**</td>
<td>Treat</td>
</tr>
<tr>
<td>IV</td>
<td>Treat</td>
<td>Treat</td>
</tr>
</tbody>
</table>

*CD4 criteria for initiation of ART*

<table>
<thead>
<tr>
<th>CD4 (cell/mm)</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;200</td>
<td>Treat irrespective of clinical stage</td>
</tr>
<tr>
<td>200-350</td>
<td>Treat if in stage 3 or pregnancy</td>
</tr>
<tr>
<td>&gt;350</td>
<td>Treat if there is more than one Stage 3 sign or repeated Stage 3 problem* (for pregnancy and TB see appropriate section)*</td>
</tr>
</tbody>
</table>

*CD4 count strongly recommended
** If CD4 >350, Treat if there is more than one Stage 3 sign or repeated Stage 3 problem.

* For others - monitor more frequently and consider treatment based on clinical or immunologic deterioration

Note: Measure CD4 after stabilization of any intercurrent illness
3.0 INFECTIONS

For patients Not eligible provide the following:
✓ Risk reduction: ABC (Abstinence, Be faithful, Condom use)
✓ Positive living
✓ Nutrition
✓ Prophylaxis
✓ Continued 3 - 6 monthly clinical reviews and CD4 monitoring

For patients Eligible provide the following:
✓ Treat presenting problem
✓ Identify latent opportunistic infections e.g. screen for TB
✓ Provide Cotrimoxazole prophylaxis -960mg daily ( 800mg Sulphamethoxazole + 160mg Trimethoprim)
✓ Provide close follow up of patient on ART in the first 2 weeks, after one month and every 3 months
✓ Conduct laboratory investigations

Prevention and care for people living with HIV/AIDS (PLWHAs)
✓ People with HIV can live full and healthy lives if they take care of themselves and access treatments

Advise how to prevent other infections.
✓ Observe high standards of hygiene
✓ Continue counseling and health education on HIV/AIDS
✓ Improve nutrition by providing supplementary food

Address food security: arrange for supplements if available and needed.
✓ Give priority to patients with weight loss or wasting
✓ In certain settings, supplements may be important for treatment adherence especially in first 3 months

Considerations before starting ARV therapy:
• Effectiveness of regimen
• Potential for serious adverse effects and toxicity
• Side effects and tolerability
• Potential for interactions with other drugs
• Potential for treatment options should the initial drug combination fail
• Cost and availability
• Patient readiness and likelihood of adequate adherence
• Presence of pregnancy or the risk of becoming pregnant
• Presence of tuberculosis and other illnesses—anemia, peripheral neuropathy, kidney disease, hepatitis
• Ability of the patient to return for regular and reliable follow-up

Recommended regimens (for patients initiating therapy)
### 3.0 INFECTIONS

<table>
<thead>
<tr>
<th>NRTI</th>
<th>NRTI</th>
<th>NNRTI</th>
<th>NRTI</th>
<th>NRTI</th>
<th>PI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zidovudine (AZT) 300 or Stavudine (D4T) 30</td>
<td>Lamivudine (3TC) 150</td>
<td>Efavirenz (EFV) 600 or Nivirapine (NVP) 200</td>
<td>Tenofovir (TDF) 300 Preferred Abacavir (ABC) 200 Alternative for renal insufficiency</td>
<td>Lamivudine 3TC 150</td>
<td>Lopinavir/Retonavir (LPV/r) 133.33/33.3</td>
</tr>
</tbody>
</table>

1 Lamivudine (3TC) or emtricitabine (FTC) are continued in the second line regimen because their resistance mutations decrease viral replication capacity, increase the susceptibility to Tenofovir (TDF) and AZT,

2 If unable to tolerate LPV/r then refer to HIV Specialist for additional options

3 For women who have had exposure to Nevirapine within 6 months for PMTCT, do not use a Nevirapine containing regimen

4 3TC resistance reduce efficacy of ABC, therefore, Didanosine (ddl) will be substituted for 3TC

5 D4T should only be used in doses of 30mg to avoid adverse effects and toxicity

---

**Recommended regimen for patients initiating therapy after the new 2007 guidelines:**

<table>
<thead>
<tr>
<th>First Line Regimen</th>
<th>Second Line Regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenofovir Disoproxil Fumarate (TDF) 300*</td>
<td>Lamivudine (3TC) 1502 or Tenofovir Disoproxil Fumarate/Emtricitabine (TDF) 300/FTC 2003</td>
</tr>
<tr>
<td>Emitricitabine (FTC) 200</td>
<td>Efavirenz (EFV) 600 or Stavudine (D4T) 30</td>
</tr>
</tbody>
</table>

- TDF has been associated with renal toxicity: If CrCl <50 ml/min , initiate therapy with ABC/3TC

1AZT300/3TC150/LPV/r 133.3/33.3 is preferred second line regimen for patients failing tenofovir based first line

2Lamivudine150 (3TC150) or emtricitabine (FTC200) are continued in the second line regimen because their resistance mutations decrease viral replication capacity, increase the susceptibility to tenofovir (TDF/300) and AZT.
3. Tenofvir (TDF) mutations can increase susceptibility to AZT and may increase AZT efficacy, while TDF may maintain some activity
4. Stavudine (D4T) is associated with long term toxicity and should only be used in the second line if AZT cannot be taken
5. If unable to tolerate LPV/r then refer to HIV Specialist for additional options
6. For women who have had exposure to nevirapine within 6 months for PMTCT, do not use a nevirapine containing regimen

**Follow up Schedule and laboratory testing**

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Clinical</th>
<th>Laboratory</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>Complete History &amp; Physical (including ART history, current meds)</td>
<td>Creatinine* (preferable for all cases but required if to start TDF)</td>
<td>RPR (repeat yearly)</td>
</tr>
<tr>
<td></td>
<td>Counselling/Education Risk Reduction Adherence Complaints Fears New illnesses</td>
<td>ALT and/or AST** (required if to start NVP)</td>
<td>PAP smear (if unavailable, then visualization with acetic acid screening)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hb, WBC (required if to start AZT)</td>
<td>If available, HBsAg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CD4 Urine protein</td>
<td>Pregnancy testing in women of reproductive age</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If available chemistry panel to include glucose, cholesterol, triglycerides</td>
<td></td>
</tr>
<tr>
<td>Every month for first 3 months</td>
<td>Targeted History &amp; Physical Counselling/Education Risk Reduction Adherence Complaints Fears Side effects New illness/IRIS</td>
<td>If on AZT- Hb If on NVP- ALT and/or AST</td>
<td></td>
</tr>
<tr>
<td>At 3 month visit</td>
<td>As above</td>
<td>If on AZT- Hb If on NVP- ALT If on TDF- Creatinine* viral load if available</td>
<td></td>
</tr>
<tr>
<td>Every 6 months</td>
<td>Targeted History &amp; Physical Counselling/Education Risk Reduction Adherence Complaints/side effects Fears New Illness</td>
<td>If on TDF- Creatinine* WBC, Hb, ALT CD4; viral load if available</td>
<td>Repeat PAP at 6 months and if normal, every 12 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If on PI-containing regimen, consider Chemistry profile (including LFTs, glucose, cholesterol, and triglycerides) on a yearly basis if normal; if abnormal, treat as indicated</td>
<td>If visual screen only with acetic acid, repeat as with Pap smear if normal; if abnormal, refer for treatment</td>
</tr>
</tbody>
</table>

**Treatment Failure**

Clinical
Treatment failure should be considered when clinical symptoms appear whilst on therapy that is suggestive of deteriorating status.

Immunological
Treatment failure is indicated by a drop of CD4 values to below pre-treatment levels or 50% from the peak value on treatment or persistent CD4 levels below 50 cells/mm³ after 12 months on therapy.

Virologic
Wherever facilities are available to test for viral load, the following may suggest failure:
- Plasma HIV viral load >400 copies/ml after 6 months on therapy.
Note: Blips (single levels of 50-1000 c/ml) are not considered as failure, repeat viral load as soon as possible.

And patients who appear to be failing on treatment while viral load is undetectable should be considered to have undiagnosed opportunistic infections or other concomitant illness.

It should not be concluded, on the basis of clinical criteria, that an ARV regimen is failing until there has been a reasonable trial of first-line therapy lasting at least six months, adherence has been assessed and optimized, intercurrent opportunistic infections have been treated and resolved, and immune reconstitution inflammatory syndrome (IRIS) has been excluded. Clinical events that occur before the first six months of therapy are excluded from this definition of failure because they often represent IRIS related to pre-existing conditions.

Factors leading to treatment failure
- Poor adherence to treatment
- Prior exposure to antiretroviral treatment with development of resistance
- Primary viral resistance (infected with resistant HIV strain)
- Inadequate drug absorption
- Suboptimal dosing (e.g. sharing dose because of side effects)
- Inadequate or inconsistent drug therapy
- Drug interactions

Treatment

<table>
<thead>
<tr>
<th>Second Line Regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zidovudine (AZT300)³ or Stavudine (D4T30)⁴</td>
</tr>
</tbody>
</table>
The basic principle of second line therapy is ideally to support the chosen boosted PI with a dual NRTI backbone composed of two unused NRTIs. Cross-resistance exists between d4T and AZT, and second line regimens that offer more activity include TDF/ABC as dual NRTI components.

Management of HIV infection in children

Clinical Features

Clinical Staging of HIV disease in Children

Clinical stage 1
- Asymptomatic
- Persistent generalized lymphadenopathy

Clinical stage 2(i)
- Unexplained persistent hepatosplenomegaly
- Papular pruritic eruptions
- Extensive wart virus infection
- Extensive molluscum contagiosum
- Recurrent oral ulcerations
- Unexplained persistent parotid enlargement
- Lineal gingival erythema
- Herpes zoster
- Recurrent or chronic upper respiratory tract infections (otitis media, otorrhoea, sinusitis, tonsillitis)
- Fungal nail infections

Clinical stage 3 (i)
- Unexplained moderate malnutrition not adequately responding to standard therapy
- Unexplained persistent diarrhoea (14 days or more)
- Unexplained persistent fever (above 37.5 °C, intermittent or constant, for longer than one month)
- Persistent oral candidiasis (after first 6 weeks of life)
- Oral hairy leukoplakia
- Acute necrotizing ulcerative gingivitis/periodontitis
- Lymph node TB
- Pulmonary TB
- Severe recurrent bacterial pneumonia
- Symptomatic lymphoid interstitial pneumonitis
- Chronic HIV-associated lung disease including bronchiectasis
- Unexplained anaemia (<8.0 g/dl), neutropenia (<0.5 x 10⁹/L³) or chronic thrombocytopenia (<50 x 10⁹/ L³)

Clinical stage 4 (i) (ii)
- Unexplained severe wasting, stunting or severe malnutrition not responding to standard therapy
- Pneumocystis pneumonia
- Recurrent severe bacterial infections (e.g. empyema, pyomyositis, bone or joint infection, meningitis, but excluding pneumonia)
- Chronic herpes simplex infection; (orolabial or cutaneous of more than one month’s duration, or visceral at any site)
- Extrapulmonary TB
- Kaposi sarcoma
- Oesophageal candidiasis (or Candida of trachea, bronchi or lungs)
3.0 INFECTIONS

- Central nervous system toxoplasmosis (after the neonatal period)
- HIV encephalopathy
- Cytomegalovirus (CMV) infection; retinitis or CMV infection affecting another organ, with onset at age over 1 month
- Extrapulmonary cryptococcosis (including meningitis)
- Disseminated endemic mycosis (extrapulmonary histoplasmosis, coccidiomycosis)
- Chronic cryptosporidiosis (with diarrhoea)
- Chronic isosporiasis
- Disseminated non-tuberculous mycobacteria infection
- Cerebral or B cell non-Hodgkin lymphoma
- Progressive multifocal leukoencephalopathy
- HIV-associated cardiomyopathy or nephropathy

(i) Unexplained refers to the condition not explained by other causes.
(ii) Some additional specific conditions can be included in regional classifications (e.g. Penicilliosis in Asia, HIV associated rectovaginal fistula in Africa).

Diagnosis

Making any diagnosis will depend on the age of the child. Laboraory tests provide confirmation of the status.

Types of testing

Virological - PCR used to test children under 18 months. The first test can be done from 6 weeks as recommended by the pediatric and PMTCT guidelines

Antibody – used to test children over 18 months. ELISA is less reliable in infants less than 18 month because they may still be carrying maternal HIV specific antibodies.

Using Elisa test in children

Two positive ELISA are used to diagnose HIV over 18 months

- A positive rapid test in a child 18 months and above means that the child is infected
- A positive rapid test in a child less than 18 months is not conclusive. This only means exposure to maternal antibodies
- A negative rapid test in a child 18 months and above, three or more months after cessation of breast feeding (or a child who has never breastfed) means the child in not infected
- A negative rapid test in a child still breastfeeding or recently stopped breastfeeding is insufficient to exclude HIV infection. The test must be repeated at least 3 months after breastfeeding ceases

Clinical Management

Goals of ART in Children

- Prolong the lives of children
- Promote optimal growth and development
- Preserve, enhance or reconstitute the immune system
- Reduce opportunistic infections and improve the quality of life
- Suppress HIV replication and prevent disease progression
Ten point Package for comprehensive Pediatric Care:

1. Confirm HIV status as early as possible
2. Monitor the child’s growth and development e.g. play at school.
3. Ensure that immunizations are started and completed according to recommended schedule
4. Provide prophylaxis for opportunistic infections against PCP, PTB. Children under five exposed to sputum positive TB.
5. Actively look for and treat infections early
6. Counsel the mother and family on:
   - Optimal infant feeding to minimize MTCT, prevent malnutrition and promote growth and development
   - Good personal and food hygiene to prevent common infections, and encourage to seek prompt treatment for any infections or other health related problems
   - Follow up according to national recommendations
7. Conduct disease staging for the infected child
8. Offer ART for the infected child and parents, if eligible
9. Provide psychosocial support for the infected child and mother
10. Refer the infected child for higher levels of specialized care if necessary, or for other social or community based support programs

Initial evaluation

Full History
- General health status
- Milestones, immunizations and growth monitoring
- Drug history
- HIV Risk factors
- Reproductive history of the mother and father.
- Physical Exam
- Laboratory investigations

Eligibility Criteria for ART

The child (<14 years) has medical eligibility for ART if:

**Where CD4 testing is available:**

- WHO Stage 4, irrespective of CD4
- WHO stage 3, irrespective of CD4 for child <12 months
- WHO stage 3, irrespective of CD4 for child >12 months except for a child with:
  - TB, LIP, or oral hairy leukoplakia and CD4 count above:
3.0 INFECTIONS

- CD4 < 20% (or < 750 cells/mm³) and age 12-35 months
- CD4 < 15% (or < 350 cells/mm³) and age 36-59 months
- CD4 < 15% (or < 200 cells/mm³) and age > 5 years

- WHO stage 1 or 2, for child with:
  - CD4 < 25% (or <1500 cells/mm³) and age < 12 months
  - CD4 < 20% (or < 750 cells/mm³) and age 12-35 months
  - CD4 < 15% (or < 350 cells/mm³) and age 36-59 months
  - CD4 < 15% (or < 200 cells/mm³) and > 5 years

Where CD4 testing is NOT available:

- WHO Stage 4, irrespective of CD4
- WHO stage 3, irrespective of CD4
- WHO stage 2, for child with:
  - TLC < 4000 (cells/mm³) and age < 12 months
  - TLC < 3000 (cells/mm³) and age 12-35 months
  - TLC < 2500 (cells/mm³) and age 36-59 months
  - TLC < 2000 (cells/mm³) and > 5-8 years
  - Children over 8 years not indicated (do CD4 count)

- WHO stage 1
  - Not indicated (do CD4 count)

For children Not eligible provide the following:

- Counselling and health education at school and home
  - Risk reduction: ABC (where applicable)
  - Positive living
  - Nutrition
  - Prophylaxis
  - Continued clinical reviews and CD4 monitoring

For children Eligible provide the following:

- Treat presenting problem
- Identify latent opportunistic infections e.g. screen for TB
- Provide Cotrimoxazole prophylaxis
- Provide close follow up of patient on ART in the first 2 weeks, after one month and every 3 months
- Conduct laboratory investigations
## 3.0 INFECTIONS

### Cotrimoxazole Prophylaxis

#### Infants and Children

<table>
<thead>
<tr>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Situation</strong></td>
</tr>
<tr>
<td>HIV Exposed Infant</td>
</tr>
<tr>
<td>(Defined as a child born to an HIV infected mother or breastfeeding from an HIV infected mother, until infection can be excluded.)</td>
</tr>
<tr>
<td>HIV Infected infant</td>
</tr>
<tr>
<td>(including all infants identified as HIV infected during the first year of life by PCR or clinical diagnosis of HIV infection with positive antibody test)</td>
</tr>
<tr>
<td>WHO clinical stages 2, 3 and 4 regardless of CD4 percentage OR any WHO stage and CD4 &lt;25%</td>
</tr>
<tr>
<td>≥ 12 months to 4 years</td>
</tr>
<tr>
<td>&lt; 5 years</td>
</tr>
<tr>
<td>Presumptive Symptomatic HIV Disease</td>
</tr>
<tr>
<td>Any Child with a history of PCP</td>
</tr>
</tbody>
</table>

### Prevention for PLWHA’s
- Continued counseling

### Drug Treatment

#### Recommended first line

**Regimen of 2 NRTI plus 1 NNRTI:**
- AZT b + 3TC c + NVP d / EFV e
- d4T b + 3TC c + NVP d / EFV e
- ABC + 3TCc + NVP d / EFV e

a The use of AZT, d4T, ABC with 3TC results in several possible dual nucleoside combinations
b AZT should not be given in combination with d4T.
c Where available, FTC can be used instead of 3TC in children over 3 months of age.
d NVP should be used with caution in post-pubertal adolescent girls (considered as adults for treatment purposes) with baseline CD4 absolute cell counts >250/mm3.

e EFV is not currently recommended for children under 3 years of age and should be avoided in post-pubertal adolescent girls who are either in the first trimester of pregnancy or are sexually active and not receiving adequate contraception.

Dosing schedules in children

<table>
<thead>
<tr>
<th>Weight range</th>
<th>Equivalent SA range</th>
<th>Dose in mg/m² (min-max)</th>
<th>Total tablets baby</th>
<th>Total tablets Junior</th>
<th>Schedule a.m.</th>
<th>Schedule p.m.</th>
<th>Total NVP (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&lt;6kg</td>
<td>0.21-0.34</td>
<td>294-476</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>6&lt;10kg</td>
<td>0.34-0.49</td>
<td>306-441</td>
<td>3</td>
<td>0</td>
<td>1/2</td>
<td>1</td>
<td>150</td>
</tr>
<tr>
<td>10&lt;15kg</td>
<td>0.49-0.65</td>
<td>308-408</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>200</td>
</tr>
<tr>
<td>15&lt;20kg</td>
<td>0.65-0.79</td>
<td>316-385</td>
<td>0</td>
<td>2/2</td>
<td>1</td>
<td>1/2</td>
<td>250</td>
</tr>
<tr>
<td>20&lt;25kg</td>
<td>0.79-0.92</td>
<td>326-380</td>
<td>0</td>
<td>3</td>
<td>1/2</td>
<td>1/2</td>
<td>300</td>
</tr>
<tr>
<td>25&lt;30kg</td>
<td>0.92-1.1</td>
<td>364-435</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>400</td>
</tr>
</tbody>
</table>

Dosing table for dose escalation of Pedimune and Lamivir-S

<table>
<thead>
<tr>
<th>Weight Range</th>
<th>Pedimune tablet</th>
<th>Lamivir-S Tablet</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&lt;6kg</td>
<td>1 QD</td>
<td>1 QD</td>
</tr>
<tr>
<td>6&lt;10kg</td>
<td>1.5 QD*</td>
<td>1.5 QD</td>
</tr>
<tr>
<td>10&lt;15kg</td>
<td>1 QD</td>
<td>1 QD*</td>
</tr>
<tr>
<td>15&lt;20kg</td>
<td>1 QD*</td>
<td>1.5 QD*</td>
</tr>
<tr>
<td>20&lt;25kg</td>
<td>2 QD</td>
<td>2 QD</td>
</tr>
<tr>
<td>25-30kg</td>
<td>1 QD</td>
<td>1 QD</td>
</tr>
<tr>
<td>30-&lt;60kg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Daily dose of d4T 6mg, 3TC 30mg (Lamivir-S Baby) NVP (50mg)

Once a child is on ART, in addition to the parameters used before ART, clinical assessment should cover the child’s and caregiver’s understanding of the therapy as well as anticipated support and adherence to the therapy. Observation of the child’s responses to therapy should be at the minimum and should also include symptoms of potential drug toxicities or treatment failure. Particularly important signs of infants’ and children’s responses to ART include the following:
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- Improvement in growth in children who have been failing to grow
- Improvement in neurological symptoms and development in children with encephalopathy or who have been demonstrating delay in the achievement of developmental milestones; and/or
- Decreased frequency of infections (bacterial infections, oral thrush and/or other opportunistic infections)

The frequency of clinical monitoring depends on the response to ART but should be at a minimum of at weeks 2, 4, 8 and 12 after starting ART and then every 2-3 months once the child has stabilized on therapy. In infants and children who were started on ART on the basis of a presumptive clinical diagnosis of severe HIV disease, HIV infection status should be confirmed as soon as possible.

Week 0:

- Initiate ART. Dispense 2 week's worth of medication
- Ensure that patient/family knows what to do in the event of new symptoms or problems

Week 2:

Increase dose of nevirapine, if no side effects

Week 4:

- Symptom checklist (and targeted physical examination if needed).
- Adherence assessment and support
- Dispense 4 week's worth of ART

Week 8:

- Symptom checklist
- Comprehensive physical examination – recalculate ART dosing based on new height/weight
- Adherence assessment and support

Dispense 4 week's worth of ART

Week 12:

- Symptom checklist
- Comprehensive physical examination – recalculate ART dosing based on new height/weight
- Adherence assessment and support
- Dispense ART – if patient is doing well and adherence is excellent, consider dispensing 2 month's worth of ART
After the 12-week initiation period, children who are doing well may be seen once in two months. Adherence should be reviewed with the parent/caregiver as well as the older child at every visit.

### Clinical indications to change ARVs due to toxicity

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea</td>
<td>Severe discomfort or minimal intake for $\geq$ 3 days</td>
</tr>
<tr>
<td>Vomiting</td>
<td>Severe vomiting of all foods/fluids in 24 hours or orthostatic hypotension or IV therapy required</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>Bloody diarrhoea or orthostatic hypotension or IV therapy required</td>
</tr>
<tr>
<td>Fever</td>
<td>Unexplained fever of $\geq$ 39.6 $^\circ$C (103 $^\circ$F) $&gt; 1$-2 weeks</td>
</tr>
<tr>
<td>Headache</td>
<td>Severe or requires narcotic therapy</td>
</tr>
<tr>
<td>Rash</td>
<td>Moist desquamation, ulceration, or mucous membrane involvement, suspected Stevens-Johnson, Toxic Necrolysis (TEN), erythema multiforme, exfoliative dermatitis, or necrosis requiring surgery</td>
</tr>
<tr>
<td>Allergic reaction</td>
<td>Angioedema or anaphylaxis</td>
</tr>
<tr>
<td>Peripheral neuropathy</td>
<td>Severe discomfort, objective weakness, loss of 2–3 previously present reflexes or absence of 2–3 previously present sensory dermatomes</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Normal activity reduced $\geq 50%$</td>
</tr>
</tbody>
</table>
### 3.10.2.2 Laboratory indications to change ARVs due to toxicity

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Grade 3 toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hematology</strong></td>
<td></td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>$\leq 7.0 \text{ g/dl}$</td>
</tr>
<tr>
<td>Absolute neutrophil count</td>
<td>$\leq 250 \text{ mm}^3$</td>
</tr>
<tr>
<td><strong>Chemistries</strong></td>
<td></td>
</tr>
<tr>
<td>Bilirubin</td>
<td>$\geq 3.0 - 7.5 \times \text{ upper limits of normal}$</td>
</tr>
<tr>
<td>Creatinine</td>
<td>$\geq 1.2 - 1.5 (&lt;2 \text{ yr}), 1.7 - 2.0 (&gt;2 \text{ yr})$</td>
</tr>
<tr>
<td><strong>Liver function tests</strong></td>
<td></td>
</tr>
<tr>
<td>AST (SGOT)</td>
<td>$\geq 10 \text{ upper limits of normal or rapidly increasing}$</td>
</tr>
<tr>
<td>ALT (SGPT)</td>
<td>$\geq 10 \text{ upper limits of normal or rapidly increasing}$</td>
</tr>
<tr>
<td><strong>Pancreatic enzymes</strong></td>
<td></td>
</tr>
<tr>
<td>Amylase, lipase</td>
<td>$\geq 2 - 3 \times \text{ upper limits of normal}$</td>
</tr>
</tbody>
</table>

### 3.10.3 Managing toxicity

The guiding principles in management of ARV toxicity

- Determine the seriousness of the toxicity
- Evaluate concurrent medications and establish whether the toxicity is as a result of ARV medicine or a non-ARV medication taken at the same time
- Consider other disease process such as other opportunistic infections
- Manage the toxicity according to severity

- Severe life-threatening conditions – immediately discontinue all ARV medicines, manage the adverse event symptomatically and reintroduce the ARV using modified regimen when patient is stable
- Severe reactions: substitute the offensive medicine without stopping ART
- Moderate reactions: Consider continuation as long as feasible. If there is no improvement with a symptomatic therapy, consider single drug substitution, i.e., peripheral neuropathy or lipodystrophy
- Mild reactions: these are bothersome but do not require any change with the medicine

- Stress the maintenance of adherence despite toxicity for mild and moderate reactions
- If there is a need to discontinue the medication because of life-threatening toxicity, all ARV discontinued until the patient is stable
3.0 INFECTIONS

Treatment Failure
The detection of clinical events classified within the WHO clinical staging may also reflect progression of the disease when a child is on ART. Consider treatment failure when either new or recurrent stage 3 or 4 events develop in a child on therapy as described in table___

<table>
<thead>
<tr>
<th>New or recurrent event on ART</th>
<th>Management options b,c,d</th>
</tr>
</thead>
</table>
| No New events or PLG (T1)    | • Do not switch to new regimen  
|                              | • Maintain regular follow up    |
| Stage 2 events (T2)          | • Treat and manage staging event  
|                              | • Do not switch to new regimen  
|                              | • Assess and offer adherence support  
|                              | • Assess nutritional status and offer support  
|                              | • Schedule earlier visit for clinical review and consider CD4 |
| Stage 3 events (T3)          | • Treat and manage staging event  
|                              | • Check if on treatment 24 weeks or more  
|                              | • Assess and offer adherence support  
|                              | • Assess nutritional status and offer support  
|                              | • Check CD4\textsuperscript{1} where available  
|                              | • Institute more frequent follow-up  
|                              | • Consider switching regimen  |
| Stage 4 events (T4)          | • Treat and manage staging event  
|                              | • Check if on treatment 24 weeks or more  
|                              | • Assess and offer adherence support  
|                              | • Assess nutritional status and offer support  
|                              | • Check CD4\textsuperscript{1} where available  
|                              | • Switch regimen  |

a. A clinical event refers to a new or recurrent condition as classified in the WHO clinical staging at the time of evaluating the infant or child on ART.
b. It needs to be ensured that the child has had at least 24 weeks of treatment and that adherence to therapy has been assessed and considered adequate before considering switching to the second-line regimen.
c. Differentiation of opportunistic infections from IRIS is important.
d. In considering changing treatment because of growth failure, it should be ensured that the child has adequate nutrition and that any intercurrent infections have been treated and resolved.
e. Pulmonary or lymph node TB, which are clinical stage 3 conditions, may not be an indication of treatment failure, and thus may not require consideration of second-line therapy. The response to tuberculosis therapy should be used to evaluate the need for switching therapy.
f. CD4 is best performed once acute phase of prescribing illness is resolved.

Immunological definition of treatment failure

Immunological treatment failure can be identified by examining baseline CD4 and the initial immunological response to ART.
Treatment failure is characterized by a drop in the CD4 to values at or below their age-related CD4 threshold for the initiation of treatment after initial immune recovery following the initiation of ART. Thus recognition of treatment failure on the basis of immunological values relies on comparison with previous CD4 values.

Switching a regimen should particularly be considered if CD4 values fall to below 15% (12–35 months of age), 10% (36–59 months of age), or 100 cells/mm3 (≥5 years of age). Immunological criteria for recognizing treatment failure are supplemental to clinical criteria.

Criteria to guide decision-making on switching to a second-line regimen

- Development of age-related severe immunodeficiency after initial immune recovery
- New progressive age-related severe immunodeficiency, confirmed with at least one subsequent CD4 measurement
- Rapid rate of decline to below threshold of age-related severe (if %CD4+ values fail to <15% (12-35 months of age), <10% (36-59 months of age), <100 cells/mm3 (≥5 years of age))

Ensure that the child has had at least 24 weeks of treatment trial and that adherence to therapy has been assessed and considered adequate prior to considering switching to second-line regimen.

Preferably at least two CD4 measurements should be available.

Age-related severe immunodeficiency values particularly be considered if percentage CD4+ values fall to

- <15% (12–35 months of age)
- <10% (36–59 months of age)
- <100 cells/mm3 (≥5 years of age)

Use of percentage CD4+ in children aged under 5 years and absolute CD4 counts after 5 years of age is preferred. If serial CD4 values are available the rate of decline should be taken into consideration.

Use of other laboratory parameters for decision-making regarding switching ART should not be used for evaluation of response to ARV therapy. However, it should be noted that basing the recognition of treatment failure solely on clinical criteria may provide a greater opportunity for drug resistance mutations to appear before regimen change.
### Second line

**Recommended second-line regimens in infants and children in the event of treatment failure of first-line regimens**

Recommended second-line regimen: boosted PI component + two RTI components

<table>
<thead>
<tr>
<th>First-line regimen at failure</th>
<th>Preferred second-line regimen</th>
<th>[A(II)]*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RTI components (NRTI/NNRTI)a</td>
<td>PI components</td>
</tr>
<tr>
<td>2 NRTI + NNRTI AZT-or d4T- containing</td>
<td>ddlc + ABCd plus LPV/r or SQV/r or NFVh</td>
<td></td>
</tr>
<tr>
<td>ABC-containing</td>
<td>ddlc AZT</td>
<td>or NFVh</td>
</tr>
<tr>
<td>Triple NRTI</td>
<td>ddlc + EFVa or NVP</td>
<td></td>
</tr>
</tbody>
</table>

*a Continuation of 3TC in second-line regimens may be considered.

*b PI components are listed in order of potency/acceptability.

*c ddl may not need to be taken on an empty stomach in children.

*d It is not recommended to introduce AZT after use of d4T or vice versa.

*e EFV is not currently recommended for children <3 years of age, should be avoided in post pubertal adolescent girls who are either in first trimester of pregnancy or are sexually active and not using adequate contraception.

*f LPV/r is available coloromulated as solid and liquid.

*g SQV/r should not be used in children or adolescents weighing less than 25kg

*h Unboosted NFV may need to be used where no cold chain is in place for liquid LPV/r or SQV/r, it should be taken with food to improve bioavailability and high doses are needed in young children (e.g. >150mg/kg per day).
3.10.4 Prevention of Mother-to-Child HIV Transmission (PMTCT)

Definition
Prevention of infant acquisition of HIV infection from their mothers during labor and delivery or after birth through breast-feeding.

Table below depicts interventions to reduce the risk of MTCT and mitigate against infection.

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Prevention/mitigating intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>High viral load</td>
<td>Antiretroviral therapy in pregnancy</td>
</tr>
<tr>
<td>Low CD4 count</td>
<td>As above + PCP prophylaxis</td>
</tr>
<tr>
<td>Advanced Diseases (AIDS)</td>
<td>ART, PCP and TB prophylaxis, OI treatment</td>
</tr>
<tr>
<td>Chorioamnionitis</td>
<td>Identify &amp; treat STI and malaria</td>
</tr>
<tr>
<td>Malaria</td>
<td>Provide malaria prophylaxis during pregnancy, IPT &amp; ITNs</td>
</tr>
<tr>
<td>Low Vit. A</td>
<td>Maternal Vit. A supplementation does not reduce MTCT</td>
</tr>
<tr>
<td>Pre-maturity</td>
<td>Comprehensive antenatal care, identify at risk mothers, provide PCP prophylaxis</td>
</tr>
<tr>
<td>Prolonged rupture of Membranes</td>
<td>Comprehensive ANC, safer delivery practices and modified obstetric care</td>
</tr>
<tr>
<td>Invasive delivery procedures</td>
<td>Discourage scalp vein monitoring, vacuum extraction, episiotomies and nasal suction</td>
</tr>
<tr>
<td>Cracked nipples</td>
<td>Counseling on optimal breast feeding practices &amp; breast care</td>
</tr>
<tr>
<td>Breast-feeding</td>
<td>Counseling on infant feeding options: EBF, early and rapid cessation, replacement feeding etc</td>
</tr>
</tbody>
</table>

Prophylaxis Regimen

**Triple Combination ART**

Highly active antiretroviral therapy (HAART) in pregnancy is the most effective regimen for reducing MTCT. Women with CD4 absolute counts of less than 200 cells/µl should receive HAART. CD4 measurement is critical to make decisions to use HAART or prophylactic AZT + NVP during pregnancy. Where the mother requires HAART to treat her HIV disease, guidelines for particular regimens do not differ when used during...
pregnancy, but you must consider the safety of particular drugs, such as efavirenz and abacavir, during the first 3 months of pregnancy. There is no additional benefit from prophylactic ART i.e. the single-dose NVP regimen when a pregnant woman is already well controlled on HAART because the viral load will be low or undetectable.

The first line recommended regimens are:

**Short-Course AZT Regimen:**
- **Mother:** Give Oral AZT starting at 32 weeks gestation or soon thereafter, 300 mg every 12 hours during pregnancy and a loading dose of 600mg at inception of labour.
- **For the infant:** Give 1 week of AZT syrup 4 mg/kg/day every 12 hours.

The aim is to provide at least 4 weeks of AZT to the mother and 1 week to the infant. Provide at least 4 weeks of maternal dosing during pregnancy (beginning at 32–34 weeks or as soon as possible thereafter).

**Single-Dose NVP 200mg**
- Give to the mother at onset of labor and
- Give 2 mg/kg single dose to the infant during the first 72 hours of life

To be effective, the woman must receive maternal NVP dosing more than 2 hours before delivery. If the maternal dose is taken less than 1 hour prior to delivery or if the mother misses her dose, then the infant is dosed as soon as possible after birth. Infant dosing can be prior to discharge from the hospital, but if the baby is not born at the hospital, then the baby can receive a single-dose NVP within the first 3 days.

*If for some reason the woman is not able to receive antenatal AZT, then give a single dose nevirapine, and the child receives single dose NVP and AZT syrup for 28 days*

**NON-MOTHER-TO-CHILD (HORIZONTAL) TRANSMISSION**

**Definition**
HIV horizontal Transmission of HIV virus to children and adolescents through,
- Sexual transmission, i.e.
  - Rape
  - Defilement,
  - High-risk survival sex,
  - Married adolescents (Mentally, psychologically, physically immature)
- Use of contaminated needles
- Other skin piercing instruments
- Exposure to infected body fluids and transfusion with contaminated blood and blood products.
The disease status of the rapist or defiler i.e. viral load, presence of STIs is an important factor. Any rapist should be assumed HIV positive unless proven otherwise.

**Management of the sexually assaulted child:**

- Admit the child where possible
- Take history to establish circumstances leading to the sexual assault
- Examine the child under anesthesia if possible or sedation to determine the extent of injury and whether the assault is acute or habitual
  - Ideally it should be done by a female health worker
  - In the presence of the mother or caregiver
- Collect blood for HIV test, HBV, and syphilis screening and plan to repeat them at 6 weeks, 3 months and 6 months after the assault
- Collect specimen of genital secretions to be examined for sperm and seminal fluid
- Take swabs for bacterial STI.

**Post-Exposure Prophylaxis**

Initiate post-exposure prophylaxis (PEP) after rape or sodomy as soon as possible because it is most effective if begun within 24 hours of the assault and is probably ineffective after 72 hours. Also consider prophylaxis in other situations, such as exposure to contaminated medical equipment, blood, or other bodily fluids and after human bites with disruption to the skin.

- **Prior to offering PEP**
  - Do a rapid HIV test & start PEP only if negative
  - If positive offer emotional support and supportive counselling, assess for ART eligibility and provide comprehensive care
  - Empirically treat for bacterial STI and vaccinate against HBV
- Offer emergency contraception to adolescents if they have evidence of sexual maturation.
- Offer trauma counselling to the child and caregivers
- Alert authority as appropriate
- Refer as appropriate to legal services
- Keep good record keeping in view that sexual assault is a criminal offence

**Treatment**

- Administer AZT plus 3TC and NFV (three drug prophylaxis) for a period of 28 days. On discharge
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- From facility, issue children enough medication to complete the 28-day course.
- Perform HIV testing at the time of initial contact (baseline test) after obtaining informed consent. Most sero-conversions occur within 6 to 8 weeks after exposure. Repeat HIV testing at intervals of 6 to 8 weeks, 3 months, and 6 months after the assault.
- In children who were sexually assaulted, give consideration to preventing pregnancy and STIs and to collecting forensic evidence, including appropriate perineal swabs.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Pediatric Dose</th>
<th>Adolescent Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>AZT</td>
<td>180mg/m²/12 hrs</td>
<td>300mg twice a day</td>
</tr>
<tr>
<td>3TC</td>
<td>4mg/kg/12hrs</td>
<td>≥50kg 150mg 12 hourly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;50kg 2mg/kg 12 hourly</td>
</tr>
<tr>
<td>Nelfinavir</td>
<td>55mg/kg/12hours</td>
<td>750mg 8 hourly</td>
</tr>
</tbody>
</table>

Other combinations shall be administered according to specific patient circumstances and physician recommendation.

3.10.5 Practical hints
- Patients who are anaemic Hb<8g/dl prior to treatment will require a blood transfusion to raise haemoglobin level.
- d4T is a better-tolerated choice than AZT in anaemic patients who might have added effect from bone marrow suppression with AZT.
- If using above regimens in TB patients, no treatment alteration is required. If using Nevirapine or protease inhibitor drugs refer to specialist at level 3.
- AZT has 60 percent CNS penetration and leads to marked improvement of HIV/AIDS-related dementia.
- Drugs should be taken at the same time of the day to maintain constant drug level.
- Give written dosing instructions to patients.
- For those patients with CNS involvement, a relative must administer drugs for them.

Monitoring after initiating therapy

Where available, these tests should be conducted.
3.0 INFECTIONS

<table>
<thead>
<tr>
<th>Frequency of tests</th>
<th>Hospital Level 1, Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 weeks after of initiation</td>
<td>FBC, LFT, U&amp;creat, blood sugar,</td>
<td>FBC, LFT, U&amp;creat, blood sugar, lipids, CPK, amylase</td>
</tr>
<tr>
<td>3 months after initiation</td>
<td>FBC, LFT, U&amp;creat, blood sugar</td>
<td>FBC, LFT, U&amp;creat, blood sugar, CD4, Viral load</td>
</tr>
<tr>
<td>6 monthly</td>
<td>FBC, LFT, U&amp;creat, blood sugar</td>
<td>FBC, LFT, U&amp;creat, blood sugar, CD4, Viral load</td>
</tr>
<tr>
<td>Yearly in addition</td>
<td>RPR, PAP smear</td>
<td>RPR, PAP smear</td>
</tr>
</tbody>
</table>

**INDICATIONS FOR CHANGING TREATMENT**

Consideration be given to patient who has persistent fever

**Definition of Treatment Failure and clinical failure Laboratory indications**

- Testing on two occasions using the same method there is still detection of plasma HIV RNA above lower limit of detection (50 Copies/ml)
  - An adherent patient who had achieved undetectable levels and had not experienced acute infection nor received any vaccinations
  - A patient who is on triple therapy for 24 weeks
- The viral load should increase by three-fold above the lower level of reading
- Clinical failure, intolerance and adverse reaction, and persistence of the symptoms the patient came with

**Clinical indications**

- Poor adherence to treatment
- Prior exposure to antiretroviral treatment
- Primary viral resistance
- Inadequate drug absorption
- Suboptimal dosing

**Management of Treatment Failure (Salvage Therapy)**

<table>
<thead>
<tr>
<th>Reason for failure</th>
<th>Action</th>
<th>What to do</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor compliance within 8-16 weeks of therapy</td>
<td>Review reasons for poor compliance and counsel accordingly.</td>
<td>Continue with same combination or simplify dosing.</td>
</tr>
<tr>
<td>Poor compliance &gt; 16 weeks of therapy</td>
<td>Consider changing therapy. Review reasons for poor compliance.</td>
<td>Change two drugs.</td>
</tr>
<tr>
<td>Treatment failure</td>
<td>Change therapy.</td>
<td>Use drugs not used in previous regimen preferably new classes.</td>
</tr>
</tbody>
</table>
3.0 INFECTIONS

<table>
<thead>
<tr>
<th>Reason for failure</th>
<th>Action</th>
<th>What to do</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverse drug reaction</td>
<td>Check drug–drug interactions.</td>
<td>Change the offending drug.</td>
</tr>
<tr>
<td></td>
<td>Stop the drugs if continuation is of no benefit to the patient.</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>Psychosocial support</td>
<td>Refer to appropriate care provider</td>
</tr>
</tbody>
</table>

Refer all suspected treatment failures to a higher-level treatment center if poor adherence has been excluded.

Post Exposure Prophylaxis (PEP)

3.11 Health workers in place of work

Accidental contamination

- Immediately clean the contaminated part of the body with soap and water
- Determine the degree of exposure. There should be compulsory testing of source of exposure, if applicable by unanimous unlinked antibody testing
- Caregivers and Health workers should undergo HIV testing

3.12 Rape case

- Determine HIV status in the afflicted individuals

In both situations (accidental and rape), the following measures should be undertaken:

- PEP recommendation based on risk and exposure category (please see table below)
- PEP is only offered to HIV sero-negative individuals
- Ideally, drug therapy should commence within first 1-2 hours of exposure

Guide for Prophylaxis

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>ARVT</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Risk:</td>
<td>No recommendation</td>
<td></td>
</tr>
<tr>
<td>Intact skin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium Risk:</td>
<td>AZT: 300mg po 12 hourly</td>
<td>28 days</td>
</tr>
<tr>
<td>Invasive injury</td>
<td>3TC: 150mg po 12 hourly</td>
<td></td>
</tr>
<tr>
<td>No blood visible on needle</td>
<td>Plus LPV/r*</td>
<td></td>
</tr>
<tr>
<td>High risk:</td>
<td>AZT: 300mg po 12 hourly</td>
<td>28 days</td>
</tr>
<tr>
<td>Large volume of blood/fluid, known HIV infected patient, hollow bore needle, deep extensive injury</td>
<td>3TC: 150mg po 12 hourly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plus LPV/r*</td>
<td></td>
</tr>
</tbody>
</table>

*for patients with hemoglobin less the 10gm/dl replace AZT/3tc with TDC/FTC

NOTE: Monitoring and baseline investigations and changing treatment should be the same as for adults.
### Recommended drug dosages and side effects

<table>
<thead>
<tr>
<th>Generic Name (trade name)</th>
<th>Recommended dosage</th>
<th>Special Instructions</th>
<th>Adverse effects Minor &amp; frequent</th>
<th>Adverse effects Serious, dose limiting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nucleoside Reverse Transcriptase Inhibitors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Zidovudine ZDV, AZT (retrovir) | 250mg bid | Caution in:  
- Liver or renal insufficiency  
- Pre-existing anaemia | Nausea  
Headache  
Fatigue  
Muscle pains | Anaemia  
Leucopaenia  
Lactic acidosis |
| Didanosine Ddi (videx) | 200mg bid  
<60kg 100mg bid |  
- To increase absorption take 1 hour before food  
- Contains antacid so may affect absorption of other drugs | Neuropathy  
Nausea  
Diarrhoea | Pancreatitis  
Lactic acidosis |
| Lamivudine 3TC (epivir) | 150mg bid | Generally well tolerated | Lactic acidosis |
| Stavudine D4T (zerit) | 40mg bid  
<60kg 30mg bid | Caution in liver insufficiency | Neuropathy | Lactic acidosis |
| Abacavir (ziagen) | 300mg bid | Caution in:  
- Liver or renal insufficiency  
- DISCONTINUE if symptoms of hypersensitivity | Nausea  
Poor appetite  
Vomiting  
Fatigue, sleep disturbance | Hypersensitivity reaction  
Lactic acidosis |
| Zalcitabine DDC (hivid) | 0.75mg tid  
<40kg 0.375mg tid | Neuropathy  
Oral ulcers | Pancreatitis  
Lactic acidosis |
| Lamivudine+ zidovudine (Combivir) | 1 tab bid | Caution in:  
- Liver or renal insufficiency  
- Pre-existing anaemia | Nausea  
Headache  
Fatigue  
Muscle pains | Anaemia  
Leucopaenia  
Lactic acidosis |
| **Non-Nucleoside reverse transcriptase Inhibitors** |
| Efavirenz (sustiva, stocrin) | 600mg nocte | Caution in liver disease | Skin rash  
Neurological disturbance  
Abn LFTS | Hepatitis |
| Nevirapine (virimmune) | 200mg od for 14 days followed by 200mg bid | Caution in liver disease | Skin rash  
Abn LFTS | Hepatitis |
| Delavirdine (rescriptor) | 400mg tid | Caution in liver disease | Skin rash  
Headaches  
Abn LFTS | Hepatitis |
| **Protease Inhibitors** |
| Saquinavir |  
- Take with high | Diarrhoea | Hyperglycaemia |
### 3.0 INFECTIONS

<table>
<thead>
<tr>
<th>Generic Name (trade name)</th>
<th>Recommended dosage</th>
<th>Special Instructions</th>
<th>Adverse effects Minor &amp; frequent</th>
<th>Adverse effects Serious, dose limiting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard gel capsule (invirase) Soft gel capsule (fortovase)</td>
<td>600mg tid 1600mg bid</td>
<td>fat meal • Caution in liver disease</td>
<td>Nausea Abn LFTS</td>
<td>Lipodystrophy Abn. bleeding</td>
</tr>
<tr>
<td>Ritonavir (norvir)</td>
<td>600mg bd (start with 300mg bd then increase over 10/7)</td>
<td>• Capsules require refrigeration • Better tolerated with food</td>
<td>Nausea Diarrhoea Weakness Skin sensitivity Perioral tingling Change in taste</td>
<td>Hyperglycaemia Lipodystrophy Abn. bleeding</td>
</tr>
<tr>
<td>Indinavir (crixivan)</td>
<td>800mg tid</td>
<td>• Take on empty stomach • Drink 1.5l fluid per day • Report loin pain or haematuria</td>
<td>Nausea Abdo pain headache</td>
<td>Kidney stones Hyperglycaemia Lipodystrophy Abn. bleeding</td>
</tr>
<tr>
<td>Nelfinavir (viracept)</td>
<td>750mg tid</td>
<td>• Take with food</td>
<td>Diarrhoea Nausea Flatulence Skin rash</td>
<td>Hyperglycaemia Lipodystrophy Abn. bleeding</td>
</tr>
<tr>
<td>Amprenavir (agenerase)</td>
<td>1200mg bid</td>
<td>• Decreased absorption if taken with fatty meal</td>
<td>Nausea Vomiting Diarrhoea Altered taste Mood disorders Perioral numbness</td>
<td>Hypersensitivity rash</td>
</tr>
</tbody>
</table>

**Prevention**

- Health promotion and public education
- Advise safe sex e.g., condom use
- Encourage sticking to one sexual partner
- Promote abstinence
- Provide individual or group counseling
- Refer for Voluntary Counselling and Testing (VCT)
- Safe professional practices by health personnel
4.0 DISEASES AND CONDITIONS AFFECTING ENDOCRINE SYSTEM

4.1 Diabetes Mellitus

Definition

Diabetes is a chronic disease characterized by persistently elevated blood glucose due to either:

i. an absolute or relative deficiency of insulin

OR

ii. a defect in the action of insulin (insulin resistance), in addition to a defect in the metabolism of fats, proteins, and electrolytes leading to short term and long term complications.

There are two main types:

a) Type 1 diabetes mellitus (T1DM)

b) Type 2 diabetes mellitus (T2DM)

Other types are neonatal diabetes, which occurs before the age of 6 months, Maturity Onset Diabetes of the Young (MODY), and diabetes secondary to other conditions like surgery, pregnancy, endocrine disorders, drugs and others.

Diagnosis

In most cases, the diagnosis of diabetes is not difficult. The classic symptoms of diabetes with a fasting plasma glucose of ≥ 7mmol/L or a random plasma glucose of ≥ 11.1 mmol/L is adequate. The test must be repeated on at least one other occasion. This is a blood sample from venous blood.

If only a glucometer is available, then the fasting capillary glucose level used is ≥ 6.1mmol/L, but the random capillary glucose remains at ≥ 11.1 mmol/L.

NB. Casual or random is defined as any time of the day without regard to time since last meal. Fasting is defined as no caloric intake for at least 8 hours.

Type 1 Diabetes mellitus (T1DM)

This was also previously referred to as Insulin Dependent Diabetes Mellitus (IDDM). It usually occurs in children and young adults. Occasionally, it can be found in adults.

Clinical features

Type 1 diabetes patients often present in an acute state.

Clinical characteristics at diagnosis:

1 NOTE: Urine glucose can only be used as a preliminary screening tool in the absence of blood glucose. The patient should be sent to a level where blood glucose can be done
4.0 DISEASES AND CONDITIONS AFFECTING ENDOCRINE SYSTEM

Symptoms
- Blurred vision
- Frequent urination (polyuria)
- Increased thirst (polydipsia)
- Increased hunger (polyphagia)
- Weight loss but can be normal/underweight
- Tiredness / weakness

Signs
- Weight loss
- Dehydration

Laboratory findings
- Elevated blood glucose
- Ketoacidosis

Treatment

All newly diagnosed patients need to be referred for initiation of treatment and stabilisation.

Drugs

Soluble insulin on its own or mixed with isophane insulin (0.6 - 1.5 units/kg) subcutaneously over 24 hours in 2 or 3 divided doses per day. Adjust dose to keep the blood sugar levels between 6 - 8 mmol/L.

Dietary control
Avoid sugar and sugar containing foods and drinks.
Take meals regularly.
Consult nutritionist or dietician on diet modification.

Supportive
Monitor the following:
- Blood pressure
- Renal function
- Blood glucose
- Hydration
- Serum electrolytes and minerals
- Urine sugar
- Urine ketones

Treat infections if any.
Teach patient and carers about disease and its management.
Encourage regular exercise
Regular review of patient at specialist clinic/hospital

4.2 Type 2 Diabetes Mellitus (T2DM)

This was also previously known as Non-Insulin Dependent Diabetes Mellitus (NIDDM). It usually occurs in older people and its onset is insidious.
Clinical features

These may be mild and may not cause the patient to seek medical attention. This condition is often discovered when a complication arises. There is usually a delay of many months or years from onset to diagnosis.

The following are the common features:

Symptoms
- Obesity
- Blurred vision
- Frequent urination/polyuria
- Bedwetting
- Increased thirst/polydipsia
- Weight loss
- Infarct/angina
- Stroke
- Susceptibility to infections eg genito tract/urinary tract infections (vulva itching in women)
- Claudication
- Paraesthesia / pain
- Foot ulcer

Signs
- Dehydration
- Weight loss

Investigation findings
- Elevated blood glucose
- Blood lipid abnormalities

Treatment

Diet and Exercise

Diet and exercise are the mainstay in treatment of T2DM. This should be tried first in all patients except those with very high glucose levels and those who are severely symptomatic. Those who fail to respond to diet and exercise can then move on to taking drugs.

Drugs

The two main classes of drugs used in Zambia are sulphonylureas and biguanides.

Sulphonyureas

- Glibenclamide. Initially can be given orally once a day or in two divided doses. Usual dose is 5mg orally daily taken before breakfast up to a maximum of 20mg in divided doses before food, depending on the patient’s response. Doses above 20mg will not result in any improvement in glucose control.
• Chlorpropamide 250mg orally once a day taken with breakfast. Dosage may be adjusted to a maximum of 500mg depending on the patient's response.
• Sulphonylureas can be given together with biguanides

**Biguanides**

Metformin. This is the preferred drug in obese patients in addition to dietary control and exercise. It may also be added in patients who have reached the maximum dose of a sulphonylurea without achieving adequate control of blood sugar levels.

• Metformin 500mg orally 2-3 times daily or 850mg orally 2-3 daily with or after food. Maximum dose is 2.55g daily in divided doses.

| NOTE: | Dosage increments in oral antidiabetic drugs should be gradual i.e. at 1 to 2 week intervals. |

### Insulin

Insulin may be used alone or added on if the combination of sulphonylurea and biguanide fails to achieve adequate control of blood sugar.

Insulin is available in two types of preparations:

i. **Short duration, soluble forms, for rapid onset of action**
ii. **Intermediate duration**

Most patients are best started on intermediate action insulin twice daily and a short-acting form may be added to control any hyperglycaemia which may follow breakfast, lunch or supper.

It is important to note that variability in absorption within the same individual and between two individuals can happen.

Insulin doses should be calculated and determined on an individual patient basis, gradually increasing the dosage until the patient stabilises. Care should be taken not to cause hypoglycaemia.

If diabetes control is poor on diet, exercise and oral drugs, do not delay starting insulin.

Withdrawal of oral (sulphonylureas & biguanides) drugs should be commenced only after the insulin therapy has been initiated. In some patients, metformin and insulin combination can be given.

**Supportive**

- Monitor blood glucose levels regularly
- Prescribe appropriate diet
- Careful weight reduction in obese patients
- Encourage regular exercise
- Regular review of patient at specialist clinic/hospital
- Educate patient and carers
Patient and carers education

Patients and carers should be educated on the following:
- Identification of symptoms of hypoglycaemia
- Principles of foot care
- Injection techniques and how to look after syringes and insulin
- Types of insulin preparations available
- Monitoring blood glucose or urine glucose
- Diet control i.e. meal intervals depending on type of insulin

Notes
Weight reduction for obese patients and appropriate diet are key in the process of managing diabetes mellitus.

Dietary control and exercise should be continued alongside drug therapy.

4.3 Hyperglycaemic/Ketoacidosis Coma/Precoma

Definition
Severe uncontrolled diabetes with very high blood sugar requiring emergency treatment with insulin and intravenous fluids and with a blood ketone body concentration of greater than 5mol/L, the common precipitating causes are infection, management errors and new cases of diabetes, but there is no obvious cause in about 40% of episodes.

In Africa, DKA carries a high mortality – through delayed diagnosis, inadequate treatment and late presentation. It presents at any age although there is a well defined peak at puberty.

Clinical features of diabetic ketoacidosis:
- Polyuria, nocturia, thirst
- Weight loss
- Weakness
- Visual disturbance
- Abdominal pain
- Leg cramps
- Confusion, drowsiness, coma
- Dehydration
- Hypotensions
- Tachycardia
- Rapid and deep respiration (kussmaul breathing)
- “Acetone” odour
- hypothermia

Management

Children
- Establish and maintain cardiovascular and renal functions
- Correct fluid and electrolyte deficiencies and imbalances
- Give insulin to reduce blood sugar
- Determine the precipitating causes of the crises
- Look out for and prevent any complications
Fluid and electrolyte replacement:
   i. Sodium chloride 0.9%, rapid infusion 20ml/kg in the first one hour then assess urine output. When blood sugar falls to between 10 – 16 mmol/L, change to dextrose 5% in order to prevent hypoglycaemia.
   ii. If potassium level is low or normal, add potassium intravenously 20 – 40 mmol/L of intravenous fluid. This should be given after insulin therapy has been commenced.

Insulin

Soluble insulin 0.1 units/kg/hour, give intravenously, as a continuous infusion. When blood sugar levels reach 10 mmol/L reduce to 0.05 units/kg/hour.

Once the patient has stabilised, manage as for Type 1 diabetes mellitus

Adults

Conduct assessments and investigations as in children

Fluid and electrolyte replacement:
   i. Isotonic (normal) saline (sodium Chloride 0.9%) rapid infusion 1 – 2L in the first one hour then reassess and repeat as needed. Normally 6-8 litres in the first 24 hours. When blood sugar falls to between below 14 mmol/L change to dextrose 5% in order to prevent hypoglycaemia. If sodium level more than 150 mmol/L give half strength (hypotonic) saline.
   ii. Sodium bicarbonate (600ml of 1.4%, or 100ml of 8.4% in a large cannulated vein) if pH>7.0
   iii. Potassium
       1. Add dosage below to each 1L of infused fluid: (a) If plasma K<3.5mmol/L, add 40 mmol KCl (b) If plasma K 3.5-5, 5mmol/L, add 20mmol KCl

Insulin

i. Soluble insulin 5-10 units (0.1 units/kg/hour intravenously), as a continuous infusion. When blood sugar levels reach 10 - 14 mmol/L reduce to 2-4U/h (0.05 units/kg/hour) or titrate against blood glucose levels and when patient is able to take oral feeds give soluble insulin 2-3 times before meals.

OR

ii. Initially soluble insulin 20 units intramuscularly stat then 5-10 units intramuscularly hourly until blood sugar is 14mmol/L. When blood glucose is 10 – 14mmol/L give 8 units 4 hourly subcutaneously until patient is able to take oral feeds. When patient is taking food orally, change to soluble subcutaneously twice or three times before meals.

Hypoglycaemia in Diabetes Mellitus

Definition

2 NOTE: Soluble Insulin given as an intravenous bolus is rapidly destroyed within a few minutes. Intravenous insulin must always be given as a continuous infusion
This is a condition in which the blood sugar falls to lower than 3 mmol/L with the attendant signs and symptoms of disorder. The classical clinical features may however occur at higher levels than this in some patients, especially those with poorly controlled type 2 diabetes. The causative factors include inadequate or delayed food consumption, alcohol consumption, excess insulin dosage or wrong injection technique, exercise, inattention or combination of these factors.

**Clinical features**

**Symptoms**
- Weakness
- Fatigue
- Sweating
- Hunger
- Abdominal pain
- Headache
- Nausea

**Signs**
- Pallor
- Tremor
- Tachycardia
- Irritability
- Speech difficulty
- Inco-ordination
- Loss of concentration
- Drowsiness
- Abnormal behavior
- Disorientation
- Convulsions
- Coma

**Treatment**

In all diabetics in coma, with no means of ascertaining the blood glucose level, give oral or intravenous glucose.

If patient is conscious and able to take orally give a sugar containing drink or food. If patient is unable to take orally give:

1. 20 ml of 50% glucose as an intravenous bolus (OR 50 ml of 20% glucose)
2. Follow up if necessary with intravenous infusion of 10% or 20% glucose, 100ml/hour. OR
3. Administer 0.5 mg to 1.0 mg glucagon intramuscularly or intravenously. IM or IV Glucagon must be followed by oral glucose
4. A continuous infusion of 10% or 20% glucose (dextrose) may be required for 24 to 72 hours if overdosage of long acting insulin or sulphnyureas (chlorpropamide or glibenclimide) is the cause of the hypoglycaemia

Monitor blood glucose regularly and maintain between 6 and 8 mmol/L.
4.4 Diabetes Mellitus in Pregnancy

Diabetes mellitus in pregnancy is usually seen in women who are already diabetic before pregnancy or have had a history of diabetes in the family. However, when this condition occurs in non-diabetics it usually presents in the second trimester.

All pregnant diabetic patients should be referred for specialist treatment. Known diabetic patients should be counselled before conception and the diabetes should be well controlled both before conception and throughout the pregnancy. Insulin use and proper diet should control the blood sugar level effectively. (See also chapter 5).
5.1 Ante-Natal Care
The goal of antenatal care is:
- To provide health promotion. e.g., health education, counselling, and provide supplementation of iron, folic acid, iodine, calcium and vitamin
- To prevent common diseases e.g. malaria, anaemia and neonatal tetanus
- To detect early signs of disease or complications in the mother and foetus e.g. proteinuria, hypertension, syphilis, foetal abnormality, malpresentation and intrauterine growth retardation.
- To provide a Birth Plan
  - Place of delivery
  - Complication readiness
  - Transportation to delivery site

Four quality antenatal visits are recommended, the first of which should be before 16 weeks of gestation. During the first visit the following should be done:

- General, obstetric and gynaecological history
- Full physical examination
- Basic investigation i.e. confirmation of pregnancy, Hb, HIV, RPR, urinalysis and ultrasound where available
- Supplements i.e. haematins (iron, folic acid, mebendazole)
- Malaria and tetanus prophylaxis
- Voluntary Counselling and Testing (VCT)

During the second and subsequent visits the following should be done:

- Examine for growth of foetus
- Maternal well being
- Check on medications given previously
- Check presentation of the foetus
- Discuss place of delivery and mode of delivery
- Discuss warning signs / danger signs
- Malaria prophylaxis
- Iron and folic acid supplementation
- ART for PMTCT or HAART

5.2 Normal Labour

General care
- Encourage women to be with support person at all times.
- Encourage ambulation and frequent oral fluid intake
- At delivery woman must choose which position to take

Monitoring of labour
- Use a partogram on all patients
- Check for foetal and maternal well-being and progress of labour
- Maintain good infection prevention practices
• Provide active management of the 3rd stage:
  o After the baby has been delivered onto the mother’s abdomen, palpate the abdomen to rule out the presence of an additional baby(s) and then give oxytocin 10 units intramuscularly within 1 minute of delivery
  o Oxytocin is preferred because it is effective 2 to 3 minutes after injection, has minimal side effects and can be used in all women. If oxytocin is not available, give ergometrine 0.2mg intramuscularly or prostaglandins e.g., Misoprostol 600mg sublingual. Make sure there is no additional baby(s) before giving these medications
  o Clamp the cord close to the perineum using sponge forceps (Spencer wells) and deliver placenta using controlled cord traction. Allow sufficient flow of blood to the baby before clamping. Hold the clamped cord and the end of the forceps with one hand. Place the other hand just above the women’s pubic bone and stabilize the uterus by gently pushing the uterus up. This helps prevent inversion of the uterus
  o Keep slight tension on the cord and await a strong uterine contraction or rub a contraction. If necessary use sponge forceps (Spencer wells) to clamp the cord closer to the perineum as it lengthens. Do not wait for a gush of blood before applying traction on the cord
  o When the uterus becomes rounded or the cord lengthens, very gently pull downward on the cord to deliver the placenta. Continue to stabilise the uterus with the other hand

If the placenta does not descend during 20 - 30 seconds of controlled cord traction (i.e. there are no signs of placental separation), do not continue to pull on the cord:
  - Gently hold the cord and wait until the uterus is well contracted again. If necessary use a sponge forceps to clamp the cord closer to the perineum as it lengthens
  - With the next contraction, repeat controlled cord traction with counter traction

Immediately following birth:
  - Gently perform uterine massage
  - Provide oxytocics
  - Estimate blood loss
  - Examine for and repair lacerations
  - Examine placenta and membrane for completeness

Provide close surveillance of vaginal bleeding, uterine hardness and vital signs during the first 6 hours postpartum:
  - Every 15 minutes for the first two hours
  - Every 30 minutes for the next one hour
  - Every hour for the next three hours

Promote early and exclusive breastfeeding. In the event of mother being HIV positive, provide counselling on breastfeeding options

Social support
✓ Clarify and reposition to first paragraph
✓ Analgesia in labour
  o Pethidine 100mg IM stat
5.0 OBSTETRIC AND GYNAECOLOGICAL CONDITIONS

- Naloxone 10 micrograms/kg may be given to a neonate to reverse Pethidine induced respiratory depression

5.3 Antepartum Haemorrhage (APH)

Definition

APH is defined as per vaginal bleeding after 22 weeks of gestation to delivery of the baby. The main causes of APH are:

- Placenta previa
- Abruptio placentae
- Cervical lesions e.g cancer, ectopy, polyp
- Vasa previa

Clinical features

- Painful or painless PV bleeding
- Provoked or unprovoked
- High pulse rate
- Low blood pressure
- Air hunger depending on amount of bleeding
- Signs of shock

Investigation must distinguish between placenta previa and abruptio placentae. **No vaginal examination is to be performed. Speculum examination should only be performed after placenta previa has been ruled out.**

Refer to a hospital

Emergency care

- Normal saline infusion
- Transfer to hospital for confirmation of diagnosis by clinician or examination by ultra sound scan, where available, for clinical examination
- Rh-negative patient may need anti-D

Note that antepartum haemorrhage is a serious complication

5.3.1 Placenta previa

Definition

This is a condition in which the placenta is implanted in the lower segment of the uterus.

Clinical features

- Painless PV bleeding
- ± malpresentation, high presenting part
- Present foetal heart
- Recurrent vaginal bleeds
- Relaxed uterus

Specific management
If the baby is premature and bleeding has stopped, conservative management is recommended until 36 - 38 weeks:

- Keep woman in hospital until delivery
- Cross match 2 units of blood at all times
- Keep haemoglobin at more than 9g using haematinics or blood transfusion
- Give dexamethasone 25mg intravenously/intramuscularly in 2 divided doses
- If there is heavy bleeding proceed to caesarean section

Plan delivery if foetus is mature, dead, or has major anomalies

### 5.3.2 Abruptio placentae

**Definition**

This is a condition in which there is premature separation of a normally implanted placenta before delivery of baby. The patient must be referred to a hospital.

**Clinical features**

- May have been provoked by Artificial Rapture of Membrane (ARM), External Encephalic Version (ECV), hypertensive disorder
- Painful Per Vaginal (PV) bleeding
- Foetus may be dead, difficult to feel foetal parts
- Height of fundus may be higher than dates
- Tender tense abdomen
- Signs of shock
- Retro placental bleeding may be concealed

**Specific management**

- Nurse in high dependency ward
- Rapid infusion of normal saline or ringers lactate
- Cross match 4 units of blood and commence transfusion as soon as possible
- Catheterise patient
- Give morphine 15mg intramuscularly stat
- Perform artificial rupture of membranes to induce labour
- Active management of third stage
- After delivery give oxytocin 10 units in normal saline running at 20 drops per minute for 2 – 4 hours

Be aware of postpartum haemorrhage due to atonic uterus or coagulopathy.

### 5.3.3 Cervical lesion (Refer to chapter 8.4)

- Cancer of the cervix
- Cervical ectopy
- Cervical polyps

### 5.3.4 Vasa Previa

**Definition**
A condition in which the foetal blood vessels are unsupported by either the umbilical cord or placental tissue, traverse the foetal membranes of the lower segment of the uterus below the presenting part. Vasa previa occurs when foetal blood vessel(s) from the placenta or umbilical cord cross the entrance to the birth canal, beneath the baby. It can result in rapid foetal hemorrhage or lack of oxygen.

**Symptoms**
- Present with sudden onset of abnormally heavy or small amounts at rupture of membranes
- Foetal bradycardia, then death

**Warning Signs**
- Very difficult to diagnose antenatally before rupture of membranes
- Low-lying placenta
- Painless birthing bleeding.

**Investigations**
- Ultrasound
  - Check the placental cord connection for velamentous cord insertion.
- Sonography
- Color Doppler

**Treatment**

**Supportive**
- Initiate breastfeeding within an hour of birth
- Use of tocolytes to stop all uterine activity
- Bedrest
- No sexual intercourse
- No vaginal examinations
- No lifting
- No heavy straining during bowel movements (use of stool softeners)

**Hospitalization; (if suspected antenatally**
- Foetal monitoring
- Regular ultrasounds to monitor progression of vasa previa
- Steroid treatment to develop fetal lung maturity
- Elective cesarean delivery, most important

When not diagnosed antepartum, aggressive resuscitation complete with blood transfusion for the infant if necessary must be planned for and/or expected

### 5.4 Post Partum Haemorrhage (PPH)

**Definition**

This is per vaginal (PV) bleeding of 500ml or more or any amount resulting in cardiovascular collapse after delivery of the baby. It is called primary PPH when it occurs within the first 24 hours and secondary PPH thereafter up to 6 weeks. PV bleeding of more than 500ml or any amount causing cardiovascular collapse or hypovolaemic shock.
This is caused by:
- Atonic uterus
- Genital tract trauma, e.g., ruptured uterus, cervical vaginal tears and vulval haematoma
- Secondary coagulopathy
- Uterine sepsis

**Clinical features**
- Excessive vaginal bleeding
- May be in shock
- High pulse rate equal or more than 100/min
- Low BP less or equal to 90/60mm
- Air hunger (restlessness)
- Cold sweat

**Emergency care**
To provide a timely surgical plan such as hysterectomy, internal iliac artery ligation
This must be teamwork
- Call for help
- Rub up the uterus for a contraction and to expel clots
- Repeat oxytocin 10 units intramuscularly
- Give oxytocin 20 units in 1Litre normal saline running at 20 drops per minute
- Alternatively in the absence of oxytocin give Misoprostol 1000microgram rectally
- Blood and fluid replacement as required
- Monitor urine output/catheterise the bladder
- If PV bleeding persists yet uterus is well contracted, check genital tract for trauma and for coagulopathy
- Where available, central venous pressure (in the absence of coagulopathy) monitoring is valuable
- In uncontrolled PPH timely surgical intervention is important, e.g., hysterectomy
- Nurse in high dependency ward- Special Observation Unit (SOU) of the hospital

5.5 **Unconscious Obstetric Patient**

A pregnant woman may be brought into a health facility unconscious without much history. Management therefore will mainly depend on clinical examination and investigations. The obstetrician should work in collaboration with the physician.

**Differential diagnosis**
- Eclampsia
- Cerebral Malaria
- Meningitis
- Hypovolaemic shock
- Diabetic coma

The following should be done as the Airway, Breathing and Circulation (ABC) of resuscitation:
- Take history from carer and note patient's previous notes
• Quick examination should include; blood pressure (BP), pulse, temperature, jaundice, cyanosis, hydration, sweating, cold clammy extremities, respiration, heart sounds, PV bleeding, fundal height, foetal viability and neck stiffness
• Give intravenous fluids
• Investigation: Cerebral spinal fluid for bacteriology and biochemistry, blood for haemoglobin level, malaria slide, blood sugar and urea urinalysis

Treatment

• Intravenous line
• ABC of resuscitation
• Transfer to hospital
• Keep patient in high dependency ward (SOU)
• Nurse in left lateral position
• Keep airway patent
• Catheterise
• Treat the cause

5.6 Pre-Eclampsia and Eclampsia

Definition

Pre-eclampsia is pregnancy-induced hypertension with proteinuria occurring after 20 weeks of gestation. There are 2 types; mild pre-eclampsia and severe pre-eclampsia. When convulsions appear in this syndrome it is then called eclampsia. This is an obstetric emergency requiring immediate referral to a hospital

Diagnosis

5.6.1 Mild pre-eclampsia

This is when two measurements of diastolic blood pressure taken 4 hours apart read 90-100mmHg with proteinuria up to 2 and above..

5.6.2 Severe Pre-eclampsia

This is when diastolic blood pressure is 110mmHg or more with increasing proteinuria of 3+ or more.

5.6.3 Eclampsia

This is when there is diastolic blood pressure of 90mmHg or more with proteinuria of 2+ or more and convulsions. The signs of impending eclampsia are:

- Epigastric tenderness
- Increased tendon reflexes
- Blurred vision

5.6.4 Pre-eclampsia management as an outpatient
The reduction of the blood pressure does not abort the progression of the disease process and its effect on the foetus. At present the only effective management of pre-eclampsia is delivery of the baby. The more severe the disease condition, the greater the risk to both the mother and the baby. If the risk to the mother’s health is significant the baby should be delivered even if it is non-viable. If the disease is mild or moderate the baby can be kept in utero until it is viable provided close observation is kept on the mother, looking out for the complications of pre-eclampsia.

All patients with pre eclampsia should have a mid stream urine (MSU) specimen taken and be seen by a specialist. A check should be kept on the baby's growth with serial measurement of symphysio-fundal height. The woman should keep a kick chart. No antihypertensives are usually required for mild pre-eclampsia.

Complications
- Cerebral Vascular Accident (CVA)
- Renal failure
- Cardiac failure
- Foetal death
- Eclampsia

The definitive treatment is delivery.

Conservative management

5.6.5 Mild pre-eclampsia and gestation less than 37 weeks.

Management should include:
- Monitoring blood pressure
- Monitoring of foetal well being (kick chart, serial scans)
- Monitoring of urine output and urinalysis for proteinuria
- Renal function test
- Normal diet

Do not give anti-hypertensives, sedatives, tranquillisers or anticonvulsants.

Severe pre-eclampsia and eclampsia

Once the blood pressure is above 160/110mmHg the mother is at risk of stroke. The baby should be delivered.

There are four principles involved in the management:
Prevention or control of convulsions
- Control of hypertension
- Maintenance of fluid balance
- Delivery of the baby

General Management

- For patients with eclampsia maintain an airway.
- Monitoring of urine output (should not be less than 30ml/hour) Carry out urinalysis for proteinuria
- Renal function test
- Normal diet
- Maintain strict fluid balance chart
- Do bedside clotting test (failure of clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy)
• Avoid fluid overload

Management of hypertension

The drug of choice is Hydralazine. The drug should be titrated against the blood pressure with the aim of achieving a diastolic pressure of 90 – 100mmHg.

If diastolic BP ≥ 110mmHg reduce by giving
- Hydralazine IV 5mg bolus and repeated every 20 to 30 minutes OR
- Nifedipine 10mg sublingually
- Give methyldopa 250mg – 500mg every 6 – 8 hours orally for maintenance

Management of convulsions

The drug of choice is Magnesium Sulphate. Diazepam, despite its effects on the baby, may be used when magnesium sulphate is not available. Diazepam must be given intravenously, never orally or intramuscularly.

• Magnesium Sulphate (Mg SO₄)
  Loading dose: 4g of 20% magnesium sulphate intravenously, slowly over 5 minutes, then 5g intramuscularly in each buttock. (Total loading dose 14g.)
  Maintenance dose: 5g Magnesium Sulphate in alternate buttock every 4 hours. A total of six maintenance doses is recommended

Before repeating administration, ensure that:
• Respiratory rate is at least 16 per minute
• Patellar reflexes are present
• Urine output is at least 30ml per hour over 4 hrs

Withhold or delay MgSO₄ if:
• Respiration rate falls below 16 per minute
• Patellar reflexes are absent
• Urinary output falls below 30ml per hour over preceding 4 hrs

Keep antidote ready

In case of respiratory arrest:
• Assist ventilation (mask and bag apparatus, intubation)
• Give an antidote, calcium gluconate 1g (10ml of 10% solution) intravenously slowly until respiration begins as an alternative to Magnesium Sulphate:

Diazepam bolus 5-10mg IV over 2 minutes. Repeat as required if the patient is convulsing

Fluid balance

Fluid input and output must be monitored. Fluid should be replaced as required. However, be aware of fluid overload. Do not give more than 2.5litres in 24hours
No matter how oedematous a woman is if the urine production goes below 30 ml/hour, the patient should be given a fluid challenge of 1 litre Normal Saline given over 30 minutes. If the response is an increase of urine more fluid should be given. If there is no response the patient may be developing renal failure and should be referred to a specialist physician.

5.6.5 Pre-eclampsia and eclampsia in labour

- The patient should be monitored as a high risk one with BP checked every 30 minutes or less, if necessary
- Listen for the foetal heart every 15 minutes and/or during and immediately after a contraction
- The patient must be catheterised and fluid input and output monitored
- The patient should be given adequate pain relief
- The second stage of labour should be kept short and an elective vacuum extraction or forceps delivery done as soon as the patient is fully dilated
- Fresh meconium in the liquor and heart rate abnormality signifies foetal distress and the baby should be delivered by caesarean section
- Ergometrine should be avoided; instead oxytocin 5 units intramuscularly should be given with delivery of the anterior shoulder

5.6.6 Care for the neonate

The baby is likely to be in a poor condition and may require resuscitation
- Keep warm
- Give Oxygen ambu bag as required
- Suction

Post partum care

The patient must be closely monitored for at least 48 hours in a place where maximum care can be given. This usually means in the labour ward or a high dependency unit (SOU).

5.7 Medical Diseases in Pregnancy

5.7.1 Diabetic Mellitus

Pregnancy may turn otherwise well controlled diabetes into poorly controlled diabetes. Some women may develop diabetes during pregnancy. These cases must be referred to the hospital if attended at a health centre.

The following principles of care should apply:

- Pre-pregnancy counselling
- Pregnancy counselling
- Monitoring blood sugar with necessary adjustments to medication
- Monitoring foetal growth and looking out for macrosomia
- In labour monitor sugar and progress of labour
- If there is poor progress in labour, deliver by caesarean section
• Beware of shoulder dystocia
• Watch for hypoglycaemia in baby
• Care for the new born
• Follow up mothers

Post Natal Care
• Patient may resort to pre-pregnancy doses of insulin or hypoglycaemics

5.7.2 Cardiac diseases

The most common cardiac disease encountered in pregnancy is Rheumatic Heart Disease (RHD). The most prevalent of RHD is Mitral Stenosis (MS) and Mitral Incompetence (MI). (See chapter 7)

Management
• Pre pregnancy counseling
• If case found at booking clinical examination confirm diagnosis by echo cardiography
• During antenatal, all conditions that precipitate cardiac failure e.g. febrile illness, malaria, anaemia and increased physical activity must be properly managed
• Advise bed rest
• Give digoxin 0.25mg daily
• Frusemide should only be used in case of pulmonary oedema
• Admit to hospital in the 3rd trimester or in case of pulmonary oedema

In labour

Keep in high dependency ward in propped up position for at least 24 hours

Give:
• Pethidine 100mg IM as required
• Cefotaxime 1g 12 hourly (2 doses)
• Oxygen PRN
• Oxytocin 5 – 10 units intramuscularly for the 3rd stage
• Frusemide 40mg intravenously after the 3rd stage

Note: Avoid Ergometrine

Post natal
• Discharge after 3 –4 days after delivery
• Discuss contraception
• Discuss surgical treatment of heart disease

5.7.3 Malaria in Pregnancy
(Refer to chapter 3)

5.7.4 HIV in Pregnancy
(refer to Chapter 3)
5.8 Abortion

Definition

This is expulsion of products of conception, usually before 22 weeks of gestation. The contents of conception may or may not be completely expelled. It may be spontaneous or induced.

Clinical features

- Vaginal bleeding
- Ruptured membranes
- Expulsion of foetus
- Static uterine size (missed abortion)
- Abdominal pain/tenderness
- May have fever

Management

This depends on the type of abortion:

- Missed, incomplete, septic abortions need evacuation of the uterus
- Septic abortion needs aggressive management with antibiotics
- For inevitable abortion await expulsion of foetus or augment with oxytocin
- Infuse IV fluids as required

Emergency treatment

- Look out for signs of hypovolaemic shock and treat appropriately
- Provide pre-MVA counselling on procedure
- Monitor blood pressure, pulse and temperature
- Look for signs of anaemia
- Evacuate uterus, preferably by Manual Vacuum Aspiration (MVA)
- Give Oxytocin 5-10Units IV

Supportive

- Provide psychological support to patient and carer
- Treat infection with appropriate antibiotics
- Provide post-MVA counselling
- Provide family planning counselling
- Facilitate linkages to other reproductive health services

5.9 Menstrual Disorders

It is important to decide whether the menstrual disorder is truly a menstrual disorder or not. The menstrual history, type of contraceptive used, history of previous pregnancies, kind of discharge and related issues must be noted. The abdomen must always be examined for tenderness or masses. The vagina should also be examined and the condition of the cervix and any discharge should be noted.
5.9.1 Dysmenorrhoea

Definition

This is severe pain associated with the menstrual cycle and is usually referred to as period pains. This may be due to gynaecological or non gynaecological reasons. There are two types:

- Spasmodic
- Congestive

5.9.1.1 Spasmodic

This occurs primarily in teenagers and young multiparous women, but is not uncommon in elderly multiparous women.

Management

- Empathy and reassurance.
- Simple analgesics such as aspirin 600mg orally 3 - 4 times daily or paracetamol 1g orally 3 - 4 times daily.
- In severe pain, ibuprofen can be given 400mg twice daily throughout the menstrual period.
- If pain is very severe, contraceptive pills may be used for 6 months

Congestive

- In this condition the pain is due to organic cause such as pelvic infection, fibroids and endometriosis

Management

- Empathy and reassurance
- Simple analgesics such as aspirin 600mg orally 3 - 4 times daily or paracetamol 1g orally 3 - 4 times daily
- In severe pain, ibuprofen can be given 400mg twice daily throughout the menstrual period
- Treat the cause

5.9.3 Amenorrhoea

Definition

It is a condition characterised by absence of menstruation. There are two types i.e.

- Primary
- Secondary

5.9.3.2 Primary amenorrhoea

This is when a girl has not menstruated by 16 years of age. The genitalia and secondary sexual development may be normal or abnormal
Management

- Reassure patient
- Refer to specialist if patient does not have menstrual periods by 18 years of age or adscence of secondary sexual development

5.9.3.3 Secondary amenorrhoea

This is a condition where menstruation stops for more than 3 consecutive months. The most common cause of amenorrhoea is of course pregnancy. Some of the other causes include:

- Stress
- Anxiety
- Significant loss of weight
- Contraceptives e.g., Mini pill, Depo contraceptive injection
- Other hormonal medicines such as Danazol (alternative: 17beta-hydroxy-2,4,17alpha-pregnadien-20-yne [2,3-D]isoxazole) LHRH Analogue

A vaginal examination and laboratory investigations may help give the diagnosis.

Management

If pregnancy is not present, and amenorrhoea persists for one year or more without obvious disease refer to a specialist.

5.9.4 Oligomenorrhoea

Definition

This is when the menstrual cycle is more than 35 days. Usually, it has no consequences unless the patient complains of infertility. If infertile for more than one year, refer to a specialist.

5.9.5 Polymenorrhoea

Definition

This is when the menstrual cycle is less than 21 days. Wrong calculation of menstruation dates could be mistaken for polymenorrhoea. It can also be caused by meno-metrorrhagia. When no abnormalities are detected, the pill may be helpful. Refer to specialist if the pill does not help.

5.9.6 Meno-metrorrhagia

Definition
This is when the menstrual period lasts more than 7 days. Often there is also excessive blood loss and irregular vaginal blood loss.

**Diagnosis**

A good history taking (i.e. family planning method used etc.) is very important. The differential diagnosis includes:

- Abortion
- Carcinoma of the cervix
- Fibromyomata
- Dysfunctional Uterine Bleeding (DUB)
- Ectopic pregnancy

**Treatment**

- Progestogens treatment
- Fractionated Dilatation and Curettage (D & C) may be needed for older women or non response to hormone therapy.

### 5.9.7 Post menopausal bleeding

The most common cause is carcinoma of the cervix and uterus. A vaginal examination, including speculum should be done to exclude carcinoma of the cervix and uterus. Hormones and antibiotics should not be given before this is done.

Refer patient to specialist.
6.0 RESPIRATORY TRACT DISEASES

Respiratory tract diseases include upper and lower respiratory tract infections or as well as obstructive airway diseases.

6.1 Respiratory Tract Infections

6.1.1 Upper Respiratory Tract Infections

Respiratory Tract Infections involve lower and upper or both respiratory tract systems. These include the common cold, bronchitis and pneumonia.


Definition

This is a self-limiting disease caused by viruses and allergies. If it is viral, it is a highly infectious condition comprising mild systemic upset and prominent nasal symptoms.

Clinical Features

Symptoms
- Running nose/nasal congestion
- Cough
- Irritation of the throat
- Fever
- Sneezing

Complications
- Lower respiratory tract infection (see 6.1.2)
- Bronchitis and pneumonia

Treatment
- Analgesics;
  - Aspirin, 600mg 3 - 4 times daily or paracetamol, 500mg - 1g orally 3 - 4 times daily in adults, children; paracetamol, 10 - 20mg/kg 3 times daily
- Nasal decongestants
- Cough mixtures may offer symptomatic relief
- Take plenty of fluids

Note: (i) Aspirin is not recommended for children under 16 years.
(ii) Antibiotics are not indicated

Supportive
- Advise patient to take plenty of fluids

6.1.1.2 Laryngotracheobronchitis
Definition
This is an inflammation of the larynx, trachea and bronchus following an acute viral respiratory infection.

Clinical features

Symptoms
- Pain in the larynx
- Hoarseness of voice
- Irritating persistent cough
- Shortness of breath
- Fever

Signs
- Stridor
- Persistent or recurrent laryngitis

Treatment
Analgesics in early stages
- Paracetamol, 500mg – 1g orally 3 – 4 times daily in adults, 10 – 20mg/kg orally 3 – 4 times daily in children

Supportive
- Give more fluids and humidification

6.1.2 Lower Respiratory Infections
These conditions include Pneumonia and Bronchitis

6.1.2.1. Pneumonia

Definition
This is an inflammation of the lungs usually caused by Streptococcus pneumoniae, Mycoplasma pneumoniae and Staphylococcus aureus Hemophilus Influenzae type B and atypical organisms such as Jiroveci pneumonia.

Clinical features
These are usually of sudden onset.

Symptoms
- Fever
- Dry or productive cough
- Chest pain
- Chills
- Breathlessness
- Children may be unable to drink or breastfeed

Signs
6.0 RESPIRATORY TRACT DISEASES

- Bronchial breathing
- Drowsiness
- Increased respiration rate
- Cyanosis may be present
- Flaring of nostrils
- Chest indrawing
- Increased pulse rate
- Crepitations
- Breath sounds may be reduced
- Sputum may be “rusty”

Complications
- Septicaemia
- Lung abscess
- Emphysema
- Heart failure
- Meningitis

Diagnosis

This is based on clinical findings but may be supported by radiological examinations which show lobar and bronchial pneumonia.

Treatment

Some patients will need admission particularly if there is cyanosis or complications.

- Benzyl penicillin, 1-2MU intravenously 6 hourly for 5 days adults, children 25,000 -50,000 units/kg intravenously/intramuscularly in 4 divided doses for 7 days (as soon as the symptoms and respiratory rates are controlled change to oral medication i.e Amoxycillin 250mg for adults and 125 mg/5ml in children) or
- Ceftriaxone, 1g - 2g daily adults, children 20 - 50mg/kg daily intravenously/intramuscularly for 7 days. if allergic to penicillin or
- Erythromycin, 500mg adults, orally 6 hourly for 7 days, children 20-30mg/kg in 4 divided doses for 7 days
- Oxygen is indicated if respiratory distress or cyanosis is present
- Non-opiate analgesics; paracetamol 500mg - 1g orally 3 - 4 times daily adults, children 10-20mg/kg orally 3 - 4 times daily

Refer early to a specialist if the patient is not rapidly improving with antibiotic treatment.

6.1.2.2. Pneumonia in Children

If a child has cough or difficulty in breathing then he/ she may have a respiratory tract infection.

Clinical features
6.0 RESPIRATORY TRACT DISEASES

May include:
- Fast breathing
- Chest in drawing
- Stridor in a calm child
- Wheezing

It is important to count the respiratory rate of the child.

<table>
<thead>
<tr>
<th>If the child is:</th>
<th>Fast breathing is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 months up to 12 months</td>
<td>50 breaths per minute or more</td>
</tr>
<tr>
<td>12 months up to 5 years</td>
<td>40 breaths per minute or more</td>
</tr>
</tbody>
</table>

Classification
- **No pneumonia cough or cold**: child is classified as having no pneumonia cough or cold if there are no signs of pneumonia
- **Pneumonia**: a child is classified as having pneumonia if there is fast breathing accompanying wheeze or cough
- **Sever pneumonia**: a child is classified as having sever pneumonia if there is chest indrawing or stridor in a calm child

Treatment
- No pneumonia cough or cold:
  - If coughing for more than 21 days, refer for assessment,
  - If wheezing give oral salbutamol,
  - Follow up in 5 days if not improving
Pneumonia:

**Give an Appropriate Oral Antibiotic**
FOR PNEUMONIA, ACUTE EAR INFECTION OR VERY SEVERE DISEASE:

<table>
<thead>
<tr>
<th>AMOXYCILLIN</th>
<th>ERYTHROMYCIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Give three times daily for 5 days Amoxycillin</td>
<td>Give four times daily for 5 days 2nd-LINE ANTIBIOTIC:- Erythromycin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGE or WEIGHT</th>
<th>TABLET 250mg</th>
<th>SYRUP 125 mg per 5 ml</th>
<th>TABLET 250 mg</th>
<th>SYRUP 125/5 mls</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 months up to 12 months (4-&lt;10 kg)</td>
<td>½</td>
<td>5 ml</td>
<td>2 months up to 4 months (4-&lt;6kg)</td>
<td>¼</td>
</tr>
<tr>
<td>12 months up to 5 years (10-19kg)</td>
<td>1</td>
<td>10 ml</td>
<td>4 months up to 12 months (6-&lt;6kg)</td>
<td>½</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12 months up to 5 years (10-19kg)</td>
<td>1</td>
</tr>
</tbody>
</table>

**FOR DYSENTRY:** 1st –LINE ANTIBIOTIC:- Nalidixic Acid 2nd –LINE ANTIBIOTIC:- Cotrimoxazole
**NALIDIXIC ACID**
- Give four times daily for 5 days

<table>
<thead>
<tr>
<th>AGE or WEIGHT</th>
<th>TABLET 250 mg</th>
<th>COTRIMOXAZOLE (trimethoprim + sulphamethoxazole)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE OR WEIGHT</td>
<td></td>
<td>ADULT TABLET 80 mg trimethoprim + 400 mg sulphamethoxazole</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PEDRIATIC TABLET 20 mg trimethoprim + 100 mg sulphamethoxazole</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SYRUP 40 mg trimethoprim + 200 mg sulphamethoxazole per 5 ml</td>
</tr>
</tbody>
</table>

| 2 months up 4 months (4-<6 kg) | ¼ | 2 months up to 12 months (4-10kg) | ½ | 2 | 5 mls |
| 4 months up to 12 months (6-<10kg) | ½ | 2 months up to 5 years (10-19kg) | 1 | 3 | 7.5 mls |
| 12 months up to 5 years (10-19kg) | 1 | | | | |

**FOR CHOLERA:**
*1st-LINE ANTIBIOTIC:* Erythromycin

*Note:* Remember that the most important life saving interventions for cholera patients is immediate and appropriate rehydration.

**Give Salbutamol**
For wheezing with no respiratory distress (chest in-drawing)

<table>
<thead>
<tr>
<th>SALBUTAMOL</th>
<th>Give three times a day</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 months up to 12 months (&lt;10kg)</td>
<td>½</td>
</tr>
<tr>
<td>12 months up to 12 months (10-19kg)</td>
<td></td>
</tr>
</tbody>
</table>

**GIVE THESE TREATMENTS IN CLINIC ONLY**
- Explain to the caretaker why the drug is given
- Determine the dose appropriate for the child’s weight (or age)
- Use a sterile needle and syringe. Measure the dose accurately
6.0 RESPIRATORY TRACT DISEASES

6.1.2.3. Aspiration pneumonia

More common in newborn babies especially in premature, respiratory distress, chronically ill, chronic aspirators, post vascular operations

Treatment
- Gentamycin, 5mg/kg twice a day or I.M 10 mg once daily
- Ciprofloxacin, 10mg/Kg body weight 3 times daily, the benefit must outweigh the risk but may be used for 5 to 17 year olds.

6.1.2.4. Atypical Pneumonia

Signs and symptoms of pneumonia plus extrapulmonary signs such as arthritis, splenomegaly caused by Mycoplasma, Chlamydia, PCP,

Treatment:
6.0 RESPIRATORY TRACT DISEASES

- Erythromycin 500mg orally QID for 14 days for Chlamydia
- Cotrimoxazole 960mg every 12 hours for 21 days in combination with a steroid i.e. Prednisolone for PCP starting with 40mg per day and reducing by 5mg every 3 days for adults
- For children above 4 weeks to adults 120mg/Kg body weight in 2 to 4 divided doses for 21 days

6.1.2.5. Obstructive Airway Disease

Obstructive Airway Disease can be upper or lower.

6.1.2.5.1. Upper airway obstruction

The condition is caused by viral infection or inhaled foreign body. The main symptom is stridor.

When it is caused by viral infection the condition is called Croup. Croup is fairly common and is frightening to parents. Usually admission is advisable. If the infection has caused epiglottitis, the obstruction may be so severe as to necessitate tracheal incubation and antibiotics may be required.

**Treatment**
- Chloramphenicol 50 - 100mg/kg intravenously in 4 divided doses daily for 5 days
- Humidified oxygen (30 - 40% concentration)
- Dexamethasone 0.3mg/kg intramuscularly stat, Repeat after 6 hours.
- Naso-tracheo intubation or tracheostomy if obstruction is severe

**Stridor due to Diphtheria**

In stridor due to diphtheria, examination of the throat will reveal a white membrane. Diphtheria infection is uncommon nowadays.

**Treatment**
- Benzyl Penicillin IM/IV 25,000 - 50,000 units/kg intravenously in 4 divided doses for 5 days

**Prevention**
- Diphtheria can be effectively prevented by active immunisation in childhood

**Stridor due to inhaled foreign body**

Stridor due to inhaled foreign body is usually preceded by sudden chock whilst eating a meal or playing with small objects.

**Treatment**
- Remove foreign body

**Stridor due to inhaled Parrafin**

**Symptoms**
- Smell of paraffin
- Cynosis
6.0 RESPIRATORY TRACT DISEASES

- High respiratory rate
- Tachycardia
- Tachypnoea

Treatment

DO NOT INDUCE VOMITING!
- Give milk
- Hydrate
- Give Oxygen
- Antibiotic prophylaxis with Amoxycillin 125mg/5ml 3 times a day

Advice to patients
- Do not put paraffin in soft drink containers
- Clearly label paraffin containers

6.2. Lower obstructive airway diseases

Obstructive airway diseases are a spectrum of diseases characterised by obstruction of the lower airway with asthma and emphysema on either end of the spectrum.

6.2.1. Asthma

Definition

This is an acute or recurrent reversible obstructive airway disease characterised by increased responsiveness of the tracheobronchial tree to a variety of stimuli resulting into obstruction of the lower airways. The attacks can be precipitated by allergy, (especially to cat, horse or other animal hair or pollens), infection or exercise. The obstruction can be reversed by treating with beta adrenergic agents such as Salbutamol.

Clinical features

Symptoms
- Wheezing
- Difficulty in breathing
- Coughing
- Restlessness

Signs
- Prolonged expiration
- Cyanosis if severe
- Rapid pulse
- Dehydration
- Sticky, clear sputum
- Wheezing

If the pulse is over 120/min, the patient's condition must be regarded as serious and admission to hospital is urgent. Chest X-ray is necessary to exclude cardiac problems, pneumothorax or foreign body in the upper airway.
Treatment

Early vigorous treatment is important. The longer treatment is delayed the more difficult it is to reverse the process.

Mild Cases

These cases are not in acute distress and the pulse rate is usually not above 100/min. They are not cyanosed or dehydrated.

- Salbutamol, 2-4mg orally three times daily
- Salbutamol inhaler 2 puffs stat. Followed by 1 puff 4-6 hourly

Note: Inhaled corticosteroids e.g. beclomethasone, 2 puffs given 10 minutes after salbutamol inhaler may be used.

The patient must be taught how to use the inhaler. Check that he can use it correctly. If he/she cannot learn, use oral Salbutamol 4mg 3 times daily though. it may cause extrapyramidal symptoms

Severe cases

The features are:
- Difficulty in breathing
- Sitting up in distress
- Difficulty in talking and drinking
- Pulse over 120/minute
- Exhaustion
- Dehydration
- Cyanosis
- Silent chest on auscultation

The patient should be admitted to hospital urgently for close monitoring.

The patient should be nursed on a propped up bed and be given a sputum cup.

The pulse and blood pressure should be checked every hour.

If possible, Peak Expiratory Flow Rate (PFR) should be measured hourly.

Treatment

- Intravenous fluids, 3 litres per day; (1 litre 0.9% sodium chloride and 2 litres 5% dextrose)
- 20mmol potassium chloride added to 1L of any of above fluids in 24 hrs
- Humidified oxygen through a mask, 3 litres/minute
- Nebulised salbutamol 5mg stat given through a nebuliser. Follow this first dose by nebulised salbutamol 2.5mg every 4 hours
- Hydrocortisone, 200mg intravenously 4 hourly
- Start oral prednisolone, 30mg once daily for 5 days
- Aminophylline 250mg i.v. over 5-10mins followed by a maintenance dose of 100mg (less than 500mg over 24hours) 8 hourly over 24 hours. If the patient has heart disease, liver disease or is taking betablockers reduce the dose of aminophylline. Always give oxygen with aminophylline. **Patients who have taken oral aminophylline in the last 8 hours should not be given the loading dose.**
- Antibiotics. If there is evidence of bacterial infection give appropriate antibiotic

Treatment
The asthmatic child

General principles of management are the same as for adults. However the following should be noted:

Child with wheezing but no rapid breathing:
- Salbutamol, 1mg orally 3 times a day (10-19 kg) and 2mg 3 times daily (over 20 kg)

Child with wheezing and respiration rate of over 50 per minute:
- Salbutamol as an aerosol in diluted solution, using a nebuliser and enriched air with oxygen. Give this over a period of 10 minutes and repeat 2-3 hourly as necessary. Follow with oral salbutamol

Very ill child:
- Nebulised salbutamol plus aminophylline 4 mg/kg intravenously, slowly over 5 minutes followed by infusion 0.75 mg/kg/hour
- Hydrocortisone 50-100mg intravenously 2-4 hourly
- At the same time start prednisolone 5-20mg orally 6 hourly depending on age of child
- If infection is present (as it often is in severe attack) give appropriate antibiotic
- Check for allergy

6.2.2. Emphysema

This is an irreversible obstruction of the airways characterised with destruction of the alveoli and bronchioles by fibrosis.

Clinical Features

Symptoms
- Severe shortness of breath with slight exertion
- Recurrent coughs
- Slight wheezing
- Barrel chest

Signs
- Barrel chest
- Clubbing of fingers
- Hyper inflated lungs on X-ray
- Air trapping on X-ray

Treatment

Treat causes of exacerbations of the conditions
- Hydrocortisone 200mg intravenously 4 hourly for 24 hours and maintain on oral Prednisolone 30mg on alternate days
- Suction of the fluid from the airway
- Give an appropriate antibiotic i.e. Erythromycin 500mg while awaiting sputum results

Supportive
6.0 RESPIRATORY TRACT DISEASES

- Give up the habit that caused the emphysema e.g. stop smoking,
- Give oxygen

Prevention

- Stop smoking
- Reduce industrial exposure
- Wear gas masks
7.0 CARDIOVASCULAR DISORDERS

7.1 Hypertension

Hypertension is one of the leading public health problems worldwide. It is often asymptomatic, easily detectable, and potentially easily amenable to treatment. Yet, if left untreated it often leads to fatal complications. Since hypertension tends to be asymptomatic, public education about the dangers of hypertension plays a significant role in the overall management of hypertension.

Definition

The World Health Organization defines grade 1 hypertension as office blood pressures ranging from 140–159 mm Hg systolic or 90–99 mm Hg diastolic, grade 2 hypertension as pressures of 160–179 mm Hg systolic or 100–109 mm Hg diastolic, and grade 3 hypertension as pressures equal to or greater than 180 mm Hg systolic and 110 mm Hg diastolic. The baseline figures do not apply to children, diabetic mellitus patients, renal patients and pregnant women (hypertension in pregnancy, refer to chapter 5.6). The frequency of hypertension increases with age.

Risk Factors with Adverse Prognosis

- Black race
- Youth
- Male sex
- Persistent diastolic pressure greater than 115mmHg
- Smoking
- Excess alcohol intake
- Hypercholesterolemia
- Diabetes Mellitus

Classification of Hypertension

The National Heart, Lung, and Blood Institutes classify blood pressure as normal, prehypertension, hypertension stage 1, and hypertension stage 2.

1. Normal (optimal)

<table>
<thead>
<tr>
<th>Systolic (mmHg)</th>
<th>Diastolic (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 120</td>
<td>&lt; 80</td>
</tr>
</tbody>
</table>

2. Hypertension

<table>
<thead>
<tr>
<th>Stage</th>
<th>Severity</th>
<th>Systolic Range(mmHg)</th>
<th>Diastolic Range(mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prehypertension</td>
<td></td>
<td>120-130</td>
<td>80 - 89</td>
</tr>
<tr>
<td>I</td>
<td>mild</td>
<td>140 - 159</td>
<td>90 – 99</td>
</tr>
<tr>
<td>II</td>
<td>( moderate-severe)</td>
<td>&gt; or = 160</td>
<td>&gt; or = 100</td>
</tr>
</tbody>
</table>

From the Seventh Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure
Aetiology of Hypertension

- Primary (essential) Hypertension
- Secondary Hypertension
- Systolic Hypertension
- Hypertensive Crises (acute hypertension)

7.1.1 Primary Hypertension

This is hypertension for which there is no specific identifiable cause. About 90% of hypertension cases fall under this category.

7.1.2 Secondary Hypertension

This is hypertension due to a specific underlying condition or conditions. Some of the causes include the following:
- Renal Parenchymal Diseases
  - e.g. glomerulonephritis
- Renovascular Diseases
  - e.g. atherosclerotic (mainly older men) and fibroplastic (mostly younger women) diseases.
- Endocrine Diseases
  - e.g. pheochromocytoma, Cushing’s Syndrome.
- Cardiovascular Disease
  - e.g. coarctation of aorta
- Pregnancy (gestational hypertension)
- Drugs
  - e.g. oral contraceptives, erythropoietin, steroids

7.1.3 Systolic Hypertension

7.1.4 Hypertensive Crises

These are clinical situations associated with blood pressure rising to levels usually above 130 mmHg diastolic. There are two types: hypertensive emergency which is associated with acute end-organ dysfunction (brain, heart and kidneys). In this setting there is a high risk of causing irreversible damage to the brain, heart or kidneys if blood pressure is not controlled within an hour or so. Hypertensive urgency is the other setting with equally markedly raised BP but without significant signs or symptoms suggestive of end organ damage. In this setting BP reduction may be gradual over 24 hours.

Other terms used in this situation are accelerated-malignant hypertension depending on retinal findings during funduscopy examination. If there are haemorrhages and/or exudates on the retina then it is referred to as accelerated hypertension but if there is papilloedema then it is called malignant hypertension. From a therapeutic point of view both forms are treated in practically the same way.

Clinical Features

Hypertension is usually asymptomatic until when it has caused complications and damage to target organs. At this point the symptoms are thus associated with the affected organ.

Symptoms
7.0 CARDIOVASCULAR DISORDERS

- Palpitations
- Dizziness
- Shortness of breath
- Blurred vision

Signs

- Tachycardia
- Cerebral vascular insufficiency
- Crepitatis hypertensive
- Retinopathy

Complications

- Atherosclerosis
- Cerebral vascular insufficiency
- Cerebral vascular accident
- Congestive heart failure
- Coronary artery disease
- Peripheral vascular insufficiency
- Dissecting aortic aneurysm
- Hypertensive retinopathy
- Hypertensive nephropathy

Management

To document presence or absence of end organ damage to exclude possibility of a secondary cause of hypertension and other co-morbidities.

Investigations

- Urinalysis
- Fundoscopy
- Electrocardiogram
- Chest x-ray
- Echocardiogram
- Urea, creatinine and electrolytes
- Random blood sugar
- Cholesterol

Treatment

The objective of treating high blood pressure is both to prevent and lower cardiovascular related complications such as strokes, renal failure and heart failure. Hypertension not responding to treatment should be referred to a specialist for further investigations.

Prevention
The initial approach to treatment is that of lifestyle modification. i.e. smoking cessation, weight reduction to optimal weight, regular exercise, reduction in alcohol intake, dietary modifications (e.g. salt reduction)

**Drugs**

Goals of therapy – blood pressure less than 140/90 mm HG and less than 130/80 mm Hg for those with diabetes and chronic kidney disease.

**Step 1.**
- Start with Diuretics (e.g. Amiloride + Hydrochlorothiazide (5/50mg) orally daily)
  - or
- Calcium channel blockers (Nifedipine retard 20 mg two times daily orally or Amlodipine 5-10 mg once daily orally)
  - or
- Angiotensin converting enzyme inhibitors (Captopril 25-50 mg two or three times daily orally, Enalapril 5-20 mg once daily orally). Those who cannot tolerate ACE-I may be given Losartan potassium 50-100 mg once daily orally

**Step 2.**
- Use a combination of drugs from different groups (e.g. Diuretic + ACE I, or Ca channel blocker + ACE I)

**Step 3.**
- Use a combination of Diuretic + ACE I + Ca channel blocker

**Step 4.**
- If not controlled as above, optimize the dose, add further diuretic therapy
  - or
- Alpha blocker (Prazosin 0.5mg two to three times daily orally – initial should be at bed time to avoid postural hypotension – then increase to 1-3 mg two to three times daily after three to seven days, maximum daily dose 20 mg)
  - or
- Add beta blocker – Atenolol 50-100 mg once daily orally, Propranolol 40-80 mg two or three times daily orally
  - or
- Hydralazine 25-50 mg two or three times daily orally

Beta blockers are no longer preferred as a routine initial therapy for hypertension, however can be used in younger people, patients with cardiovascular risk or existing ischemic heart disease, those with contraindications or intolerance to ACE I, as adjunctive drugs to other antihypertensive.

**Emergency** – very severe to malignant hypertension:
- Start with Labetalol 50 mg IV over at least a minute, repeated after five minutes if necessary, maximum dose is 200 mg
- or
- Hydralazine 10 mg IV stat followed by 5 mg IV every 30 minutes until diastolic BP is 110 mm Hg or less
- or
- Frusemide 40-80mg IV may be used as adjunctive therapy as a stat dose

**7.2 Congestive Heart Failure**
Definition

This is a condition in which an abnormality of cardiac function is responsible for the inability of the heart to meet the requirement of the metabolising tissues.

Causes

Some underlying causes of heart failure:
- Valvular Heart Disease e.g. mitral valve regurgitation
- Viral Myocarditis
- Congenital Heart Disease
- Hypertension
- Cardiomyopathies
- Pericardial diseases
- Ischaemic heart disease
- Arrhythmias
- Thyroid dysfunctions
- Anaemia

Precipitating Causes
- infection including endocarditis
- anaemia
- thyrotoxicosis
- arrhythmias
- systemic hypertension
- pulmonary embolism
- pregnancy

Forms of Heart Failure
- Diastolic
- High output
- Low output
- Right sided
- Left sided

Clinical Features

Symptoms
- Fatigue
- Shortness of breath at rest or on exertion
- Orthopnoea
- Paroxysmal Nocturnal Dyspnoea
- Cough
- Anorexia
- Swollen legs
- Abdomen distension

Signs
- Neck vein distension
7.0 CARDIOVASCULAR DISORDERS

- Basal crepitations (rales)
- cardiomegaly
- S2 gallop
- Hepatomegaly
- Hepatojugular reflux
- Pulmonary oedema
- Tachycardia
- Ankle oedema
- Pleural effusion
- Ascites

Management

Investigations
- chest x-ray
- ECG
- Echocardiogram
- Full Blood Count
- Liver function test
- Urea, creatinine, electrolytes
- Urinalysis routine and microscopic

The following tests are not routinely ordered unless there is a clinical indication:
- cardiac enzymes
- Thyroid function tests
- Cardiac catheterisation
- HIV test

Treatment

This is divided in 3 parts:
- Remove precipitating cause
- Correct underlying cause e.g. valve replacement in Mitral regurgitation
- Control congestive heart state

General Measures
- Restrict physical activities
- Restrict salt and water
- Lifestyle modification (no smoking, no alcohol, nutrition)

New York Heart Association functional class. (NYHA)

1. Class I Asymptomatic
2. Class II Symptomatic on moderate exertion
3. Class III Symptomatic on mild exertion
4. Class IV symptomatic at rest

Drugs
1. **Class I**  Asymptomatic
   - Most patients do not require medicine but will require lifestyle modifications.

2. **Class II**
   - Captopril 12.5mg to 25mg twice a day orally
     OR
   - Lisinopril 5 - 10mg daily orally
     OR
   - Enalapril 5mg to 20mg daily orally (if patient develops a persistent dry cough replace with Losartan 50mg daily orally)
   - Hydrochlorothiazide 25mg daily or oral Frusemide 20 – 40mg daily
   - Beta blockers (Carvedilol 3.125 mg twice daily orally, increase dose at least every two weeks to 25mg twice daily, if patient is over 85 Kg then maximum dose 50mg twice daily or use Metoprolol 50 – 100mg daily orally)

3. **Class III**
   - Captopril 25mg 2 to 3 times daily
     OR
   - Lisinopril 10mg to 20mg daily
     OR
   - Enalapril 5mg to 20mg daily orally (if patient develops a persistent dry cough replace with Losartan 50mg daily orally)
   - Frusemide 40mg – 80mg twice a day orally (monitor potassium levels)
   - Digoxin 0.25mg daily
   - Isosorbide dinitrate 5mg to 10mg twice a day + Hydralazine 25 – 50mg twice daily orally if patient cannot tolerate Ace inhibitors
   - Acetylsalicylic Acid (ASA) 75mg once daily

4. **Class IV**
   - Captopril 25mg 2 to 3 times daily
     OR
   - Lisinopril 10mg to 20mg daily
     OR
   - Enalapril 5mg to 20mg daily orally (if patient develops a persistent dry cough replace with Losartan 50mg daily orally)
   - Frusemide I.V. 40mg – 80mg once or twice a day (monitor potassium levels)
   - Digoxin 0.25mg daily
   - Isosorbide dinitrate 5mg to 10mg twice a day + Hydralazine 25 – 50mg twice daily orally if patient cannot tolerate Ace inhibitors
   - Spironolactone 25 – 50 mg twice daily orally
   - Acetylsalicylic Acid (ASA) 75mg once daily

**7.2.1 Cardiogenic shock**

This is advanced cardiac failure with inadequate peripheral perfusion

**Clinical Features**
7.0 CARDIOVASCULAR DISORDERS

Symptoms
- As above but severe

Signs
- BP less than 90mmHg systolic
- Pulse feeble or non detectable
- Cold extremities
- Peripheral cyanosis
- Poor urine output
- Comatose

Treatment
- ICU care
- Oxygen
- Dopamine 5-10 mcg per Kg/bwt per minute I.V. infusion (dilute 400mg in 500ml of 5% Dextrose infusion rate to be calculated according to body weight)
- Acetylsalicylic Acid (ASA) 75mg once daily
- If BP goes above 90mmHg treat as class IV

7.2 Cardiomyopathy

Definition
This is characterised by dilatation of both left and right ventricles.

Treatment
Treat as in heart failure

7.2.2 Hypertrophic

Definition
This is characterised by marked asymmetric hypertrophy of left ventricle without obvious cause. It is usually inherited in an autosomal dominant manner.

Clinical Features

Symptoms
- Chest pains
- Fatigue
- Syncope attack (fainting)
- Palpitations

Signs
- Aarythmias
- Systolic murmur on left sternal border
7.0  CARDIOVASCULAR DISORDERS

Diagnosis
- Echocardiography
- Holter Monitor

Treatment
- Propranolol, 10-40mg 3-4 times a day,
- Atenolol, 25-50mg daily, (use with care in people who have asthma. Occasionally, beta-blockers may make you feel tired or lethargic, cause sleep disturbance, and pain in the hands and feet during cold weather).
- Acetylsalicylic Acid, (ASA) 75mg once daily

7.2.2.2 Restrictive cardiomyopathy

Definition
This is a condition of restricted ventricular filling resulting in diastolic heart failure.

Clinical Features

Symptoms
- Fatigue
- Abdominal distension/discomfort
- Oedema
- Shortness of breath

Signs
- Elevation of jugular venous pressure with inspiration
- Hepatic enlargement
- Ascites
- Fourth heart sound

Management
- ECG
- Echocardiogram
- Transvenous endocardial biopsy

Treatment
- There is no specific treatment.
- Cardiac failure (refer to chapter 7.2) and embolic problems should be treated.
- Cardiac transplantation should be considered in severe cases.
7.3. Myocardial Infarction

Definition

This is a necrosis of part of the cardiac muscle due to sustained myocardial ischemia of more than 30 minutes and formation of thrombus coronary artery.

Clinical Features

Symptoms
- Chest pain of greater severity and duration (>30 minutes) than in angina but similar in nature
- Shortness of breath
- Sweating
- Extreme distress

Some infarcts may be painless e.g. in the elderly and diabetics

Signs
- Distress
- Coldness and clamminess of extremities
- Tachycardia
- Raised or lowered blood pressure
- Cyanosis
- Arrythmias

Complications
- Arrhythmias
- Heart Failure
- Hypotension
- Pericardial effusion
- Systemic embolisation
- Dressler’s syndrome (autoimmune syndrome-pericarditis, pneumonia, pleurisy)
- Papillary muscle rupture
- Cardiogenic shock
- Rupture of ventricular septum or ventricular wall
- Left ventricular aneurysm with Left Ventricular Failure

Management

- Investigations
- ECG
- Cardiac enzymes (troponin T and I, CPK)
- Echocardiography
- Chest X-Ray
- Urea and Electrolytes (U + E)
- Full Blood Count
- Erythrocyte Sedimentation Rate
- Lipid profile

Diagnosis requires at least two of the following;
7.0 CARDIOVASCULAR DISORDERS

- History of ischaemic-type chest pain
- Evolving ECG changes
- A rise and fall in cardiac enzymes

Treatment

Keep under close observation or refer for management in intensive care unit.

Drugs

- Oxygen by mask or nasal catheter
- Access to IV line
- Morphine 5-10mg intravenously at about 1mg per minute
- Glyceryl trinitrate 0.5mg sublingually
- Aspirin 300mg orally to chew stat
- Streptokinase, 1,500,000 units in 100ml of 0.9% saline intravenously over 1 hour (If presentation is less than 12 hours after onset of pain) (Do not give if there is stroke or active bleeding in the last 2 months, blood pressure > 200mmHg, surgery or trauma in last 10 days, bleeding disorder, pregnancy, diabetic retinopathy, previous streptokinase or any thrombolytic treatment in the last 5 days to 1 year)
- Heparin, 5000 I.U intravenously stat, then 1000 I.U hourly intravenously for 24hrs for 3-5 days
- ACE inhibitors i.e. Enalapril 5-10mg daily
- Beta blockers e.g. Atenolol 50mg daily
- Antacids e.g. IV Ranitidine 50mg three times daily
- Laxatives, e.g. Lactulose 15 – 30ml two – three times daily orally
- Diazepam, 5 mg orally daily
- Aspirin, 75-150 mg daily.
- Statins e.g. Simvastatin 10 – 20mg daily orally
- Isosorbide dinitrate, 10mg three times a day

If pain continues;
  - Nitroglycerine I.V. infusion 10 – 200 mcg/minute

Supportive

✓ Reassure the patient and carers
✓ Continuous ECG monitoring
✓ 24 hour bed rest
✓ 24 hour Temperature, Pulse and Respiratory rates
✓ 24 hour blood pressure readings
✓ Daily 12 lead ECG, Chest X-Ray, cardiac enzymes, and U&E for 2-3 days
✓ Refer patient for coronary angiography

Prevention

✓ Low lipid diet
✓ Stop smoking
✓ Regular exercise

7.4. Angina Pectoris

Definition

This is chest pain due to myocardial ischemia
Clinical features

Symptoms
- Chest pain: The pain is central/retrosternal and may radiate to the jaw / or arms.
- Breathlessness

Signs
- Fourth heart sound
- Anxiety
- There may be no signs

Management
- ECG
- Exercise ECG
- Echocardiogram
- Lipid profile
- Coronary angiography

Treatment

Drugs
- Aspirin, 75 - 300mg orally once daily
- Glyceryl trinitrate, 0.3 - 1mg sublingually, repeated as required or
- Isosorbide dinitrate, 5 - 10mg sublingually, 30 - 120mg orally in 2 divided doses daily.
- Atenolol, 50 - 100mg orally daily
- Nifedipine, 10 - 20mg orally once or twice daily
- Statins e.g. Simvastatin, 10 – 20mg daily orally

Coronary angioplasty

Surgery
- Coronary by-pass

Supportive
- Manage co-existing conditions
- Stop smoking
- Weight loss
- Encourage regular exercise

7.5 Pulmonary Oedema

Definition
Acute left ventricular failure due to various cardiac conditions or due to severe mitral stenosis with pulmonary hypertension

Clinical features

Symptoms
7.0 CARDIOVASCULAR DISORDERS

- Breathlessness
- Wheezing
- Profuse sweating
- Productive cough
- Bloodstained sputum

Signs
- Paroxysmal dyspnoea
- Anxiety
- Blood stained sputum
- Tachypnoea
- Peripheral circulatory shut down
- Crackles
- Wheezing

Diagnosis

Investigations
- Arterial gases
- Chest X-Ray
- Central venous pressure
- ECG
- Echo
- Cardiac enzymes

Treatment

The patient should be placed in a sitting position.

Drugs
- Frusemide, adults: initially 40mg to 120mg I.V. Stat, thereafter continue Frusemide 20mg-daily orally or 40mg on alternate days
- Morphine 5mg to 10mg I.V. slowly
- Oxygen 60% via mask
- Glyceryl trinitrate, 0.3 - 1mg sublingually, repeated as required

Underlying conditions should be treated

7.6. Rheumatic Fever

Definition

This is an inflammatory disease that occurs in children and young adults (5 - 15 years) as a result of infection with group A streptococci. It affects the heart, skin, joints and central nervous system. Pharyngeal infection with group A streptococcus may be followed by the clinical syndrome of rheumatic fever. This is thought to develop because of an autoimmune reaction triggered by the infective streptococcus and not due to direct infection of the heart or the production of a toxin.

Clinical features

Revised Jones criteria for the diagnosis of rheumatic fever
7.0 CARDIOVASCULAR DISORDERS

Major

- Carditis
- Polyarthritis
- Sydenham’s chorea
- Erythema marginatum
- Subcutaneous nodules

Minor

- Arthralgia
- History of rheumatic fever
- Fever
- Increased P-R interval on ECG
- Raised ESR
- Increased C-reactive protein

Evidence of streptococcal infection
Raised ASO titre (or increased titre of other specific antistreptococcal antibodies)
Positive throat culture

Diagnosis

Investigations
- Throat swab
- Serology
- ESR

Diagnosis is made on the basis of two or more major criteria or one major plus two or more minor criteria plus evidence of antecedent streptococcal infection.

Treatment

Drugs
- Benzathine penicillin 0.6 – 1.2 mega units intramuscularly stat or
- Phenoxymethyl penicillin 500mg orally 4 times daily for 7 days. For recurrences 250mg daily until the age of twenty or for 5 years after the latest attack or
- Erythromycin, 250 – 500mg orally 4times daily for 7 days. For recurrences 125 – 250mg once daily until the age of twenty or for 5 years after the latest attack
- Prednisolone 1 – 2mg/kg per day divided into 4 equal doses for 10 days (in severe carditis)

Chronic rheumatic heart disease

More than 50% of those who suffer acute rheumatic fever with carditis will later develop chronic rheumatic valvular disease predominantly affecting the mitral and aortic valves.

Complications
- Congestive cardiac failure
- Pulmonary oedema
Management

Investigations
- Chest X-Ray
- ECG
- Echo

Treatment
- Treat underlying complications.
- Give prophylaxis against recurrent rheumatic fever
- Give prophylaxis against infective endocarditis

Refer
- For further evaluation if patient has significant heart murmurs
- All patients with increasing cardiac symptoms

7.7 Cardiac Arrhythmias

Definition
This involves the disorders of cardiac impulse formation, automaticity, impulse conduction, heart rate and abnormal ectopic activity.

Clinical features

Symptoms
- palpitation
- missing heart beats
- Dizziness and syncope
- Difficulty in breathing

Signs
- Increased or decreased pulse and heart rate (more than 100 or less than 60/min)
- Irregular pulse and heart rate
- Features of heart failure

Bradyarrhythmias (sinus bradycardia, sinus node dysfunction, atioventricular blocks).
Tachyarrhythmias (atrial fibrillation and flutter, supraventricular and ventricular tachycardias).
Premature atrial and ventricular contractions.

Investigations
- ECG
- Ambulatory ECG monitoring (Holter)
- Serum electrolytes level

Management

Bradyarrhythmias:
Sinus bradycardia – no treatment required unless symptomatic, remove offensive drugs (e.g. B-blockers, digoxin), if symptomatic – Atropin 0.6 mg IV or cardiac pacing

Sinus arrhythmia – no treatment needed

Atrioventricular block 1st degree – treat underlying causes (carditis, drug toxicity).

Atrioventricular block 2nd degree – may require cardiac pacing, refer to specialist

Atrioventricular block 3d degree – cardiac pacing, refer to specialist.

Tachyarrhythmias:

Supraventricular tachycardia – start with vagal stimulation (unilateral carotid massage, Valsalva maneuver), drug of choice Adenosin 6 mg IV push, if no response give 12 mg IV push. Other drugs – Verapamil 2.5-5.0 mg IV slowly. Refer to specialist.

Ventricular tachycardia – if the patient’s condition is unstable – defibrillate at 50-100 J. If patient is stable, pharmacological treatment: Amiodarone 300 mg IV over 10 min, followed by infusion at 1mg/min for 6 hours; Lignocaine 100mg IV bolus, followed by infusion of 4 mg/min for 30 min, 2 mg/min for 2 hours, then 1 mg/min.

In case of multifocal Ventricular tachycardia use Magnesium sulfate 1-2 g IV.

Atrial fibrillation:

- Rate control can be achieved by Digoxin 0.125-0.25 mg once or two times daily orally, Verapamil 40 to 80 mg three times daily orally, Diltiazem 60 mg three times daily orally
- Amiodarone 200 mg three times daily orally 1st week, then reduce to 200 mg two times daily (maintenance dose 200 to 400 mg daily)
- Electrical cardioversion (refer to specialist)
- Anticoagulation therapy (to reduce the risk of systemic embolization) – Aspirin 75-150 mg once daily orally, Warfarin 2.5-10 mg once daily orally (to maintain INR 2.5 to 3.5)

Premature atrial contractions – no treatment required

Premature ventricular contractions – no treatment if asymptomatic, if symptomatic or frequent – B-blockers (Propanolol 40-80 mg three times daily orally), Amiodarone 200 mg three times daily orally for 5-7 days, then reduce to 200 mg two times daily (maintenance dose 200-400mg daily).

7.8 Cardiopulmonary Resuscitation and Advanced Cardiac Life Support

Basic life support (BLS)

Goals of resuscitation – to maintain cerebral perfusion until cardiopulmonary function is restored.

1. Check responsiveness by gently shaking the patient.
2. Call for help, fetch defibrillator and oxygen and airway adjuncts, resuscitation kit.
3. Position the patient on a firm flat surface.
4. Open the patient’s airway and assess for the presence of respiration.
5. If respiration is not present, give 2 slow breaths. Ambu bag can be used.
6. Oxygen administration.
7. Check circulation (palpate for carotid pulse), if not present start CPR.
8. Initiate chest compressions (position both hands over the lower part of the sternum and compress at the rate of 15 compressions/2 breaths).
9. Once the patient is intubated, ventilation can be at a rate of 12-15 per minute without pausing for compressions.
10. Check every 1-2 minutes if the patient has resumed spontaneous breathing or circulation.

Advanced cardiac life support

Advanced cardiac life support (ACLS) is an extension of BLS and usually is implemented by a team with the use of necessary facilities.

1. IV access.
2. Attach defibrillator-monitor if available.
3. Assess cardiac rhythm.

If Ventricular tachycardia or ventricular fibrillation:
- Defibrillate up to 3 times (200 J, 200 to 300 J, 360 J)
- If defibrillation is not available or delayed, precordial thump can be used to terminate VT/VF
- Epinephrine 1mg IV push, repeat every 3-5 minutes
- Resume defibrillation if no response (1 x 360 J)
- Consider antiarrhythmic drugs – Amiodarone 300 mg IV push or Lignocaine 1.0-1.5 mg/kg IV push or Magnesium sulfate 1-2 g IV push
- Resume attempts to defibrillate

Identify and treat reversible causes: hypovolemia, hypoxia, hypo- or hyperkalemia, hypothermia, acidosis, cardiac tamponade, pulmonary embolism, myocardial infarction, poisoning.

If asystole:
- Continue CPR
- Epinephrine 1 mg IV push every 3-5 minutes until there is a cardiac rhythm or CPR is stopped
- Atropine 1 mg IV push, repeat every 3-5 min, maximum of 3 mg
- Treat reversible causes (see above)

8.0 MALIGNANCIES

Malignancies are caused by abnormal cells that cause cancer and can affect any organ in the body.

8.1. Leukaemias

Definition

These are diseases characterised by the proliferation of a single malignantly deranged committed cell in the haemopoietic system. Leukemia’s are classified according to the morphological cell type involved and the speed of evolution of the disease.

- Acute Lymphoblastic Leukaemia (ALL)
- Acute Myelogenous Leukaemia (AML)
- Chronic Lymphatic Leukaemia (CLL)
- Chronic Myeloid Leukaemia (CML)

Acute leukaemia, if untreated, has a rapidly fatal course. Chronic leukaemia has a more prolonged course but patients invariably die from it.

8.1.1 Acute Lymphoblastic Leukaemia (ALL)

Definition

This is a malignant disease of the lymphopoetic stem cell arising from bone marrow, thymus or lymphatic nodes

Clinical features

Any age may be affected but it is most common in 4-8 year olds. The male to female ratio is 1:1

Symptoms

- Fatigue
- Headache
- Palpitations
- Bleeding into skin, nose and mucous membrane
- Infections such as sore throat, pneumonia and bone pain

Signs

- Pallor
- Bleeding gums
- Gum hypertrophy
- Lymphadenopathy
- Bruises
- Petechial haemorrhages
- Bone tenderness
- Splenomegaly
- Hepatomegaly
- Haemorrhages in the optic fundi
- Hard enlarged testicles
- Opportunistic infections
Management

Diagnosis

- Full blood count which shows a normocytic/normochromic anaemia
- The White Blood Cell (WBC) count may be normal or raised (50,000 or more)
- The platelet count is usually reduced to below 150x10^9/L
- The peripheral smear shows lymphoblasts (leukaemic cells)
- Bone marrow aspirate shows more than 5% lymphoblasts
- The CSF prepared sediment may show blast cells if meningeal leukaemia is present

Bone marrow biopsy should be performed in all suspected cases. It should show more than 5% lymphoblasts. Lumbar puncture may be done if meningeal leukemia is suspected. This should show blast cells in the CSF.

Treatment

Chemotherapy

Phase I, Remission induction:

- Vincristine 1.5mg/m² intravenously day 1, 8, 15 & day 22
- Prednisolone 60mg/m² orally daily on day 1 – 28 then taper dose to
- 30mg/m² daily for days 29 - 31; then 15mg/m² daily for days 32 – 35
- Stop drug on day 36
- Adriamycin 30mg/m² intravenously on day 1 & 15
- L-Asparaginase 6000i.u/m² intramuscularly 3 times a week for 3 weeks (Monday, Wednesday, Friday - total 9 doses)

Triple intrathecal (TI) therapy on days 15 and 28

- Cytarabine age adjusted dose (see table below)
- Methotrexate age adjusted dose (see table below)
- Hydrocortisone 20mg – 50mg

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Phase II CNS/intensification:

Duration is 5 weeks; treatment preferably started on a Monday

- 6-Mercaptopurine 50mg/m² orally daily on day 1 – 28
- Cyclophosphamide 1g/m² intravenously on day 1 & 15
- Cytarabine 75mg/m² intravenously push
  On day 2, 3, 4, 5 (Tuesday – Friday)
  On day 9, 10, 11, 12, (Tuesday – Friday)
  On day 16, 17, 18, 19 (Tuesday – Friday)
  On day 23, 24, 25, 26 (Tuesday – Friday)
- Methotrexate intrathecally age adjusted dose day 12, 26
- Cranial radiotherapy may be considered

Phase III, Interim maintenance:

Duration 8 weeks; Treatment preferably started on a Monday
8.0 MALIGNANCIES

- 6-Mercaptopurine 50mg/m\(^2\) orally daily days 1 – 42
- Methotrexate 15mg/m\(^2\) intravenously weekly day 1, 8, 15, 22, 29 & 36

Phase IV, Re-induction/Re-intensification:
Duration 8 weeks; Treatment preferably started on a Monday
- Vincristine 1.5mg/m\(^2\) intravenously push day 1, 8, 15, and day 22
- Daunorubicin 30mg/m\(^2\) intravenously push day 1, 15
- L-Asparaginase 6000i.u/m\(^2\) intramuscularly 3 times a week (Monday, Wednesday & Friday) for 3 weeks (total 9 doses)
- Dexamethasone 10mg/m\(^2\) daily day 1 – 28, then taper dose to 5mg/m\(^2\) daily day 29 – 32; then 2.5mg/m\(^2\) daily day 33–35. Stop drug on day 36
- Cyclophosphamide 1.0mg/m\(^2\) intravenously day 36
- Cytarabine 75mg/m\(^2\) intravenously push day 36, 37, 38, 39 (Tuesday – Friday) 43, 44, 45, 46 (Tuesday – Friday)
- Methotrexate, age adjusted intrathecal dose day 39, 46

Maintenance:
8 cycles of 12 weeks each. Each cycle begins on day 1; treatment preferably started on a Monday
- Vincristine, 1.5mg/m\(^2\) intravenously push day 1, 8
- Prednisolone, 60mg/m\(^2\) orally daily in divided doses day 1 – 14
- 6-Mercaptopurine* 75mg/m\(^2\) orally daily day 1 – 84 (i.e. to be given daily throughout maintenance phase)
- Methotrexate, 20mg/m\(^2\) intravenously once every week, day 8, 15, 22, 29, 36, 43, 50, 57, 64, 71, 78 (i.e. throughout maintenance phase except day 1 of each cycle)
- Methotrexate age adjusted dose intrathecally on day 1 of each cycle

Supportive
- Blood and platelet transfusion
- Prophylactic antibiotics e.g. cotrimoxazole until remission is achieved to prevent Pneumocystis carinii (jiroveci)
- Appropriate antibiotic treatment at the first sign of infection
- Correction of dehydration
- Treatment of hyperuricaemia
- Barrier nursing
- Emotional support

Prognosis
Survival chances are better in children, where the cure rates are 70 – 90% and very poor in adults where cure rates are around 20%. The prognosis in blacks is worse than in other racial groups.

Relapse is common in blood, CNS and testes.

8.1.2 Acute Myelogenous Leukaemia (AML)

Definition
This is the proliferation of myeloid stem cells in the bone marrow and blood. This has unfavourable prognosis and increases with age.

Clinical features

Symptoms
- Malaise
- Weakness
- Fever
- Bleeding from the gums
- Bone pain

Signs
- Pallor
- Gum hypertrophy
- Lymphadenopathy
- Proptosis
- Evidence of infection
- Disseminated intravascular coagulation
- Tender sternum
- CNS signs (cord compression, cranial nerve lesions)
- Enlarged testes
- Hepatosplenomegaly
- Skin and peri-anal involvement
- Polyarthritis

Diagnosis
- The white cell count is variable
- Diagnosis depends on bone marrow biopsy.

Treatment

Phase I, Induction:
Duration 1 week
- Daunorubicin, 60mg/m² intravenously day 3, 4, 5
- Cytarabine, 100mg/m² intravenously day 1, 2
- Etoposide, 150mg/m² intravenously day 6, 7, 8

Triple intrathecal therapy (TI) day 1 and 22 as follows:
- Cytarabine, age adjusted dose (see table below)
- Methotrexate age adjusted dose (see table below)
- Hydrocortisone, 20mg

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Phase II Consolidation
Duration 8 weeks; treatment preferably started on a Monday
• Vincristine pulse 1.5mg/m² intravenously day 1, 8, 15, 22
• Doxorubicin, 30mg/m² intravenously day 1, 8, 15, 22
• Cytarabine, 75mg/m² intravenously day 2, 3, 4, 5
• then day 9, 10, 11, 12; then day 16, 17, 18, 19 then day 23, 24, 25, 26
• 6-thioguanine, 60mg/m² orally once daily day 1-28 and day 35-63
• Prednisolone, 60mg/m² orally daily day 1-28 then taper dose to 30mg/m² once daily day 29-31; then 15mg/m² once daily day 32-35. Stop drug on day 36
• Cyclophosphamide, 500mg/m² intravenously day 36 and 64
• Cytarabine, 75mg/m² intravenously day 37,38,39,40 then day 44, 45, 46, 47; then day 51, 52, 53, 54; then day 58, 59, 60, 61
• Methotrexate age adjusted dose intrathecal day 36, 43, 50, 57
• Hydrocortisone, 20mg intrathecal 36, 43, 50, 57

Phase III: Continuation/maintenance

Duration 2 years treatment preferably started on a Monday
• Cytarabine 40mg/m² intravenously day 2, 3, 4, 5 then day 30, 1, 32, 33
• Doxorubicin, 25mg/m² intravenously day 1
• 6-thioguanine, 50mg/m² orally once daily throughout maintenance
Long-term maintenance is generally considered to be less effective

Bone marrow transplant (BMT)
Allogenic transplant is possible in acute conditions.
CNS Prophylaxis
• Methotrexate, 5mg/kg intrathecally weekly

Supportive
✓ Blood and platelet transfusion
✓ Barrier nursing

8.1.3 Chronic Lymphatic Leukaemia (CLL)

Definition

This is the infiltration of the bone marrow and blood with relatively mature lymphocytes. It is common in people above 60 years of age.

Clinical features

Symptoms
- Bleeding
- Weight loss
- Infection
- Anorexia
- Lethargy
- Fever
8.0 MALIGNANCIES

- Sweating

Signs
- Enlarged, rubbery, non-tender nodes
- Hepatosplenomegaly
- Pallor

Complications
- Autoimmune haemolysis
- Bacterial or viral respiratory tract infections
- Bone marrow failure

Diagnosis
- Full Blood Count (FBC) will show mild anaemia of normocytic/normochromic type.
- The white cell count is > 15 x 10^9/L of which more than 60% are lymphocytes
- The platelet count is usually normal in the early stages
- Bone marrow shows mainly more mature lymphocytes

Treatment

Chemotherapy

Stage A
- No anaemia
- No thrombocytopenia
- Less than 3 areas of lymphoid enlargement
- Lymphocytes less than 30 X 10^9/L

This will need supportive treatment only, which includes antimalarial prophylaxis.

Where there is high lymphocytosis with systemic symptoms give
- Chlorambucil 0.1mg/kg daily orally indefinitely; interrupt if neutrophils are less than 1 X 10^9/L or platelets less than 50 X 10^9/L

Stage B – 3 or more areas of lymphoid enlargement treat as in Stage A

Stage C
Anaemia and thrombocytopenia present treat as indicated below
- Vincristine, 2mg/m^2 intravenously day 1
- Doxorubicin, 25mg/m^2 intravenously day 1
- Cyclophosphamide, 300mg/m^2 orally day 1, 2, 3, 4, 5
- Prednisolone, 40mg/m^2 orally daily day 1, 2, 3, 4, 5

A total of 12 courses needed i.e. 6 courses given monthly then 6 courses given every 3 months.

Transfusion
Blood transfusion when necessary

Prophylaxis
8.0 MALIGNANCIES

Prophylactic antibiotic may be given to prevent opportunistic infections

8.1.4 Chronic Myeloid Leukaemia (CML)

Definition

This is the infiltration of the bone marrow and blood with relatively mature myeloblasts. It accounts for 15% of leukaemias and often occurs in the middle age (45 – 55 years), with a slight male predominance.

Clinical features

Symptoms
- Pallor
- Fatigue
- Swelling of the abdomen
- Priapism
- Gout
- Sweating
- Fever
- Loss of weight
- Bruising

Signs
- Pallor
- Massive splenomegaly
- Hepatomegaly
- Bleeding into the mucous membrane
- Evidence of infection

Diagnosis
- FBC will show raised WBC often >100 x 10⁹/L
- Low haemoglobin
- Platelets may be reduced, normal or raised
- The blood film will show an abundance of neutrophils with the whole spectrum of myeloid precursors, including a few blast cells
- Bone marrow may present with the whole spectrum of myeloid precursors, including a few blast cells. Megakaryocytes may be abundant
- Philadelphia chromosomes are present
- Levels of Vitamin B₁₂ and B₁₂⁻ binding proteins are elevated

Treatment

Chemotherapy
- Hydroxyurea, 30 - 50 mg/kg orally in two divided doses; discontinue if WBC is less than 15 x 10⁹/L
- Busulfan, 2- 4 mg orally daily until WBC is less than 20 x 10⁹/L. If the WBC continues to fall discontinue when WBC is less than 10 x 10⁹/L. If it begins to rise give busulfalan 2mg daily to maintain WBC less than 20 x 10⁹/L; Review every 14 days
- Imatinib, 300mg – 600mg once daily until the Philadelphia chromosomes become negative (hematological and cytogenic emission)
8.0 MALIGNANCIES

Bone Marrow Transplant
Allogenic bone marrow transplant may be done in patients less than 30 years old

Surgery
Splenectomy can reduce discomfort

Radiotherapy
Radiation to spleen may reduce discomfort.

Prevention
Avoid predisposing environmental factors including chemicals (e.g. benzene compounds), drugs (e.g. alkylating agents) and radiation

8.2. Lymphomas

Definition
Lymphomas are malignant tumors of the lymphoreticular system and are classified into Hodgkin’s disease and Non-Hodgkin's lymphoma.

8.2.1 Hodgkin’s Disease

Definition
This is a condition in which, on biopsy, the lymphoid tissue shows malignant lymphoid cells with Dorothy Reed Sternberg cells. To determine the distribution and extent of the disease, it is classified into 4 stages.

Clinical features

Symptoms
- Fever
- Weight loss
- Swelling of the nodes
- Night sweat
- Loss of appetite
- Pruritus

Signs
- Pallor
- Lymphadenopathy
- Hepatosplenomegaly
- Weight loss
- Evidence of bleeding

Diagnosis
- Biopsy of the lymph node or tumour
- FBC will show a normocytic, normochromic anaemia
8.0 MALIGNANCIES

- Erythrocyte Sedimentation Rate (ESR) will be raised
- Liver biochemistry may be abnormal
- Chest X-Ray
- Computed Tomography (CT) scan of the abdomen
- HIV and CD4 testing
- Bone marrow aspiration and trephine

Treatment

The choice of treatment is determined largely by the disease stage. It consists of radiotherapy, cyclical combination chemotherapy, or both

Radiotherapy

Radiotherapy is curative in stages 1 and 2

Chemotherapy

MOPP regimen:
- Mustine, 6mg/m² intravenously on days 1 and 8
- Oncovin, (vincristine) 1-1.4mg/m² intravenously on days 1 and 8
- Procarbazine, 100mg/m² orally daily on days 1 to 14
- Prednisolone, 40mg/m² orally daily on days 1 to 14. Prednisolone should be given in the 1st and 4th cycles only

14-day cycles are separated by 14-day rest periods (28 day cycles). Usually 6 cycle regimens are available.

Other alternative regimens:

ABVD regimen:
- Doxorubicin, 25mg/m² intravenously day 1, 15 (adriamycin)
- Bleomycin, 10 units/m² intravenously day 1, 15
- Vinblastine, 6mg/m² intravenously day 1, 15
- Dacarbazine, 375mg/m² intravenously day 1, 15

There are 4 cycles to be repeated every 28 days

MOPP/ABV hybrid regimen
- Nitrogen mustard, (Mustine) 6mg/m² intravenously day 1
- Vincristine, 1.5mg/m² intravenously day 1
- Procarbazine, 100mg/m² orally daily day 1 – 7
- Prednisolone, 40mg/m² orally daily day 1- 14
- Doxorubicin, 35mg/m² intravenously day 8
- Bleomycin, 10 units/m² intravenously day 8
- Vinblastine, 6mg/m² intravenously day 8

There are 6 cycles to be repeated every 28 days

COPP regimen:
- Cyclophosphamide, 500mg/m² intravenously day 1, 8
- Vincristine, 1.5mg/m² intravenously day 1, 8 (Oncrovin)
- Procarbazine, 100mg/m² orally daily day 1 – 14
8.0 MALIGNANCIES

- Prednisolone, 40mg/m² orally daily day 1-14

There are a total of 6 cycles to be repeated every 28 days

CODP regimen:
- Cyclophosphamide, 500mg/m² intravenously day 1, 8
- Vincristine, 1.5mg/m² intravenously day 1, 8
- Dacarbazine, 375mg/m² intravenously day 1, 15
- Prednisolone, 40mg/m² orally daily day 1-14

There are a total of 6 cycles to be repeated every 28 days

ACOPP REGIMEN:
- Doxorubicin, 20mg/m² intravenously day 1, 2, 3
- Cyclophosphamide, 1200mg/m² intravenously day 42
- Vincristine, 1.5mg/m² intravenously day 14, 21, 28, 35
- Procarbazine, 50 – 100mg/m² orally daily day 13 – 42
- Prednisolone, 30mg/m² orally daily day 14 – 42

There are a total of 6 cycles to be repeated every 8 – 9 weeks

8.2.2 Non-Hodgkin's Lymphoma

This group includes all lymphomas without the Dorothy Reed-Sternberg cells. These lymphomas are sometimes associated with HIV/AIDS.

Clinical features

Symptoms and signs

See under Hodgkin's Lymphoma. The tumors could be low grade, and may run an indolent course and are incurable or high-grade tumors, which are more aggressive, but long-term cure is achievable. Currently this malignancy is associated with HIV infection and defines AIDS. In this case anti-retroviral (ARVs) should be considered.

Diagnosis:
- Refer to Hodgkin's Disease
- HIV and CD4 Count
- Immunochrometry and flow cymetry where possible
- Lumber puncture for the highly aggressive

Treatment
8.0 MALIGNANCIES

Non-Hodgkin's lymphoma

- Low Grade tumors I &II: Curative radiotherapy or watchful waiting if they are HH negative
- Low Grade tumors III & IV watchful waiting or with single or combination chemotherapy and radiotherapy
- These may not need treatment and occasionally may show remission

Chemotherapy
Phase I, induction

Single agency
Fludarabine 25mg/m² IV D1-5 for 28 days or Chlorambucil 2-4mg orally daily or 30-60mg orally every 2 weeks

Combination therapy
Duration 6 weeks
- Cyclophosphamide, 1200mg/m² intravenously day 1
- Vincristine, 2mg/m² intravenously day 3, 10, 17, 24
- Methotrexate, 300mg/m² intravenously day 12 (60% of the dose as intravenous push, 40% as 4 hourly transfusion)
- Prednisolone, 60mg/m² maximum orally daily day 3 – 30; then taper off day 31 – 37
- Methotrexate, 6.25mg/m² intrathecally day 5, 31, 34

Phase II maintenance
Duration 6 months
- Cyclophosphamide, 1000mg/m² intravenously day 1
- Vincristine, 1.5mg/m² intravenously day 1, 4
- Methotrexate, 300mg/m² intravenously day 15 (60% of the dose as intravenous push, 40% as 4 hourly transfusion)
- Prednisolone, 60mg/m² maximum orally daily day 1-5 (do not include in first maintenance cycle)
- Methotrexate, 6.25mg/m² intrathecally day 15

Repeat maintenance cycle every 28 days for 6 months

Surgery
Splenectomy may help

Radiotherapy
This can be used for local bulky disease

High Grade but not advanced tumours

Chemotherapy:
- Treat as in low-grade tumours.
- High grade and advanced tumours

The benefit of chemotherapy in this stage is less certain so patient can be referred for specialist attention.

8.2.3 Burkitt’s Lymphoma
This is Non-Hodgkin's lymphoma, which presents mainly in children. This may present in children as massive jaw lesions, extranodal, abdominal involvement, ovarian tumors or CNS manifestation.

Clinical features

Refer to Hodgkin’s Disease.

Diagnosis

Refer to Hodgkin’s Disease.

Treatment

Radiotherapy

Radiotherapy can be used to treat this condition.

Chemotherapy

This is associated with tumour lysis syndrome, so IV pre-hydration and allopurinol must be given before starting chemotherapy.

Regimen

Patients with localised disease receive 3 cycles of CODOX-M.

Patients with multiple site involvement are treated with CODOX-M alternating with IVAC and intrathecal therapy for 4 cycles each.

CODOX-M and CODOX-M alternating with IVAC

CODOX-M

- Cyclophosphamide 800mg/m2 D1 and 200mg/m2 D2-5 IV
- Vincristine 1.5mg/m2 D1 IV (max 2mg)
- Doxorubicin 40mg/m2 D1 & 8 IV
- Methotrexate 1.2g/m2 continuous IV infusion on D10, then 240mg/m2 IV each hour over 23hrs
- Folinic Acid 192mg/m2 IV D11 starting from the 12th hour of methotrexate infusion, then 12mg/m2 IV every 6hrs for next 48hrs
- G-CSF (Filgastrim) support starting on day 13 until granulocyte count is above 1X10⁹/L

CNS prophylaxis

- Cytarabine 30mg/m2 IT D1 & 3
- Methotrexate 12mg/m2 IT D15 (Not more than 20mg total dose)
- Hydrocortisone 20mg/m2 D1, 3 and 15
- Folinic Acid

IVAC

- Ifosphamide 1.5g/m2 IV D1 – 5
- Etoposide 60mg/m2 IV D1 – 5
- Cytarabine 2g/m2 IV every 12hrs for D1 and 2
- Filgastrim start on D7 till absolute granulocyte count is over 1X10⁹/L

CNS prophylaxis

- Methotrexate 12mg/m2 IT D5
- Folinic Acid 15mg orally stat on D6
8.2.4 Retinoblastoma

Definition

This is malignancy affecting the retina of the eyes. It may affect one or both eyes.

Clinical features

It usually affects children below three years.

Symptoms

- Yellow whitish reflex
- Swelling of the eye

Signs

- Yellow whitish fundal reflex
- Proptosis

Diagnosis

- History and examination
- Skull X-ray
- Urine for VMA (Vinyl Mandillic Acid)
- Fundoscopy
- Ocular ultrasound

Treatment

Stage I & II - Enucleation followed by radiotherapy

Chemotherapy (VAC)

- Vincristine 1.5mg/m² intravenously day 1, 8
- Actinomycin, D 0.015mg/kg intravenously day 1, 2, 3, 4, 5
- Doxorubicin, 70mg/m² intravenously day 1, 15, then fortnightly for a total of 7 – 8 doses
- IT Methotrexate, or Cytarabine given as in ALL

This is a curable tumor, early recognition is very important. Therefore fundoscopy in children is a vital part of the examination.

8.2.5 Nephroblastoma (Wilms’s Tumour)

This is cancer of the kidney usually occurring in children between the ages of 2 and 4.
8.0 MALIGNANCIES

- Abdominal swelling
- Failure to thrive
- Pallor
- Fatigue

Signs
- Abdominal swelling
- Mass in the flanks
- Pallor
- Wasting
- Failure to thrive

Diagnosis
- Hemogram
- IVP
- Ultrasonography of the abdomen
- CT scan
- Chest X-ray
- Electrolyte

Treatment

Surgery
Total nephrectomy plus post-operative radiotherapy

Induction chemotherapy
- Actinomycin D 0.015mg/kg intravenously day 1, 2, 3, and day 4
- Vincristine 0.05mg/kg intravenously day 1, 8

Stage III & IV add
- Doxorubicin in week 6 for 4 days.
Rest for 6 weeks

Consolidation
- Vincristine in weeks 2, 3, 4, 5, 6
- Actinomycin D in week 6 for 4 days
Rest for 6 weeks

Maintainance
- Actinomycin D for 4 days
- Vincristine days 1 & 8 at 3, 6, 9 and 12 months

Supportive therapy
- Psychosocial therapy for both child and parent

8.2.6 Neuroblastoma
This is a cancer arising from the neural crests usually in the abdomen.

Signs and symptoms as in nephroblastoma including proptosis
Diagnosis
Abdominal ultrasound, IVP CT scan and VMA

Treatment
Surgical
Exirpation (removing the tumor) in the early stages. The tumour is radiosensitive but responds poorly to chemotherapy.

Chemotherapy
- Cyclophosphamide, 300mg/m² intravenously day 1, 8
- Vincristine, 1.5mg/m² intravenously day 1, 8
- Procarbazine, 100mg/m² orally day 1 - 14

4 weeks rest then repeat six courses

Radiotherapy

8.3 Carcinoma of the Breast

Definition
This is a malignancy of the breast.

Clinical features

Symptoms
- Lump in the breast
- Nipple discharge
- Change in breast size
- Nipple inversion

Signs
- Local lymphadenopathy
- Skin changes – orange-like appearance (peau d’orange)

Diagnosis
- History and examination
- Mammography
- Biopsy of the local lymph nodes or breast lump

Treatment
This depends on the stage of the disease.
Hormone Treatment
- Tamoxifen, 20mg orally daily
  * May cause retinal damage

Chemotherapy
- Cyclophosphamide, 30mg/kg intravenously as a single dose
• Fluorouracil, 300-1000mg/m² intravenously. This may be given every four weeks depending on the response of the patient
• Paclitaxel 6mg/ml in combination with Cisplatin 1mg/ml

**Surgery**
- Wide local excision or
- Simple mastectomy or
- Modified radical mastectomy

**Late cancer**

For wide spread disease

**Hormone Treatment**
- Tamoxifen, 20mg orally daily, *Caution* May cause retinal damage

**Chemotherapy**

If there is relapses initiate chemotherapy as for early cancer.

**Early Detection**

The following may assist in the early detection of breast cancer:

- Patient education and self-examination
- Regular medical check ups
  Mammography, at least every 2 years

### 8.4 Cervical Cancer

**Definition**

This is cancer of the cervix.

**Clinical features**

**Symptoms**
- Per vaginal (PV) bleeding which at first is irregular but may later become continuous
- A thin, bloodstained vaginal discharge may be present
- Backache
- Pain during sexual intercourse
- Post coital bleeding
- Lower abdominal pain

**Signs**
- Nodule or small ulcer on the surface of the cervix
- Crater-shaped ulcer or a friable warty mass
- Fungating growth

**Complications**
8.0 MALIGNANCIES

- Anaemia
- Sciatic pain
- Backache
- Incontinence of urine and sometimes faeces
- Sepsis
- Uraemia

Diagnosis
- Diagnosis is by history and examination both digital and with a speculum.
- Definitive diagnosis is by biopsy.

Treatment
This depends on the stage of the cancer. Carcinoma in situ requires surgery.

Stage 1
Surgical followed by radiation

Stage 2
Surgical followed by radiation

Stage 3
Chemotherapy and palliative radiotherapy

Stage 4
Chemotherapy and palliative radiotherapy

Drugs
- Doxorubicin, 40-75mg/m² (Upper limit 450 mg/m²) intravenously
- Cyclophosphamide, 30-40mg/kg as a single dose

Surgery
Surgery may be curative in the early stages or palliative in the late stages. It involves radical hysterectomy.

Radiotherapy

Supportive
Analgesics
- Codeine phosphate or
- Pethidine or
- Morphine

Treat anaemia

Prevention and early Detection
The following may assist in the early detection of cervical cancer:

✓ Psychosocial therapy for both child and parent
✓ Health education for men and women
✓ Male circumcision
✓ Screening programmes using cervical smears (pap smear) and acetowhiteness
8.0 MALIGNANCIES

Colposcopy and cone biopsy of areas of abnormal epithelium.

8.5 Ovarian Cancer

These are malignancies of the ovaries.

Classification

1. Epithelial Ovarian Cancer
2. Germ Cell Ovarian Cancers
3. Stromal Tumours

The most common of these are the epithelial ovarian cancers. The prognosis depends on the stage at diagnosis and the histologic type.

Clinical Features

70 – 80% are diagnosed at an advanced stage. Early stage disease is difficult to diagnose due to lack of specific signs and symptoms. Have a high index of suspicion. Symptoms and signs: pelvic mass, lower abdominal pain, abdominal distension, and Ascites.

Diagnosis

- History and physical examination
- Ultrasound of abdomen and pelvis
- CT Scan abdomen and pelvis
- CXR
- FBC, U/Es, CA 125
- Definitive diagnosis confirmed by Histology

Treatment

1. Primary treatment is surgery maximal debulking aiming for less than 2cm residual disease.
2. Adjuvant Treatments: This requires a thorough pathologic staging and selection of adjuvant therapies is dependant stage and grade of the cancer (For staging readers are referred to the latest FIGO and AJCC cancer staging manual).
   i. Early Stage low risk – stage IA and IB grade 1 & 2 No further treatment after maximal surgery
   ii. Early Stage High Risk – Stage IA and IB with grade 3 or clear cell histology, stage IC and Stage II disease; these require
      ➢ Carboplatin AUC 5 – 7 iv and Paclitaxel 175mg/m² iv 21 day cycles for 3 – 6 cycles, OR
      ➢ Cisplatinum 75mg/m² iv and Paclitaxel 135mg/m² iv infusion over 24 hrs (Neurotoxic) OR
      ➢ Carboplatinum and Cyclophosphamide 750mg/m² iv
   iii. Advanced Disease stage
      ➢ As for early stage but for 6 – 8 cycles.
      ➢ Interval debulking as indicated
8.5.1 Endometrial Cancer

Definition

These are cancers that arise from the Uterus

Classification

1. Epithelial – Adenocarcinoma, adenosquamous, papillary serous
2. Stromal tumours – Sarcomas of the uterus

Prognosis and adjuvant treatment are dependent on the grade, histology and stage of the cancer.

Clinical Features

Postmenopausal bleeding

Diagnosis

- History and physical examination
- Endometrial biopsy
- CXR
- Abdominal and pelvic ultrasound
- FBC, U/Es, LFTs

Treatment

1. Primary treatment is surgery TAH and BSO plus minus pelvic lymphadenectomy. For patients who refuse surgery or are medically inoperable curative radiotherapy is indicated.
2. Adjuvant treatments depend on stage, grade, and histology; Radiotherapy with either vaginal brachytherapy alone or in combination with external beam radiation therapy at 2Gy to 50Gy.
3. Systemic therapy include
   a. Hormonal Therapies with medroxyprogesterone actate 400 – 800mg po twice weekly, Tamoxifen 20mg daily
   b. Chemotherapy TAP ie Cisplatinum 50mg/m² iv, Adriamycin 45mg/m² iv D1 followed by Paclitaxel 160mg/m² repeat every 21 days OR carboplatin and Paclitaxel as for Ovarian cancer

8.5.2 Vulval Cancer

These are cancers that arise from the vulva and are mostly Squamous Cell

8.5.2.1 Carcinomas

Clinical Features

Pruritus, waterly discharge, bleeding, mass, pain and ulceration
8.0 MALIGNANCIES

Diagnosis

- History and physical examination
- Biopsy including pap smear and colposcopy
- CXR
- FBC, U/E's and LFT's
- HIV and CD4

Treatment

All patients must be seen and assessed at the combined Gynaecology and Oncology meeting to plan treatment

1. Primary treatment
   a. Surgery with 1cm margin of resection of the vulval lesion and inguinal lymphadenectomy
   b. Definitive chemoradiation for inoperable patients, refused or medically inoperable patients. Radiotherapy 1.8Gy per fraction to 66-70Gy concurrent with chemotherapy

2. Adjuvant treatment
   a. Post operative chemoradiation is indicated for patients with the following; positive or close <8mm, 2 or more positive lymphnodes. Radiotherapy 1.8Gy per fraction to a total of 60 - 65Gy
   b. Preoperative chemoradiation is indicated for patients with central disease within 1cm of vital structures, fixed bulky positive or ulcerating nodes or inoperable primaries to downsize them for operability. Radiotherapy 50G split course with surgical assessment after 30Gy followed with 20Gy boost concurrent with chemotherapy

Regimens

1. Chemotherapy ONLY in combination with Radiation therapy
   a. 5 Fluorouracil 400mg/m² iv D1 – 4 and D28 – 32 plus Cisplatinum 25mg/m² iv D1 – 4 and D28 – 32
   b. Radiotherapy

8.6 Prostate Cancer

Definition

This is malignancy of the prostate gland. The patient is usually elderly but the condition may occur in younger men.

Clinical features

Symptoms
- Hesitancy
- Frequency
- Dribbling
- Bone pain e.g. back ache

Signs
- Firm hard nodular prostate which may be irregular on digital rectal examination

Diagnosis

- Full Blood Count
- Erythrocyte Sedimentation Rate
8.0 MALIGNANCIES

- Urea and Electrolytes
- Creatinine
- Calcium
- Acid phosphatase
- Bone marrow aspiration
- Prostate specific antigen
- Trans-rectal ultrasound morphology
- Bone X-rays
- Outflow obstruction tests {bladder ultrasound, urine flow rates, Intra Venous Urogram (IVU)}
- Biopsy of the prostate

Treatment

Surgery
- Trans-urethral resection of the prostate
- Orchidectomy
- Abdominal prostectomy

Drugs
- Cyproterone acetate, 100mg orally 8 hourly
- Stilboestrol, 1 mg orally daily
- Chemotherapy with Docetaxel 75mg/m² IV repeat 21 days for 6 cycles with or without estramustine or prednisolone, in those patients who have failed after adequate androgen deprivation therapy

Radiotherapy
- Local radiotherapy

Early detection
- Regular per rectal examinations
- Prostate specific antigen screening
- Trans-rectal ultrasound

8.7 Testicular Tumours

Definition

These are malignant growths that arise from the testis. It is a common malignancy in males aged between 15 – 34 years.

Classification

i) Seminomas
ii) Non-seminomas

Clinical Features

Testicular mass, that is either painful
Diagnosis

- History and physical examination
- Testicular ultrasound
- $\beta$ HCG, $\alpha$ Fetoprotein, LDH
- FBC, U/E’s, LFT’s,
- CXR

Treatment

High Inguinal orchidectomy

Further treatment depends on stage and histological type

Seminomas

Stage I disease: after surgery options include
- Radiotherapy 2Gy to 20Gy total to paraaortic area
- Single agent, single dose Carboplatin dose in mg = 5 – 7 AUC (see formula) or 400mg/m² IV
- Active surveillance (only in expert hands)
Stage II : Surgery followed by 2 – 3 cycles of BEP i.e. Bleomycin 30Units IV D1,8 & 15, Etoposide 100mg/m2 D1 –5 IV, Cisplatinum 20mg/m2 D1 – 5 IV every 21 days.
Stage III: Surgery followed by 4 cycles BEP as above

Non-Seminomas

Stage I : surgery followed by BEP chemotherapy 2 – 4 cycles every 21 dyas
Stage II and III: Surgery followed by BEP chemotherapy 4 cycles every 21 days

Prevention

Orchidoplasty for undescended testis

8.8 Penile Cancer

Definition

This is a cancer that arises from the penis

Classification

Most of these are squamous cell carcinomas

Clinical Features
8.0 MALIGNANCIES

Penile nodule, mass, or ulcer which is non healing.

Diagnosis

- History and physical examination
- Biopsy of ulcer or mass
- CXR
- FBC, U/Es
- HIV and CD4 count

Treatment

- Surgery:- in the form of circumcision, excision, partial or total penectomy followed by bilateral inguinal node dissection in clinically involved nodes.
- Radiotherapy:- curative radiotherapy is used in young patients who still want to preserve penile function.
- Chemotherapy is given concurrent with radiotherapy using cisplatinum 25mg/m2 D1 – 4 IV and D28 – 32 and 5 Fluorouracil 400mg/m2 D1 – 4 and D28 – 32 IV

8.9 Lung Cancer

Definition

This is a primary cancer of the lung tissues. There are two different types of lung cancer: small cell carcinoma and non-small-cell carcinoma. Non-small-cell carcinoma includes: adenocarcinoma, squamous cell and large cell carcinoma.

Clinical features

Symptoms

- Cough
- Blood in sputum
- Breathlessness
- Chest pain
- Wheeze

Signs

- Weight loss
- Anaemia
- Bleeding
- Rib erosion

Complications

- Pleural effusion
- Recurrent laryngeal nerve palsy
- Superior vena cava obstruction
- Brachial neuritis
- Homer's syndrome
- Pneumonia
- Pericarditis
- Atrial fibrillation
8.0 MALIGNANCIES

- Brain, bone, liver, adrenal metastasis
- ADH or ACTH secretion
- Hypercalcaemia
- Neuropathy
- Myopathy
- Dementia
- Cerebellar degeneration
- Myasthenic syndrome
- Solid retinal detachment

Diagnosis

- Chest X-ray
- Pleural aspiration for cytology
- Pleural biopsy
- Lymph node biopsy
- Liver Function Tests (LFT's)
- Computed Tomography (CT) of the thorax
- Bronchoscopy

Treatment

Non-small cell carcinoma:
  If no sign of extra- pulmonary or pleural spread, attempt;
    Surgical excision

Drugs

- Doxorubicin, 40-75mg/m² intravenously (upper limit 450mg)

Cyclophosphamide, 30-40mg/kg as a single dose

Radiotherapy

Small cell carcinoma

- Cyclophosphamide
- Doxorubicin
- Vincristine

Alternatively

- **SCLC**
  1. Limited Stage disease:- concurrent chemoradiation with Cisplatinum and Etoposide and Radiation therapy at 1.5Gy BD to 45Gy. This is followed by prophylactic cranial irradiation for complete responders
  2. Extensive Stage disease:- chemotherapy with Cisplatinum and Etoposide followed with consolidation radiotherapy for patients with a near total or a partial response.

- **NSCLC**

  The treatment depends on the stage
  1. Stage I, II and IIIA:- Surgery is mandatory followed with 4 cycles of adjuvant chemotherapy with cisplatin + etoposide or carboplatin + vinorelbine, or cisplatin + gemcitabine. In completely resected NSCLC radiation therapy to 60Gy is reserved for those with positive lymph nodes or resection margins.
2. Locally advanced is treated with chemoradiation to 66Gy concurrent with cisplatinum based chemotherapy.
3. Metastatic disease is treated with chemotherapy and radiotherapy is used in this situation for palliation.

Avoid passive or active smoking.

**8.10 Nasopharyngeal Carcinoma**

**Definition**
This is a carcinoma that arises from the nasopharynx commonly the fossa of resemuller

**Classification**
- Keratinising squamous cell carcinoma WHO type I
- Non keratinizing squamous cell carcinoma WHO type II
- Undifferentiated squamous carcinoma or lymphoepithelial carcinoma WHO type III

**Symptoms and signs**
- Nasal voice
- Nasal congestion and obstruction
- Nasal bleeding
- Neck swellings / lymphadenopathy
- Cranial nerve palsies
- Other CNS signs
- Bone pain and/or tenderness

**Diagnosis**
- History and physical examination
- CXR
- FBC, U/Es, LFTs
- CT Scan whole brain and Base of skull to clavicle
- Biopsy of nasopharynx

**Treatment**
The main stay of treatment of NPC is radiotherapy.

Stage I & II: - Curative radiation therapy to 70Gy at 1.8 – 2GY per fraction
Stage III: - chemoradiation to 70Gy with cisplatinum 75 – 100mg/kg IV 3 weekly starting with day 1 of radiation treatment and currently this is followed with 4 cycles of cisplatinum and 5 fluorouracil

**8.11 Other Head and Neck Cancers**

**Sites**
- Larynx
- Oral cavity
- Oropharynx
8.0 MALIGNANCIES

- Nasal cavity and paranasal sinuses
- Salivary gland tumours

All these sites have unique symptoms and signs

Treatment

Depends on the stage

Stage I & II:- surgery or curative radiation therapy produce equivalent results but differ in the side effect profile.

Stage III:- has three options of treatment

1. Surgery followed with post operative radiation therapy plus or minus chemotherapy
2. Curative chemoradiation for organ sparing
3. Radical radiotherapy for medically challenged patients who can not stand chemotherapy

8.11.1 Medulloblastoma

Definition

Medulloblastoma is a primitive cerebellar tumour of neuroectodermal origin that is the most common posterior fossa malignant tumour in children. It account for 20% of paediatric brain tumours.

Symptoms and Signs

- Headache
- Vomiting
- Convulsions
- Ataxia
- Cranial nerve palsies
- Coma and unconsciousness
- BP and pulse

Diagnosis

- History and physical examination
- CSF cytology
- MRI or CT scan of the brain and whole spine
- FBC, U/Es
- Audiometry
- Histological confirmation is done after craniotomy and complete resection of the tumour

Treatment

Depends on the risk category

- **Average Risk**: children older than 3 years, no metastasis, near to total resection, with less than 1.5cm² residual disease on early post operative imaging (24-48hrs)
- **High Risk**: overt metastatic disease based on CSF cytology or imaging > 1.5cm² residual disease, and all children < 3 years of age
1. Surgery: maximal judicial surgical resection is the most important step. However, the aggressiveness of surgery is sometimes associated with the posterior fossa syndrome in up to 15% of children post op. (difficulty swallowing, truncal ataxia, mutism and less often respiratory failure)

2. Radiation Therapy
   - **Average Risk Medulloblastoma:** The standard of care for average risk medulloblastoma is either Cranial Spinal Irradiation (CSI) to 23.4Gy with platinum based chemotherapy, OR CSI to 35Gy without chemotherapy with a boost in both situations of the posterior fossa to a total dose of 54 – 55Gy in both situations
   - **High Risk Medulloblastoma:** post operative irradiation is given first followed by chemotherapy as a preferred sequence. However preirradiation chemotherapy is sometimes utilised in some centres with a risk of disease progression

Chemotherapy regimens

- Vincristine 1.5mg/ m² D1 weekly for 3 consecutive weeks
- Lomustine (CCNU) 75mg/m² orally D1
- Cisplatin 75mg/ m² iv D1
  Repeat every 6 weeks for 8 cycles

8.11.2 Thyroid Cancer

Definition

These are malignancies that arise from the thyroid gland

Classification

There are four categories based on WHO classification.

- Two differentiated Thyroid Cancer
  - papillary Adenocarcinoma
  - follicular Adenocarcinoma
- Medullary thyroid carcinoma
- Anaplastic thyroid carcinoma
- Malignant lymphomas of the thyroid are not uncommon

Symptoms and signs

- Thyroid nodule – found incidentally or during routine physical examination
- Lump in the neck
- Hoarseness of voice if recurrent laryngeal nerve involved or extension to larynx,
- Dysphagia if oesophageal extension is present.
- Neck nodes
- Haemoptysis
- Cough
- Chest pain
- Bone pain
Diarrhoea due to calcitonin, serotonin or prostaglandin production in those with MTC

Diagnosis

- history and examination
- ENT exam
- Ultrasound of the neck FNAB is recommended at this stage
- CXR
- FBC, CMP, U/E’s and LFT’s

**Preoperatively**
- Routine use of CT scan, MRI and PET scan is not recommended.
- Thyroglobulin level not recommended

**Postoperatively**
- All patients with papillary and follicular cell carcinoma must have an initial 131Iodine diagnostic scan within 6 weeks post surgery
- Ultrasound of the neck with Tg levels
- CT scan with contrast is contraindicated
- Non contrast CT chest can detect pulmonary metastasis
- PET scan is useful in patients with:
  - increased Tg levels and a negative 131Iodine uptake scan
- MRI – useful post op in all forms of thyroid cancer to detect local recurrence

Treatment

1. **Surgery**
   - For DTC surgery is followed by radioactive iodine therapy in selected cases.
   - ATC require adjuvant radiotherapy and or chemotherapy after surgery.
   - MTC a thyroidectomy is followed by genetic testing of the individual and family members.

2. **Radio Active Iodine 131 Therapy**
   - this is indicated in all DTC patients with a positive RAI uptake scan at 6 weeks post operatively, in which case 100 – 150mCi is given orally. This achieves 85 – 95% complete ablation of residual thyroid tissue. A repeat whole body scan is done at 5 – 10 days post 131Iodine therapy. Start thyroid replacement and at 3 months do TSH and Thyroglobulin and at 6 months repeat 131Iodine uptake scan. This is repeated every 6 months until all thyroid tissue is ablated including metastatic areas.

3. **Radiation therapy**
   - is used for inoperable tumours, and in palliation of symptomatic metastatic areas.

4. **Chemotherapy**
   - the preferred agent is doxorubicin and is indicated in ATC only post operatively

### 8.12 Skin Cancers

There are different types of skin cancer. Some of them are:

- Squamous cell carcinoma
- Basal cell carcinoma
- Melanoma
8.0 MALIGNANCIES

8.12.1 Squamous Cell Carcinoma

Definition
This is cancer of the squamous cells of the skin

Clinical features

Symptoms
Swelling or wound on the skin

Signs
- Indurated plaque or nodule with an everted, indurated and irregular margin
- Crusted or ulcerated surface
- Usually occurs on exposed surfaces

Complications
Local destruction of tissues and rarely spreads distally

Diagnosis
Biopsy of the lesion

Treatment
- Total excision
- Radiotherapy

Prevention
√ Use of sun screen/block

8.12.2 Basal cell carcinoma

Definition
This is cancer of the epidermal basal cell layer. It is more common in the elderly and particularly in caucasians.

Clinical features

Symptoms
- Painless swelling on the skin
- Wound on the skin

Signs
- Well-defined papule or nodule with a rolled pearly margin
- Ulcer

Diagnosis
Biopsy of the lesion

Complications
Extensive local destruction may occur

**Treatment**
- Early removal by curettage
- Cryotherapy
- Radiotherapy in the elderly but should be avoided in the young because of scarring
- 5-Fluoro-uracil

### 8.12.3 Melanoma

**Definition**

This is a neoplasm arising from melanocytes. It is the commonest fatal skin cancer. Some melanomas arise in pre-existing moles.

**Clinical features**

**Symptoms**
- Bleeding
- Wound on the skin
- Persistent itching

**Signs**
- Bleeding
- Increasingly variegated pigmentation
- Small satellite lesions around the principal lesion
- Ulceration

**Diagnosis**

Biopsy of the lesion

**Complications**

- Early spread by blood and lymphatics

**Treatment**

- Prompt excision with wide margins

### 8.12.4 Kaposi’s Sarcoma (KS)

**Definition**

This is a cancer arising from capillary endothelial cells. There are four types:
- Classic- (Mediterranean) Kaposi’s sarcoma
- Endemic (Central Africa) Kaposi’s sarcoma. These are slow-growing lesions affecting extremities in people over 40 years of age. Visceral involvement is rare. It responds well to chemotherapy
- Epidemic -Aggressive Kaposi’s sarcoma. These are fast-spreading lesions affecting any part of the body. Aggressive Kaposi’s sarcoma generally occurs in people less than 40 years of age who are HIV- positive. It is a diagnostic feature of HIV/ AIDS
- Immunosuppressive – in organ transplant
Clinical features

Symptoms
- Swollen glands
- Swollen feet
- Purple (dark) papules on the skin, mucosa and viscera in late disease
- Cough with haemoptysis

Signs
- Lymphadenopathy
- Lymphoedema (Woody)
- Wollen feet
- Purple (dark) papules and nodules on the skin mucosa and viscera in late disease

Diagnosis
- Clinical presentation of typical lesions
- Biopsy of skin, mucosal lesions or lymph nodes

Stage I
- Cutaneous, locally indolent

Stage II
- Locally aggressive, with or without involvement of regional lymph nodes

Stage III
- Generalised aggressive, with or without lymph node involvement

Stage IV
- Visceral disease

Treatment

Chemotherapy
1. Stage I & II
- Vincristine, 2mg/m² intravenously day 1
- Actinomycin, D 1.4mg/m² intravenously day 1

Repeat the course every 3 – 4 weeks until remission is achieved and then give 2 further courses

Radiotherapy
- Local radiotherapy may be useful

2. Stage III & IV (HIV negative)
- Vincristine 2mg/m² intravenously day 1
- Actinomycin, D 2mg/m² intravenously day 1
  plus
- Doxorubicin, 30mg/m² intravenously day 1 or
- Bleomycin, 7.5mg/m² intravenously day 1, 2, 3

Repeat weekly for 4 weeks until remission is achieved then give 2 further courses

3. Radiotherapy
- Local radiotherapy may be useful as an alternative

For HIV Positive Ks)
- Chemotherapy as above plus anti-retroviral therapy
8.13 Gastric Cancer

Definition

This is cancer of the stomach.

Classification

Most are adenocarcinomas

Symptoms and Signs

Initially symptoms are vague and non-specific.

- Dysphagia
- Post prandial fullness
- Heart burn
- Indigestion
- Loss of appetite
- Weight loss
- Abdominal discomfort and fullness
- Haematemesis and malaena
- Anaemia

Diagnosis

- History and physical examination
- Endoscopy with biopsy
- FBC, U&Es, LFTs, CEA
- Barium meal
- CXR
- Abdominal ultrasound
- CT scan of the abdomen
8.0 MALIGNANCIES

- Endoscopic ultrasound

Treatment

Surgery
- Is the primary treatment. Subtotal or total gastrectomy with adequate lymphadenectomy and negative margins.

Radiotherapy
- Adjuvant Chemoradiation for stage IB and above
- Definitive chemoradiotherapy for medically unfit or unresectable patients
- Palliative radiotherapy

Chemotherapy
- Leucovorin 20mg/m² IV bolus, 5 fluorouracil 425mg/m² IV bolus D1-D5(cycle 1,4,5)
- Leucovorin 20mg/m² IV bolus, 5 fluorouracil 400mg/m² IV bolus first 4 and last 3 days of radiotherapy (cycle 2 &3)
- Metastatic cancer- Leucovorin 20mg/m² IV bolus, 5 fluorouracil 425mg/m² IV bolus D1-D5 28 day cycle, 6 cycles

8.14 Pancreatic Cancer

Definition
This is cancer of the pancreas

Classification
Adenocarcinomas

Symptoms and signs
- Upper abdominal pain
- Vomiting
- Obstructive jaundice
- Pruritus
- Weight loss
- Symptoms of diabetes mellitus
- Migratory thrombophlebitis
- Upper abdominal mass
- Palpable gall bladder

Diagnosis
8.0 MALIGNANCIES

- History & physical examination
- Endoscopic ultrasound and ERCP/biopsy
- FBC, LFTs, U&Es, CEA, blood glucose
- CXR
- CT scan

Treatment

Surgery

1. Definitive - Mainstay of treatment (Whipple’s procedure)
2. Palliative surgery for advanced cases - Endoscopic or Percutaneous biliary stent, Open biliary enteric bypass.

Radiotherapy

1. Post-operative 5-FU based chemoradiation (45-54Gy@1.8-2Gy/day) followed by systemic Gemcitabine
2. Localised unresectable disease and good performance status – Concurrent 5-FU based chemoradiation (50-60Gy @1.8-2Gy/day)
3. Palliation of pain and metastases.

Chemotherapy

1. With Chemoradiation- 5 FU 500mg/m² IV bolus on first and last 3 days of radiotherapy
2. Gemcitabine 1000mg/m² over 30minutes IV D1, 8 &15 every 28 days for 6 cycles as adjuvant therapy and for locally unresectable or metastatic disease

8.15 Anal Cancer

Definition

This is cancer of the anal canal

Classification

- Squamous
- Cloacogenic (transitional)
- Adenocarcinoma
- Others-pagets disease, basal cell, melanoma, lymphoma

Symptoms and signs

- Bleeding
- Anal pain
- Pruritis
- Palpable mass
- Change in bowel habit
8.0 MALIGNANCIES

- Chronic anal condition- Haemorhoids,fistula,fissure

Diagnosis

- History and physical examination including DRE, gynaecologic exam in women
- EUA, Proctoscopy, Biopsy of primary tumour
- FNA/biopsy of clinically suspicious inguinal nodes
- CXR
- Abdominal pelvic CT scan
- Ultrasound abdomen and pelvis if unable to do CT scan
- FBC, U&Es, LFTs, HIV, CD4

Treatment

Surgery

- Wide local excision-Only in tumours <2cm which are well differentiated, and preservation of anal function assured
- Abdominal perineal resection - is reserved only for salvage of patients who have failed chemoradiotherapy

Combined modality therapy

- Chemoradiation is the standard primary treatment option with doses of 45-60Gy
- Fluorouracil 400mg/m² Day1-4 and Day 22-25 of radiotherapy
- Mitomycin C 10mg/m² Day 1 only
- Mitomycin may be substituted by cisplatin especially in HIV positive patients

8.16 Astrocytomas

Definition

These are glial tumours (astrocytomas and oligodendrogiomas) that arise from supportive tissues in the CNS and represent over 40% all CNS tumours in adults. In childhood astrocytomas predominate.

Classification

- Low-grade astrocytomas include WHO grade I (fibrillary, pilocytic) and II (astrocytoma)
- High –grade astrocytomas include WHO Grade III (anaplastic) and IV (glioblastoma multiforme)

Symptoms and signs

- Headache (usually persistent)
- Nausea, vomiting
- Poor balance and coordination
- Seizures
- Hemi- or paraparesis
- Visual disturbances
- Imparment of mental function

Diagnosis
MALIGNANCIES

8.0

- History and physical + neurological examination
- Skull X ray
- Brain CT or MRI scan
- Radionuclide brain scan

Treatment

Mainstay of treatment is complete surgical resection where possible for both low or high grade

- Low-grade astrocytomas
  - Complete resection followed by observation
  - In incomplete resection observation or adjuvant chemotherapy and/or radiation therapy is considered

- High-grade astrocytomas (anaplastic or glioblastoma multiforme)
  - Complete surgical resection followed by radiotherapy alone or concurrent with temozolomide

A. Chemotherapy:
  - Single agent regimens
    - Carmustine (BCNU) 80 mg/m2 I.V. D1-3 every 6-8 weeks
    - Lomustine (CCNU) 130 mg/m2 P.O D1 every 6-8 weeks

B) combination chemotherapeutic regimens
  1. PCV
     - Procarbazine 60mg/m2 P.O D 8-21
     - Lomustine 110 mg/m2 P.O D1
     - Vincristine 1.4 mg/m2 I.V. D8 & D29
     - Repeat every 6 - 8 weeks (max 10 courses)

  2. PE
     - Cisplatin 30 mg/m2 I.V. D 1-3
     - Etoposide 150 mg/m2 I.V. D 1-3
     - Repeat every 3 weeks 6-8 courses

Radiotherapy using 3D conformal radiation therapy technique
- Low-grade gliomas 1.8Gy per fraction to 50.4Gy
- High-grade gliomas 1.8Gy per fraction to a total of 54 – 59.9Gy

8.17 Multiple myeloma

Definition

This is a cancerous condition resulting into formation of a thrombus or clot commonly in the veins of the leg and pelvis.

Clinical features

- Pulmonary embolism in asymptomatic patients
- Pain in the calf on dorsiflexion (Homan’s sign)
- Paedal oedema
- Cyanotic discoloration of the proximal limb affected
8.0 MALIGNANCIES

Risk Factors;
   Bed ridden patients
   Radiotherapy
   Chemotherapy
   Cancer itself
   i.e Factors affecting virshow’s triad.

Diagnosis
   • History and examination
   • U/S
   • Doppler
   • Venograph

Treatment
   • Anticoagulants-heparin
   • Analgesia
   • Being alert for any sign of DVT

8.18 Multiple Myeloma

Definition;
Is a progressive malignant characterized by plasmacytomas and over production of monoclonal immunoglobulins(IgG, IgA, IgD, IgE ) or Bence Jones Protein

Sign and Symptoms;
   • Persistent unexplained bone pain esp of the back and thorax
   • Pathological fractures and vertebral collapse
   • Paralysis due to spinal compression
   • Recurrent bacterial infections
   • Weakness and fatigue

Diagnosis;
   • Bence Jones protein in urine 20%
   • Serum protein electrophresis 80%
   • Bone marrow aspiration and biopsy show increase number of plamacytes
   • X Ray of bones and chest
   • Radionucleide bone scan may be used but rarely useful as osteoblastic lesions are rare
   • FBC, ESR, U+E, Calcium

Treatment;
   Chemotherapy
   • Predinisolone 1mg /kg D1-4 repeated every 4-6 wks in combination with Melphan 0.25mg/kg D1-4 q 4-6 wks
   • Cyclophosphomide 200mg/day 5-7day q6wks then 50 -100mg /day for maintainance
   • Radiotherapy 18 – 24 Gy to symptomatic areas
9.0  EYE DISEASES

9.1.  The Red Eye

This is characterised with the redning of the eye caused by:

<table>
<thead>
<tr>
<th>With Pain</th>
<th>Without Pain</th>
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9.1.1  With Pain

9.1.1.1  Iritis

Definition
It is the inflammation of the Iris.

Clinical Features

Symptoms
- Deep seated eye pain
- Decreased vision
- Redness of the eye
- Light intolerance
- Watery eye

Signs
- Pink ring of blood vessels around the cornea – ciliary flush
- Small white spots on the back of the cornea – keratic precipitates
- Iris may be stuck to the lens – posterior synechiae

Treatment
- Atropine 1% Eye ointment twice daily
- Bethamethasone 1% eye drops, or
- Hydrocortisone 1% eye drops, or
- Dexamethosone 0.1% eye drops, or
- Prednisolone 1% eye drops 1-2 times a day
9.1.1.2 Corneal Foreign Body

Definition

This is the presence of a foreign body on the cornea.

Clinical Features

Symptoms

- Red eye
- Watering eye discharge
- Difficulty to keep the eye open
- Pain
- Distorted vision

Sign

- Foreign object may be seen on the cornea

Treatment

- Apply a drop of 2% Lignocaine onto the affected eye
- Wipe away the foreign body with a wisp of sterile cotton wool on an orange stick
- If foreign body does not come out easily refer to nearest eye clinic where it may need surgical removal (with a hypodermic needle)
- Chloramphenical 0.5% eye drops 1 drop every 2 hours, then reduce frequency as infection is controlled
- Pad the eye for 24 hours

9.1.1.3 Acute Angle Closure Glaucoma

Definition

This is an acute increase in the intra ocular pressure brought about solely by closure of the anterior chamber angle by the peripheral iris.

Predisposing Factor

- Small long sighted eye
- Anatomical shallow anterior chamber

Clinical features
Symptoms
- Impaired vision
- Red eye
- Severe Periocular pain
- Nausea
- Vomiting
- Severe headache

Signs
- Ciliary flush
- Very, very high Intraocular pressure (50 – 100mmltg)
- Hazy Cornea Bathroom window glass type of cornea (mildilated pupil)
- Bombe iris
- Flare
- Dilated Iris vessels
- Painful hard eye

Investigation
Tonometry with a schiotz or perkins tonometer will show very high intraocular pressure

Treatment
The definitive treatment is surgical

Drugs
- Acetazolamide 500mg intravenously start, then 250mg 6 hourly
- Pilocarpine 4% 6 hourly
- Paracetamol 500 – 1gm orally 6 hourly

This is the initial treatment to relieve the angle closure

Definitive Treatment: Permanently keep the angle open surgically by:

(i) Peripheral laser iridotomy
(ii) Peripheral Iridectomy
(iii) The surgery must be done to both eyes as the predisposing condition affects both eyes

Other Hyperosmotic agents

Because of their speed of action and effectiveness, hyperosmolar agents are of great value during the acute crisis of acute glaucoma to reduce the intraocular pressure.

- Mannitol (1-2g/kg body wt of 20% solution in water, given over 30 – 40 minutes, (60 drops per minute as slow intravenous infusion) until intra-ocular pressure has been satisfactory reduced
- Urea 1-2kg body wt of a 30% solution in 10% invert sugar
9.1.1.4 Chemical Conjunctivitis

Definition

It is an inflammation of the eye caused by a chemical substance.

Common Chemicals

- Car battery acid
- Snake venom
- Fluid from plants
- Household cleanic chemicals
- Alkali chemicals are more damaging to the eye than acids

Clinical Features

Symptoms

- Pain
- Redness
- Watering
- Pus discharge if secondarily infected.

Emergency management:
- Apply local anaesthetic – lignocaine 2% eye drops
- Wash the eye copiously with normal saline or tap water for about 30 minutes

Investigation

Fluorescein staining will reveal area of conjunctival corneal chemical erosion

Treatment

- Hydrocortisone 1% Eye Ointment. Apply 3-4 times daily
- Atropine eye drops 1% 2 times a day
- Tetracycline 1% eye ointment three times daily if infected

Note that the first line drug of choice is Hydrocortisone. Use Tetracycline as second line, only if steroid is not available.

Other Drugs Used In Chemical Burns

- Vitamin C (Sodium ascorbate) 10% drops and a daily oral dose of ascorbic acid 1gm (assist in laying down of the corneal collagen)
- Collagenase inhibitors – L-cysteine and or cenicillamine applied topically helpful in preventing corneal perforation
- Artificial tears. Prevents effects of corneal drought. SNO tears, or Hypromelrose 0.3%
- Bandage soft contact lenses prevent formation of adhesions between eyelid and eyeball
- Sodium EDTA – Chelates calcium, a co factor for the collagenase enzyme, thereby rendering the enzyme unavailable for corneal melting

Late Treatment
• Division of adhesions between conjunctiva of eye and of eyelid. Place an eye shell between the divided bands during ball synechiealisis
• Conjunctival grafting
• Eyelid surgery to correct deformity
• Corneal grating after 6 – 12 months to allow for maximum resolution

9.2 Corneal Ulcers

Definition
This is ulceration of the cornea

Common causes
Injuries
Infections
- Bacteria
- Fungal
- Viral
- Other causes

Clinical Features

Symptoms
• Red eye
• Severe pain
• Difficult to open eye in light (photophobia)
• Discharge, water or pus
• Disturbed vision

Signs
– Poor vision on snellen testing a white spot of the eye may be seen
– On retinoscopy – irregular light refraction

Investigation

• Flouresce in staining of the cornea, the wound stains green
• Corneal swab for microscopy, culture and sensitivity

Treatment

Depends on the cause
For all types of ulcers, prevent ocular pain with atropine 1% once daily in the affected eye

Infections
- Bacteria Corneal Ulcers use tetracycline 1% eye ointment, or chloramphenicol 1% eye ointment 3-4 times a day
- If not resolving within 2 weeks, then refer
(ii) Fungal Ulcers

Typically see main ulcer, with riders, and satellite ulcers around the main one. (This is seen occasionally. It may not be seen at all)

Treatment

- Povidone Iodine, 2%, four times daily in the affected eye
- Natamycin, 5% eye suspension given hourly for 7 days
- Econazole, 1% suspension for topical use
- Miconazole, 10mg/ml given subconjunctival or intravitrial given as 10 microgram per ml
- Amphotericine, B 0.05-0.2% can be made from IV injection and instill every 5 minutes first hour and 30-60 minutes until clinical picture changes. (protect from light- use umber coloured bottle)

(iv) Viral ulcers, Herpes simplex

Typical characteristic - on Fluorescein, 1 or 2% staining a dendritic corneal ulcer (branching)

Treatment

- Acyclovir eye ointment (suspension) five times daily in the affected eye for about 21 days.
  Note: If has a very high association with HIV/AIDS steroids are contra indicated

(iv) Ophthalmia neonatorum

- presents 2 – 4 days post partum

Clinical reactive

Hyperacute conjunctivitis with pus, with or without a membrane
Severe swelling of both eyes

Treatment

- Penicillin G 50,000 IU in 2 divided closes for 7 days - systemic
- Penicillin eye drops 1 hourly both eyes - Topical

9.1.1.6 Penetrating and Perforating Eye Injuries

Definitions

Penetrating wounds are injuries of the eye ball that result from a sharp object. They typically have a wound of entry, and a wound of exit. There may or may not have a retained foreign body.

Perforating wounds are injuries of eye ball that have only one wound of entry,. There also may have a retained foreign body.

Clinical Features

Symptoms:
- History injury present
- Red eye
9.0 EYE DISEASES

- Painful eye
- Soft eye

Signs
- Eye maybe shrunken due to loss of volume
- There may be subconjunctival haemorrhage.
- Pigment discoloration of the conjunctiva in the area of the wound
- Foreign Body may be seen.

Investigation
- X-ray orbit – to rule out intraocular foreign body
- Ocular ultrasound
- Cranial CT scan

Treatment
- Tetanus toxoid
- I/V antibiotic preferably cefotaxime 1gm start
  Or
- Gentamycin 80m IV start

Refer to the nearest eye unit promptly

9.1.2 Without Pain

The main cause of red eye without pain is conjunctivitis of different types.

a) Infective
   o Bacterial
   o Viral
b) Allergic
c) Chemical

9.1.2.1 Bacterial Conjunctivitis

Definition

This is a bacterial infection of the conjunctiva

Clinical Features

Symptoms
- Ocular discomfort – gritty sensation in the eye
- Eye discharge (pus)
- Diffuse conjunctival redness

Signs
- Red conjunctiva with discharge
- Normal vision (clear cornea)

Investigation
Fluorescein staining is negative

**Treatment:**
Tetracycline 1% eye ointment 3 – 6 times daily

**Supportive**
- Good personal hygiene to prevent re-infection
- Facial washing

### 9.1.2.2 Viral Epidermic haemorrhagic conjunctivitis

**Definition**
This is a viral infection of the conjunctiva and is associated with bleeding. The condition is very infectious and difficult to treat. It is often seen in families and epidemics.

**Clinical Features**

**Symptoms**
- Pain
  - Watery discharge
  - Ocular discomfort
  - Photophobia

**Signs**
- Sub conjunctiva haemorrhage (severe redness).
- Tender cervical lymphnodes, preauricular, submental groups
- Swollen conjunctiva
- Water discharge
- Normal vision

**Complication**
- Secondary bacterial infection

**Treatment**
- Tetracycline 1% eye ointment 3 times daily for 7 days

**Supportive**
Patient hygiene – do not share face cloth
Wash face and eyes

### 9.1.2.3 Allergic conjunctivitis

**Definition**
An allergic inflammation of the conjunctiva. This condition is common but very difficult to treat. A positive family history of atopic disease may be present
9.0 EYE DISEASES

Clinical Features

Symptoms

- Itchy eyes

Signs

Ring of pale, fleshy, pink-grey tissue around the cornea
Follicles on the tarsal conjunctiva (cobblestone type)

Treatment

Hydrocortisone 1% eye drops 3-4 times a day
Sodium chromoglycate 2% eye drops 5 times daily

9.2 Trachoma

Definition

This is an infection of the eye caused by Chlamydia Trachomatis. It is a disease of the underprivileged communities, with poor hygienic conditions. The common fly is the major vector in the infection and re-infection cycle. It is one of the leading causes of preventable blindness in the world.

Characterized by an acute inflammation which appears in the first decade of life, slowly progressing until the disease becomes inactive during the 2nd decade of life. Last sequelae may not appear for many years.

Stages

- Trachoma Follicular (TF): characterized by follicles on the upper lid conjunctiva
- Trachoma intense (TI): characterized by acute red tarsal conjunctiva with obliteration of blood vessel
- Trachoma Scaring (TS): Tarsal conjunctiva starts showing lines of scaring
- Trachoma Triachiasis (TT): - upper eye lid turns in, because of extreme scaring and shortening of lid conjunctiva causing corneal damage and ulceration
- Ulcerated Cornea (CO): starts scaring forming corneal opacification

Clinical features

Symptoms

- None
- Red eyes
- Ocular discomfort

Signs

- Follicles on tarsal conjunctiva
- Eye lid conjunctival scaring
- In-turning of eyelids (entropion)
- Eye lashes rubbing on cornea (Trichiasis) heading to corneal ulceration
9.0 EYE DISEASES

- Corneal scars

Treatment

WHO recommends adopting the SAFE strategy in proven endemic areas (after conducting survey).

S  Surgery for stage 5

A  Mass Antibiotic treatment. A single dose of Azithromycin 500mg. In children 10mg/kg/bd/wt as start dose (Donated by Pfizer free of charge once results of the survey are made available proving endemicity of the problem.

F  Face washing (provision of clean and safe water – multi-disciplinary approach where MOH partners with other line Ministries responsible for safe water as well as the some international NGOS that fund this expensive aspect of Trachoma control.

E  Environmental sanitation – Its a public health aspect of management

9.3. Lumps and Bumps on and around the Eye Ball

These are lumps and bumps on ana around the eye ball and are divided into:

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<td>• Pinguiculae</td>
<td>- Retinoblastoma</td>
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<td>• Pterygia</td>
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9.3.1.1 Stye

Definition
This is a small abscess caused by an acute staphylococcus infection of a lash follicle

Clinical Features

Symptom

- Painful lump on the lid margin

Sign
9.0 EYE DISEASES

- Tender inflamed nodule or lump on lid margin

Treatment:
- None – usually undergoes spontaneous resolution
- Hot compresses
- Removal of associated eye lash and drain the pus
- Tetracycline eye ointment may be applied to prevent eye ball infection

9.3.1.2 Tarsal Cyst (Chalazion)

Definition:
- This is a cyst on the eyelid that results from blockage of the duct of tarsal glands. It is usually formed a way from the lid margin.

Treatment
- Incision and curettage (I & C)

9.3.1.3 Orbital dermoid Cyst

Definition
These are round, localized nodules or lumps in the upper temporal or upper nasal aspect of the orbit. They arise from a displacement of epidermis to a subcutaneous location.

Types
(a) Simple type – not associated with body defect, these are superficially located
(b) Complicated – deeply seated, with deep intra-ocular extension. Present later in life with displacement of the eye ball

Investigation
- X-ray skull
- CT Scan to rule out intra orbital extension

Treatment
Surgery, total excision.

9.3.1.4 Pinguicula

Definition
This is a yellowish white growth on the bulbar conjunctiva adjacent to the nasal or temporal aspect of the limbus. This type does not involve the cornea.

Treatment
- Leave alone, if asymptomatic
- If inflamed – red – Tetracyline 1% eye ointment 2 times a day for 7 days
9.3.1.5  Pterygium

Definition
These are conjunctival growths on the nasal or temporal conjunctiva that enlarge and encroach on the cornea. May cause a skin-like band over the cornea that may cover the pupil.

Clinical features

Symptoms
May not cause any problem
May be a discomfort of the eye ball if the pterygium is inflamed.

Sign
Redness of the conjunctiva growth that lies within the palpebral fissure.

Treatment
Local Excision in case of progression towards visual axis.
Tetracycline 1% eye ointment if inflamed, post excision

9.3.2.  Malignant

9.3.2.1  Kaposi Sarcoma of the Conjunctiva and Eyelid (See section on malignancies Page ------)
• It appears as a sessile or papillary growth on the intrapalpebral area of the perilimbal conjunctiva

• In immuno-compromised patients, the tumour is aggressive, with deep infiltration in the orbit and eyeball. Metastases occur to the preauricular and submandibular lymph nodes

• The predisposing factor is the immunocompromised host

Signs

• Early: Usually, nasal limbal fungating growth in the region of an underlying pinguicula or pterygium

• Late: Huge fungating tumour of the orbit with metastases to local lymphnodes

Treatment:

• Refer to the nearest eye specialist unit.

• Early: Local excision with 2mm margin of normal limbus

• May use local mitomicin C (antimitotic)

• Late: If the whole eyeball is involved with extension into the orbit, and vision is lost – total exenteration

• Chemotherapy – if systemically spread

• Poor response to radiotherapy

9.3.2.3. Retinoblastoma
(see page oncology chapter)

9.4 Common Eye Diseases Associated With HIV and AIDS

Skin:
Molluscum contagiosum of eyelid
Kaposi Sarcoma of the eyelid skin or conjunctiva
Herpes zoster ophthalmicus
Herpes simplex the eyelid skin

Cornea
Dendritic (Herpes simplex) corneal ulcers
Fungal corneal ulcers

Uvea
Anterior uveitis – iritis
Posterior uveitis – choroiditis or retinochoroiditis
Pan uveitis

Vitreous
Candida vitritis

Retinal
Retinal vasculitis
Cytomegalovirus Retinitis

Neoplasia
Kaposi Sarcoma
Squamous cell carcinoma

Neuro-ophthalmic

Intracranial infections by pathogens such as *Cryptococcus neoformans* and *Toxoplasma gondii* may cause ocular motor nerve palsies, papillary abnormalities, visual field defects and optic neuropathy.

### 9.4.1. Moluscum Contagiosum

**Definition**

This is a viral infection caused by the cytomegalovirus commonly affecting children. The typical lesion is a pale, waxy elevated nodule on the eyelids.

**Clinical Features**

**Complications**

The shedding of cell laden with viral particles can produce a chronic follicular conjunctivitis and superficial keratitis.

**Treatment**

Expression of the contents of the nodule
Heat cauterisation of the lesions

### 9.4.2 Herpes Zoster Ophthalmicus

**Definition**

This is infection caused by the varicella zoster affecting the ophthalmic division of the trigeminal vein. It is more common and more severe in patients with lymphomas and in those being treated by radiotherapy or immuno-suppressed individuals.

**Clinical Features**

**Symptoms**

- Severe pain along the ophthalmic division of the trigeminal nerve VI)
- Maculo papular rash along the VI that obeys mid facial line.
- Swelling of the affected part of the face

**Signs**

- Typical Herpes Zoster rash

**Complications**

- Anterior uveitis
- Neurological : cranial nerve palsies
- Optic neuritis
- Encephalitis
9.0  EYE DISEASES

- Contra-lateral hemiplegia
- Severe facial skin scarring
- Corneal opacification
- Neuropathic keratopathy
- Disciform keratopathy

**Diagnosis**

Clinical – the typical distribution of the Herpes Zoster rash

**Treatment**

- Oral acyclovir 800mg 5 times daily
- Oxytetracyline 3%/hydrocortisone 1% eye drops or
- Betamethasone 0.1% neomycin 0.5% eye drops or
- Dexamethasone 0.1% chloramphenical 1% eye drops 4-6 times daily
- Calamine lotion to the skin or acyclovir 3% skin ointment
- ± systemic steroids (x-ray to rule out PTB) may activate TB in AIDS patients
- Acyclovir 3% eye ointment 5 times daily

9.4.3.  Cytomegalovirus Retinitis (CMV)

**Definition**

This is a rare chronic diffuse exudative infection of the retina caused by the CMV virus which occurs with rare exception, in patients with an impaired immune system caused by either AIDS, cytotoxic chemotherapy or long term immuno suppression following organ transplantation

**Clinical Features**

**Symptoms**

- Poor vision
- Floaters

**Signs**

- Cotton wool spots
- Full thickness retinal necrosis and oedema which starts peripherally or at the posterior pole
- Retinal bleeding
- Retinal vasculitis
- Whole retina eventually involved
- Total retinal atrophy
- Retinal detachment

**Treatment**

- Dihydroxypropoxymethyl guanine i/v causes regression
- Gancidovir IV infusion (induction) 5mg/kg 2 times a day for 12-21 days maintenance dose 5 mg/kwbtwt daily until adequate recovery of immunity
9.0 EYE DISEASES

- Forscarnet IV infusion, induction 60mg/kg every 8 hours for 2-3 weeks, then maintenance dose 60mg/kg daily increased to 90-120mg/kg if tolerated. If CMW progresses while on maintenance dose repeat the induction dose. Treatment is needed for life

9.5. Optics & Refraction (Refractive Errors and low vision)

Definition

This is deficiency in the refracting mechanism of the eye resulting into poor vision. The eye is designed to be able to perceive light that falls within the visible part of the electromagnetic spectrum. The two parts of the eye that are responsible for image formation are:

- a) The Cornea – accounts for 2/3 of the refractive power of the eye.
- b) The Crystalline Lens which accounts for 1/3 of the refractive power of the eye as well as for the accommodative capacity.

9.5.1. Refractive Errors

Types of refractive error:

- Myopia: “short sightedness”
- Hyperopia: (Hypermetropia): Long sightedness
- Aphakia: Poor vision that results from absence of the crystalline lens
- Presbyopia: Difficult in reading in the elderly (above 40 years) that results from loss of the accommodative power of the lens
- Astigmatism: In this condition of the eye, the meridians of the eye are not equal, resulting in unequal refraction

Clinical Features

Symptom
Poor vision

Sign
Specific retinal reflex in line with the types of refractive error mentioned above on retinoscopy.

Refractive errors should be managed by optometrists, refractionists and opticians and sometimes ophthalmic clinical officers, ophthalmic nurses and ophthalmologists.

After carrying out a visual acuity examination on a patient complaining of poor vision, if the VA is found below 6/12 in the better eye with maximum correction, the patient should be referred to the nearest eye specialist where further assessment and management of such a patient can be completed.

Treatment

- Glasses, contact lenses, or
- Refractive surgery sometimes

9.5.2. Low Vision (VA range of 6/18 – 6/60)
Definition

This is failure to attain a visual improvement of more than 6/18 in the better eye after being given the maximum conventional treatment for poor vision. In such a patient further improvement of vision can be achieved by using low visual aids.

Treatment

The types of low visual aids available are:

- **Optical** – High power reading glasses, magnifies (illuminating and non-illuminating), telescopes, closed circuit television sets.
- **Non-optical** – Environmental modification aimed at further enhancing the corrected residue vision if such as:
  - improving lighting
  - special reading stands
  - painting of the stair cases to improve contrast
  - painting kitchen utensils for ease of identification
  - special cheque signing cards
  - talking watches etc.

Refer such a patient to higher centers where appropriate aid can be provided.

9.6. Strabismus (Squint)

Definition:

This is ocular misalignment resulting from either an abnormality in binocular vision or anomalies of neuromuscular control of ocular motor motility. When eyes become dissociated (not aligned) then strabismus (squint) is present.

**Orthophoria**: This is when the ocular motor apparatus is in perfect equilibrium, so that both eyes remain aligned (i.e. directed on the fixation point) in all positions of gaze and at all distances of the fixation point even when the fusion mechanism is disrupted such as when one eye is occluded. Orthophoria – describes “essentially straight eyes.”

**Phorias**: These are latent deviations (latent strabismus or squint) or is a deviation kept latent by the fusion mechanisms.

**Tropias**: Are manifest deviations. A deviation (squint) that is manifest at all times and is not kept under control by the fusion mechanisms.

Types of Strabismus (squint):

- **Esotropia**: Eye is rotated so that the cornea is rotated nasally. This is also known as **convergent horizontal strabismus**
- **Exotropia**: Eye is rotated so that the cornea is rotated temporally (i.e. on the temporal side). This is also known as **divergent horizontal strabismus**
- Hypotropia: Eye is rotated about a transverse X axis so that the cornea is rotated inferiorly (downwards). This is also known as vertical strabismus
- Hypertropia: Eye is rotated about the transverse X axis so that the cornea is rotated superiorly (upwards). This is also known as vertical strabismus
- Incyclotropia: Eye is rotated about the sagittal Y axis so that the superior portion of the vertical meridian is rotated nasally and the inferior portion of the vertical meridian is rotated temporally. This is also known as torsional strabismus
- Excyclotropia: Eye is rotated about the sagittal Y axis so that the superior portion of the vertical meridian is rotated temporally (on the temporal side of the face) and the inferior portion of the vertical meridian is rotated nasally (This one is also a torsional strabismus)

Classification

Several methods of classifying eye alignments and motility disorders are used:

1. Classification according to fusional status
   - Phoria – a latent deviation in which fusion control is always present
   - Tropia – a manifest deviation in which fusion control is not present
   - Intermittent – Fusion control is present at times

2. Classification according to variation of the deviation with gaze position, or fixating eye.
   - Comitant – a deviation does not vary with direction of gaze or fixating gaze
   - Incomitant – The deviation does vary with direction of gaze or fixating eye. Most incomitant strabismus is paralytic, indicating either neurological or orbital disease.

3. According to fixation:
   - Alternating: There is spontaneous alteration of fixation from one eye to the other.
   - Monocular – There is definite preference of fixation with one eye.

4. According to age of onset
   - Congenital – a deviation noted (documented) prior to age of 6 months
   - Acquired – an ocular deviation noted and documented after the age of 6 months.

5. According to type of deviation
   - Horizontal – Exo deviation or Eso deviation
   - Vertical – hyper deviation or hypo deviation
   - Torsional – Incyclo deviation or excyclo deviation or
   - Combined

Treatment

This requires specialized assessment that starts with a careful history, clinical examination and treatment. Management requires the expertise of orthoptists working hand in hand and under an ophthalmologist’s in order to treat these unsightly ocular deviations.

A squinting child or an adult has an underlying problem that is responsible for deviation. It could be an abnormality of binocular vision, or anomalies of neuromuscular control of ocular motility. Some, if not all are treatable provided these patients are referred and corrected early in life.
All squinting children should be referred to the specialist, preferably centers that have ophthalmologists.

9.7 Systemic Eye Diseases and the Eye

9.7.1. Eye Diseases associated with Hypertension

- Hypertensive retinopathy
- Retinal vein occlusion
- Retinal artery occlusion
- Ocular motor palsies

9.7.1.1 Hypertensive Retinopathy

Definition
The primary response of retinal arterioles to hypertension is narrowing. In sustained hypertension, there is a disruption of the blood-retinal barrier resulting in increased vascular permeability. The fundus picture of hypertensive retinopathy is characterized by: Vasoconstriction, leakage and arteriosclerosis.

Severe hypertension may lead to obstruction of the precapillary arterioles leading to development of cotton wool spots. Abnormal vascular permeability leads to development of flame-shaped hemorrhage, retinal oedema and hard exudates. The deposition of hard exudates in the macular area may lead to their radial distribution in form of a macular star. Swelling of the optic nerve head is the hallmark of malignant hypertension. Arteriolar sclerotic features are due to thickening of the blood vessel wall. The single most important clinical sign is presence of marked changes at the arteriolar venous crossings.

Grading of Hypertensive retinopathy

Grade I: Mild generalized arteriolar constriction. Broadening of the arteriolar light reflex and vein concealment.

Grade II: More severe generalized as well as focal arteriolar constriction and deflection of veins at arteriolar/venous crossings.

Grade III: Flame-shaped hemorrhages, cotton wool spots, hard exudates, copper-wiring of arterioles, banking of veins distal to the arteriolar/venous crossings and right-angled deflections of veins.

Grade VI: Disc swelling and silver wiring of arterioles.

Treatment

- Medical, Control of hypertension

9.7.1.2 Retinal Vein Occlusion

Systemic hypertension is associated with an increased risk of both branch retinal vein occlusion and central retinal artery occlusion.

Treatment
• No effective treatment
• Control the hypertension
• refer to an ophthalmologists
• Some patients develop secondary retinal neo vascularization which requires pan retinal laser photocoagulation (Ischaemic type of central retinal vein occlusion)

9.7.1.3 Retinal artery Occlusions

Patient may suffer attacks of amourosis fugax (transient absences of vision) or frank retinal artery occlusion as a result of the associated arteriosderosis

Treatment

Requires urgent management

• patient should lie flat
• Firm Ocular massage – to lower intraocular pressure, and increase retinal blood flow
• Intravenous Acetazolamide 500mg start to further lower the intraocular pressure
• Inhalation of a mixture of 5% Carbon dioxide and 95% Oxygen and anterior chamber paracentesis.

Unfortunately, the results of the treatment are usually disappointing.

9.7.1.4. Ocular motor palsies

Ocular muscle palsies may be found in patients with hypertension, even though hypertension is not the only cause of ocular muscle palsies. There are other causes like diabetes mellitus.

Treatment

Medical, control of hypertension
May undergo spontaneous resolution

9.7.2. Dysthroid Eye disease

Definition

Dysthyroid eye disease is a syndrome of clinical and orbital imaging abnormalities caused by deposition of mucopolysaccharides and infiltration with chronic inflammatory cells of the orbital tissues, particularly the extraocular muscles.

Clinical Features
In general, the ocular features of Grave’ disease and ophthalmic euthyroid graves’ disease are similar, although they tend to be more asymmetrical in the latter stages.

Signs

Eyelid signs:
• Lid retraction
• Lid lag
Signs resulting from infiltrative ophthalmopathy
- Conjunctival injection (redness)
- Chemosis (swelling)
- Superior limbic conjunctivitis
- Proptosis
- Optic neuropathy whose early sign is colour desaturation
- Restrictive myopathy

Treatment
- non specific (reassurance, head elevation to reduce the severity of peri orbital oedema, taping of eyelids at night to protect the cornea, prismatic glasses to reduce diplopia, diuretics such as cyclopenthiazide .5mg at night to reduce morning periorbital oedema
- Hypromellose 0.3mg (artificial tears) or SNO tears
- In severe cases, Prednisolone 80-100mg/day, enteric coated and after 48hrs taper by 5mg every 5th day. Treat for a maximum of 2-8 weeks and stop at 3 months
- Radiotherapy – used for patients who have systemic contraindications to steroids, refuse steroids develop serious steroids side effect or a steroid resistance.
- Dose – 20gy to the posterior orbit given for over a 10 day period
  Response is usually evident within 6 weeks and maximum improvement evident by 4 months.
- Orbital decompression; if patient develops severe exposure keratopathy, optic neuropathy or cosmetically unacceptable proptosis
- Surgery on Eyelids
  - Tarsorrhaphy in uncontrolled exposure keratopathy
  - To weaken muller’s muscle for patient with severe lid retraction.
  - Blepharoplasty

9.7.3. Diabetes Mellitus

Ocular complications:
- Diabetic Retinopathy
- Background
- Maculopathy
- Preproliferative
- Proliferative
- Advanced diabetic eye disease
- Cataract
- Accelerated senile
- True diabetic
- Ocular Motor nerve palsies
- Abnormal pupillary reactions
• Changes in refraction

a) Diabetic Retinopathy (DR)

The overall prevalence of retinopathy in diabetic patients is about 25%. In none insulin depended diabetics (NIDDs) the prevalence is 20% and in insulin dependent diabetics it is about 40%.

Predisposing factors (risk factors)

• Duration, the incidence of diabetic retinopathy is closely related to the duration of diabetes. (generally more likely after 5 years onset of diabetes mellitus.
• Control of diabetes – poor controlled patients develop the complication sooner than well controlled.
• Pregnancy
• Hypertension
• Renal disease
• Anemia

b) Background diabetic retinopathy (BDR)

Clinical Features

Signs

Microaneurysms at the posterior pole, temporal to the macula.
- Dot and blot hemorrhage
- Hard exudates
- Diffuse retinal oedema

Treatment

• Treat associated high Blood pressure, anaemia, renal failure
• Annual retinal (fundal) examination usually regresses spontaneously when the diabetes is controlled

c) Diabetic Maculopathy – results from macular oedema and hard exudates

Clinical Features

Symptoms:

Gradual impairment of central vision
Difficult in reading small print

Signs

Features of BDR, plus foveal oedema, or foveal hard exudates.

Treatment

Refer to Ophthalmologist
Laser macular grid

d) Preproliferative diabetic retinopathy (PPDR)

Clinical Features
Signs
- cotton wool spots
- Intra retinal microvascular angiopathies and segmentation
- Arteriolar narrowing
- Large blot and dot hemorrhages

Treatment
Refer to specialist

e) Proliferative diabetic retinopathy (PDR)

Clinical features

Signs
- Early neovascularization disc, or elsewhere on retina
- Late elevated new vessels, associated with a white fibrosis component

Treatment
- Urgent referral to Ophthalmologist because they require Pan retinal photocoagulation

f) Advanced Diabetic eye disease

Clinical Features

Symptoms
- Sudden onset of floaters
- Blurred vision from vitreous hemorrhage

Signs
- Dense vitreous hemorrhage
- Tractional retinal detachment
- Neovascular glaucoma

Treatment
- Surgery
- Vitrectomy with endolaser photocoagulation

9.8 Ocular Emergencies

9.8.1 Absolute

- Chemical injury to the eye
- Cornea Laceration
- Hyphaema (Traumatic) absolute
9.0  EYE DISEASES

9.8.2  Relative

- Pediatric cataract
- Retinal detachment

9.8.1.1. Chemical Injury to the Eye:
Already discussed under Red eye with pain

9.8.1.2 Cornea Laceration:

Definition
Laceration if the Cornea,

Clinical Features

Symptoms
History of injury, always ascertain mode of injury
Loss of vision following trauma
Bleeding from the eye

Signs
- Obvious corneal laceration visible on direct light examination of the eye
- Prolapsed iris is seen plugging the laceration
- Anterior chamber is flat with blood
Eye ball is soft

Diagnosis
- Examine under local anaesthesia lignocaine 2% eye drops, gently examine the eye under full aseptic condition. The aceration will be visible.

Treatment

Early Management:
- Tetanus Toxoid
- IM or IV Gentamycin 80mg start, or cefotaxime 1gm stat.
- Chloramphenicol 1% eye drops or Gentamycin 0.3% eye drops to affected eye start
- Light dressing (padding) of the affected eye
- Refer to specialist.

Specialist Management

- Under lignocaine 2%, examine the eye gently to ascertain the wound shape.
- Exclude retained intraocular foreign body (x-ray or ultra-sound)
- Arrange for emergency repair, preferably under general anaesthesia.
- Suture the laceration under microscope
- Reform the anterior chamber
- Sub-conjunctival injection of gentamycin 0.3ml + atropine 0.3ml + dexamethasone, 0.3ml
- Gentamycin, 0.3% eye drops 2 drops 4 times a day, or Chloramphenicol 1% eye drops 2 drops 4 times a day and
- Keep eye padded
9.8.1.3 Traumatic Hyphaema

Definition
This is blood in the anterior chamber as a result of trauma, or very rarely spontaneous. If spontaneous, rule out intraocular malignancy or juvenile xanthogranuloma.

Clinical Features

Symptoms
- History of injury, usually blunt type of trauma
- Poor vision

Signs
Blood clots visible in the anterior chamber.

Treatment
- If the patient is a child admit in hospital and keep under observation. If left unattended, chances of a re-bleed are high resulting in intraocular pressure elevation and corneal staining
- If anterior chamber is 1/3 full in an adult, can treat as an out patient
- If anterior chamber is 1/2 full or 2/3 of it full, admit the patient
- Bed rest
- Betamethasene, or Dexamethasene, 0.1% eye drops four times a day
- Induce cycloplegia, with Tropicamide, 1% eye drop twice daily or Atropine, 1% eye drop once daily
- If intraocular pressure is elevated, use antiglaucoma drops, preferably Timolol 0.5% two drops or oral Acetazolamide, 250mg tablets 4 times daily
- Use topical antibiotic to prevent or treat associated infection
- Chloramphenical, 1% or Gentamycin, 0.3% eye drops

Relative Emergencies
- Congenital cataract
- Retinal detachment
  Refer to the specialists early.

9.9 Glaucoma

Definition
This is a group of diseases in which the intraocular pressure is sufficiently elevated to damage vision.

Types
(i) Primary
(ii) Secondary
(iii) Congenital

9.9.1 Primary angle closure (congestive) Glaucoma
(see section on red eye with pain page)

9.9.2 Primary open angle glaucoma
(chronic simple glaucoma)

Definition
This is prolonged increase in the ocular pressure. The result is complete damage of the optic nerve.

Clinical Features

Symptoms
• Usually asymptomatic

Signs
• Gonioscopy – normal angle
• on Tonometry, Intra-ocular-pressure (IOP) will be raised, above 25mmHg
• Optic nerve cupping
• Visual field – trachoma type of visual field loss
• Late - When blind – Optic atrophy

Investigations
• Perimetry – Peripheral visual field analysis, either by confrontation, or using Periferal visual field analyzer
• Tonometry – Perkins or Goldman
• Gonioscopy – Normal angle
• Fundoscopy – optic disc cupping

Treatment
1st Line  Timolol maleate 0.25% or 0.5% twice daily
Rule out underlining cardiac or pulmonary malfunction
2nd Line  Pilocarpine 2% or 4% eye drops 4 times daily
Dipivefrine 0.1% eye drops twice daily
3rd line  Latanoprost 50 micrograms/ml once or twice daily

Acetazdamide 250mg actazolamine sustate (slow release) 250mg once daily. use only for a short while

Treatment is for life as long as the compliance stays good and as long as intra-ocular pressure is controlled.

Ocular association of Primary open angle glaucoma (POAG) (recommend to rule out glaucoma in any of these conditions:)
• High myopia
• Retinal vein occlusion
• Retinal detachment
• Pigmentary Retinopaty of retinitis pigmentosa type

Systemic associations
• Diabetes Mellitus
9.0 EYE DISEASES

- Dysthyroid ophthalmopathy

Current practice recommends surgery as 1st line management because of poor compliance of treatment for life. Trabeculectomy (Filtration surgery) ± use mitomycin C.

DO NOT DISCHARGE PATIENT. SEE AT LEAST TWICE YEARLY TO SAFEGUARD AGAINST SECONDARY CLOSURE OF THE FILTRATION BLEP

9.9.3. Primary Congenital Glaucoma

Definition
This is intraocular pressure elevation in a child, that manifest either at birth or a few years after birth due to a developmental anomaly of the formation of the eye anterior chamber angle.

Clinical Features

Symptoms
- Lacrimation (usually mistaken for lacrimal duct closure
- Light intolerance

Signs
- Large eye – Buphthalmos
- Misty looking cornea
- Haabs striae on the cornea (on slit lamp microscopy)
- Cuped disc

Investigation
- Corneal diameters (7 – 11mm) 16 over 11mm, reason to be suspicious
- Refraction: myopic
- Tonometry – Intra ocular pressure will be high
- Fundoscopy – varying degrees of cupping

Treatment
Surgical – Trabeculectomy
Goniotomy

9.9.3 Secondary glaucomas

Definition
These are glaucomas that are secondary to an underlying cause.

Treatment
Refer to eye specialist services

References
Jack Kanski; Clinical Ophthalmology
Jack Kanski; Dafydd T. Thomas; The Eye in Systemic Diseases
The American Academy of Ophthalmology; Basic and Clinical Science Course
Peadiatric Ophthalmology and Strabismus
10.0 ANAEMIA AND NUTRITIONAL CONDITIONS

10.1 Anaemia

Definition
This is a reduction in the haemoglobin concentration in an individual to below the normal range for that individual's age and sex.

The normal haemoglobin concentration ranges are as follows:

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Haemoglobin Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male adults</td>
<td>130 – 180g/L</td>
</tr>
<tr>
<td>Female adults</td>
<td>120 – 160g/L</td>
</tr>
<tr>
<td>Children</td>
<td></td>
</tr>
<tr>
<td>Birth (full term)</td>
<td>135 – 195g/L +/- 30</td>
</tr>
<tr>
<td>6 weeks</td>
<td>110 – 170g/L</td>
</tr>
<tr>
<td>2 - 6 months</td>
<td>115 – 155g/L</td>
</tr>
<tr>
<td>2 - 6 years</td>
<td>110 – 140g/L</td>
</tr>
<tr>
<td>7-12 years</td>
<td>110 – 150g/L</td>
</tr>
</tbody>
</table>

Anaemia is not a diagnosis in itself as there is always an underlying cause, which must be determined before the anaemia can be properly treated. Anaemia is most often detected by measuring the haemoglobin (Hb) concentration of the blood.

In the management of anaemia, one must obtain a detailed history from the patient or care giver's, examine the anaemic patient carefully and perform the appropriate investigations with a view of:-

1. Establishing that the patient is anaemic
2. Establishing the type of anaemia the patient has
3. Determining the cause of the anaemia
4. Determining whether or not there are complications arising from the anaemia, the cause of the anaemia or both.

The history obtained from the patient or care giver's often gives very important information for making an appropriate diagnosis.

Once the type of anaemia and its cause have been established, appropriate treatment can be given and, where possible, the underlying cause corrected or removed.

One principle function of the red blood cells is to carry oxygen from the lungs to all other areas of the body and this function is performed by the haemoglobin. The haemoglobin, found in the red blood cells, binds to oxygen in the lungs and the haemoglobin bound oxygen is transported to other organs where it is released. When the haemoglobin concentration is low, the oxygen carrying capacity of the blood is reduced and thus the amount of oxygen reaching other organs is also reduced. In anaemic states, the body will thus react in such a way as to try to maintain the levels of oxygen reaching the organs.

Clinical features

The clinical features of anaemia are directly due to the lowered haemoglobin concentration and are therefore common to all types of anaemia irrespective of the cause.

Symptoms
• Tiredness, weakness, dizziness, shortness of breath and headache, palpitations visual disturbances

Signs
• One general sign of anaemia is pallor of the mucous membranes, and nail beds. However, this sign is unreliable as it can be masked by other conditions such as jaundice and conjunctivitis.
• Other signs will be of either the underlying cause e.g., bruising of the skin in aplastic anaemia or the effects of anaemia such as heart failure.

Classification of Anaemia

There are several methods of classifying anaemia but the most common is based upon the cause of the anaemia. Anaemia can result from
1. Poor production of red blood cells
2. Increased destruction of the red blood cells
3. Increased loss of red blood cells from the body

Anaemias that arise from poor production of red blood cells include:
Nutritional deficiency anaemias such as iron, folic acid and vitamin B12 deficiency anaemias, anaemia of chronic illness and bone marrow failure syndromes such as aplastic anaemia, invasion of the bone marrow by cancer, infection in the bone marrow

Anaemias arising from increased red blood cell destruction include sickle cell anaemia, infections such as malaria, auto-immune haemolytic anaemia, G-6-PD deficiency. Increased blood loss may result from parasitic infestations such as hookworm, and schistosomiasis, heavy menstrual loss and surgical conditions such as bleeding peptic ulcers.

Nutritional anaemia

Iron deficiency anaemia
Iron deficiency anaemia is by far the most common type of anaemia in the world. Hookworm infestation and schistosomiasis not only cause anaemia by whole blood loss but they are also leading causes iron deficiency in developing countries. Iron deficiency may also arise from poor dietary intake, malabsorption or increased demands as in pregnancy

Folic acid and Vitamin B12 deficiency
Deficiency of either or both of these micronutrients results in anaemias characterised by larger than normal red blood cells (megaloblastic anaemias). Megaloblastic anaemias may arise from increased demands for the micronutrients as may occur in pregnancy and lactation, haemolysis, poor dietary intake particularly in absolute vegetarians (Vit B 12) and malabsorption

Diagnosis
• FBC, peripheral smear
• Urinalysis + Microscopy
• Stool for occult blood, ova and parasites
• Other investigations will be dependent on the clinical evaluation of the patient
10.1.1 Treatment of nutrititional anaemias

Drugs

Ferrous Sulphate, Adults 200mg 3 times a day after meals until the Hb has reached the normal range. Continue with 200mg daily for 6 months to build up iron stores. Children up to 1 year: Ferrous Sulphate 9-18mg of iron daily (0.75ml-1.5 ml mixture). 1-5 years: 100-150mg daily (10-15ml mixture daily) in divided doses. 6-12 years: 200mg 3 times a day.

For prophylaxis 200mg 3 times daily

Iron Dextran injection to be be used in a hospital under the direct supervision of a doctor. It is not superior to oral iron and is used only when patients cannot tolerate oral therapy.

Folic Acid 5-10mg daily for as long as required.

Vitamin B₁₂ (Hydroxycobalamin) injection, Initially 1mg i.v. repeated 5 times at intervals of 2-3 days. Maintenance dose 1mg every 2-3 months. Life long treatment may be required.

10.2. Malnutrition

Definition

Malnutrition is a term that covers a wide range of clinical conditions in children and adults causing an impairment of health. It results from a deficiency or an excess of one or more essential nutrients. Malnourished individuals are prone to infections and in children it causes poor growth. In pregnancy, poor nutrition results in the birth of low weight babies.

Protein Energy Malnutrition (PEM)

This is the commonest form of malnutrition in children below 5 years of age. It is a result of deficiencies in any or all nutrients (macro and micronutrients) The first sign is loss of weight or failure to gain weight. The children’s under five card helps us to detect this form of malnutrition at the clinic through growth monitoring.

There are three main clinical syndromes:-
1. Kwashiorkor
2. Marasmic-kwashiorkor
3. Marasmus

Underweight represent the mildest form of malnutrition while kwashiorkor, marasmus and marasmus-kwashiorkor represent the severe forms and require admission in health centre or hospital for treatment.

80-60% of normal
Underweight
Kwashiorkor

Below 60% of normal without oedema
Marasmus
70-60% Marasmic-Kwashiorkor with oedema

Marasmus Below 60% without oedema

The child has gross muscle wasting, no subcutaneous fat, has a hungry and anxious look.
Kwashiorkor 80-60%

The child shows oedema, flaky paint rash; thin, pale sparse easily pluckable hair, apathetic, anorexic, moon-faced. Big fatty liver on palpitation

Marasmic-kwashiorkor 60-70%

Wasted body but also has oedema. This is severe malnutrition and usually requires admission in health centre or hospital for treatment.

Treatment

Those that are admitted to hospital have severe malnutrition with complications and need very special treatment, you have heard of F75 and F100. Those that are not severe or are severe but without complication can be managed at community level using RUFT (You have heard foods like plumpy nut?)

Procedures on admission:-

1. Weigh the child
2. Record temperature (rectal), pulse, respiration rate
3. Check blood sugar (Dextrostix)
4. FBC/ESR, electrolytes, urea, serum protein/albumin, sugar and MP
5. Stool and urine
6. Manitoux, CXR

Resuscitation

a) Resuscitation first 4-7 days. Most deaths occur in this period.

b) Generally keep warm with heater and hot water bottles.
   - Do not give bath
   - Nurse away from windows
   - Adequate covering during the night (most kwashiorkor babies die at night).

c) Start feeding immediately after admission with F75.
   Oral: Use a cup and spoon. For a very sick and anorexic child, careful continuous nasogastric tube feeding can be used.

Milk Diet:- 100ml/kg increasing to 150ml/kg in 7 divided doses. The milk diet is made from:

- Dried skim milk 120g
- Sugar 30g
- Oil 35g
- Electrolyte sol. 30 ml

Add cooled boiled water slowly up to 1 litre. Stir well.

Electrolyte Solution made up of:

- Potassium chloride 90g
- Magnesium hydroxide 9g
- Cooled boiled water 100ml

Only 30ml of the Electrolyte solution is used for each litre of milk diet made.

d) Rehydration, severe dehydration can be present despite oedema!
Give half strength darrow with dextrose, 20ml/kg in the first hour. 20ml/kg over the next 2 hours, followed by 5 – 10ml/kg per hour depending on severity of the dehydration.
In less severe dehydration and when an IV line is not possible, give ORS, 50-80ml/kg over 4-6 hours followed by milk diet.

f) Drugs
Potassium: 6 mEq/kg per day for 2 weeks or more, particularly in a child with chronic diarrhoea. Give potassium as potassium citrate, or potassium chloride.

Magnesium sulphate 25% IM 0.2g for 3-5 days,

Vitamin A 6 drops (30.000 IU) stat followed by one drop (5.000 IU) daily given with water or milk. If there are signs of keratomalacia give 1ml or 30 drops (150.000 IU) orally stat.

Folic Acid 5 mg daily

Vitamin K injection 5mg stat on admission

Antibiotics
These should be all the time. Gentamycin

Multivitamin syrup
Note: Iron containing syrup should be avoided in the acute phase of malnutrition.

Complications

1. Hypothermia: With temperature below 35.5°C, mortality doubles. Warm up the child. Temperature monitor every hour until the temperature reaches 37°C, then take every 4 hours.

2. Hypoglycaemia: If blood sugar is below 2.2mmol/l (or below 2.5mmol/l by dextrostix) mortality increases by about 4 times. May be asymptomatic.

Treatment

- IV dextrose 25% 2ml/kg or dextrose 50% 1ml/kg followed by IV drip of 10% dextrose 75ml/kg/day. Reduce gradually as the blood sugar stabilises.
- Monitor blood sugar with dextrostix 4 hourly until normal and stable.
- Heart failure: May be precipitated by severe anaemia or excessive fluids given IV or orally. This condition is common in the second week of treatment.

Complications

Suspect heart failure if oedema disappears but weight is constant, or sudden rapid weight gain, or increase of pulse. Check size of liver.

10.2.1 Treatment (heart failure)

- Diuretic (Furosemide 1mg/kg).
• Blood transfusion to anaemic children (4-6 g%), 20ml/kg slowly. If CCF present, Hb below 4 g/dl give 10ml/kg or packed cells slowly.

4. Convulsions: Diazepam to stop convulsions.
   Do Lumbar Puncture, dextrostix, electrolytes and Blood Slide.

5. Diarrhoea: Check stool for reducing sugars. If positive change to lactose-free milk.

If there is no evidence of reducing sugars in stool continue with milk diet.
Treat any parasites, e.g. giardiasis.
   • Metronidazole 100mg 3 times daily for 5 days
   • Bebendazole 100mg 2 times daily

Rehabilitation

2-6 weeks of gradually increasing the energy and protein intake to 200-300 kcals/kg per day (normal requirement 100-110 kcals per day) and protein 4-5 g/kg per day (normal requirement 2g/kg per day). As soon as the child wants food put on normal diet in addition to his full requirement of milk diet.

10.3. Vitamin Deficiencies

Vitamins are compounds needed in small quantities for operation of normal bodily metabolism. The vitamin requirements may be increased during disease and fevers.

Vitamin deficiency may appear as single or combined conditions. Multivitamin preparations will cover mild deficiencies of a combined nature. Vitamin B complex preparations will often cover most of the vitamin B deficiencies.

Note that a diet with sufficient fruit and vegetables will prevent most vitamin deficiencies.

Vitamin A

Sources of Vitamin A: Mangoes, pawpaw, carrots, spinach, cod liver oil. Deficiency leads to:-
   - Dryness of conjunctiva (Xerosi)
   - Scaliness of the skin and sometimes acne
   - Keratization of the cornea, cortical opacity and blindness
   - Inability to see easily in the dark (night blindness),
   - Softening of cornea (keratomalacia) often followed by cortical perforation and panophthalmitis.

Treatment
   - Children with severe malnutrition, give one age specific dose (see under malnutrition above)
   - Children with diarrhoea for more than 3 days and children with measles give one dose

Prevention
   - 6 - 11 months give 100,000 i.u. once
   - 12 - 72 months give 200,000 i.u. once every six months
10.3.2 Vitamin B group

a) Vitamin Bl. May cause neuropathy in adults and cardiac failure in babies (Beriberi)
b) Vitamin B2 (Riboflavin). Deficiency causes mucocutaneous lesions such as angular stomatitis, sore cracked lips, and glossitis
c) Nicotinic Acid. Deficiency leads to pellagra, a disease common in adults and recognisable by the so-called 3 Ds:
   Dermatitis: Skin developing a cracked, pigmented scaliness in the areas exposed to sun or mechanical irritation.
   Diarrhoea: Gastrointestinal symptoms of loose watery stools.
   Dementia: Neurological symptoms, usually severe in adults but showing as apathy and irritability in children.

Treatment
- Vitamin B1; 25 – 100mg i.m. or orally
- Vitamin B2; 5 – 10mg daily
- Nicotinamide 100-300mg daily
- Until symptoms disappear

10.3.3 Vitamin C (Ascorbic acid)

Sources of ascorbic acid: Oranges, lemons, green vegetables. Deficiency leads to scurvy, a disease recognised by:

Clinical features

Signs and Symptoms
- Periodontal haemorrhage
- Swelling and pain of long bones due to sub-periodontal haemorrhage
- Loosening of teeth and lesions of the gums
- Leading to infections in the mouth.

Treatment
- Vitamin C tablets (Ascorbic acid) 200mg 4 times daily.
- Until symptoms disappear.

10.3.4 Vitamin D

Sources of vitamin D: Milk, butter, eggs, cod liver oil. It is normally formed in the skin from sunlight.

Clinical Features

Signs and Symptoms
- Deficiency leads to rickets, recognised by:
  - Softening of bones resulting in bowing of legs or knock-knees.
  - Thickening of the ends of bones.

Treatment
- Vitamin D, 1000-5000 units/day orally for a period of 6 weeks to 3 months.
Exposure to sunlight,

Prevention

- Prevention of malnutrition requires the administration of a variety of foods providing a balanced or mixed diet to satisfy the individual nutritional needs. Guidance concerning locally produced foods of the different food groups is important. People should be educated on the importance of eating regular nutritious meals including fruits and vegetables.

Pregnant women
Encouraged to:
- Eat a well balanced diet. (enough quantity of foods daily to meet her daily energy and enough critical nutrients needs, comply to the micronutrient supplement – Essential nutrition)
- Have extra rest especially during third trimester.
- Space their pregnancies (child-spacing 3yrs) adequately through the use of family planning methods. And must know their HIV status to safely breast feed her child

Infant and young Children:
- Initiate breastfeeding within an hour of birth
- Exclusively breastfeed for the first 6 months
Timely introduction to Complementary feeding (from 6 months with continued breastfeeding up to 24 months and beyond) and follow complementary feeding guidelines (Frequency of feeds according to the age group, density, utilization of food by vitamins and active feeding) after 6 months with continued breastfeed until 18-24 months. To the porridge should be added protein foods e.g. legumes (beans, peas, groundnuts), fish, meat.
- Pre-school children should be fed 4-5 times a day
- Children should be fed even when they are sick
- Children should be given fruits and vegetables regularly
- Encourage immunisation
For episodes of diarrhoea in breast fed young children intensify breast feeding for and promote use of ORS according to the severity of the diarrhoea. Early detection of children developing malnutrition (not gaining weight or loss of weight) and institutional high protein and high calorie diet.

10.4. Vulnerable Group Feeding
The supplementary rations given to selected vulnerable or at risk groups to make up for deficiencies in the diet should be instituted on a temporary basis. Meanwhile permanent home-based ways to make the diet adequate should be sough
11.0  SKIN CONDITIONS

These are classified according to the cause of infection or infestation:

- Bacterial infections
- Fungal infections
- Viral infections
- Parasitic infestations

11.1.  Bacterial Infections

Definition

This is a condition caused by blocked sebaceous glands. It usually begins at or after puberty. The most affected parts are the face, neck, back and chest.

Clinical features

- Occurs in mild form as blackheads and whiteheads (closed comedones and open comedones) and in more severe form as nodular lesions, with or without infection

Treatment

Drugs

- Benzoyl peroxide gel 2.5-10%, topically 1-2 times daily
- Doxycycline, 50-100mg orally daily for 6 weeks in severe cases

Supportive

- Wash the affected parts with carbolic soap and water 2 to 3 times daily
- Avoid use of cosmetics
- Diet should include plenty of fruits and vegetables
- Avoid fatty foods

11.1.2  Abscess

Definition

This is a collection of pus in the dermis and subcutaneous fat layer of the skin. It occurs as a result of infection of the hair follicles commonly caused by Staphylococcus aureus.

Clinical features

- The skin surrounding the affected hair follicle becomes red, hot, swollen and tender to touch. In severe cases there will be fever and involvement of the local lymph nodes
11.0 SKIN CONDITIONS

Treatment

Drugs

- Cloxacillin, adults; 250 - 500mg orally. 6 hourly for 5 days, children; 125 - 250mg orally 6 hourly five days or
- Erythromycin, adults; 250 - 500mg orally 6 hourly for 5 days, children; 125-250mg orally 6 hourly for 5 days

Surgery

- Incision and drainage
- In cases of multiple abscesses, non response to antibiotic therapy or an abscess in a diabetic, refer to specialist

Supportive

✓ Encourage patient to maintain good general hygiene
✓ Apply hot compression 3-4 times daily until abscess is ready for draining

11.1.3. Impetigo

Definition

This is a superficial infection of the epidermal layer of the skin by *aureus* commonly but Streptococcus species may also be involved. Painful vesicles and pustules break down to form scabs or crusts. Impetigo starts on the face and may spread to the neck, hands and legs. It usually occurs in children.

Treatment

Drugs

- Cloxacillin, orally, adults; 250 - 500mg 6 hourly for 5 days, children; 125 -250mg 6 hourly for 5 days or
- Erythromycin, orally, adults; 250 - 500mg 6 hourly for 5 days, children; 125 -250mg 6 hourly for 5 days

Supportive

✓ Keep finger nails short
✓ Soak and clean pustules with water and soap
✓ Patient should be referred to the next level if there is no improvement after 2 weeks

11.1.4. Eczema

Definition

Eczema is an inflammatory rash which may be due to endogenous or exogenous factors.

Classification of Eczema:

- Endogenous-
- Atopic (inherited disposition)
- Seborrhoeic
11.0 SKIN CONDITIONS

- Asteatotic
- discoid(nummular)
- unclassified
- Exogenous
- allergic contact dermatitis
- primary irritant dermatitis
- photodermatitis

11.1.4.1 Atopic eczema

Definition

This is a condition characterised by an itchy, rough, dry skin. In babies it occurs mainly in the areas surrounding the knees, elbows and neck whereas in older children and adults it can occur on any part of the body. The itching is intense at night and could become chronic and infected. Where possible the causative factor should be determined before commencing treatment.

Treatment

Drugs

- Aqueous cream, topically 1-3 times daily after bathing or
- Zinc oxide cream, topically 1-3 times daily after bathing
- Bethamethasone 1%, topically twice daily for 7 days (for severe or non-responsive cases) or
- Hydrocortisone in, topically twice daily for 7 days
- Zinc and Coal Tar Paste, topically 1-2 times daily (in chronic cases)
- Chlorpheniramine 4mg 2 times a day
- Erythromycin 500mg 4 times a day for 7 days

Supportive

- Keep fingernails short
- Keep skin hydrated with Oil bath
- Patient should avoid scratching
- Avoid exposure of affected parts to sunlight
- Avoid known irritants e.g. soap, woolen clothing

If there is no improvement of acute condition after 2 weeks refer to specialist.

11.1.4.2 Seborrhoeic eczema

Definition

This is a condition characterized by thick adherent scales presenting as a diffuse scaly scalp (dandruff). It may also affect other parts of the body which tend to be oily e.g. facial skin nasolabial folds, eyebrows, eyelashes, external ears, and centre of back. Variable pruritis and vesicular or scaly lesions may be present.
Infantile seborrhoiec eczema occurs in early infancy 2-4 weeks after birth. Begins with cradle cap (scaly scalp surrounding the anterior fontanelle), spreads to face, axilla, neck and nappy area. The rash is non itchy and gets better without leaving marks.

**Treatment**

**Drugs**

- Hydrocortisone 1% cream, topically twice daily
- Maintenance; once or twice a week as required
- Zinc oxide cream, topically 1-3 times daily after bathing specially in the nappy area or
- Aqueous cream, topically 1-3 times daily after bathing

To reduce scaling and itching of the scalp use keratolytic or antifungal containing shampoos once or twice weekly. Refer patients who do not respond to treatment or have acute oozing eczema to a specialist.

### 11.2. Fungal Infections

Superficial fungi live in the stratum corneum and feed on the keratin. They are called dermatophytes and belong to 3 genera microsporum, trichophyton, and epidermophyton. More than 40 species are currently recognized with 10 causing human infection. They are transmitted from person to person by direct body contact or by formites e.g. combs. They can also be transmitted from animals such as cats and dogs (zoophilic) or from the soil and plants (geophillic) The infections are named according to the body parts affected

- Tinea pedis - feet
- Tinea corporis - body
- Tinea capitis - scalp and hair
- Tinea manus - hands
- Tineaunguim -nails
- Tineacruiris - groin area covering the T of the genital area extending behind along the gluteal cleft
- Tinea facialis - face
- Tinea barbae - beard area
- Tineaversicolor
- Cutaneous candidiasis

#### 11.2.1 Tinea pedis (athletes foot)

**Definition**

This is a contagious fungal infection of the foot caused by *Trichophyton mentagrophytes* and *T. rubrum* most commonly.

**Clinical features**

- Itching of the foot
- Burning or stinging lesions with scaling borders between the toes
11.0 SKIN CONDITIONS

- Vesicular eruptions with white scaling between the 4th or 5th toes or the instep of the sole
- May be accompanied by vesicles on the palms and sides of fingers called ‘id’ reaction. The vesicles do not contain fungus and gets better when the fungus is treated

Diagnosis

Scrape the scales from the infected site and put on a glass slide with a drop of 20% KOH. On microscopy branching fungal hyphae are seen.

Treatment

Drugs

- Miconazole 2% cream, topically twice daily
Continue treatment for 2 weeks after the symptoms have cleared.

Supportive

- Keep feet dry all the time
- Wear open footwear
- Wear cotton socks, if need be
- Change socks daily

11. 2.2 Tinea corporis (ringworm of body, trunk and limbs)

Definition

This is a condition which can be acquired from animal (Trichophyton verrucossum, Microsporon canis) or human contact (T. rubrum). It is characterised by itchy lesions appearing as scaly grayish patches with raised borders. It can affect any part of the body, with the most commonly affected parts being the arms, groin, buttocks, waist and the area under the breasts.

Treatment

Drugs

- Miconazole cream 2%, topically twice daily for 2 to 6 weeks.
- Ketoconazole 200mgs O.D. oral for 6 wks
- Griseofulvin 500mgs O.D. oral up to 2 weeks after lesions disappear

Supportive

- Maintenance of general hygiene
- Avoid sharing of personal items such as towels and clothes

11.2.3 Tinea capitis (scalp ringworm)

This is a fungal infection of the scalp which is especially common in children. It is caused by Trichophyton species – violaceum in Africa and Asia, T. rubrum in Europe. Non inflammatory invasion of the hair shaft can occur due to Microsporum audouini transferred by contact wiith barber shears, hats or m.canis from pets.

Clinical features
11.0 SKIN CONDITIONS

- Diffuse scaling of scalp with no hair loss
- Circular scaly patches in the scalp with associated alopecia (hair loss)
- In severe cases, a boggy swollen mass with discharging pus and exudates called Kerion is due to animal fungus.

**Diagnosis**

Remove scales and broken hairs with a blunt scalpel and put it on a slide with KOH (Potassium Hydroxide 20%). The hair shaft is seen under the microscope full of fungal spores.

**Treatment**

**Drugs**

- Griseofulvin, adults; 500mg orally daily as a single dose or in divided doses (in severe infection dose may be doubled, reducing when response occurs), children; 10mg/kg body weight daily as a single dose or in divided doses continue till two weeks after the lesions disappear and hair is growing

**Supportive**

- Maintenance of good general hygiene
- Avoid sharing of personal items such as, towels and clothes
- Keep hair short

11.2.4 Cutaneous Candidiasis

**Definition**

This is an infection of the skin caused by *Candida albicans* a yeast fungus which is a normal commensal occupying the gut. Under certain circumstances such as diabetes or other endocrine diseases or immunosuppressive states it becomes pathogenic. The infection usually occurs in the skin folds such as, around the groin area, under the breasts, in the nail folds and axilla. In chronic or severe cases suspect HIV/AIDS.

**Clinical features**

Moist, white curdlike papules and plaques form which are easily scrapped off leaving red and raw-looking patches with clear edges

**Diagnosis**

Scrape off white patch and place on glass slide with a drop of KOH. Hyphae and yeast are seen.

**Treatment**

**Drugs**

- Miconazole cream 2%, topically twice daily.

Continue treatment for 14 days after lesions have healed.

For nail infections apply under occlusive dressing.

**Supportive**
11.0 SKIN CONDITIONS

☑ Patient should be advised to keep the skin dry
☑ Long-term antibiotic use should be avoided

Patients not responding to topical applications should be referred to a specialist.

11.3 Viral Skin Infections

These include:

- Chickenpox
- Herpes zoster
- Herpes simplex

11.3.1 Chickenpox

Definition

This is a condition caused by the Varicella zoster virus (VZV). It is a common childhood infection. It is characterized by an itchy rash, which appears first on the trunk and spreads out to other parts of the body. Papules and crusts form within a few days. Fever may be present. When the blisters occur they are in crops. The rash lasts 2 to 4 weeks. The condition is usually more severe in the elderly.

Diagnosis

Diagnosis is usually done clinically.

Treatment

Drugs

- Calamine lotion, topically twice daily or
- Chlorpheniramine, adults; 4mg orally twice daily, children up to 10 years; 2mg orally twice daily
- Acyclovir, 800mg orally 5 times daily for 7 days
- Paracetamol, adults; 500mg-lg orally 3-4 times daily, children; 10-20mg/kg orally 3-4 times daily

11.3.2. Herpes Zoster

Definition

This is a condition caused by the resurgence of the Varicella- zoster virus. It is characterized by burning pain before vesicular rash appears. The rash is always unilateral and does not cross the midline (see section 8.8, malignancies).

Treatment

Drugs

- Paracetamol, 500mg-lg orally 3-4 times daily
- Gentian violet maybe applied
- Acyclovir 5%, topically 4 hourly for 10 days.
- Acyclovir, 800mg orally 5 times daily for 7 days
- Carbamazepine, 200-400mg orally 3 times daily (for post herpetic neuralgia)

Treat secondary bacterial infection with appropriate antibiotics.
11.0 SKIN CONDITIONS

Severe neuralgia should be referred to a neurologist.

11.3.3. Herpes Simplex

Definition

This is a condition caused by Herpes simplex virus (HSV) type 1 characterised by a vesicular rash around the mouth or genitalia.

Treatment

Drugs

- Usually no drugs are required
- Wash lesions with saline water
- Paracetamol, adults; 500mg-1 g orally 3-4 times daily, children; 10- 20mg/kg orally 3-4 times daily
- Acyclovir cream, 4 hourly

11.4 Parasitic Infestations

Definition

Parasitic infestations of the body include:

- Pediculosis
- Scabies

11.4.1 Pediculosis (lice)

Definition

This is the infestation of the hair or body with lice. Hair infestation (Pediculus humanus var capitis) is characterised by eggs (nits) which appear as small white specks attached to the hair. Body infestation (P. humanus corporis) is characterised by bite marks. Both hair and body infestations cause itching. Eczema may be present. The lice usually live in cloth folds. Infestation of the pubic area called pediculosis pubis is caused by the crab or pubic louse Pthirus pubis transmitted during close physical contact which may be sexual in nature.

Treatment

Drugs

- Malathion 0.5% lotion. Apply to affected parts. Let it dry naturally and remove by washing after 12 hours.
- Permethrin 1% cream. Apply to clean damp hair.
- Rinse after 10 minutes and dry.

Supportive
11.0 SKIN CONDITIONS

- The whole family should be examined and treated if possible
- Bed linen and clothes should be washed in warm water and dried in the sun
- Maintenance of good personal hygiene

11.4.2 Scabies

Definition
This is an infestation of the skin by mites, Sarcoptes scabiei, which burrow the skin causing lesions where the female rests and lays eggs. The most common sites are skin folds, wrists, in between fingers and axilla. The main characteristic is intense itching which worsens at night.

Treatment

Drugs
- Benzyl Benzoate 25%, applied all over the body from the neck downwards. Leave to dry and repeat without bathing after 24 hours. Wash off on the third day. A third application may be required. (Not recommended in children, pregnancy and breastfeeding mothers) or
- Permethrin cream 5%, applied all over the body from the neck down to the feet. Wash off after 8 to 24 hours
- For children apply all over the body including the face, neck, scalp and ears
- If hands are washed with soap within 8 hours of application, cream should be re-applied or
- Malathion 0.5% lotion. Apply all over the body and wash off after 24 hours

Supportive
- All members of the family should be examined and treated (if possible)
- Clothes and bedding should be washed in warm water and dried in the sun
- After treatment only clothes washed as above should be worn
- Discourage scratching
- Keep fingernails short and clean
12.0 CONDITIONS OF THE EAR, NOSE AND OROPHARYNX

These include:
- Oral diseases
- Pharyngeal diseases
- Nasal diseases
- Ear conditions

12.1 ORAL DISEASES

These include:
- Dental caries
- Periodontal disease
- Oral candidiasis
- Herpes simplex stomatitis
- Mouth ulcers

12.1.1 Dental caries

**Definition**

This is a sugar-dependent disease, which by a combination of chemical and bacterial action, progressively destroys the enamel of the tooth. Many bacteria ferment sugar to produce acid, which in turn causes lesions on the enamel of the tooth.

**Clinical features**

- Chalky white spots on the chewing surface of the tooth
- Sensitivity of tooth to cold or hot drinks and foods
- Cavity on the tooth
- Pain
- Swelling at the base of the tooth if pulp nerve roots are involved
- Fever

**Treatment**

The aim of treatment is to preserve the tooth as far as possible.

Drugs use in infections, complicated extractions or prophylaxis:

- Phenoxymethyl penicillin, adults; 250-750mg orally 6 hourly, children; 1 – 5 years; 125mg orally 6 hourly, 6 – 12 years; 250mg orally 6 hourly
- Paracetamol, adults; 500mg -1g orally 3 times daily, children; 10-20mg/kg orally 3 times daily or
- Aspirin, adults; 600mg orally 3 times daily (Not recommended for children)

**Conservation**

- Tooth filing
- Root canal treatment if pulp is affected

**Surgical**

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12.0 CONDITIONS OF THE EAR, NOSE AND OROPHARYNX

- Extraction
- Apicectomy

Prevention
- Encourage maintenance of good oral hygiene
- Reduce intake of sugary foods
- Use of fluoride containing toothpaste
- Use of mouth rinses containing fluoride
- Use of topical fluoride applications
- Use of sealants in children, where available
- Dental check at least twice a year

12.1.2 Periodontal disease

Definition
This is a pathological condition of the periodontium and refers to inflammatory diseases which are plaque-induced. These fall into two groups:

- Gingivitis
- Periodontitis

12.1.2.1 Gingivitis

Definition
This is an inflammatory condition of the free gingivae. It is caused by dental plaque and supragingival calculus or tartar. In this condition there is no destruction of the supporting tissue.

Clinical features
- Red mucosa
- Loss of gum texture
- Gums bleed easily

Treatment
Scaling and prophylaxis

Drugs
- Metronidazole, adults; 200mg orally 3 times daily for 5 days, children; 7.5mg/kg orally 8 hourly for 5 days
- Phenoxymethyl penicillin, adults; 250-500mg orally 6 hourly for 5 days, children; 12.5 - 25mg/kg orally 6 hourly for 5 days or
- Erythromycin, adults; 250-500mg orally 6 hourly for 5 days, children; 2-8 years; 12.5 - 25mg/kg orally 6 hourly, 8-12 years; 25 – 50mg/kg 6 hourly for 5 days

Preventive
- Encourage maintenance of good oral hygiene
- Gargle warm salty water or mouthwash after every meal
- Brush teeth at least twice daily
- Flossing
12.1.2.2 Periodontitis

Definition

This is an inflammatory response of the free gingivae affecting all the periodontal structures. It is caused by plaque and supra or sub gingival calculus. It results in the destruction of the attachment apparatus and the development of a periodontal pocket. Halitosis is usually present.

Treatment

• Scaling and prophylaxis
• Sub gingival curettage

Drugs

• Metronidazole, 200mg orally 3 times daily for 5 days
  Refer patient to next level

Prevention

✓ Encourage maintenance of good oral hygiene
✓ Use of mouthwash containing fluoride

12.1.3 Oral candidiasis

Definition

This is an infection of the mouth caused by Candida albicans. It is commonly known as oral thrush. The infection sometimes also affects the pharynx. The predisposing factors include: trauma, denture wearing, dryness of the mouth, inhaled steroids, radiotherapy, diabetes mellitus, antibiotic therapy, HIV/AIDS.

Clinical features

■ Creamy white or yellow plaques on normal mucosa
■ Patches on the palatal and buccal mucosa and dorsum of the tongue and gums.
■ Removal of plaques reveals bleeding surface.

Treatment

Drugs

• Gentian violet solution, topically 2 times daily for 7 days or
• Nystatin oral suspension or lozenges, 2 times daily for up to 10 days or
• Miconazole oral gel, applied 2 times daily for 10 days or

Refer to specialist in case of:

■ No improvement
■ Painful or difficulty in swallowing or
■ Affected pharynx

Supportive

✓ Remove or treat predisposing factor
✓ Use snugly-fitting dentures
✓ Good oral hygiene
✓ Gargle warm salty water after every meal
12.1.4 Herpes simplex stomatitis

Definition
This is inflammation of the mucosal area due to infection by the herpes simplex virus. It is usually a self-limiting condition clearing up after 7 - 10 days. It is characterised by painful, shallow ulcers around the lip area, gums and tongue. It is common in small children who usually present with high fever and refusal of food because it is too painful to eat.

Treatment
- Debridement
- Mouthwash with tetracycline

Drugs
- Paracetamol, adults; 500-1g orally 3 times daily, children; 10-20mg / kg orally 3 times daily for 5 days.
- * Metronidazole, adults; 200-400mg orally 3 times daily, children; 100-200mg orally 3 times daily for 5 days or
- *Phenoxyethyl penicillin, adults; 250-500mg orally 4 times daily, children; 125-250mg orally 4 times daily for 5 days

*In case of secondary infection only

Supportive
- Increase fluid intake
- In severe cases, a nasogastric tube may be necessary until the child can feed again.
- Saline mouthwash and gargle
- Avoid acidic foods and drinks

Refer to a specialist if the condition is severe or does not heal within 7-10 days

12.1.5 Mouth Ulcers

Definition
This is a condition in which there is damage to the mucosal lining of the mouth, including the tongue. These are similar to ulcers due to the herpes simplex virus. They are painful and may occur singly or in groups. They frequently recur and can be very troublesome.

Treatment
- Paracetamol, adults; 500-1g orally 3 times daily, children; 10-20mg/kg orally 3 times daily
- Aspirin, 600mg orally 3 times daily for adults only
- Chlorhexidine gluconate, 10-15ml as a mouthwash kept in the mouth for about 30 seconds to 1 minute 2-3 times daily

Ulcers that do not heal rapidly should be referred to a specialist.

12.2. Pharyngeal Diseases

These are conditions affecting the pharynx. They include:
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- Tonsillitis and pharyngitis
- Peri-tonsillar abscess
- Epiglottitis

12.2.1 Tonsillitis and Pharyngitis

Definition

This is an inflammation of the pharynx and tonsils. There are two types of pharyngitis; viral and bacterial. The vast majority of pharyngitis is viral, which is self-limiting. In clinical practice, it is difficult to distinguish between viral and bacterial pharyngitis. It is important to diagnose and treat streptococcal throat infections to prevent Rheumatic fever and other complications.

Acute tonsillitis is most frequent in childhood. However, it is very rare in adults. Untreated acute tonsillitis will subside over the course of one week. Appropriate treatment will make the illness shorter.

Diphtheria infection is an important differential diagnosis.

Clinical features

Symptoms
- Sore throat
- Pain on swallowing
- Headache
- Fever
- Voice change

Signs of streptococcal pharyngitis
- High fever
- White pharyngeal exudates
- Tender enlarged anterior cervical lymph nodes
- Grossly enlarged painful tonsils which are asymmetrical
- Absence of signs suggesting a viral pharyngitis

Signs of viral pharyngitis
- Nasal stuffiness
- Coryza
- Irritating cough
- Conjunctivitis

Signs of tonsillitis
- Hyperaemic tonsils
- Enlarged tonsils
- Pus in the crypts

Treatment

Viral pharyngitis
- No antibiotics should be given
- Analgesia for pain and fever relief
12.0 CONDITIONS OF THE EAR, NOSE AND OROPHARYNX

Streptococcal pharyngitis and tonsillitis

Drugs
- Phenoxymethyl penicillin, adults; 250-500mg orally 6 hourly at least 30 minutes before food, children, up to 1 year; 62.5mg orally 6 hourly, 1-5 years; 125mg orally 6 hourly, 6-12 years; 250mg orally 6 hourly for 7 days or
- Erythromycin, adults; 250mg-500mg orally 6 hourly, children, up to 2 years; 125mg orally 6 hourly, 2-8 years; 250mg orally 6 hourly for 7 days
- Paracetamol, adults; 500mg-1g orally 3-4 times daily, children; 10-20mg/kg orally 3-4 times daily

Complications of streptococcal pharyngitis
- Peritonsillar and parapharyngeal abscesses
- Rheumatic fever

Refer for specialist treatment

12.2.2 Peri-tonsillar abscess

Definition
This is an abscess around the tonsils

Clinical features
It presents with signs of acute tonsillitis but with more pain on one side and almost always a large, very tender lymph node on that side. The patient may be unable to swallow fluids. It is always difficult to see into the mouth because the mouth cannot be opened widely. Use a good light and gently depress the tongue on the painful side to look for bulging of the tonsil and the palate above the tonsil.

Treatment

Drugs
- Pethidine (if needed), adults; 50-100mg intramuscularly repeated 4 hourly, children; 0.5-1mg/kg intramuscularly repeated 4 hourly
- Dextrose solution or Normal Saline intravenously
- Benzyl Penicillin, adults; 1 MU intravenously 6 hourly, children; 50,000-100,000 IU kg/day intravenously in 4 divided doses for 5 days or
- Phenoxymethyl penicillin, adults; 500-750 mg orally 6 hourly, children; 20-50 mg/kg orally daily in 4 divided doses for 5 days
- Metronidazole, adults; 500mg intravenously or 400 mg orally 8 hourly for 5 days, children; 20-30 mg/kg orally or 7.5 mg/kg intravenously in divided doses 8 hourly

Surgical
- Incision and drainage, if necessary
Patients should be nursed in a place where surgery can be done urgently.

12.2.3 Epiglottitis
**12.0 CONDITIONS OF THE EAR, NOSE AND OROPHARYNX**

**Definition**
This is an acute inflammation of the epiglottis due to *Haemophilus influenzae* type B. The condition can be life threatening.

**Clinical features**
- Acute onset, usually within 6 hours
- High fever
- Toxic patient
- Drooling of saliva
- Respiratory stridor

**Diagnosis**
Diagnosis should be suspected from clinical features. Avoid throat examination as the patient's airway may become completely obstructed.

**Treatment**
Refer immediately for specialised treatment

**Drugs**
- Chloramphenicol, adults; 500mg-1g intravenously 4 times daily, children; 50-100mg/kg daily in 4 divided doses for 5 days
- Cefotaxime, adults; 1g intramuscularly/intravenously 12 hourly, increased in severe infection to 8 - 12 g in 3-4 divided doses, children; 100-150mg/kg daily in 2-4 divided doses increased up to 200mg/kg daily in very severe infections.

**12.3. Nasal Diseases**
These include:
- Acute sinusitis
- Allergic rhinitis
12.3.1 Acute sinusitis

Definition
This is inflammation of one or more sinuses. This condition usually occurs after suffering from a cold or allergic rhinitis.

Clinical features
- Tenderness over the affected sinuses
- Headache
- Blocked nose
- Copious mucopurulent discharge
- Fever

Treatment

Drugs
- Paracetamol, adults; 500mg-1g orally 3-4 times daily, children; 10-20mg/kg orally 3-4 times daily
- Amoxicillin, adults; 250 - 500mg orally 3 times daily, children over 20kg; 250mg orally 3 times daily, 10 - 20 kg; 125mg orally 3 times daily, below 10kg; 62.5mg orally 3 times daily for 5 days or
- Cotrimoxazole, adults and children over 12 years old; 960mg orally 2 times daily, children 5 - 12 years; 480mg orally 2 times daily, 6 months to 5 years; 240mg orally 2 times daily

Supportive
- Steam inhalation
- Saline nasal drops

Complications
- Dental abscess
- Periorbital swelling

Patients with complications need referral to a specialist.

12.3.1.2 Allergic rhinitis

Definition
This is inflammation of the nasal mucosa due to hypersensitivity to allergens. The common allergens include pollen, dust, animals, or food.

Clinical features
- Recurrent nasal blockage
- Irritation
- Watery nasal discharge
- Sneezing
- Watery and itchy eyes

Treatment

Drugs
12.0 CONDITIONS OF THE EAR, NOSE AND OROPHARYNX

- Chlorpheniramine, adults and children over 12 years; 4mg orally 2 times daily, children 5 - 12 years old; 2mg orally 2 times daily, 6 months to 1 year 1mg orally 2 times daily
- Loratidine, adults; 10mg orally once daily, children 2-5 years; 2-5mg orally once daily

Supportive

✓ Saline nasal drops used at night. But these should not be used for too long periods, as rebound blockage is likely to occur
✓ Avoid causative allergens

Persistent attacks with severe symptoms should be referred to the specialist.

12.4. Ear Conditions

These include:
- Acute otitis media
- Chronic suppurative otitis media

12.4.1 Acute otitis media

Definition
This is inflammation of the middle ear. It usually follows an upper respiratory tract infection.

Clinical features
- Fever
- Severe pain in the ear, worse at night
- Babies cry, rub or pull the ear
- Red bulging eardrum
- Blood and/or pus discharge

Treatment

Drugs
- Amoxicillin, adults; 250-500mg orally 8 hourly, children; 12.5-25mg/kg orally 8 hourly for 5 days
- Aspirin (adults only); 600mg orally 3 times daily
- Paracetamol, adults; 500mg-1g orally 3-4 times daily, children; 10-20mg/kg orally 3-4 times daily
- Phenoxymethyl penicillin, adults; 250-500mg orally 6 hourly, children up to 1 year; 62.5 orally 6 hourly, 1-5 years; 125mg orally 6 hourly, 6-12 years; 250mg every 6 hours for 7-10 days or
- Erythromycin, adults; 250-500mg orally 4 times daily, children; 125-250mg orally 4 times daily for 5 days

Supportive
✓ Avoid wetting the inside of the ear

Complications
- Mastoiditis
- Hearing loss
- Acquired cholesteatoma
12.4.2 Chronic suppurative otitis media

This is a condition in which there is an ear discharge lasting more than two weeks and results from inadequately treating or neglecting acute otitis media.

Clinical features
- Painless discharge from one or both ears
- Perforation of the eardrum
- Discharge may be thin, clear, mucoid to thick, pasty, offensive mucopus
- Presence of multiple organism infection
- Red and swollen middle ear mucosa
- Mucosa may bulge if blocked

Treatment
- Wick dry with a cotton cloth
- Keep the ear as dry as possible
- Antibiotics are not usually indicated

The patient should be referred if:
- Pain is present
- There is swelling behind the ear
- There is poor response to treatment
13.0 SURGICAL CONDITIONS

This chapter discusses the following conditions:

- Injuries
- Animal bites
- Testicular torsion
- Strangulated hernia
- Hydrocele
- Varicocele

13.1 Injuries

Definition

Injuries refers to harm that occurs to the body. They may be intentional or due to accidents. The cause may be physical, chemical, burns, or traffic accidents. Injuries may cause temporary or permanent disability. Injuries may be divided into minor and major injuries.

13.1.1 Minor injuries

These include cuts and blunt injuries. Cuts are usually from sharp objects, especially household implements. Blunt injuries usually follow assault.

Clinical features

Cuts may bleed and if seen late may have developed infection with pus formation. Blunt injuries will cause bruises or haematomas or more serious deeper injuries, such as bone fractures.

Treatment

- Clean open wounds thoroughly with soap and water or a disinfectant
- Remove foreign matter and dead tissue
- Suture fresh superficial wounds
- Do not suture open wounds after 6 hours of injury
- Cover the wound with dressing

Drugs

- Tetanus toxoid, 0.5ml intramuscularly as a single dose
- Anti-tetanus serum, 250 IU as a single dose (for non-immunised patients)
- Paracetamol, adults; 500mg-1g orally 3 times daily, children; 10-20mg/kg orally 3 times daily or
- Aspirin, (adults only) 600 mg orally 3 times daily

Haematomas usually resolve on their own

13.1.2 Major injuries

These are multiple injuries or serious injuries to specific body parts.
13.1.2.1 Multiple injuries

These may be characterised by fractures, bruises, internal injuries, head injuries, spinal injuries, and chest trauma or eye injuries. The patient will present with two or more of such injuries. They may result from traffic accidents, assault or war.

Treatment

Initially a quick history and examination should be carried out to establish the severity of the injuries.

- Establish a clear airway
- Remove any debris in the mouth
- Insert airway breathing, if necessary
- Ensure good circulation
- Set up an intravenous line with the largest gauge possible
- Control bleeding
- Resuscitate, if necessary
- Treat shock
- Look for signs of internal haemorrhage
- Group and cross match blood
- Clean and debride wounds before suturing
- Immobilize fractures immediately

Drugs

- Tetanus toxoid, 0.5ml intramuscularly as a single dose

Refer patient to the nearest hospital in case of head or chest injuries, suspected internal haemorrhage, loss of consciousness or need of additional care.

13.1.3 Specific injuries

13.1.3.1 Head injuries

The patient may present with a laceration, fracture, a history of altered consciousness or amnesia

General Management

- An accurate history is needed, especially to find out if the patient was unconscious at any time after the head injury. A careful examination is needed. Head injuries may be associated with a fracture or dislocation of the cervical spine
- Brainstem compression causes hypertension and bradycardia, with irregular respiration
- Assess the conscious level using the Glasgow Coma Scale (GCS). The face and head should be examined carefully for blood or cerebrospinal fluid draining from the nose or ears, suggesting a fractured base of the skull
- Examination of the eyes is needed as a unilateral fixed and dilated pupil may indicate a haematoma on the same side

Investigations

- X-ray of the cervical spine (lateral view)
- X-ray of the skull (antero-posterior, lateral and Townes’ views)
Specific treatment

Patient should be admitted to hospital for observation for at least 24 hours, even if it is apparently a trivial injury, if there is:

- History of loss of consciousness
- Loss of consciousness on arrival in hospital
- Focal neurological signs
- Post traumatic amnesia
- Significant drowsiness
- Severe headache or vomiting
- Blurred vision
- Other associated injuries
- Skull fracture

Management

- Do hourly observation of GCS, breathing pattern, vital signs, and pupil reaction
- The airway must be safe and patients nursed with the head propped up at 15°
- Severe injuries need specialised management by a neurological centre
- Restrict intravenous fluids to minimise cerebral oedema. Sufficient fluid to maintain a urine output of 0.5 – 1ml/kg/hour should be given

2.2.1.1 Facial injuries

Treatment

- Maintain the airway as swelling may be severe
- Intubation or tracheostomy may be performed, if necessary
- Prophylactic antibiotics should be given for facial fractures

13.1.3.3 Spinal injuries

This should always be suspected in patients with head injury or multiple trauma(s). There may be numbness, parasthesia, weakness of the limbs or pain radiating down a limb.

Diagnosis

Lateral view X-ray of the cervical spine, including all cervical vertebrae and first thoracic vertebra.

Treatment

- The patient should be moved very carefully
- Avoid rotation and extremes of flexion and extension
- The attendants should work as a team to move the patient. One assumes responsibility for the neck and places the fingers under the angle of the mandible with palms over the ears and parietal region and maintaining gentle traction. Keep the neck straight and in line with the body. The neck can be splinted with a sandbag on either side or a cervical collar

Refer for specialised management, which will be needed for specific injuries.
13.1.3.4 Eye injuries

For penetrating or blunt trauma refer patient for specialised treatment at higher level of care. (See also chapter 9)

13.1.3.5 Chest injuries

Clinical features
- Pain on breathing
- Dyspnoea
- Unequal movement of chest wall
- Surgical emphysema of neck and chest
- Palpable rib fractures
- Bruising
- Tracheal deviation
- Restlessness
- Central cyanosis
- Tachycardia
- Hypotension
- Sweating

Diagnosis
- Bruising over the lower left ribs may indicate a ruptured spleen
- Bruising over the right lower ribs may indicate a ruptured liver
- Chest X-ray (antero-posterior view)

Treatment
- Rib fractures do not require any specific management apart from analgesia
- Large flail chest may require mechanical ventilation for 10-14 days and stronger analgesia

Pneumothorax
There are two types: open and tension.

Open
- Conservative management
- Refer for appropriate treatment if patient's condition deteriorates

Tension
- This is an emergency
- Convert to open pneumothorax by pushing a large bore needle into the 2nd intercostal space along the midclavicular line
- Insert an intercostal under water seal drainage

Haemothorax
There are two types: asymptomatic and symptomatic.

Asymptomatic
- Conservative management
- Refer for appropriate treatment if patient's condition deteriorates
Symptomatic
- Insert an intercostal under water seal drainage
- Patient should be referred to higher level or specialist

Flail chest
- Patient needs oxygen or mechanical ventilation
- Ribs may need to be fixed.
- Refer to higher level or specialist

13.1.3.6 Abdominal injuries

Penetrating injuries are usually due to stab and bullet wounds. The patient may present with a metal protrusion or disembowelment. The injuries may result in haemoperitoneum. Haemoperitoneum may be present with pain, abdominal distension, rigidity or tenderness.

Diagnosis
- Peritoneal aspiration for haemoperitoneum should be done

Treatment
- All abdominal bullet or stab wounds should be explored by laparotomy

13.1.3.7 Renal injuries

There is usually microscopic or macroscopic haematuria.

Diagnosis
- Abdominal ultra sound
- Intravenous urogram

Clinical features
- Swelling in the loin area
- Bruising in the loin area
- Tenderness in the loin area

Treatment
- Catheterise patient

Refer patient to a specialist for specific treatment

13.1.3.8 Burns

A burn is an injury occurring after exposure of the body surface to friction, chemicals, electricity or extreme temperature.

Clinical Features

Burns may result in damage to the dermis. Such damage may be partial or full thickness.
Partial thickness burns
- Some of the dermis is alive
- Heals in 10-14 days without scarring
- Blisters may be present
- Pain
- Shock may be present

Full thickness burns
- Damage to all of the dermis
- Usually heal after 21 days with scarring
- Painless
- Shock may be present

Complications
- Infection
- Anaemia
- Contractures
- Pulmonary oedema may occur after inhalation of smoke
- Acute peptic ulcers
- Acute renal failure

Management

Assessment
- Examine for shock and loss of fluids
- Assess the extent and depth of the burn
- Look for signs of infection

Treatment

Drugs
- Paracetamol, adults; 500mg-1g orally 3 times daily, children; 10-20mg/kg orally 3 times daily or
- Pethidine, 0.5-1mg/kg intramuscularly 4-6 hourly for severe burns
- Tetanus toxoid 0.5ml intramuscularly as a single dose, if necessary
- Topical antibacterial agents – silver nitrate, and silver sulphadiazine cream. Others used are povidone-iodine, chlorhexidine

Supportive
- ✓ High calorie, high proteins diet
- ✓ Physiotherapy for burns affecting joints as soon as patient is resuscitated and pain has been controlled

Specific Care
- ✓ Superficial burns should be cleaned with water, dried and left open
- ✓ Fluid replacement. Suggested fluids are normal saline, ringer’s lactate or hartmann’s solution. 50ml of 50% dextrose per litre can be added
- ✓ Do not open blisters
- ✓ Dress burns with vaseline gauze but exposure method is preferred
- ✓ Wash burns every 4-6 hours with salt water
- ✓ Use showers. Avoid baths which may allow cross-infection
- ✓ Slough is removed using wet to dry dressings
- ✓ Dressings should not be allowed to dry and stick
Specific areas such as the eyes, eyelids, ears, perineum and hands need specific care
The haemoglobin should be checked once a week and transfusion given, if necessary
Monitor urine output. It should be at least 1ml/kg/hour

All patients with deep and extensive burns should be referred to a specialist

**Determination of burn size**

The burn size in adults is determined using the rule of nines in which the following body areas are taken to represent 9% or 18%:

- Whole of each upper limb = 9%
- Whole of each lower limb = 18%
- Front of trunk = 18%
- Back of trunk = 18%
- Whole of head and neck = 9%
- Perineum = 1%

The above formula is not applicable to children. In children the burn size can be determined by considering the area of one palm surface of the patient's hand as 1% of body surface area. This palm surface formula is also applicable to adults.

**Fluid therapy in burns**

**Fluid requirements**

a) Maintenance requirements

<table>
<thead>
<tr>
<th>Age group</th>
<th>Weight (kg)</th>
<th>ml/kg/24hours</th>
<th>ml/kg/hour</th>
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</thead>
<tbody>
<tr>
<td>Neonates (&lt;3months)</td>
<td>3</td>
<td>150</td>
<td>6</td>
</tr>
<tr>
<td>Infants (&gt;3months)</td>
<td>3-10</td>
<td>120</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>10-20</td>
<td>80</td>
<td>3</td>
</tr>
<tr>
<td>Children</td>
<td>&gt;20</td>
<td>60</td>
<td>2.5</td>
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<tr>
<td>Adults</td>
<td></td>
<td>35</td>
<td>1.5</td>
</tr>
</tbody>
</table>

b) Extra requirements

<table>
<thead>
<tr>
<th>Age under 6</th>
<th>One ration = 2 x burn size x weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 6 or over</td>
<td>One ration = 1 x burn size x weight</td>
</tr>
</tbody>
</table>

Note: On top of the maintenance fluid requirement which is given at a constant rate, one ration of extra fluid is given during the first 8 hours from the time of the burn, a second ration during the next 8 hours and a third ration during the next 24 hours.

**Prevention of injuries**

- Public education on supervision of young children
13.2 Bites

These are bites which are inflicted by animals or humans.

Clinical features

A wound may sometimes be associated with fractures or amputations if inflicted by large animals. There may be bleeding.

Complications
  Infection with both aerobic and anaerobic bacteria or viruses.

Treatment
  - Clean, debride the wound
  - Excise dead tissue
  - Leave the wound open for delayed primary or secondary suture

Drugs
  - Phenoxymethyl penicillin, adults; 250-500mg orally 4 times daily, children; 125-250mg orally 4 times daily for 5 days
  - Metronidazole, adults; 200-400mg orally 3 times daily, children; 100mg -200mg orally 3 times daily for 5 days
  - Tetanus toxoid, 0.5ml intramuscularly as a single dose.

If bite is from suspected rabid animal, administer post-exposure rabies treatment. (Refer to chapter 2.7).

13.3 Testicular Torsion

Definition

This is the twisting of the testis along its vertical axis, resulting in compromised blood supply to the testis and the adjoining spermatic cord. It may be spontaneous or following strenuous activity. It may also result from anomalies in the development of the tunica vaginalis and the spermatic cord.

Clinical Features

Symptoms
  - Severe local pain
  - Nausea
  - Vomiting
  - Scrotal swelling
14.0 POISONINGSURGICAL CONDITIONS

- Dark discoloration of the scrotum
- Fever

Diagnosis

This is clinical and confirmed on surgical exploration

Treatment

- Immediate surgical intervention is advised if torsion is suspected. Surgical exploration of the scrotum within a few hours offers the only hope of testicular salvage. Fixation of the contra lateral testis is performed to prevent torsion on that side.
- Appropriate antibiotic cover is required.

13.4 Strangulated Hernia

Definition

This is a condition in which the blood flow to an abnormally protruding viscus is compromised. The strangulation can occur in any type of hernia.

Clinical Features

- Abdominal pain
- Fever
- Vomiting
- Irritability
- Restlessness
- Abdominal distension
- Guarding of the abdomen
- Rebound tenderness

Diagnosis

- History and examination is very important in making a diagnosis
- Abdominal X-rays

Treatment

The basic line of management is immediate surgical intervention and relieving the obstruction. It is mandatory to inspect the bowel if gangrenous resection is done and anastomose the viable segments.

Drugs

- Benzyl penicillin, adults; 2MU intravenously 4 times daily, children; 50,000-100,000 IU/kg intravenously in 4 divided doses for 5 days
- Metronidazole, adults; 500mg intravenously 3 times daily, children; 7.5mg/kg 8 hourly for 5 days
- Gentamicin, adults; 80mg intravenously 3 times daily, children; 2-3mg/kg intravenously in three divided doses for 5 days
- Intravenous fluids
13.5 Hydrocele

Definition
This is a condition characterised by the accumulation of fluid in the tunica vaginalis and it presents as a cystic scrotal mass.

Clinical Features
- Intrinsic, often cystic and painless scrotal mass
- May be painful when severely distended
- Mass is unilateral
- Transluminable mass
- Spermatic cord is palpable above the cystic mass

Treatment
- Hydrocelectomy
- Appropriate antibiotic cover is required

13.6 Varicocele

Definition
This is a collection of large veins, usually occurring in the left scrotum. It feels like a "bag of worms". It is present when the patient is in the upright position and should empty in the supine position.

Clinical Features
- Pain
- Feeling of scrotal fullness

Treatment
- Varicocelectomy
- Appropriate antibiotics cover is required
14.0 POISONING

Definition

This is the exposure by ingestion, inhalation or other means of a substance capable of causing harm to the body.

Clinical features

The patient may present a variety of symptoms ranging from mild to serious ones like the loss of consciousness.

Diagnosis

- Assess for vital signs
- Ascertain as far as possible, the nature and quantity of the poison and when it was taken.

14.1 Management

Management depends on the type of poison taken and the clinical condition of the patient. Treatment is aimed at slowing down, reducing or preventing further absorption of the poison and to counteract the effects of the poison already absorbed.

All patients with poisoning should be referred to a specialist after emergency treatment.

Emergency resuscitation measures should be taken in the following circumstances:

a) **Obstructed airway**
   - Pull the tongue forward
   - Remove dentures, foreign bodies (e.g. food) and oral secretions
   - Hold the jaw forward and insert an oropharyngeal airway if possible
   - Put the patient in a semi-prone position with head down to minimise the risk of inhaling vomit

b) **Inadequate respiration**
   - Give continuous oxygen
   - Apply assisted ventilation with an ambu bag or mouth to mouth or intubate and do mouth to tube respiration
   - Do not use respiratory stimulants as they cause harm

c) **Hypotension**
   - Keep patient in a position with his head downwards by elevating the foot of the bed
   - Administer 0.9% sodium chloride intravenously

d) **Recurrent fits**
   Control with diazepam, adults; 5-10mg intravenously stat, children; 0.2-0.3mg/kg intravenously stat.
   Repeat as necessary

e) **Removal of poison from the stomach**
   Gastric emptying carries the risk of the victim inhaling gastric contents. The benefit of the procedure should therefore be weighed against this risk. The procedure should not be performed in the following circumstances:
   - When corrosive substances (e.g. acids, alkalis and petroleum products) have been swallowed.
   - When there is marked hypothermia (less than 30°C)
   - When the amount of poison swallowed is minimal
- If poison was ingested more than 2 hours earlier (except in the case of poisoning with salicylates, tri-cyclic anti-depressants and beta-blockers)

**Procedure**

To remove poison from the stomach, two methods may be used:

- Inducing vomiting by giving:
  - Ipecacuanha syrup, adults; 30ml, children above 1 year; 15ml, children below 1 year; 10ml followed by a glass of water. Repeat after 20 minutes if necessary.

- Gastric lavage

If done in an unconscious patient, a cuffed endotracheal tube should be passed to prevent aspiration of stomach contents into the lungs.

**Reduction of absorption of poison**

After vomiting has occurred:

- Activated charcoal; 50g mixed with 400ml water in a bottle and shaken well. Administer the suspension in a dose of 5ml/kg. Repeat every 4 hours. Total dose of 100g for adults, if necessary
- Magnesium sulphate mixture or magnesium hydroxide mixture; 50ml to avoid constipation
- Milk, cooking oil or beaten raw egg may also be given in the absence of activated charcoal, to delay absorption of the poison

### 14.2 Treatment of specific common poisoning

#### 14.2.1 Aspirin and other salicylates

**Treatment**

- Induce emesis with ipecacuanha, unless respiration is depressed
- Give activated charcoal
- If respiration is depressed, do airway-protected gastric lavage
- Gastric emptying is effective up to 4 hours after ingestion of poison

#### 14.2.2 Carbon monoxide

**Treatment**

- Remove patient from further exposure
- Give oxygen for several hours
- Maintain blood pressure and normal body temperature
- To reduce cerebral oedema, give 20% mannitol, intravenously 5ml/kg body weight over 20 minutes and a corticosteroid intravenously or intramuscularly 4 hourly (e.g. prednisolone, 1mg/kg body weight dexamethasone, 0.15mg/kg body weight or hydrocortisone, 4mg/kg body weight)
- Control convulsions or hyperactivity with diazepam, 0.1mg/kg body weight by slow intravenous or per rectum
14.2.3 Ethanol

Treatment
- Remove unabsorbed ethanol by gastric lavage or inducing emesis with ipecacuanha syrup
- Give activated charcoal
- Maintain adequate airway
- Maintain normal body temperature
- If patient is hypoglycaemic give dextrose 50%, followed by 5% intravenously
- May need Vitamin B compound, if chronic alcohol abuser

14.2.4 Insecticides

14.2.4.1 Organochlorine

Treatment
- Remove patient from source of poisoning and remove contaminated clothing
- Give ipecacuanha syrup
- After vomiting give activated charcoal followed by gastric lavage with 2 – 4 litres water (adult dose)
- Give a laxative such as magnesium hydroxide
- Do not give milk, fats or oils as they will increase absorption of the poison
- Scrub the skin with soap and cold water to remove skin contamination
- Give artificial respiration with oxygen if there is respiratory depression
- Give diazepam, 10mg slow intravenous or phenobarbitone, 100mg intramuscularly to control convulsions, hyperactivity or tremors

Organophosphates and carbamate

Treatment
- Remove patient from source of poisoning and remove contaminated clothing
- Establish airway and give artificial respiration if necessary
- Remove excess bronchial secretions by suction
- Give ipecacuanha syrup or start gastric lavage
- Give atropine, adults; 2mg intravenously/ intramuscularly stat, children; 100-200mcg intravenously/intramuscularly/orally every 3 – 8 minutes until signs of atropinisation appear (hot dry skin, dry mouth, widely dilated pupils and fast pulse)

14.2.5 Paraffin, petrol and other petroleum products

Treatment
- Prevent the substance from entering the lungs to avoid damage to tissue
- Do not induce vomiting
- Do not do gastric lavage
- Look out for pulmonary oedema and chemical pneumonitis and treat accordingly
14.2.6 Paracetamol poisoning

Clinical features

Liver damage may result in paracetamol overdosage. The damage occurs within a few hours of ingestion.

Treatment

- Keep the patient quiet and warm
- Induce emesis with ipecacuanha syrup
- Where there is depressed respiration use airway-protected gastric lavage
- N-acetylcysteine, 20% solution, orally 140mg/kg as a loading dose, followed by 70mg/kg every 4 hours for 3 days. It may be necessary to administer through a nasogastric tube
- Dextrose, 5% intravenously for the first 48 hours
- Phytomenadione, 1–10mg intramuscularly if the prothrombin time ratio exceeds 2.0
- Do not force diuresis

14.2.7 Chloroquine poisoning

Clinical features

Characterised by blurred vision, tinnitus, weakness, haemoglobinuria, oliguria, low blood pressure, shock, convulsions, cardiac arrest

Treatment

- Induce emesis
- Stomach wash (air-way protected gastric lavage, if respiration is depressed)
- Give activated charcoal
- Treat symptomatically

14.2.8 Mushroom or other foods poisoning

Clinical Features

There will be abdominal pain, nausea, vomiting, and diarrhoea.

Shock, in severe cases

Treatment

Symptomatic:

- Bed rest
- Keep patient warm
- Stomach wash using normal saline
- Give Oral Rehydration Salts (ORS) or intravenous fluids to re-hydrate
- If no improvement refer to specialist
14.2.9 Snake Bites

Treat all snake bites an emergency

Clinical features
- Pain
- Swelling
- Tissue necrosis
- Regional lymph node swelling
- Haemorrhagic symptoms; bleeding at wounds site
- And other parts of the body

Danger signs
- Drowsiness
- Slurred speech
- Excessive oral secretions
- Difficulty in breathing
- Neurological signs

Treatment
- Immobilise limb And keep slightly elevated
- Administer tetanus toxoid
- Dextrose 5% in saline intravenously
- Treat shock
- Vitamin K, 1-10mg intramuscularly
- Anti-snake venom, if available
- Transfer patient to specialist

Prevention
- Wear protective shoes
- Clear bushes near dwelling places
- Avoid walking on dark paths
1  Drugs used in anaesthesia
   1.1.  Drugs used in general anaesthesia
      1.1.1  Intravenous and intramuscular anaesthetics
             1.1.1.1 Ketamin  injection 10mg/ml (10 ml)  II-IV  V
             1.1.1.2 Thiopentone sodium powder for reconstitution  II-IV  V
             1g and 5g vials

      1.1.2  Inhalation anaesthetics
             1.1.2.1 Halothane  inhalation  II-IV  V
             1.1.2.2 Nitrous oxide  medical gas  II-IV  E

      1.1.3  Muscle relaxants
             1.1.3.1 Suxamethonium chloride injection 50mg/ml, (2ml)  II-IV  V

      1.1.4  Anticholinesterases
             1.1.4.1 Neostigmine injection 2.5mg/ml, (1ml)  II-IV  V

   1.2  Drugs used in local anaesthesia
      1.2.1  Lignocaine injection 1% (10ml, 50ml)  I-IV  V
      1.2.2  Lignocaine + adrenaline dental cartridge injection 2% (1 in 80,000)

   1.3  Drugs used in spinal anaesthesia
      1.3.1  Bupivacaine/glucose injection 0.5%, (4ml)  IV  E

2  Drugs acting on the gastrointestinal system

   2.1  Antacids
      2.1.1  Aluminium hydroxide gel, chewable tablets  I-IV  E
      2.1.2  Magnesium trisilicate chewable tablets, mixture  I-IV  E

   2.2  Antispasmodics
      2.2.1  Hyoscine butyl bromide injection 20mg/ml, (1ml)  II-IV  E
      2.2.2  Propantheline bromide tablets 15mg  I-IV  E

   2.3  Ulcer healing drugs
      2.3.1  Cimetidine tablets 200mg  II-IV  E
      2.3.2  Omeprazole tablets 10mg,  II-IV  E
      2.3.3  Ranitidine tablets 150mg  II-IV  E
2.3.4 Tripotassium dicitratobismuthate tablets 120mg II-IV E
2.3.5 Clarithromycin tablets 250mg II-IV E

2.4. Antidiarrhoeals
2.4.1 Codeine phosphate tablets 15mg II-IV E
2.4.2 Loperamide tablets 2mg IV E
2.4.3 Nitazoxanide suspension 100mg III-IV E

2.5. Laxatives
2.5.1 Glycerol suppository 1g, 4g I-IV E
2.5.2 Senna tablets 7.5mg II-IV E

2.6 Drugs used for treating haemorrhoids
2.6.1 Bismuth subgallate and suppository, cream zinc oxide II-IV E

3 Drugs acting on the central nervous system
3.1 Anxiolytics and Antipsychotic drugs
3.1.1 Alprazolam tablets 0.25 microgram III-IV E
3.1.2 Lorazepam tablets 2mg tablets III-IV E
3.1.3 Diazepam tablets 2mg, injection 5mg/ml (2ml)II-IV V
3.1.4 Medazolam injection 1mg/ml III E
3.1.5 Selective serotonin reuptake inhibitors
3.1.5.1 Sertraline tablets 50mg IV E

3.2.1 Tricyclic Antidpressants
3.2.1.1 Clomipramine tablets 25mg III E

3.3 Anti-depressant drugs
3.3.2 Fluoxetine tablets 20mg IV E
3.3.4 Lithium carbonate tablets 300mg IV E
3.3.5 Sodium valproate tablets 200mg, II-IV E

3.4 Antiepileptic drugs
3.4.1 Carbamazepine tablets 200mg injection 5mg/ml I-IV V
3.4.2 Lamotrigine tablets 25mg, 50mg I-IV V
3.4.3 Ethosuximide capsules 250mg III-IV V

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<table>
<thead>
<tr>
<th>3.4.4</th>
<th>Phenobarbitone</th>
<th>tablets 30mg, injection 200mg/ml</th>
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<td>Phenytoin</td>
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<th>Drugs used in Parkinsonism and related disorders</th>
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<tr>
<td>3.5.1</td>
<td>Benzhexol</td>
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<th>Drugs used in nausea</th>
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<td>Non-opioid analgesics</td>
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<td>Acetyl salicylic acid (aspirin)</td>
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<td>Paracetamol (acetaminophen) tablets 100mg, 500mg, mixture 120mg/5ml</td>
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<td>Opioid analgesics</td>
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<td>Dihydrocodeine</td>
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<td>3.9.1</td>
<td>Methylphenidate</td>
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3.10 Non-steroidal anti-inflammatory drugs
3.10.1. Ibuprofen tablets 200mg, 400mg I-IV E

4 Drugs used in the treatment of infections
4.1 Antibacterial drugs
4.1.1 Penicillins
4.1.1.1 Benzathine penicillin injection 2.4 MU vial I-IV E
4.1.1.2 Benzyl penicillin injection 5MU vial I-IV V
4.1.1.3 Phenoxyethyl penicillin tablets 250mg, suspension 125mg/5ml I-IV E
4.1.1.4 Procaine penicillin injection 3MU vial I-IV E
4.1.2 Broad-spectrum penicillins
4.1.2.1 Amoxycillin tablets/capsules 250mg, syrup 125mg/5ml I-IV V
4.1.2.2 Ampicillin injection 500mg vial II-IV V
4.1.3 Penicillinase-resistant penicillins
4.1.3.1 Amoxycillin+clavulanic acid tablets 375mg(250mg+125mg) III-IV E
4.1.3.2 Cloxacillin capsules 250mg, injection 500mg II-IV V
4.1.3.3 Flucloxacillin capsules 250mg, injection 250mg III-IV E
4.1.4 Aminoglycosides
4.1.4.1 Gentamicin injection 40mg/ml, (2ml) I-IV V
4.1.4.2 Kanamycin injection 1g vial I-IV E
4.1.5 Aminocyclitol
4.1.5.1 Spectinomycin injection 2g vial III-IV E
4.1.6 Sulphonamides and trimethoprim
4.1.6.1 Co-trimoxazole tablets 120mg, 480mg, (sulfamethoxazole + trimethoprim)mixture 240mg/5ml I-IV V
4.1.6.2 Trimethoprim tablets 200mg I-IV E
4.1.7 4-quinolones
4.1.7.1 Ciprofloxacin tablets 250mg III-IV E
4.1.7.2 Nalidixic acid tablets 500mg, suspension 30mg/5ml I-IV V
4.1.7.3 Ofloxacin tablets 400mg, I.V 2mg/ml IV E

4.1.8 Nitro-furan drugs
4.1.8.1 Nitrofurantoin tablets 50mg I-IV E

4.1.9 Macrolides
4.1.9.1 Erythromycin tablets 250mg, injection 500mg vial, syrup 125mg/5ml I-IV V
4.1.9.2 Azithromycin capsules/tablets 250mg, Suspension 200mg/5ml II-IV V
4.1.9.10 Clindamycin capsule 75mg, suspension 75mg/5ml, injection 150mg/ml III-IV E

4.1.11 Cephalosporins and cephamycins
4.1.11.1 Cefotaxime injection 500mg vial III-IV E
4.1.11.2 Cefoxitine injection 1g, 2g vial II-IV E
4.1.11.3 Ceftriaxone injection 250mg, 500mg, 1g vial II-IV E
4.1.11.4 Cephalexin tablets or capsules 250mg III-IV E

4.1.12 Tetracyclines
4.1.12.1 Doxycycline tablets 100mg I-IV E
4.1.12.2 Tetracycline tablets 250mg I-IV E

4.1.13 Metronidazole tablets 200mg I-IV V
IV infusion 5mg/ml, (100ml) III-IV V

Other antibacterials
4.1.14 Chloramphenicol capsules 250mg, suspension 125mg/5ml, injection 1g vial II-IV V

4.2 Anti-tuberculosis drugs
4.2.1 Ethambutol tablets 400mg I-IV V
Rifampicin+Isoniazide+Pyrazinamide+Ethambutol tablets 300/300/500/400mg I-IV V
4.2.3 Rifampicin + isoniazid tablets 300mg/150mg, 150mg/100mg I-IV V
Rifampicin+Isoniazide+Ethambutol Tablets 300/150/400mg I-IV V
4.2.4 Isoniazid tablets 100mg, 300mg I-IV V
4.2.5 Ethambutol + isoniazid tablets 400mg/150mg I-IV V
4.2.6 Streptomycin injection 1g, 5g vial II-IV V
### 4.3 Anti-leprosy drugs

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation(s)</th>
<th>Stage(s)</th>
<th>Risk Factor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clofazimine</td>
<td>capsules 50mg, 100mg</td>
<td>II-IV</td>
<td>V</td>
</tr>
<tr>
<td>Dapsone</td>
<td>tablets 10mg, 25mg, 50mg</td>
<td>II-IV</td>
<td>V</td>
</tr>
<tr>
<td>Rifampicin</td>
<td>capsules 150mg, 300mg, syrup 100mg/5ml</td>
<td>II-IV</td>
<td>V</td>
</tr>
</tbody>
</table>

### 4.4 Antifungal drugs (also see section 12.3 and 13.3)

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation(s)</th>
<th>Stage(s)</th>
<th>Risk Factor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphotericin B</td>
<td>injection 50mg</td>
<td>III-IV</td>
<td>E</td>
</tr>
<tr>
<td>Clotrimazole</td>
<td>vaginal tablet 500mg</td>
<td>II-IV</td>
<td>E</td>
</tr>
<tr>
<td>Fluconazole</td>
<td>50mg, 150mg, 299mg, IV 2mg/ml</td>
<td>III-IV</td>
<td>V</td>
</tr>
<tr>
<td>Fluocytosine</td>
<td>Injection 10mg/ml</td>
<td>III-IV</td>
<td>E</td>
</tr>
<tr>
<td>Griseofulvin</td>
<td>tablets 125mg</td>
<td>III-IV</td>
<td>E</td>
</tr>
<tr>
<td>Ketoconazole</td>
<td>tablets 200mg</td>
<td>II-IV</td>
<td>E</td>
</tr>
<tr>
<td>Nystatin</td>
<td>vaginal tablets 100,000 IU</td>
<td>II-IV</td>
<td>V</td>
</tr>
</tbody>
</table>

### 4.5 Anti-protozoal drugs

#### 4.5.1 Antimalarials

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation(s)</th>
<th>Stage(s)</th>
<th>Risk Factor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artemether-lumefantrine</td>
<td>tablets 20mg/120mg</td>
<td>I-IV</td>
<td>V</td>
</tr>
<tr>
<td>Pyrimethamine + sulphadoxine</td>
<td>tablets 25mg/500mg</td>
<td>I-IV</td>
<td>V</td>
</tr>
<tr>
<td>Quinine</td>
<td>tablets 300mg, injection 300mg/1ml (2ml)</td>
<td>I-IV</td>
<td>V</td>
</tr>
</tbody>
</table>

#### 4.5.2 Amoebicides

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation(s)</th>
<th>Stage(s)</th>
<th>Risk Factor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metronidazole</td>
<td>tablets 200mg</td>
<td>I-IV</td>
<td>V</td>
</tr>
<tr>
<td>Tinidazole</td>
<td>tablets 500mg</td>
<td>III-IV</td>
<td>E</td>
</tr>
</tbody>
</table>

### 4.6 Trypanocides

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation(s)</th>
<th>Stage(s)</th>
<th>Risk Factor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melarsoprol</td>
<td>injection 3.6%</td>
<td>III-IV</td>
<td>V</td>
</tr>
<tr>
<td>Suramin sodium</td>
<td>injection 1g vial</td>
<td>III-IV</td>
<td>V</td>
</tr>
</tbody>
</table>

### 4.7 Drugs used in pneumocystis pneumonia

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation(s)</th>
<th>Stage(s)</th>
<th>Risk Factor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-trimoxazole (sulfamethoxazole + trimethoprim)</td>
<td>tablets 120mg, 480mg, mixture 240mg/5ml</td>
<td>II-IV</td>
<td>V</td>
</tr>
</tbody>
</table>

### 4.8 Herpes zoster and varicella zoster drugs

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation(s)</th>
<th>Stage(s)</th>
<th>Risk Factor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acyclovir</td>
<td>cream</td>
<td>II-IV</td>
<td>E</td>
</tr>
<tr>
<td>Acyclovir</td>
<td>tablets 200mg, 400mg</td>
<td>II-IV</td>
<td>E</td>
</tr>
</tbody>
</table>
4.9  Antiretrovirals

4.9.1  Nucleoside Reverse Transcriptase Inhibitors

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation</th>
<th>Strength</th>
<th>Stage level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abacavir</td>
<td>tablets</td>
<td>300mg</td>
<td>II-IV E</td>
</tr>
<tr>
<td>Didanosine, DD1</td>
<td>tablets</td>
<td>25mg</td>
<td>II-IV E</td>
</tr>
<tr>
<td>Lamivudine, 3TC</td>
<td>tablets</td>
<td>150mg</td>
<td>II-IV E</td>
</tr>
<tr>
<td>Lamivudine + zidovudine</td>
<td>tablets</td>
<td>150/250mg</td>
<td>II-IV E</td>
</tr>
<tr>
<td>Lamivudine + Stavudine</td>
<td>tablets</td>
<td>150/30mg</td>
<td>II-IV E</td>
</tr>
<tr>
<td>Lamivudine + Stavudine + Nevirapine</td>
<td>Tablets</td>
<td>150/30/200mg</td>
<td>II-IV E</td>
</tr>
<tr>
<td>Stavudine, D4T</td>
<td>tablets</td>
<td>30mg</td>
<td>II-IV E</td>
</tr>
<tr>
<td>Zidovudine, ZDV, AZT</td>
<td>tablets</td>
<td>100mg, 250mg</td>
<td>II-IV E</td>
</tr>
<tr>
<td>Tenofovir</td>
<td>tablets</td>
<td>245mg</td>
<td>II-IV E</td>
</tr>
<tr>
<td>Emetricitabine</td>
<td>tablets</td>
<td>200mg</td>
<td>II-IV E</td>
</tr>
<tr>
<td>Tenofovir/Emetricitabine</td>
<td>tablets</td>
<td>300/200mg</td>
<td>II-IV E</td>
</tr>
</tbody>
</table>

4.9.2 Non-nucleoside Reverse Transcriptase inhibitors

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation</th>
<th>Strength</th>
<th>Stage level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efavirenz</td>
<td>tablets</td>
<td>600mg</td>
<td>II-IV E</td>
</tr>
<tr>
<td>Nevirapine</td>
<td>tablets</td>
<td>200mg</td>
<td>II-IV E</td>
</tr>
</tbody>
</table>

4.9.3 Protease inhibitors

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation</th>
<th>Strength</th>
<th>Stage level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ritonavir</td>
<td>tablets</td>
<td>600mg</td>
<td>II-IV E</td>
</tr>
<tr>
<td>Lopinavir/Ritonavir</td>
<td>tablets</td>
<td>133.3/33.3mg</td>
<td>II-IV E</td>
</tr>
<tr>
<td>Nelfinavir</td>
<td>tablets</td>
<td>750mg</td>
<td>II-IV E</td>
</tr>
</tbody>
</table>

4.10 Anthelmintics

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation</th>
<th>Strength</th>
<th>Stage level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mebendazole</td>
<td>chewable tablets</td>
<td>100mg</td>
<td>I-IV V</td>
</tr>
<tr>
<td>Niclosamide</td>
<td>tablets</td>
<td>500mg</td>
<td>I-IV E</td>
</tr>
<tr>
<td>Pyrantel</td>
<td>tablets</td>
<td>125mg,</td>
<td>I-IV E</td>
</tr>
<tr>
<td></td>
<td></td>
<td>suspension</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>250mg/5ml</td>
<td></td>
</tr>
<tr>
<td>Thiabendazole</td>
<td>tablets</td>
<td>500mg</td>
<td>II-IV E</td>
</tr>
<tr>
<td>Albendazole</td>
<td>tablets</td>
<td>400mg</td>
<td>II-IV E</td>
</tr>
</tbody>
</table>

4.11 Schistosomicides

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation</th>
<th>Strength</th>
<th>Stage level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Praziquantel</td>
<td>tablets</td>
<td>600mg</td>
<td>I-IV V</td>
</tr>
</tbody>
</table>

4.12 Anti-filarials

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation</th>
<th>Strength</th>
<th>Stage level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethylcarbamazine</td>
<td>tablets</td>
<td>50mg</td>
<td>III-IV E</td>
</tr>
<tr>
<td>Ivermectin</td>
<td>tablets</td>
<td></td>
<td>III-IV E</td>
</tr>
<tr>
<td>Suramin sodium</td>
<td>injection</td>
<td>1g vial</td>
<td>III-IV V</td>
</tr>
</tbody>
</table>
5. Drugs acting on the endocrine system and obstetrics, gynaecology and contraception

### 5.1 Drugs used in diabetes

#### 5.1.1 Insulin

<table>
<thead>
<tr>
<th>Type</th>
<th>Formulation</th>
<th>Strength</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short acting (soluble)</td>
<td>Injection</td>
<td>100 IU/ml 10ml</td>
<td>II-IV V</td>
</tr>
<tr>
<td>Isophane Insulin</td>
<td>Injection</td>
<td>100IU/ml 10ml</td>
<td>II-IV V</td>
</tr>
<tr>
<td>Actraphane or mixtard (30/70)</td>
<td>Intermediate-and long acting</td>
<td>Injection 100IU/ml 10ml</td>
<td>II-IV V</td>
</tr>
</tbody>
</table>

#### 5.1.2 Oral hypoglycaemics

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation</th>
<th>Strength</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorpropamide</td>
<td>Tablets</td>
<td>100,250mg</td>
<td>II-IV V</td>
</tr>
<tr>
<td>Glibenclamide</td>
<td>Tablets</td>
<td>5mg</td>
<td>II-IV V</td>
</tr>
<tr>
<td>Metformin</td>
<td>Tablets</td>
<td>500mg</td>
<td>II-IV V</td>
</tr>
</tbody>
</table>

#### 5.1.3 Other Antidiabetics

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucagon</td>
<td>Injection</td>
</tr>
</tbody>
</table>

#### 5.1.4 Other Antidiabetics

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbimazole</td>
<td>Tablets</td>
</tr>
<tr>
<td>Iodine</td>
<td>Aqueous solution</td>
</tr>
<tr>
<td>Thyroxin</td>
<td>Tablets</td>
</tr>
</tbody>
</table>

### 5.2 Preparations acting on the thyroid

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbimazole</td>
<td>Tablets</td>
<td>5mg</td>
</tr>
<tr>
<td>Iodine</td>
<td>Aqueous solution</td>
<td></td>
</tr>
<tr>
<td>Thyroxin</td>
<td>Tablets</td>
<td>100mcg</td>
</tr>
</tbody>
</table>

### 5.3 Corticosteroids

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexamethasone</td>
<td>Tablets</td>
<td>500mcg</td>
</tr>
<tr>
<td>Hydrocortisone sodium succinate</td>
<td>Injection</td>
<td>5mg/ml (5ml)</td>
</tr>
<tr>
<td>Prednisolone</td>
<td>Tablets</td>
<td>5mg</td>
</tr>
</tbody>
</table>

### 5.4 Oestrogens and progestogens

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norethisterone</td>
<td>Tablets</td>
<td>5mg</td>
</tr>
<tr>
<td>Conjugated oestrogens</td>
<td>Tablets</td>
<td>625micrograms</td>
</tr>
</tbody>
</table>

### 5.5 Androgens and anti androgens

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyproterone</td>
<td>Tablets</td>
<td>50mg</td>
</tr>
<tr>
<td>Stilboestrol</td>
<td>Tablets</td>
<td>1mg</td>
</tr>
<tr>
<td>Testosterone</td>
<td>Capsules, Injection</td>
<td>40mg, oily depot 250mg/ml (1ml)</td>
</tr>
</tbody>
</table>
5.6 Other endocrine drugs
5.6.1 Bromocriptine tablets 2.5mg III-IV E
5.6.2 Clomiphene citrate tablets 50mg III-IV E
5.6.3 Danazol capsules 100mg III-IV E

5.7 Drugs used in obstetrics and gynaecology
5.7.1 Drugs acting on smooth muscle
5.7.1.1 Prostaglandins and oxytocics
5.7.1.1.1 Magnesium sulphate injection 50% II-IV E

5.7.1.2 Anticonvulsants
5.7.1.2.1 Dinoprostone tablets 500mcg, injection 1mg/ml III-IV E
5.7.1.2.2 Ergometrine maleate tablets 250mcg, 500mcg, injection 200mcg/ml I-IV V
5.7.1.2.3 Ergometrine/ oxytocin injection II-IV E
5.7.1.2.4 Oxytocin injection 10IU/ml, 1ml II-IV V
5.7.1.2.5 Misoprostol Tablet 200microgram I-IV V

5.7.1.3 Myometrial relaxants
5.7.1.3.1 Salbutamol injection 500mcg/ml (1ml) II-IV V

5.8 Contraceptives
5.8.1 Combined oral contraceptives
5.8.1.1 Ethinyloestradiol/levonorgestrel tablet 30mg/150mcg I-IV V

5.8.2 Emergency contraception
5.8.2.1 Levonorgestrel tablet 750mcg I-IV V

5.8.3 Progesterone-only oral contraceptives
5.8.3.1 Levonorgestrel tablet 30mcg I-IV V

5.8.4 Progesterone-only injectable contraceptives
5.8.4.1 Medroxyprogesterone acetate injection 150mg/ml, 1ml I-IV V
5.8.4.2 Norethisterone enanthate injection, oily 200mg/ml, 1ml I-IV V

5.8.5 Barrier methods
5.8.5.1 Female condoms artificial plastic sheath I-IV V
5.8.5.2 Intrauterine device (IUD) copper long coil type II-IV V (Copper T 380A)
5.8.5.3 Male condoms latex sheath with/without spermicide I-IV V
5.8.5.4 Menefegol vaginal foaming tablets I-IV E
5.8.6 Implants
5.8.6.1 Levonorgestrel implant 38mg in silicone capsule  IV V

6 Drugs used in the treatment of diseases of the respiratory system and allergy

6.1 Bronchodilators
6.1.1 Adrenaline 1 in 1000, (1ml) I-IV V
6.1.2 Aminophylline tablets 100mg, injection I-IV V
25mg/ml (10ml) suppositories 50mg,360mg I-IV E
6.1.3 Salbutamol tablets 2mg, syrup 2mg/5ml, I-IV V
inhaler 100mcg/dose I-IV E

6.2 Corticosteroids
6.2.1 Hydrocortisone sodium succinate injection 100mg vial I-IV V
6.2.2 Prednisolone tablets 5mg II-IV V

6.3 Asthma prophylaxis therapy
6.3.1 Beclomethasone inhaler 50mcg/dose II-IV E
6.3.2 Sodium chromoglicate inhaler 5mg/dose II-IV E

6.4 Antihistamines
6.4.1 Chlorpheniramine tablets 4mg I-IV E
6.4.2 Promethazine tablets 10mg, 25mg I-IV E

6.5 Oxygen
6.5.1 Oxygen medical gas I-IV V

7 Drugs used in the treatment of diseases of the cardiovascular system

7.1 Cardiac glycosides
7.1.1 Digoxin tablets 250mcg, injection II-IV V
250mcg/ml, (2ml), elixir

7.2 Diuretics
7.2.1 Thiazides
7.2.1.2 Bendrofluazide tablets 5mg II-IV E

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| 7.2.1.3 | Hydrochlorothiazide | tablets 50mg | II-IV | E |
| 7.2.2 | Loop diuretics | | | |
| 7.2.2.1 | Frusemide | tablets 40mg, injection 10mg/ml, (2ml) | II-IV | V |
| 7.2.3 | Potassium sparing diuretics | | | |
| 7.2.3.1 | Amiloride + hydrochlorothiazide | tablets 5mg/50mg | II-IV | E |
| 7.2.4 | Osmotic diuretics | | | |
| 7.2.4.1 | Mannitol | injection 20% 250ml bottle | II-IV | V |
| 7.3 | Antiarrhythmic drugs | | | |
| 7.3.1 | Amiodarone | tablets 100mg | III-IV | E |
| 7.3.2 | Atenolol | tablets 50mg | II-IV | E |
| 7.3.3 | Digoxin | tablets 250mcg, injection 250mcg/ml,(2ml) | II-IV | V |
| 7.3.4 | Lignocaine | injection 1%, (10ml, 25ml) | II-IV | V |
| 7.3.5 | Quinidine | tablets 200mg, 300mg | IV | V |
| 7.4 | Anti-angina drugs | | | |
| 7.4.1 | Atenolol | tablets 50mg | III-IV | E |
| 7.4.2 | Glyceryl trinitrate | sub-lingual tablets 500mcg | II-IV | E |
| 7.4.3 | Isosorbide mononitrate | tablets 10mg | II-IV | E |
| 7.4.4 | Nifedipine | tablets or capsules 10mg | II-IV | E |
| 7.5 | Antihypertensive drugs | | | |
| 7.5.1 | Diuretics | | | |
| 7.5.1.1 | Thiazide diuretics | | | |
| 7.5.1.1 | Hydrochlorothiazide | tablets 50mg | II-IV | E |
| 7.5.1.2 | Potassium sparing diuretics | | | |
| 7.5.1.2.1 | Amiloride + hydrochlorothiazide | tablets 5mg/50mg | II-IV | E |
| 7.5.1.2.2 | Spironolactone | tablets 25mg | II-IV | E |
| 7.5.2 | Beta blockers | | | |
| 7.5.2.1 | Atenolol | tablets 50mg | II-IV | E |
| 7.5.2.2 | Propranolol | tablets 10mg, 40mg | II-IV | E |
| 7.5.2.3 | Carvedilol | tablets 3.125mg | IV | E |
| 7.5.2.4 | Labetalol | tablets 100mg | III-IV | E |
| 7.5.2.5 | Metoprolol | tablets 50mg, 100mg | III-IV | E |

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7.5.3 Vasodilators
7.5.3.1 Hydralazine tablets 25mg, injection 20mg ampoule

7.5.4 ACE inhibitors
7.5.4.1 Captopril tablets 25mg
7.5.4.2 Lisinopril tablets 5mg, 10mg, 25mg
7.5.4.3 Enalapril tablets 5mg, 10mg, 20mg

7.5.4 ACE inhibitors II
7.5.4.4 Losartan tablets 25mg, 50mg

7.5.5 Calcium channel blockers
7.5.5.1 Nifedipine tablets or capsules 10mg, 20mg
7.5.5.2 Verapamil tablets 40mg
7.5.5.3 Amlodipine tablets 5mg, 10mg

7.6 Drugs used in shock -sympathomimetics
7.6.1 Adrenaline injection 1 in 1000 (1mg/ml)

7.7 Alpha-adrenoceptor blocking agents
7.7.1 Prazosin tablets 500 mcg, 1mg

7.8 Lipid-regulating drugs
7.8.1 Statins
7.8.1.1 Simvastatin tablets 20mg, 40mg

7.9 Inotropic sympathomimetics
7.9.1 Dopamine injection 40mg/ml

8 Drugs used in the treatment of malignant disease: anti-neoplastic drugs
8.1 Actinomycin D injection 500mcg
8.2 Asparaginase injection 1000 IU
8.3 Azathioprine tablets 50mg, injection 50mg vial
8.4 Bleomycin injection 15 unit ampoule
8.5 Busulphan tablets 500mcg
8.6 Calcium folinate tablets 15mg
8.7 Carboplatin injection 10mg/ml
8.8 Carmustine vial 100mg
8.9 Chlorambucil tablets 2mg
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<tr>
<th>Code</th>
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<th>Route</th>
<th>Usage</th>
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<td>Cyclophosphamide</td>
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<td>Cytarabine</td>
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<td>Cyproteron acetate</td>
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<td>Doxorubicin</td>
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<td>Etoposide</td>
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<td>Fludarabine</td>
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<td>Filgastrin</td>
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<td>Fluorouracil</td>
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<td>Hydroxyurea</td>
<td>capsules 500mg</td>
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<td>Ifosfamide</td>
<td>injection, 1g, 2g vial</td>
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<td>Imatinib</td>
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<td>Interferon</td>
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<td>Lomustine</td>
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<td>Melphalan</td>
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<td>Mercaptopurine</td>
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<td>Methotrexate</td>
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<td>Mitomycin</td>
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<td>Mustine</td>
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<td>Paclitaxel</td>
<td>IV infusion 6mg/ml</td>
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<td>V</td>
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<td>Procarbazine</td>
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<td>Stilboeastroil</td>
<td>tablets 1mg</td>
<td>IV</td>
<td>V</td>
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<td>8.35</td>
<td>Tamoxifen</td>
<td>tablets 20mg</td>
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<td>Temozolomide</td>
<td>capsules 5mg</td>
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<td>Thioguanine</td>
<td>tablets 40mg</td>
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<td>V</td>
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<td>8.38</td>
<td>Vinblastine</td>
<td>injection 1mg/ml</td>
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<td>V</td>
</tr>
<tr>
<td>8.39</td>
<td>Vincristine</td>
<td>injection 1mg,5mg</td>
<td>III-IV</td>
<td>V</td>
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</tbody>
</table>

9  **Drugs acting on the eye**

9.1  **Ophthalmic diagnosis**

9.1.1  **Fluorescein sodium**  eye drops, strips  III-IV  E

9.2  **Anti-infective preparations**

9.2.1  **Antibacterial**

9.2.1.1  **Chloramphenicol**  eye drops 0.5% eye ointment 1%  II-IV  E
9.2.1.2 Chloramphenicol/dexamethasone  
   eye drops 15/0.1%  III-IV E
9.2.1.3 Framycetin  
   eye drops, eye ointment  III-IV E
9.2.1.4 Tetracycline  
   eye ointment 1%  I-IV E
9.2.1.5 Oxy-tetracycline/Hydrocortisone  
   eye drops 3%/1%  III-IV E
9.2.1.6 Neomycin/betamethasone eye drops 0.5%/0.1%  III-IV E
9.2.1.7 Gentamicin  
   eye drops 0.3%  II-IV E
9.2.1.8 Cefotaxime  
   injection 500mg, Ig vial  III-IV E

9.2.2 Antifungals – Preparations are not generally available and could be made extemporaneously
9.2.2.1 Pivodine Iodine  
   eye drops 2%  III-IV E
9.2.2.2 Natamycin  
   eye suspension 5%  IV E
9.2.2.3 Econazole  
   eye suspension 1%  IV E
9.2.2.4 Miconazole  
   eye suspension 10mg/ml  IV E
9.2.2.5 Amphotericine B  
   eye solution 0.05% -0.2%  IV E

9.2.3 Antiviral
9.2.3.1 Aciclovir  
   eye ointment  III-IV E
9.2.3.2 Ganciclovir  
   IV infusion 500mg vial  IV E
9.2.3.3 Forscarnet  
   IV infusion 24mg/ml  IV E

9.3 Anti-inflammatory preparations
9.3.1 Betamethasone  
   eye drops, eye ointment  III-IV E
9.3.2 Hydrocortisone acetate  
   eye drops, eye ointment  II-IV E
9.3.3 Dexamethasone  
   eye drops 0.1%  III-IV E
9.3.4 Prednisolone  
   eye drops 0.5%, 1%  III-IV E
9.3.5 Tropicamide  
   eye drop 1%  III-IV E
9.3.6 Sodium chromoglycate  
   eye drops 2%  III-IV E

9.4 Miotics and anti-glaucoma drugs
9.4.1 Pilocarpine  
   eye drops 2%, 4%  III-IV E

9.5 Mydriatic drugs
9.5.1 Atropine sulphate  
   eye drops 1%  III-IV E

9.6 Systemic preparations
9.6.1 Acetazolamide sodium  
   tablets 250mg  III-IV V

9.7 Local anaesthetics

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9.7.1 Lignocaine hydrochloride eye drops 4% III-IV E

9.8 Postaglandin Analogue
9.8.1 Latanoprost eye drops 50mcg/ml IV E

9.9 Sympathomimetics
9.9.1 Dipivefrine eye drops 0.1% IV E

9.10.1 Beta-blocker
9.10.1 Timolol maleate eye drops 0.25% or 0.5% III-IV E

9.11 Diuretics
9.11.1 Cyclopenthiazide tablets 0.5mg IV E

9.12 Artificial tears
9.12.1 Hypermellose eye drops 0.3mg III-IV E

9.13 Hyperosmotic agents
9.13.1 Mannitol solution in water 20% III-IV E
9.13.2 Urea solution 30% in 10% invert sugar III-IV E

10 Blood
10.1 Anti-coagulants
10.1.1 Heparin injection 5000IU/ml, 1ml II-IV V
10.1.2 Warfarin tablets 1mg, 5mg II-IV V

10.2 Anti-haemorrhagic
10.2.1 Amino caproic acid Effervescent powder 3g III-IV E
10.2.2 Fibrinogen dry or freeze dried powder III-IV V
10.2.3 Human anti-haemophilic fraction (dried) 3 units/ml IV E
10.2.4 Phytomenadione (vitamin K) injection 10mg/ml, (1ml) II-IV V

10.3 Haemopoetics
10.3.1 Ferrous sulphate tablets 50mg, 200mg I-IV V
10.3.2 Folic acid tablets 5mg I-IV V
10.3.3 Hydroxocobalamin (vitamin B12) injection 1mg/ml, 1ml II-IV E
10.3.4 Iron dextran injection 50mg iron in 2ml ampoule II-IV E
11 Nutrition

11.1 Vitamins, minerals and dietary supplements

11.1.1 Ascorbic acid (vitamin C) tablets 50mg, 200mg I-IV E
11.1.2 Calcium gluconate injection 10%, (5ml, 10ml) III-IV E
11.1.3 Ergocalciferol (vitamin D) tablets 50,000 IU, solution 3000 IU/ml II-IV E
11.1.4 Nicotinamide tablets 50mg II-IV E
11.1.5 Pyridoxine (vitamin B6) tablets 50mg I-IV E
11.1.6 Retinol (vitamin A) capsules/tablets 200,000IU I-IV E
11.1.7 Riboflavine (vitamin B2) tablets 5mg III-IV E
11.1.8 Thiamine (vitamin B1) tablets 50mg III-IV E

11.2 Electrolyte and water replacement

11.2.1 Oral administration

11.2.1.1 Oral rehydration salts sachet 27.9g powder to make 1 litre I-IV V
11.2.1.2 Potassium chloride tablets slow-release 600mg II-IV E

11.2.2 Infusions

11.2.2.1 Dextrose (glucose) solution 5%, 20, 50% I-IV V
11.2.2.2 Potassium chloride solution 11.2% II-IV E
11.2.2.3 Sodium bicarbonate solution 4.2% III-IV V
11.2.2.4 Sodium chloride solution 0.9% I-IV V (normal saline)
11.2.2.5 Sodium lactate and glucose (Darrows) solution, full and half strength I-IV V
11.2.2.6 Sodium lactate compound (Ringers lactate) solution I-IV V
11.2.2.7 Water for injection 2ml, 5ml, 10 ml I-IV V

11.2.3 Plasma substitutes

11.2.3.1 Dextran 40 solution 10% III-IV V
11.2.3.2 Gelatin (as polygeline) solution III-IV E

12 Drugs acting on the skin

12.1 Topical corticosteroids

12.1.1 Betamethasone cream/ointment 0.1% III-IV E
12.1.2 Hydrocortisone cream/ointment 1% I-IV E

12.2 Soothing preparations
<table>
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<tr>
<th>Section</th>
<th>Description</th>
<th>Strength</th>
<th>Notes</th>
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<tr>
<td>12.2.1</td>
<td>Aqueous lotion</td>
<td>I-IV</td>
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<td>12.2.2</td>
<td>Calamine lotion</td>
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<td>12.2.3</td>
<td>Zinc oxide cream</td>
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<td>12.3</td>
<td>Antifungal preparations</td>
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<td>12.3.1</td>
<td>Miconazole nitrate cream 2%</td>
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<td>12.3.2</td>
<td>Ketokonazole tablets 200mg</td>
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<td>Griseofulvin tablets 500mg</td>
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<td>Anti-bacterial preparations</td>
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<td>Anti-parasitic preparations</td>
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<td>Benzyl benzoate application 25%</td>
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<td>12.6.2</td>
<td>Malathion lotion 0.5%</td>
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<td>12.6.3</td>
<td>Permethrin cream 1%</td>
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<td>12.7</td>
<td>Keratoplastics and keratolytics</td>
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<td>Coal tar solution 5%</td>
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<td>12.7.2</td>
<td>Dithranol ointment 1%</td>
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<td>12.7.3</td>
<td>Podophylline paint 15% in compound benzoin tincture</td>
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<td>12.7.4</td>
<td>Salicylic acid ointment 5%, 10%, 20%</td>
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<td>Acne preparations</td>
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<td>12.8.2</td>
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<td>Surgical disinfectants</td>
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<td>12.9.1</td>
<td>Cetrimide solution 1%</td>
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<td>12.9.2</td>
<td>Chlorhexidine + cetrimide concentrated solution (1.5%/15%)</td>
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<td>12.9.3</td>
<td>Chlorhexidine gluconate</td>
<td>I-IV V</td>
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<td>12.9.4</td>
<td>Chloroxylenol concentrated solution 4.8%</td>
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<td>12.9.5</td>
<td>Povidone iodine solution 10%</td>
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<tr>
<td>12.9.6</td>
<td>Sodium hypochlorite 0.1% available chlorine</td>
<td>I-IV V</td>
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12.10. Antivirus
12.10.1 Acyclovir  cream 5%  II-IV  E
       Tablets 50mg  II-IV  E

13 Drugs used in the treatment of diseases of the ear, nose and throat
13.1 Drugs acting on the ear
13.1.1 Betamethasone  eye/ear drops  III-IV  E
13.1.2 Gentamicin + hydrocortisone  ear drops  II-IV  E
13.1.3 Sodium bicarbonate  ear drops  III-IV  E
13.1.4 Vegetable oil  ear drops  I-IV  E

13.2 Drugs acting on the nose: topical nasal decongestants
13.2.1 Normal saline  nasal drops  II-IV  E

13.3 Drugs acting on the throat
13.3.1 Chlorhexidine  mouth wash 0.2%  I-IV  E
13.3.2 Ketaconazole  tablets 200mg, suspension 100mg/5ml  I-IV  E
13.3.3 Miconazole  oral gel  I-IV  E
13.3.4 Nystatin  oral suspension  I-IV  E

14 Drugs used in the treatment of musco-skeletal disorder
14.1 Drugs used in rheumatic diseases
14.1.1 Acetyl salicylic acid  tablets 300mg  I-IV  V
14.1.2 Ibuprofen  tablets 200mg  I-IV  E

14.2 Drugs used in gout
14.2.1 Allopurinol  tablets 100mg  III-IV  E
14.2.2 Colchicine  tablets 500mcg  IV  E

15 Immunological products
15.1 Antisera, immunoglobulins and anti-toxins
15.1.1 Anti-D immunoglobulin  injection  II-IV  V
15.1.2 Diphtheria antitoxin  injection  II-IV  V
15.1.3 Mamba anti-sera  injection  II-IV  V
15.1.4 Polyvalent snake anti-sera  injection  II-IV  V
15.1.5 Tetanus antitoxin  injection  I-IV  V
15.2 Vaccines

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<tr>
<th>15.2.1</th>
<th>BCG</th>
<th>injection</th>
<th>I-IV</th>
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<tr>
<td>15.2.3</td>
<td>Diptheria-pertussis</td>
<td>injection</td>
<td>I-IV</td>
<td>V</td>
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<tr>
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<td>tetanus, hemophilia influenza B and hepatitis B (Pentavalent,)</td>
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<td>I-IV</td>
<td>V</td>
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<td>15.2.4</td>
<td>Hepatitis B</td>
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<td>II-IV</td>
<td>E</td>
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<td>Measles</td>
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<td>V</td>
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<td>V</td>
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<td>Rabies</td>
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<td>I-IV</td>
<td>V</td>
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<td>15.2.8</td>
<td>Tetanus toxoid (TT)</td>
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<td>V</td>
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<td>15.2.9</td>
<td>Typhoid</td>
<td>injection</td>
<td>III-IV</td>
<td>E</td>
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<td>15.2.10</td>
<td>Yellow fever</td>
<td>injection</td>
<td>III-IV</td>
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16 Antidotes and other substances used in poisoning

<table>
<thead>
<tr>
<th>16.1</th>
<th>General treatment of poisoning</th>
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<tr>
<td>16.1.1</td>
<td>Activated charcoal</td>
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<tr>
<td>16.1.2</td>
<td>Ipecacuanha</td>
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16.2 Specific treatment of poisoning

<table>
<thead>
<tr>
<th>16.2.1</th>
<th>Atropine</th>
<th>injection 1mg/ml, (1ml)</th>
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<th>V</th>
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<tr>
<td>16.2.2</td>
<td>Naloxone</td>
<td>injection 400mcg/1ml</td>
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<td>V</td>
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<td>16.2.3</td>
<td>Pralidoxine mesylate</td>
<td>injection 200mg/ml, (5ml)</td>
<td>III-IV</td>
<td>V</td>
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<td>16.2.3.</td>
<td>N-acetylcysteine,</td>
<td>20% solution</td>
<td>IV</td>
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## Essential Laboratory Reagents and Supplies

### Health Centre & District Hospital Level

<table>
<thead>
<tr>
<th>TEST</th>
<th>REAGENTS</th>
</tr>
</thead>
</table>
| **Malaria** | Methanol (absolute) - for Giemsa  
Giemsa Powder (gurr)  
Glycerol AR  
Disodium hydrogen ortho phosphate (anhydrous) (Buffer)  
Sodium dihydrogen phosphate 1-hydrate (Buffer) |
| **Hb (Cyan met haemoglobin method)** | Potassium cyanide  
Potassium ferricyanide  
Sodium bicarbonate  
Haemoglobin Standard (ISCN) |
| **WCC** | Acetic Acid (white cell count)  
Gentian violet white cell count |
| **Sickling** | Sodium metabisulphite |
| **Solubility** | Potassium dihydrogen phosphate  
Dipotassium hydrogen sulphate  
White saponin |
| **Full Blood Count** | pocH Pack D (PPD-300A)  
pocH Pack L (PPL-200A)  
Eight Check-N, 1.5ML  
Eight Check-H, 1.5ML |
| **CD4 Estimation** | Dynabeads CD14  
Dynabeads CD4  
BD FACS Lysing Solution  
Trypan Blue Stain  
Washing/Dilution Buffer |
| **Blood Glucose** | Dextrostix (no glucometer rqd) or Glucostix (if glucometer) |
| **Urinalysis** | Uristix  
Multistix |
| **Stool** | Sodium chloride (analar)  
Potassium iodide (analar)  
Iodine  
Formaldehyde (health centres with centrifuges)  
Di-ethyl ether (health centres with centrifuges) |
<table>
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**Serology**
- Antistreptolysin O latex
- Streptococcal Grouping kit

### Additional reagents for level 2 and 3 Laboratories

**CD4 (FACSCalibur)**
- BD TriTest CD3/CD4/CD45 with Trucount tubes
- BD Calibrite 3 Beads (340486)
- BD FACSFlow Sheath Fluid (342003)
- BD FACS Clean Solution (340345)
- BD FACS Rinse Solution (340346)
- BD FACS Lysing Solution
- ABX Alphalyse (0906004)

**Full Blood Count (ABX Pentra 60C+)**
- ABX Basolyse II (0906003)
- ABX Cleaner (0903010)
- ABX Diluent (0901020)
- ABX Eosinofix (0206010)
- ABX Diffstrol - Normal pack (2062203)
- ABX Diffstrol - High & Low Pack (2062204)

**Clinical Chemistry (Cobas Integra 400)**
- **Description**
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| **(Olympus AU 400) Level 3 only** | Serum Testosterone  
Serum Estradiol  
Serum Prolactin  
Serum Luteinizing Hormone (LH)  
Free Thyroxine (FT4)  
Thyrotropin (TSH)  
Apho-Feto Proteins (AFP)  
Total Prostate Specific Antigen (ASP)  
Human Chorionic Gonadotropin (HCG)  
Total Tri – Iodothyronine (T3)  
Free Tri – Iodothyronine (FT3)  
ISE Buffer solution  
ISE Reference Solution  
CL – electrode  
Na – electrode  
K – electrode  
Ref – electrode  
MID STD  
ISE Cleaning Solution  
Ref Int. Solution  
Reference solution  
Select Check  
STD serum high  
STD serum low  
System Calibrator  
Wash Solution  
Olympus Control Sera level 1  
Olympus Control Sera level 2 |
| **Clinical Chemistry (Nova pHox plus)** | Reagent Pack D  
Na/pH conditioning solution  
Soaking (polishing) solution  
Preheater cleaning agent  
Glucose / Bun Over range solution  
SP multicontrol: SO2% & Multipack  
Tri Level External QC ampoules (pHOx-Plus): QAP  
PHOx+ 1-Plus, on board QC Tri-level  
Linearity Solutions  
§ Set A level IV |
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<td>Celestin Blue ' B'</td>
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<td>Gold Chloride</td>
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<td>Toluidine Blue ' O ' dye</td>
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<tr>
<td></td>
<td>Periodic acid</td>
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<td></td>
<td>Histopathology</td>
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292
<table>
<thead>
<tr>
<th>TEST</th>
<th>REAGENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serology</td>
<td>Tetrachloracetic acetic acid</td>
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<tr>
<td></td>
<td>Rheumatoid factor test kit</td>
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<tr>
<td></td>
<td>HIV Eliza test kit</td>
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<td>Chlamydia test kit</td>
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<td>Rheumatoid factor test kit</td>
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<tr>
<td></td>
<td>Hepatitis B Elisa test</td>
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<tr>
<td>PCR - PEDIATRIC</td>
<td>AMPLICOR HIV-1 Monitor Test, v. 1.5 P/N 03290140018</td>
</tr>
<tr>
<td></td>
<td>DBS Bundles for sample collection</td>
</tr>
<tr>
<td></td>
<td>0.2ml Thin Wall Individual Tubes, pack of 1000 tubes</td>
</tr>
<tr>
<td></td>
<td>Low Profile 0.2ml Thin Wall Strip Tubes, Natural 120 Strips</td>
</tr>
<tr>
<td></td>
<td>1.7ml UltraTclean Microcentrifuge Tubes 500/pack</td>
</tr>
<tr>
<td></td>
<td>Domed 8-Cap Strips for 0.2ml Strip Tubes, Natural 120 Strips</td>
</tr>
<tr>
<td></td>
<td>Disposable Multichannel Pipette Basin 80/Case</td>
</tr>
<tr>
<td></td>
<td>RNase Away Surface Decontaminant 4x1L, DNA/RNA free filtered 20 - 200 microliters</td>
</tr>
<tr>
<td></td>
<td>DNA/RNA free filtered 200 - 1000 microliters</td>
</tr>
<tr>
<td></td>
<td>DNA/RNA free filtered 1000 microliters</td>
</tr>
<tr>
<td></td>
<td>Sterile BD Falcon Plastic Tubes 352057 500/Case</td>
</tr>
<tr>
<td></td>
<td>Fisherbrand East Reader 50ml Tubes 500/Case</td>
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<tr>
<td></td>
<td>Thermal paper</td>
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<tr>
<td>Viral Load</td>
<td>AMPLICOR HIV-1 Monitor Test, v. 1.5 P/N 21117750 123</td>
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<td>0.2ml Thin Wall Individual Tubes, pack of 1000 tubes</td>
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<tr>
<td></td>
<td>1.7ml Ultracean Microcentrifuge Tubes 500/pack</td>
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<td>Domed 8-Cap Strips for 0.2ml Strip Tubes, Natural 120 Strips</td>
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<td>Disposable Multichannel Pipetter Basin 80/Case</td>
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<td>RNase Away Surface Decontaminant 4x1L, DNA/RNA free filtered 20 - 200 microliters</td>
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<td>DNA/RNA free filtered 200 - 1000 microliters</td>
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<tr>
<td></td>
<td>DNA/RNA free filtered 1000 microliters</td>
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<tr>
<td></td>
<td>Sterile BD Falcon Plastic Tubes 352057 500/Case</td>
</tr>
<tr>
<td></td>
<td>Fisherbrand East Reader 50ml Tubes 500/Case</td>
</tr>
</tbody>
</table>

**Bacteriology**

- Blood culture media adult
- Blood culture media pediatric
- Dehydrated tryptone soya agar
- Thioglycollate broth
- Enteropathogenic E.coli types 2,3, and 4
- Enteropathogenic E.coli types 0157
- Enteropathogenic E.coli types 2
- Enteropathogenic E.coli types 015
- Enteropathogenic E.coli type 3
- Shigella flexnerii polyvalent antisera
- Shigella dysenteriae type 1 antisera
- Shigella dysenteriae polyvalent types 1-10
- Shigella flexneri polyvalent types 1-6, x, y
- Shigella boydii polyvalent 1-15
- Shigella sonnei phase 1 and 2
- Shigella flexneri type 1 antisera
- Shigella flexneri type 2 antisera
- Shigella flexneri type 3 antisera
- Shigella flexneri type 4 antisera
- Shigella flexneri type 5 antisera
- Shigella flexneri type 6
- Shigella flexneri type X
- Shigella flexneri type Y
<table>
<thead>
<tr>
<th>TEST</th>
<th>REAGENTS</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Shigella sonnei phase 1 antisera</td>
</tr>
<tr>
<td></td>
<td>Shigella sonnei phase 2 antisera</td>
</tr>
<tr>
<td></td>
<td>Salmonella polyvalent O antiserum</td>
</tr>
<tr>
<td></td>
<td>Salmonella O antiserum Factor 9 (Group D)</td>
</tr>
<tr>
<td></td>
<td>Salmonella H antiserum d</td>
</tr>
<tr>
<td></td>
<td>Salmonella Vi antiserum</td>
</tr>
<tr>
<td></td>
<td>Salmonella Group A</td>
</tr>
<tr>
<td></td>
<td>Salmonella Group B</td>
</tr>
<tr>
<td></td>
<td>Salmonella Group C</td>
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<td></td>
<td>Salmonella Group D</td>
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<td>Salmonella Group E</td>
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<td>Salmonella Group F</td>
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<td>Salmonella polyvalent groups A-G</td>
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<td>Salmonella polyvalent H phase 1-2</td>
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<td></td>
<td>Salmonella Group G</td>
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<td>Salmonella antiserum 1</td>
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<td></td>
<td>Salmonella antiserum 2</td>
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<td>Salmonella antiserum 3</td>
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<td>Salmonella antiserum 7</td>
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<td>Salmonella antiserum 8</td>
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<tr>
<td></td>
<td>Salmonella antiserum 9</td>
</tr>
<tr>
<td></td>
<td>Vibrio Cholerae Ogawa</td>
</tr>
<tr>
<td></td>
<td>Vibrio Cholerae Inaba</td>
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<tr>
<td></td>
<td>Vibrio cholera antisera polyvalent 01</td>
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<tr>
<td>Tb Culture</td>
<td>Lowenstein-Jensen Agar</td>
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<td></td>
<td>Asparagine</td>
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<tr>
<td></td>
<td>Pyruvic Acid</td>
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<td>Nitrate Strip</td>
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<tr>
<td></td>
<td>Niacin Strip</td>
</tr>
<tr>
<td></td>
<td>Rimfampicin Powder</td>
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<tr>
<td>General Reagents - all levels</td>
<td>Thermal paper</td>
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<tr>
<td></td>
<td>Hypochlorite disinfectant</td>
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<td></td>
<td>Phenolic disinfectant</td>
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<td>Xylene</td>
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<td>Sodium hydroxide pellets</td>
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<tr>
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<td>Potassium dichromate</td>
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<td></td>
<td>Potassium chloride</td>
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<td></td>
<td>Ammonium Oxalate</td>
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<td></td>
<td>Potassium hydroxide</td>
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<tr>
<td></td>
<td>Sodium Chloride</td>
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<tr>
<td></td>
<td>Potassium permanganate</td>
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<tr>
<td></td>
<td>p-amino benzoic acid</td>
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<tr>
<td></td>
<td>Universal container Sterile</td>
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<tr>
<td></td>
<td>4ml, Sterile, liquid EDTA, hemoguard stopper</td>
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<td></td>
<td>Plain red top, rubber cork, 4 ml</td>
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<tr>
<td></td>
<td>Fluoride oxalate vacutainer tubes 4ml</td>
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<tr>
<td></td>
<td>Tri sodium citrate tubes 4ml</td>
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<tr>
<td></td>
<td>Vacutainer needle</td>
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<tr>
<td></td>
<td>vacutainer Holder</td>
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<tr>
<td></td>
<td>Heparinised capillary tubes</td>
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<td></td>
<td>Plain capillary tubes</td>
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<td>Strainer</td>
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<td>Lancets</td>
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<td>Cotton wool</td>
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<td>5ml disposable syringes</td>
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<tr>
<td></td>
<td>Needles 21G</td>
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<tr>
<td></td>
<td>10mls syringes</td>
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<td></td>
<td>Needles 23g</td>
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<td>Orange sticks(stool and TB)</td>
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<td></td>
<td>Stool containers 30ml wide necked with spoon</td>
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<td></td>
<td>Universal containers(non-sterile)</td>
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<td></td>
<td>Frosted end glass slide</td>
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<td></td>
<td>Plain glass slide</td>
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<tr>
<td></td>
<td>Coverglass 22X 22mm</td>
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<tr>
<td></td>
<td>Coverslip 24X40mm</td>
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<td></td>
<td>Antiseptic soap</td>
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<tr>
<td></td>
<td>Immersion oil</td>
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<td></td>
<td>Lens tissue 100X 150mm pkt of 50 sheets</td>
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<tr>
<td></td>
<td>Autoclave tape</td>
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<tr>
<td></td>
<td>Plastic pasteur pipettes 3mls</td>
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<td>Grease markers</td>
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**Consumables- all levels**
<table>
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<tr>
<th>TEST</th>
<th>REAGENTS</th>
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<tbody>
<tr>
<td></td>
<td>Whatman filter paper medium 150mm</td>
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<td>Gauze roll of 50m</td>
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<tr>
<td></td>
<td>Bijou bottles 7ml glass</td>
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<tr>
<td></td>
<td>Disposable gloves vinyl non-sterile medium</td>
</tr>
<tr>
<td></td>
<td>Disposable gloves vinyl non-sterile large</td>
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<td></td>
<td>Labels 22X17</td>
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<td>Black bags disposable - medium 600X770</td>
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<td>Graph paper 297X210mm (A4)</td>
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<td>Record books</td>
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<td>Lab tissue roll</td>
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<td></td>
<td>Universal indicator paper pH 1-14</td>
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<td>Autoclave bags</td>
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<td>Tourniquet</td>
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<td>Dispensing bottles</td>
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<td>Wireloop holder</td>
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<td>Wireloop</td>
</tr>
<tr>
<td></td>
<td>Wash bottles</td>
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<tr>
<td></td>
<td>Brushes for bijou bottles</td>
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<tr>
<td></td>
<td>Test tube brushes</td>
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<tr>
<td></td>
<td>Centrifuge tubes round bottom</td>
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<tr>
<td></td>
<td>Centrifuge tubes conical bottom</td>
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<tr>
<td></td>
<td>Cinbin sharps container</td>
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<tr>
<td></td>
<td>Pipette tips(yellow)</td>
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<td></td>
<td>Pipette tips(blue)</td>
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<tr>
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<td>Sterilin Water Sampling Container</td>
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<td>ESR tubes (Westergren)</td>
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<td>ESR Stand (Westergren)</td>
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<td>Embedding cassets</td>
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<td>Fibro Wax</td>
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<tr>
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<td>Microtome Blades</td>
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<tr>
<td></td>
<td>Diamond pencils</td>
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<tr>
<td></td>
<td>Humalyzer 2000 cuvettes</td>
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<tr>
<td></td>
<td>Disposable laboratory gowns</td>
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<td></td>
<td>Forceps</td>
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<td></td>
<td>Funnels</td>
</tr>
<tr>
<td></td>
<td>Thermometers</td>
</tr>
<tr>
<td></td>
<td>Filter paper 90mm diam (small)</td>
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<td></td>
<td>McCartney bottles 30ml glass (Microbiology)</td>
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<tr>
<td>TEST</td>
<td>REAGENTS</td>
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<tr>
<td>-----------</td>
<td>-----------------------------------------</td>
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<tr>
<td></td>
<td>Anaerobic sachets</td>
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<tr>
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<td>Gauze mesh plain</td>
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<td></td>
<td>Microaerophilic sachets</td>
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<tr>
<td></td>
<td>Petri dish</td>
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<tr>
<td></td>
<td>Prepacked iodine swabs</td>
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<tr>
<td></td>
<td>Screw cap-type Microtube (1.5 ml)</td>
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<tr>
<td></td>
<td>Sealant clay</td>
</tr>
<tr>
<td></td>
<td>Spatula</td>
</tr>
<tr>
<td></td>
<td>Sterile paper swab</td>
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<tr>
<td></td>
<td>Sterile swab</td>
</tr>
<tr>
<td></td>
<td>Test tube</td>
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APPENDIX I; DRUG USE IN PREGNANCY

There are many drugs that can disrupt the development of the foetus (especially during the first trimester), or can have effects on maturing babies and new borns through drugs excreted in breast milk. Often the effect of the drugs on the foetus and babies are unknown.

**Generally, drugs should be avoided in pregnancy**
Some drugs are known to be safe (e.g. penicillin), others have a slight risk, which is outweighed by the benefit of the treatment (e.g. malaria is such more dangerous to pregnancy than chloroquine).

The list below contains references to drugs found in this formulary. It is not a comprehensive list for all drugs.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ace Inhibitor (1,2,3,)</td>
<td>Avoid, can effect foetal and neonatal blood pressure control and renal function; possible skull defects.</td>
</tr>
<tr>
<td>Alcohol (1,2,)</td>
<td>Regular alcoholics teratogenic, possible growth retardation.</td>
</tr>
<tr>
<td>Aminoglycocides (2,3,)</td>
<td>Auditory or vestibular nerve damage, greatest risk with streptomycin, less risk gentamycin but avoid unless essential.</td>
</tr>
<tr>
<td>Aminophylline</td>
<td>see theophylline</td>
</tr>
<tr>
<td>Amitriptyline</td>
<td>see antidepressants</td>
</tr>
<tr>
<td>Anaesthetics general (3)</td>
<td>Depress neonatal respiration</td>
</tr>
<tr>
<td>Anaesthetics local (3)</td>
<td>Large doses causes neonatal respiratory depression, hypotonia and bradycardia</td>
</tr>
<tr>
<td>Anticoagulants heparin (1,2,3,)</td>
<td>osteoporosis after prolonged use</td>
</tr>
<tr>
<td>Anticoagulants oral (1,2,3,)</td>
<td>congenital malformations Foetal and neonatal haemorrhage</td>
</tr>
<tr>
<td>Oral antidepressants (3)</td>
<td>tachycardia, irritability and muscle spasms (e.g. imipramine), avoid unless benefit outweighs risk</td>
</tr>
</tbody>
</table>
Antiepileptics

Benefit of treatment outweighs risks to foetus, risk increases if more than 1 drug used (see also individual drugs)

Antihistamines

No evidence of teratogenicity

Antimalarials (1,3,)

Benefit of treatment outweighs risk to foetus, (see also individual drug)

Antipsychotics (3)

Avoid clozapine, extra pyramidal effects in neonates occasionally observed.

Aspirin (3)

Impaired platelet function, risk of haemorrhage, delayed onset and increased duration of labour. Avoid in last weeks of pregnancy. High doses cause closure of the foetal ductus arteriosus in utero and possible pulmonary hypertension of the new born.

Atenolol

See betablockers

Beclomethasone

See corticosteroids

Bendrofluazaine

See diuretics

Betablockers

May cause intra-uterine growth retardation, neonatal hypoglycaemia and bradycardia

Betamethasone

See corticosteroids

Calcium Channel blockers

May inhibit labour and may be teratogenic

Captopril

See ACE inhibitors

Carbamazepine (1)

Possibly teratogenic

Carbimazole (2,3,)

Neonatal goitre and hypothyroidism

Cephalsporins

Not known to be harmful

Chloramphenicol (3)

Neonatal "grey syndrome"

Chlordiazepoxide

See hypnotics and anxiolytics

Chlormethiazole

See hypnotics and anxiolytics
Chloroquin See antimalarials
Chlorpeniramine See antihistamines
Chlopromazine See antipsychotics
Clomiphene possible effects on foetal development
Clozapine Avoid
Codeine See opioid analgesics
Contraceptives, Oral epidemiological evidence suggest no harmful effect
Corticosteroids (2,3,) Only if benefit is high e.g. asthmatic attack
Cotrimoxazole (1) Theoretical teratogenic risk
Danazol (1,2,3,) Weak androgenic effects
Dapsone (3) Neonatal haemolysis and methaemoglobinemia. Adequate folic acid supplements necessary
Dexamethasone See corticosteroids
Diazepam See hypnotics and anxiolytics
Digoxin May need dosage adjustment
Diltiazem See calcium channel blockers
Disophyramide (3) May induce labour
Diuretics (3) Should not be used to treat hypertension in pregnancy. Thiazides cause neonatal thrombocytopenia
Doxycycline See tetracyclines
Ergotamine (1,2,3,) Oxytocic effect on the pregnant uterus
Erythromycin Not known to be harmful
Ethinylestradiol See contraceptives, oral
Fluconazole avoid Antidepressants
Glibenclamide See sulphonylureas
Griseofulvin (1,2,3,) avoid, foetotoxicity and teratogenicity
Haloperidol See antipsychotics
Heparin See anticoagulants
Hydralazine (1) possible toxicity
Hydrochlorothiazide See diuretics
Hydrocortisone see corticosteroids
Hydroxyprogesterone See progestersones
Hypnotics and anxiolytics Avoid
Ibuprofen See NSAIDs
Idoxuridine Possible toxicity
Imipramine Avoid, see also antidepressants
Insulin (1,2,3,) Insulin requirements should be frequently reassessed.
Iodine (2,3,) neonatal goitre and hypothyroidism
Kanamycin See aminoglycosides
Ketamine See anaesthetics: General
Ketoconazole possibly teratogenic
Labetolol See betablockers
Levodopa Possible toxicity
Lignocaine See anaesthetic, local
Lithium (1,2,3,) Dose requirements increased, neonatal goitre and lithium toxicity
Lorazepam See hypnotics and anxiolytics
Mebendazole Possible toxicity
Mefloquine possible teratogenic
Methformin avoid
<table>
<thead>
<tr>
<th>Medicine</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metoclopramide</td>
<td>Not known</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>Avoid high doses</td>
</tr>
<tr>
<td>Nalidixicacid</td>
<td>See 4 quinolones</td>
</tr>
<tr>
<td>Nalaxone</td>
<td>Only if benefit outweighs risk</td>
</tr>
<tr>
<td>Naproxen</td>
<td>See NSAIDs</td>
</tr>
<tr>
<td>Neomycin</td>
<td>See aminoglycocides</td>
</tr>
<tr>
<td>Nifedipine</td>
<td>See calcium channel blockers</td>
</tr>
<tr>
<td>Nitrazepam</td>
<td>See hypnotics and anxiolytics</td>
</tr>
<tr>
<td>Nitrofurantoin (3)</td>
<td>May produce neonatal haemolysis</td>
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<tr>
<td>Nitrous oxide</td>
<td>See anaesthetics, general</td>
</tr>
<tr>
<td>Norethisterone</td>
<td>See contraceptives, oral</td>
</tr>
<tr>
<td>NSAIDs (3)</td>
<td>Avoid unless large benefit of treatment.</td>
</tr>
<tr>
<td></td>
<td>Regular use causes closure of ductus</td>
</tr>
<tr>
<td></td>
<td>arteriosus in utero and possible persistent</td>
</tr>
<tr>
<td></td>
<td>pulmonary hypertension of the newborn</td>
</tr>
<tr>
<td>Nystatin</td>
<td>Unknown</td>
</tr>
<tr>
<td>Oestrogens</td>
<td>See contraceptives respiration</td>
</tr>
<tr>
<td>Opioid analgesics (3)</td>
<td>Depress neonatal respiration</td>
</tr>
<tr>
<td>Paracetamol</td>
<td>Not known to be harmful</td>
</tr>
<tr>
<td>Pethidine</td>
<td>See opioid analgesics</td>
</tr>
<tr>
<td>Phenobarbitone (1,2,)</td>
<td>Congenital malformation, neonatal</td>
</tr>
<tr>
<td></td>
<td>bleeding tendency</td>
</tr>
<tr>
<td>Phenytoin (1,3,)</td>
<td>Congenital malformation - see also anti</td>
</tr>
<tr>
<td></td>
<td>epileptics</td>
</tr>
<tr>
<td>Pilocarpine</td>
<td>Avoid</td>
</tr>
<tr>
<td>Pindolol</td>
<td>See beta blockers</td>
</tr>
<tr>
<td>Podophylline (1,2,3,)</td>
<td>Avoid: neonatal death and teratogenic</td>
</tr>
<tr>
<td>Povidone iodine (2,3,)</td>
<td>Sufficient iodine may be absorbed to</td>
</tr>
<tr>
<td></td>
<td>affect foetal thyroid</td>
</tr>
<tr>
<td>Medicine</td>
<td>Effect</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Prednisolone</td>
<td>See corticosteroids</td>
</tr>
<tr>
<td>Primaquine (3)</td>
<td>Neonatal haemolysis and methaemoglobinaemia</td>
</tr>
<tr>
<td>Progesterones (1)</td>
<td>High doses possibly teratogenic</td>
</tr>
<tr>
<td>Promethazine</td>
<td>See antihistamines</td>
</tr>
<tr>
<td>Propranolol</td>
<td>see betablockers</td>
</tr>
<tr>
<td>Pyrimethamine + Sulphadoxine (1)</td>
<td>Possibly teratogenic</td>
</tr>
<tr>
<td></td>
<td>neonatal haemolysis and methaemoglobinaemia</td>
</tr>
<tr>
<td>Quinine (1)</td>
<td>High doses are teratogenic, but malaria treatment may outweigh risk</td>
</tr>
<tr>
<td>Quinolones (1,2,3,)</td>
<td>possible antropathy</td>
</tr>
<tr>
<td>Rifampicin (1)</td>
<td>High doses teratogenic</td>
</tr>
<tr>
<td>Spironolactone</td>
<td>Possible toxicity</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>See aminoglycocides</td>
</tr>
<tr>
<td>Sulphonylureas (3)</td>
<td>Neonatal hypoglycaemia, avoid, substitute with insulin</td>
</tr>
<tr>
<td>Tetracyclines (1)</td>
<td>Effects on skeletal development</td>
</tr>
<tr>
<td></td>
<td>Dental discoloration</td>
</tr>
<tr>
<td>Tetracycline (2,3,)</td>
<td></td>
</tr>
<tr>
<td>Theophyllin (3)</td>
<td>Neonatal irritability and apnoea have been reported</td>
</tr>
<tr>
<td>Thiazides (3)</td>
<td>Neonatal thrombocytopoenia possible</td>
</tr>
<tr>
<td>Thiopentone</td>
<td>See anaesthetics: General</td>
</tr>
<tr>
<td>Thioridazine</td>
<td>See ntipsychotics</td>
</tr>
<tr>
<td>Timolol</td>
<td>See beta blockers</td>
</tr>
<tr>
<td>Trimethoprim (1)</td>
<td>Teratogenic risk</td>
</tr>
<tr>
<td>Warfarin</td>
<td>See anticoagulants</td>
</tr>
</tbody>
</table>
Administration of some drugs to nursing mothers may cause toxicity in the infant (e.g. ergotamine), whereas others may have an effect on the neonate (e.g. digoxin). Toxicity to the infant can occur if the drug enters the milk in pharmacologically significant quantities. Milk concentrations of some drugs might exceed those in maternal plasma so that therapeutic doses in the mother might be toxic to the infant. For many drugs there is insufficient evidence to provide guidance and it is therefore only advisable to administer those drugs that are necessary to the mother during breast feeding.

The following list contains the drugs covered in this formulary that should be used with caution or which should be avoided in breast feeding.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>Large amounts may be persistent pulmonary hypertension for the newborn.</td>
</tr>
<tr>
<td>Amiloride</td>
<td>Avoid</td>
</tr>
<tr>
<td>Aminophylline</td>
<td>See theophylline</td>
</tr>
<tr>
<td>Amitriptyline</td>
<td>See antidepressants</td>
</tr>
<tr>
<td>Anticoagulants, oral</td>
<td>Risk of haemorrhage, warfarin appears to be safe</td>
</tr>
<tr>
<td>Antidepressants</td>
<td>Small amount of tricyclics in breast milk, manufacturers Advise to avoid</td>
</tr>
<tr>
<td>Antihistamines</td>
<td>Significant amount of some antihistamines although not known to be harmful</td>
</tr>
<tr>
<td>Antipsychotics</td>
<td>Avoid, possible effects on development of nervous system</td>
</tr>
<tr>
<td>Aspirin</td>
<td>Avoid</td>
</tr>
<tr>
<td>Atenolol</td>
<td>See beta blockers</td>
</tr>
<tr>
<td>Barbiturates</td>
<td>Avoid if possible, large dose may cause drowsiness</td>
</tr>
<tr>
<td>Beclomethasone</td>
<td>See corticosteroids</td>
</tr>
<tr>
<td>Bendrofluazide</td>
<td>See thiazdes</td>
</tr>
</tbody>
</table>
Benzodiazepines
Avoid repeated doses, lethargy and weight loss in infant

Beta blockers
Monitor infant, possible toxicity due to beta blockade, but amount excreted of most beta blockers too small, antenolol has greatest risk

Betamethasone
See corticosteroids

Bromocriptine
Suppress lactation

Captopril
Probably amount too small to be harmful

Carbamazepine
Probably amount too small to be harmful

Carbimazole
Amounts in milk may be harmful

Cefalosporins
Excreted in low concentrations

Chloramphenicol
Avoid, may cause neonatal "Grey syndrome"

Chlordiazepoxide
See benzodiazepines

Chlormethiazole
Amount too small to be harmful

Chloroquine
Amount probably too small to be harmful

Chlorpromazine
Drowsiness in infant reported

Cimetidine
Significant amount, not known to be harmful

Ciprofloxacin
Avoid, high concentration on breast milk

Codeine
Amount too small to be harmful

Contraceptives, oral
Avoid combined oral contraceptives until weaning or 6 months after birth. Adverse effects on lactation

Corticosteroids
Continuous high doses may affect infant adrenal function

Cotrimoxazole
Small risk of jaundiced infants

Danazol
Avoid, possible weak androgenic effects

Dexamethasone
See corticosteroids

Diazepam
See benzodiazepines

Digoxin
Amount too small to be harmful
Diltiazem
Avoid

Disopyramide
Monitor infant for antimuscarinic effects

Doxycycline
See tetracyclines

Enalapril
Amount too small to be harmful

Ergotamine
Avoid

Erythromycin
Not known to be harmful

Ethynoestradiol
See contraceptives, oral

Fentanyl
Avoid

Fluconazole
Avoid

Fluoxetin
Avoid

Glibenclamide
See Sulphonylureas

Haloperidol
See antipsychotics

Hydrochlorthiazide
See thiazides

Hydrocortisone
See corticosteroids

Ibuprofen
Amount too small to be harmful

Idoxuridin
May make breast milk taste unpleasant

Imipramine
Avoid, see also antidepressants

Insulin
Amount too small to be harmful

Indomethacin
Maybe harmful

Iodine
Harmful, if required stop breast feeding, danger of hypothyroidism

Isoniazid
Monitor possible toxic effects, theoretical risk of convulsion and neuropathy

Labetolol
See beta blockers

Levodopa
No information

Lignocaine
Amount too small to be harmful

Lisinopril
No information

Lithium
Monitor infant for possible intoxication
Lorazepam See benzodiazepines
Mebendazole No information
Mefloquine Avoid
Metoclopramide Avoid
Metronidazole Avoid
Nalidixic acid Small risk
Naloxone No information
Naproxen Amount too small to be harmful
Nifedipine Amount too small to be harmful
Nitrazepam See benzodiazepines
Nitrofurantoin May be harmful in some individuals
Norethisterone See contraceptives, oral
Nystatin No information
Oestrogens See contraceptives, oral
Opioid Depress neonatal respiration
Paracetamol Not known to be harmful
Penicillins Not known to be harmful
Pethidine See opioid analgesics
Phenobarbitone Congenital malformations, neonatal bleeding tendency
Phenytoin Congenital malformations - see also anti epileptics
Pilocarpine Avoid
Pindolol See beta blockers
Podophylline Avoid: neonatal death and tetratogenic
Povidone Iodine Sufficient iodine may be absorbed to affect foetal thyroid
Prednisolone See corticosteroids

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<table>
<thead>
<tr>
<th>Drug</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primquine</td>
<td>Neonatal haemolysis and methaemoglobinaemia</td>
</tr>
<tr>
<td>Progesterones</td>
<td>High doses possibly tetratogenic</td>
</tr>
<tr>
<td>Promethazine</td>
<td>See antihistamines</td>
</tr>
<tr>
<td>Propranolol</td>
<td>See beta blockers</td>
</tr>
<tr>
<td>Pyrmentamine + Sulfadoxine</td>
<td>Possibly teratogenic, neonatal haemolysis and methaemoglobinaemia</td>
</tr>
<tr>
<td>Quinine</td>
<td>High doses are tetratogenic, but malaria may outweigh risk</td>
</tr>
<tr>
<td>4 Quinolones</td>
<td>Possible anthropathy</td>
</tr>
<tr>
<td>Rifampicin</td>
<td>High doses tetratogenic</td>
</tr>
<tr>
<td>Spironolactone</td>
<td>See aminoglycocides</td>
</tr>
<tr>
<td>Sulphonylureas</td>
<td>Neonatal hypoglycaemia, avoid, substitute with insulin</td>
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<tr>
<td>Tetracyclines</td>
<td>Effects on skeletal development</td>
</tr>
<tr>
<td>Theophylline</td>
<td>Neonatal irritability and apnoea have been reported</td>
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<tr>
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</tr>
<tr>
<td>Thioridazine</td>
<td>See antipsychotics</td>
</tr>
<tr>
<td>Timolol</td>
<td>See beta blockers</td>
</tr>
<tr>
<td>Trimethprim</td>
<td>Avoid, fetotoxicity and teratogenicity, avoid conception 6 months after administration to a woman or man</td>
</tr>
<tr>
<td>Warfarin</td>
<td>See anticoagulants</td>
</tr>
</tbody>
</table>
# APPENDIX III

## HAEMATOLOGICAL REFERENCE VALUES FOR NORMAL INFANTS AND CHILDREN

<table>
<thead>
<tr>
<th></th>
<th>At birth (Full term)</th>
<th>Day 3</th>
<th>1 month</th>
<th>2 – 6 months</th>
<th>2 – 6 years</th>
<th>6 – 12 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Blood Cell Count (x10^{12}/L)</td>
<td>6.0±1.0</td>
<td>5.3±1.3</td>
<td>4.2±1.2</td>
<td>3.0±0.8</td>
<td>4.6±0.7</td>
<td>4.6±0.6</td>
</tr>
<tr>
<td>Haemoglobin (g/L)</td>
<td>165±30</td>
<td>185±40</td>
<td>140±30</td>
<td>115±20</td>
<td>125±15</td>
<td>135±20</td>
</tr>
<tr>
<td>Packed cell volume/haematocrit</td>
<td>0.54±0.10</td>
<td>0.56±0.11</td>
<td>0.43±0.12</td>
<td>0.35±0.07</td>
<td>0.37±0.0</td>
<td>0.40±0.0</td>
</tr>
<tr>
<td>mean cell volume (MCV) (fL)</td>
<td>110±10</td>
<td>108±13</td>
<td>104±19</td>
<td>91±17</td>
<td>81±6</td>
<td>86±8</td>
</tr>
<tr>
<td>Mean cell haemoglobin MCH (Pg)</td>
<td>34±3</td>
<td>34±3</td>
<td>34±6</td>
<td>30±5</td>
<td>27±3</td>
<td>29±4</td>
</tr>
<tr>
<td>Mean cell haemoglobin concentration (MCHC)</td>
<td>330±30</td>
<td>330±40</td>
<td>330±40</td>
<td>330±40</td>
<td>330±40</td>
<td>330±40</td>
</tr>
<tr>
<td>Reticulocytes (%)</td>
<td>2 – 5</td>
<td>1-4.5</td>
<td>0.3-1</td>
<td>0.4-1</td>
<td>0.2-2</td>
<td>0.2-2</td>
</tr>
<tr>
<td>White blood cell count (x10^{9}/L)</td>
<td>18±8</td>
<td>15±8</td>
<td>12±7</td>
<td>12±6</td>
<td>10±5</td>
<td>9±4</td>
</tr>
<tr>
<td>Neutrophils (x10^{9}/L)</td>
<td>3-13</td>
<td>3 – 5</td>
<td>3 – 9</td>
<td>1.5-9</td>
<td>1.5-8</td>
<td>2 – 8</td>
</tr>
<tr>
<td>Lymphocytes (x10^{9}/L)</td>
<td>3 – 10</td>
<td>2 – 8</td>
<td>3 -16</td>
<td>4 - 10</td>
<td>6 - 9</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Monocytes (10^{9}/L)</td>
<td>0.7-1.5</td>
<td>0.5-1</td>
<td>0.3-1</td>
<td>0.1-1</td>
<td>0.1-1</td>
<td>0.1-1</td>
</tr>
<tr>
<td>Eosinophils (x10^{9}/L)</td>
<td>0.2-1</td>
<td>0.1-2.5</td>
<td>0.2-1</td>
<td>0.2-1</td>
<td>0.2-1</td>
<td>0.1-1</td>
</tr>
</tbody>
</table>

Expressed as mean +2 SD or 95% range

---

## HAEMATOLOGICAL REFERENCE RANGES FOR ADULTS

---

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<table>
<thead>
<tr>
<th>TEST</th>
<th>NORMAL RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 WBC (TOTAL)</td>
<td>4 – 11 x 10⁹/L</td>
</tr>
<tr>
<td>2 WBC (DIFFERENTIAL)</td>
<td></td>
</tr>
<tr>
<td>NEUTROPHILS</td>
<td>40 – 75%</td>
</tr>
<tr>
<td>LYMPHOCYTES</td>
<td>20 – 45%</td>
</tr>
<tr>
<td>MONOCYTES</td>
<td>2 – 10%</td>
</tr>
<tr>
<td>EOSINOPHILIS</td>
<td>1 – 6%</td>
</tr>
<tr>
<td>BASOPHIL</td>
<td>1%</td>
</tr>
<tr>
<td>3 RBC</td>
<td></td>
</tr>
<tr>
<td>MEN:</td>
<td>4.5 – 6.5 x 10¹²/L</td>
</tr>
<tr>
<td>WOMEN:</td>
<td>3.8 – 5.8 x 10¹²/L</td>
</tr>
<tr>
<td>4 Hb</td>
<td></td>
</tr>
<tr>
<td>MEN:</td>
<td>130 – 180 g/L</td>
</tr>
<tr>
<td>WOMEN:</td>
<td>120 – 160 g/L</td>
</tr>
<tr>
<td>5 Hct (PVC) (Ratio)</td>
<td></td>
</tr>
<tr>
<td>MEN:</td>
<td>0.40 – 0.54</td>
</tr>
<tr>
<td>WOMEN:</td>
<td>0.37 – 0.47</td>
</tr>
<tr>
<td>6 MCV</td>
<td>76 – 96 FL</td>
</tr>
<tr>
<td>7 MCH</td>
<td>27 – 32 pg</td>
</tr>
<tr>
<td>8 MCHC</td>
<td>30 – 35 g/Dl</td>
</tr>
<tr>
<td>9 PLATELET COUNT</td>
<td>150 – 400 x 10⁹/L</td>
</tr>
<tr>
<td>10 PT</td>
<td>12 – 16 sec</td>
</tr>
<tr>
<td>11 APTT</td>
<td>30 – 40 sec</td>
</tr>
<tr>
<td>12 BLEEDING TIME (IVY’S METHOD)</td>
<td>2 – 7 min</td>
</tr>
<tr>
<td>13 CLOTTING TIME (TUBE METHOD)</td>
<td>2 – 7 min</td>
</tr>
<tr>
<td>14 RETICULOCYTE COUNT</td>
<td>0.5 – 2.5%</td>
</tr>
<tr>
<td>15 ESR</td>
<td></td>
</tr>
<tr>
<td>MEN:</td>
<td>Up to 10 mm/hr</td>
</tr>
<tr>
<td>MEN:</td>
<td>Over 50 years up to 12 – 14 mm/hr</td>
</tr>
<tr>
<td>WOMEN:</td>
<td>Up to 12 mm/hr</td>
</tr>
<tr>
<td>WOMEN:</td>
<td>Over 50 years up to 19 – 20 mm/hr</td>
</tr>
</tbody>
</table>

**HAEMATOLOGICAL REFERENCES RANGES DURING PREGNANCY AND OBSTETRIC DELIVERY**

<table>
<thead>
<tr>
<th>TEST</th>
<th>PREGNANCY</th>
<th>DELIVERY</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC (TOTAL)</td>
<td>5.0 – 16.0 x 10⁹/L</td>
<td>&lt;40.0 x 10⁹/L</td>
</tr>
<tr>
<td>WBC (DIFFERENTIAL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cells</td>
<td>Low Limit</td>
<td>High Limit</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------</td>
<td>--------------</td>
</tr>
<tr>
<td>NEUTROPHILS</td>
<td>2.5-14.0 X 10^9/L</td>
<td>&lt;36.0 X 10^9/L</td>
</tr>
<tr>
<td>LYMPHOCYTES</td>
<td>Slightly lower than non-pregnant</td>
<td></td>
</tr>
<tr>
<td>MONOCYTES</td>
<td>&lt;0.1 X 10^9/L</td>
<td>Low</td>
</tr>
<tr>
<td>EOSINOPHILIS</td>
<td>&lt;0.02 X 10^9/L</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>BASOPHILIS</td>
<td>&lt;1%</td>
<td></td>
</tr>
<tr>
<td>Platelets</td>
<td>120-320 x 10^9/L</td>
<td>Raised post-partum</td>
</tr>
<tr>
<td>Test</td>
<td>Value</td>
<td>Reference Range</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------</td>
<td>-----------------</td>
</tr>
<tr>
<td>CKMB</td>
<td>1.0</td>
<td>0.0-2.0</td>
</tr>
<tr>
<td>a – Amylase</td>
<td>0.0</td>
<td>0.0-2.0</td>
</tr>
<tr>
<td>Total protein</td>
<td>66</td>
<td>60-80</td>
</tr>
<tr>
<td>Albumin</td>
<td>36</td>
<td>30-50</td>
</tr>
<tr>
<td>Calcium</td>
<td>2.1</td>
<td>2.0-2.5</td>
</tr>
<tr>
<td>Phosphate</td>
<td>0.8</td>
<td>0.8-1.5</td>
</tr>
<tr>
<td>Bilirubin: Total Direct</td>
<td>3.4</td>
<td>0.5-1.5</td>
</tr>
<tr>
<td>Total cholesterol</td>
<td>2.8</td>
<td>3.5-5.5</td>
</tr>
<tr>
<td>High density lipoprotein</td>
<td>1.0</td>
<td>0.8-1.8</td>
</tr>
<tr>
<td>Low density lipoprotein</td>
<td>0.0</td>
<td>0.5-1.5</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>0.0</td>
<td>0.5-2.3</td>
</tr>
<tr>
<td>C-reactive protein</td>
<td>0.0</td>
<td>0.0-10</td>
</tr>
<tr>
<td>Total iron</td>
<td>9.0</td>
<td>7.5-13.0</td>
</tr>
<tr>
<td>Transferrin</td>
<td>2.0</td>
<td>1.5-4.0</td>
</tr>
<tr>
<td>Osmolality</td>
<td>275</td>
<td>280-300</td>
</tr>
<tr>
<td>Fibrinogen</td>
<td>1.5</td>
<td>0.8-1.7</td>
</tr>
<tr>
<td>Magnesium</td>
<td>1.7</td>
<td>1.5-2.2</td>
</tr>
<tr>
<td>Total glycated haemoglobin</td>
<td>4.0</td>
<td>3.5-8.0</td>
</tr>
<tr>
<td>Cerebrospinal fluid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chloride</td>
<td>120</td>
<td>100-120</td>
</tr>
<tr>
<td>Glucose</td>
<td>0.6</td>
<td>0.4-0.8</td>
</tr>
<tr>
<td>Protein</td>
<td>0.15</td>
<td>0.3-1.0</td>
</tr>
<tr>
<td>Urine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium</td>
<td>2.5</td>
<td>2.0-2.5</td>
</tr>
<tr>
<td>Creatinine: Female</td>
<td></td>
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<td>: Male</td>
<td>7100</td>
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<td>5300</td>
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<td>Substance</td>
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<td>Female 1</td>
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<tr>
<td>Phosphate</td>
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<td>K</td>
<td>140</td>
<td>260</td>
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<tr>
<td>Na</td>
<td>250</td>
<td>600</td>
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<td>Protein S.G</td>
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<td>Urea</td>
<td>88</td>
<td>128</td>
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<td>Uric acid</td>
<td>15</td>
<td>30(3hrs urine)</td>
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<td>VMA</td>
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<tr>
<td>Creatinine clearance: Male</td>
<td>97</td>
<td>137</td>
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<tr>
<td>Lithium Clearance</td>
<td>15</td>
<td>30(3hrs urine)</td>
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**ENDOCRINOLOGY REFERENCE RANGES**

**THYROID HORMONES REFERENCES RANGES (ADULTS)**

T3 1.5 --------------- 3.7 nmol/L
T4 50.0 --------------- 129.0 nmol/L
TSH 0.8 --------------- 5.0 mU/L

**REPRODUCTIVE HORMONES**

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<thead>
<tr>
<th></th>
<th>REFERENCES RANGE</th>
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<tbody>
<tr>
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<td>MALES</td>
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<td>FEMALE</td>
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<table>
<thead>
<tr>
<th>Hormone</th>
<th>Phase</th>
<th>Normal Range</th>
<th>Post Menopause Range</th>
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<tbody>
<tr>
<td>Progesterone</td>
<td>Follicular phase</td>
<td>0.6-3.2 nmol/L</td>
<td>0.3-3.2 nmol/L</td>
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<td>Luteal phase</td>
<td>9.5-79.5 nmol/L</td>
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<tr>
<td>Testosterone</td>
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<td>0.3-3.6 nmol/L</td>
<td>10.4-31.2 nmol/L</td>
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<td>LH</td>
<td>Early follicular</td>
<td>3.0-12.0 iU/L</td>
<td>2.0-9.5 iU/L</td>
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<td>Ovulation peak</td>
<td>25.0-65.0 iU/L</td>
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<td>2.5-13.0 iU/L</td>
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<td></td>
<td>Post menopause</td>
<td>25.0-120 iU/L</td>
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<td>Estradiol</td>
<td>Follicular phase</td>
<td>110-440 pmol/L</td>
<td>36-128 pmol/L</td>
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<td>367-770 pmol/L</td>
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<td>Pre-ovulation peak</td>
<td>500-1285 pmol/L</td>
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<td>Post menopause</td>
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<tr>
<td>FSH</td>
<td>Early follicular</td>
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<td>1.2-5.0 iU/L</td>
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<td>Prolactin</td>
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<th>Potential Side Effects</th>
<th>Laboratory Tests</th>
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<td>Lithium</td>
<td>Cardiac</td>
<td>Conduction disturbance</td>
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<td>Hematologic</td>
<td>Sinus node dysfunction</td>
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<td></td>
<td>Renal</td>
<td>Elevated white blood cell count</td>
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<td></td>
<td>Reproductive (women)</td>
<td>Diabetes insipidus/development of renal failure</td>
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<tr>
<td></td>
<td>Thyroid</td>
<td>Hypothyroidism/goiter</td>
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<tr>
<td></td>
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<td>Fetal abnormalities</td>
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<tr>
<td></td>
<td></td>
<td>Hypothyroidism/goiter</td>
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<tr>
<td></td>
<td></td>
<td>Pregnancy test</td>
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<td></td>
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<td>Thyroid-stimulating hormone (TSH)</td>
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<td>Complete blood count with differential</td>
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<td>Electrolytes, blood urea nitrogen (BUN), creatinine,</td>
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<td>urinalysis (specific gravity)</td>
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315
<table>
<thead>
<tr>
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<th>Anemia</th>
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<td>Thrombocytopenia</td>
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<td>Hepatic</td>
<td></td>
<td>Hepatic dysfunction or failure</td>
<td>Hepatic enzymes</td>
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<tr>
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<td></td>
<td>Fetal abnormality</td>
<td>Pregnancy test</td>
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<td>(women)</td>
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<thead>
<tr>
<th>Carbamazepine</th>
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<th>Arrhythmia</th>
<th>ECG</th>
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<td>Agranulocytosis</td>
<td>Complete blood count with differential</td>
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<td>Thrombocytopenia</td>
<td>Platelet count</td>
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<td>Hepatitis</td>
<td>Hepatic enzymes</td>
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<td></td>
<td>Jaundice</td>
<td>Bilirubin</td>
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<td>Renal</td>
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<td>Syndrome of inappropriate secretion of antidiuretic hormone</td>
<td>BUN/creatinine</td>
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<tr>
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<td>Fetal abnormality</td>
<td>Pregnancy tests</td>
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