

DISORDERS OF THE GASTROINTESTINAL TRACT

8. Diarrhoea

Diarrhoea is defined as the passage of frequent, loose, watery stools 3 or more times a day. Diarrhoea may be accompanied by vomiting.

In children, the commonest cause is viral. There is therefore usually no need to prescribe antibiotics. Other diseases like malaria, pneumonia, ear infections and urinary tract infections, may be associated with diarrhoea. Fluid loss occurs quickly in this age group because of their size. If not corrected, it may result in dehydration, which can be fatal.

A complaint of diarrhoea should be taken seriously. Always ask about the frequency and the texture of the stools. Giving antibiotics in all cases of diarrhoea may worsen or prolong the condition except in special circumstances (See section on 'Causes' below). Enemas and laxatives should not be given to patients with diarrhoea.

CAUSES

Acute diarrhoea (< 2 weeks)

- Infections
 - Viral: e.g. rotavirus, norovirus
 - Bacterial: e.g. *Salmonella* spp., *Shigella*, *Campylobacter*, *E. coli*, *Vibrio cholerae*
 - Protozoal: e.g. *Entamoeba histolytica* (amoebiasis)
- Drug-induced: e.g. penicillins

Chronic diarrhoea (> 2 weeks)

- Chronic infections: e.g. amoebiasis, tuberculosis, opportunistic infections with HIV
- Functional: e.g. irritable bowel syndrome
- Inflammatory: e.g. ulcerative colitis, Crohn's disease
- Malabsorption syndromes: e.g. chronic pancreatitis
- Malignancy: e.g. colon cancer
- Endocrine: e.g. hyperthyroidism, diabetic autonomic neuropathy
- Drug-induced: e.g. laxatives, NSAIDs

SYMPTOMS

- Frequent watery stools
- Blood or mucus in the stool

- Presence of fever
- Reduced urine output
- Associated vomiting

SIGNS**Adults**

- Anaemia
- Weight loss
- Anorexia
- Oral lesions e.g. oral ulcers, candidiasis
- Skin lesions e.g. erythema nodosum
- Signs of dehydration (dry mucous membranes, reduction in skin turgor, capillary refill > 2 seconds, tachycardia, postural hypotension)
- Enlarged thyroid
- Abdominal masses
- Rectal mass

Box 1-1: Diagnostic clues for Diarrhoea

- Diarrhoea WITH vomiting, low grade fever with no mucus in stools: consider viral infection
- Diarrhoea WITH vomiting, fever, abdominal cramps, blood and mucus in stools: consider bacterial infection
- Diarrhoea WITH blood and mucus in stool WITHOUT fever: consider amoebiasis
- Profuse diarrhoea present (rice water stools) WITH vomiting: consider cholera
- Diarrhoea WITH excessive vomiting (especially if in more than one member of the household or group): consider food poisoning
- Diarrhoea presenting with oral and/or skin lesions, weight loss etc. over long period: consider HIV
- Diarrhoea alternating with constipation in adults: consider bowel malignancy

The following table can be used to assess the degree of dehydration in children with diarrhoea:

Table 1-1: Assessment of degree of dehydration in children with diarrhoea

Assessment of degree of dehydration in children with diarrhoea

% DEHYDRATION	<5% Nil	5-10% Mild-moderate	>10% Severe
LOOK AT			
Condition	Well, alert	Restless, irritable	Lethargic, unconscious, floppy
Eyes	Normal	Sunken	Very sunken and dry
Mouth and tongue	Moist	Dry	Very dry

Assessment of degree of dehydration in children with diarrhoea

% DEHYDRATION	<5% Nil	5-10% Mild-moderate	>10% Severe
Thirst	Drinks normally, not thirsty	Thirsty, drinks eagerly	Drinks poorly
FEEL			
Skin	Goes back quickly after pinching	Goes back slowly after pinching	Goes back very slowly after pinching
DECIDE			
	The patient has no signs of dehydration	If the patient has two or more signs, including at least one sign underlined, there is some dehydration	If the patient has two or more signs, including at least one sign underlined, there is severe dehydration
TREATMENT PLAN	Weigh patient and use Treatment Plan A	Weigh patient and use Treatment Plan B	Weigh patient and use Treatment Plan C

Adapted from Integrated Management of Childhood Illnesses, WHO

INVESTIGATIONS

- FBC
- Blood film for malaria parasites
- Stool routine examination
- Stool for culture and sensitivity
- Blood urea and creatinine

TREATMENT**Treatment objectives**

- To prevent dehydration
- To replace lost fluid
- To maintain nutrition by ensuring adequate dietary intake during illness
- To maintain personal hygiene
- To eliminate infecting organisms where appropriate

Non-pharmacological treatment

- Keep surroundings clean
- Improve personal hygiene e.g. hand washing after toilet
- Adequate fluid intake - oral and intravenous as necessary (See section on 'Fluid management for children with diarrhoea')
- Maintain adequate nutrition as can be tolerated

Pharmacological treatment

A. Bacterial gastroenteritis (fever, abdominal cramps, blood and mucus in stools)

Note 1-1

No antibiotics are required for suspected viral gastroenteritis. Adequate rehydration is the main requirement.

1st Line Treatment

Evidence Rating: [A]

- Ciprofloxacin, oral,
Adults
500 mg 12 hourly for 5 days
Children (for all child age groups)
15 mg/kg 12 hourly for 5 days

2nd Line Treatment

Evidence Rating: [A]

- Cefuroxime, IV,
Adults
750 mg 8 hourly
Children
25 mg/kg body weight 12 hourly
Neonates
> 7 days; 25 mg/kg body weight 8 hourly
< 7 days; 25 mg/kg body weight 12 hourly
Then
• Cefuroxime, oral,
Adults
250 mg 12 hourly for 5-7days
Children
12-18 years; 250 mg 12 hourly for 5-7 days
2-12 years; 15 mg/kg body weight for 5-7 days (max.
250 mg 12 hourly)
3 months-2 years; 10 mg/kg body weight for 5-7 days (max.
125 mg 12 hourly)

Note 1-2

Suspension can only be given to children above 3 months, however the IV can be given to neonates.

B. Amoebic dysentery suspected (patient failing to respond to empirical treatment for bacterial gastroenteritis within 2 days or based on stool microscopy)

Evidence Rating: [A]

- Metronidazole, oral,
Adults
800 mg 8 hourly for 5 days
Children

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8-12 years;	400 mg 8 hourly for 5 days
4-7 years;	200 mg 8 hourly for 5 days
0-3 years;	100 mg 8 hourly for 5 days

C. Cholera: profuse diarrhoea (rice water stool) + vomiting1st Line Treatment

Evidence Rating: [A]

- Tetracycline, oral,
Adults

500 mg 6 hourly for 3 days

Children

Not recommended

Or

- Doxycycline, oral,
Adults

100 mg 12 hourly for 3 days

Children

Not recommended

Or

- Erythromycin, oral,
Adults

500 mg 8 hourly for 5 days

Children

> 13 years; 500 mg 8 hourly for 5 days

6-12 years; 250-500 mg 8 hourly for 5 days

2-6 years; 250 mg 6 hourly for 5 days

1 month-2 years; 125 mg 6 hourly for 5 days

Neonates; 12.5 mg/kg 6 hourly for 5 days**D. Zinc supplementation for diarrhoea**

Evidence Rating: [A]

- Zinc supplement, oral,
Adults

Not required

Children

> 6 months; 20 mg/day for 10-14 days

< 6 months; 10 mg/day for 10-14 days

REFERRAL CRITERIA

Refer patients who fail to improve, or get worse, despite therapy for acute diarrhoea. Refer all patients with chronic diarrhoea to a specialist for further evaluation and management.

TREATMENT ALGORITHM**Fluid management for children with diarrhoea****Treatment Plan A—Nodehydration**

- Child can be treated safely at home
- Instruct mother to give home-based fluids like rice water, koko, soup,

water, and Oral Rehydration Salt (ORS).

- Breastfed babies should be given breast milk and ORS
- Give as much as child wants of all the fluids
- Child should continue to feed
- Ask the mother to return to the health facility if the child gets worse, passes more watery stools, vomits repeatedly, becomes very thirsty, eats or drinks poorly or is not better in 2 days
- Instruct mother on how to prevent diarrhoea

ORS currently recommended for use in mild to moderate diarrhoea has a reduced sodium and glucose concentration (low osmolarity).

How to prepare ORS

ORS: Dissolve the contents of one sachet of ORS in 600 ml or 1000 mls depending on type of ORS.

- To get 600 ml, use 2 small (300 ml) soft drink bottles or 1 big beer bottle
- To get 1000 ml, use 1L mineral water bottle

The child or adult should drink AS MUCH of it as he/she wants. If the child vomits, the mother should wait about 10 minutes and give it again.

Table 1-2: Treatment by Fluid Therapy - Plan A

Age	ORS Basic Amount	ORS for every extra stool passed
<2 years	500 ml or more	50–100 ml
2–10 years	1000 ml or more	100–200 ml
>10 years	2000 ml or more	100–200 ml

Treatment Plan B—mild to moderate dehydration

For the child with mild-moderate dehydration, use treatment Plan B

- Child to be treated in the health facility
- Give ORS over the first 4 hours as shown in the Table for Plan B
- If child vomits, wait 10 minutes and start again
- Continue with other fluids the child will accept
- Instruct mother to continue breast feeding if child is breastfeeding
- Observe stools passed and record quantity
- Check for signs of worsening dehydration
- If eyes become puffy, it means too much fluid has been given so stop ORS and re-evaluate
- Reassess state of dehydration after 4 hours
- If clinical state has improved with no dehydration - go to plan A
- If there is still mild-moderate dehydration repeat plan B
- If condition is worsening - go to plan C

Table 1-3: Treatment by Fluid Therapy - Plan B

Weight	<6 kg	6 <10 kg	10 <12 kg	12–19 kg
Age*	Up to 4 months	4 months up to 12 months	12 months up to 2 years	2 years up to 5 years
Amount of ORS	200-400 ml	400-700 ml	700-900 ml	900-1400 ml

*Use the child's age only when you do not know the weight. The approximate amount of ORS required (in ml) can also be calculated by multiplying the child's weight (in kg) by 75

Treatment Plan C—Severe dehydration

- A child with severe dehydration requires urgent treatment with IV fluids in hospital
- If the child can drink, give ORS by mouth while the IV line is being set up
- Start IV fluids immediately. Give 100 ml/kg Ringer's lactate solution or, if not available, normal saline or cholera replacement fluid (5:4:1), divided as shown in the Table for Plan C below:
- If you cannot give the above treatment and cannot pass a nasogastric tube, refer to a health facility that can do so.
- Reassess the child every 1-2 hours. If hydration status is not improving, give the IV fluid more rapidly than as stated in the Table for Plan B
- Also give ORS (about 5 ml/kg body weight/hour) as soon as the child can drink: usually after 3-4 hours (infants) or 1–2 hours (children)
- Reassess an infant after 6 hours and a child after 3 hours. Classify dehydration. Then choose the appropriate plan (A, B, or C) to continue treatment
- Assess child hourly. If not improving or dehydration is worse, increase drip rate
- Do not stop the IV fluids until the child has been observed to retain the ORS for at least 1 hour and there is improvement in the clinical condition
- Continue ORS on treatment plan B and continue to observe child until child has no signs of dehydration, then move to Plan A
- Severe diarrhoea may be complicated by marked fluid loss accompanied by loss of potassium (hypokalaemia) or on the other hand, impaired renal function leading to acidosis and elevated blood potassium (hyperkalaemia)
- When the patient is passing adequate amounts of urine, probably indicating good renal function, start potassium containing foods such as coconut water and fresh fruits (e.g. banana)
- If there is clinical and/or laboratory evidence of severe hypokalaemia, potassium should be given by the intravenous route using potassium chloride but only in a hospital. Potassium containing fluids such as

- half strength Darrow's solution or Ringer's lactate may be added
- If possible infants and children should continue to breastfeed or eat during the period of diarrhoea

Table 1-4: Treatment by Fluid Therapy - Plan C

Age	First give 30 ml/kg in:	Then give 70 ml/kg in:
Infants (< 12 months)	1 hour*	5 hours
Children (12 months up to 5 years)	30 minutes*	2½ hours

*Repeat once if radial pulse is still very weak or not detectable.

Note 1-3

Anti-diarrhoeal medicines like Mist Kaolin, diphenoxylate/atropine, codeine, loperamide should not be used in the treatment of diarrhoea in children and are likely to do more harm than good. Similarly, antibiotic preparations with kaolin or pectin are of no therapeutic value in the management of diarrhoea.

9. Rotavirus Disease and Diarrhoea

Rotavirus is the most common cause of severe diarrhoea in young children. It accounts for more than a third of all hospitalizations of children less than 5 years. It occurs year round with peaks between the dry months (December - March). Children are infected by age 2 to 3 years and re-infections are common.

CAUSES

- Rotavirus: 5 types of rotavirus are known to cause >90% of all cases worldwide

SYMPTOMS

- Fever
- Vomiting
- Profuse watery diarrhoea
- Thirst

SIGNS

- Sunken eyes
- Diminished skin turgor
- Altered consciousness, depending on the degree of dehydration

INVESTIGATIONS

- Detection of rotavirus antigen in stool by an enzyme immunoassay (EIA)

TREATMENT

Treatment objectives

- Correction of fluid and electrolyte deficits

- Replacement of on-going fluid losses
- Adequate nutrition to prevent malnutrition

Non-pharmacological treatment

- Home-based fluids e.g. breast milk, porridges, coconut drink
- Nutrition: feed as can be tolerated during the episode, give an extra meal per day for 2 weeks after the episode

Pharmacological treatment

A. ORS and Zinc supplementation

(See section on 'Diarrhoea')

REFERRAL CRITERIA

- Poor response to rehydration process (passing more stools than drinking)
- Poor drinking
- Blood in stool
- Poor feeding
- Altered consciousness/convulsions
- Diarrhoea and vomiting continuing for > 3 days

Note 1-4

Prevention:

Two (2) doses of Rotavirus vaccine, given at 6 - 10 weeks, is effective in preventing rotavirus diarrhoea. The 2nd dose should be given by 16 weeks, and not later than 24 weeks. Rotavirus vaccine is now currently given as part of routine immunization in Ghana. (See section on 'Immunisation').

10. Constipation

In general, constipation refers to bowel movements that are infrequent or stools that are difficult to pass. There is great individual variation in normal bowel habits; therefore emphasis should be laid on changes in the bowel habit.

Diarrhoea alternating with constipation may indicate a large bowel cancer especially in those aged 40 years and above. In children and the elderly, this may indicate chronic constipation with spurious diarrhoea.

The habitual use of laxatives is very common in the community. This practice must be discouraged to avoid hypokalaemia and its consequences.

CAUSES

Medical

- Diet deficient in roughage
- Ignoring the urge to defaecate e.g. due to immobility
- Hypothyroidism
- Irritable bowel syndrome
- Hypercalcaemia
- Drugs e.g. atropine, codeine, morphine, tricyclic antidepressants,

disopyramide

- Lazy bowel from chronic laxative use including 'herbal' preparations
- Lack of exercise
- Dehydration and starvation (particularly in children)

Surgical

- Gastrointestinal obstruction
- Anal fissure and other painful perianal lesions
- Carcinoma of the rectum and sigmoid colon
- Foreign body in the gut
- Pelvic mass e.g. fibroid, foetus
- Aganglionic and acquired megacolon
- Pseudo-bowel obstruction (Ogilvie syndrome) following immobility from any cause

SYMPTOMS

- Inability to move bowels
- Passing hard stools
- Infrequent passing of stools
- Straining to pass stools
- Feeling of incomplete evacuation of bowel
- Inability to pass flatus, colicky abdominal pain with or without vomiting

SIGNS

- Frequent high pitched bowel sounds - suspect mechanical bowel obstruction
- Absent bowel sounds - suspect paralytic ileus
- Signs of peritonitis (generalised tenderness, guarding and rebound tenderness, refer appropriate section) -suspect gangrenous bowel

INVESTIGATIONS

- Digital rectal examination (must be carried out in all patients with suspected diagnosis of constipation)
- Stool for occult blood
- Plain abdominal X-ray (erect and supine)
- Proctoscopy/proctosigmoidoscopy/colonoscopy (must not be done if acute intestinal obstruction is suspected)

TREATMENT

Treatment objectives

- To identify possible cause of constipation
- To relieve constipation

Non-pharmacological treatment

- Adherence to regular exercise
- High fibre diet
- Adequate fluid intake (minimum of 3.2L of water per day if no contraindications exist)

Pharmacological treatment

A. Management of Constipation in Adults

1st Line Treatment

Evidence Rating: [C]

- Bisacodyl, oral, 10-20 mg at night
Or
- Senna, oral, 15-30 mg at bedtime (maximum 70-100 mg daily). Doses above 70 mg should be divided 12 hourly
Or
- Lactulose, oral, 15-30 ml daily until response, then 10-20 ml daily

2nd Line Treatment

Evidence Rating: [C]

- Bisacodyl, rectal, 10 mg in the morning
Or
- Glycerol suppositories, rectal, 4 g at night
Or
- Liquid paraffin, oral, 10-30 ml at night
Or
- Milk of Magnesia, oral, 5-10 ml in a glass of water, 12-24 hourly

B. Management of Constipation in Children

1st Line Treatment

Evidence Rating: [C]

- Lactulose, oral,

10-18 years;	15 ml 12 hourly
5-10 years;	10 ml 12 hourly
1-5 years;	5 ml 12 hourly
< 1 year;	2.5 ml 12 hourly

Or
- Glycerol suppositories, rectal,

2-5 years;	2 g at night
< 1 year;	1 g at night

Or
- Bisacodyl, rectal,

> 10 years;	5 mg in the morning
< 10 years;	on medical advice only

Or
- Senna, oral,

6-12 years;	5-40 ml at bedtime
2-6 years;	2.5-20 ml at bedtime

Note 1-5

Do not use magnesium salts in patients with impaired renal function.

REFERRAL CRITERIA

The following categories of patients should be referred to a surgeon:

- Patients with absent bowel sounds, vomiting or not passing flatus
- Cases resistant to medical treatment
- Any suspected surgical cause

11. Peptic Ulcer Disease

Peptic ulcer may be duodenal or gastric. Duodenal ulcers are more common and occur more often in younger adults. Gastric ulcers usually occur after middle age. Gastric ulcers should be taken seriously because they may be malignant.

Peptic ulcers may lead to life threatening complications of bleeding, perforation and gastric outlet obstruction.

CAUSES

- *Helicobacter pylori* (*H. pylori*) infection
- Excessive secretion of gastric acid
- Inadequate protection of the lining of the stomach and duodenum against digestion by acid and pepsin
- Medicines e.g. non-steroidal anti-inflammatory drugs (NSAIDs), corticosteroids

SYMPTOMS

- Episodic abdominal pain (often aggravated by dietary indiscretions and lifestyle)
 - May be a minor discomfort, gnawing, burning, dull ache or very severe pain
 - Typically pain is in the epigastrium or right hypochondrium
 - Occasionally high up behind the sternum or low down around the umbilicus
 - In duodenal ulcer, pain typically comes on when the patient is hungry and may wake the patient up in the middle of the night.
 - In gastric ulcer, it is typically worsened by food, and may be relieved by vomiting
 - Is relieved by alkalis and food in duodenal ulcer
- Vomiting may occur in both duodenal and gastric ulcers. It is usually a complication in duodenal ulcer (gastric outlet obstruction) but may be self-induced in gastric ulcer to relieve pain

In children

- Pain may be peri-umbilical

SIGNS

- There may be no abdominal signs
- Weight loss (sometimes in gastric ulcer)
- Weight gain (sometimes in duodenal ulcer)
- Tenderness - epigastrium, right hypochondrium or umbilical region

INVESTIGATIONS

- Haemoglobin
- *H. pylori* stool antigen
- Oesophago-gastro-duodenoscopy (endoscopy)
- Barium meal (in the absence of endoscopy)
- Stool examination (to exclude intestinal parasites)

TREATMENT**Treatment objectives**

- To relieve pain (dyspepsia) and reduce gastric acid secretion
- To eradicate *H. pylori* if present
- To promote healing of the ulcer
- To prevent recurrence of the ulcer
- To prevent and manage complications

Non-pharmacological treatment

- Avoid alcohol and tobacco intake
- Avoid foods that aggravate the pain
- Allay anxiety and stress
- Surgical treatment: for chronic cases with severe periodic attacks, failed medical treatment and complications e.g. perforation, gastric outlet obstruction and haemorrhage)

Pharmacological treatment**A. Dyspepsia**

1st Line treatment

Evidence Rating: [A]

- Magnesium trisilicate, oral, 15 ml 8 hourly (in-between meals and at bedtime to control dyspepsia)
Or
- Aluminium hydroxide, oral, 500 mg 6 hourly (in-between meals and at bedtime)

Note 1-6

Avoid taking antacids within 2 hours of proton pump inhibitors (PPIs) e.g. omeprazole, esomeprazole, pantoprazole

2nd Line treatment

Evidence Rating: [A]

- Omeprazole, oral,
Adults
20 mg daily for 4 weeks. Repeat course if ulcer is not fully healed.
- B. NSAID-associated duodenal or gastric ulcer and gastro-duodenal erosions**
Evidence Rating: [A]
- Esomeprazole, oral,

Adults

20 mg daily for 4 weeks. Repeat course if ulcer is not fully healed.

Or

- Omeprazole, oral,

Adults

20 mg daily for 4 weeks. Repeat course if ulcer is not fully healed.

Or

- Pantoprazole, oral,

Adults

20-40 mg daily for 4 weeks. Repeat course if ulcer is not fully healed.

C. Bleeding peptic ulcer (may be an indication for surgery)

Evidence Rating: [A]

- Esomeprazole, IV,

Adults

40 mg daily

Or

- Omeprazole, IV,

Adults

40 mg 12 hourly for up to 5 days

D. *Helicobacter pylori* Eradication

Majority of patients presenting with duodenal ulcer are infected with *Helicobacter pylori*. Eradication of *H. pylori* should therefore be done using a 10-14 day course of treatment consisting of a PPI plus a combination of two of the antibiotics indicated in the table below.

Table 1-5: *Helicobacter pylori* Eradication Therapy

Helicobacter pylori Eradication therapy

PPI	Antibiotic		
	Amoxicillin, oral §	Clarithromycin, oral	Metronidazole, oral
Esomeprazole, oral 20 mg 12 hourly	1 g 12 hourly -----	500 mg 12 hourly 500 mg 12 hourly	----- 400 mg 12 hourly
Or Omeprazole, oral 20 mg 12 hourly	1 g 12 hourly 500 mg 8 hourly -----	500 mg 12 hourly ----- 500 mg 12 hourly	----- 400 mg 8 hourly 400 mg 12 hourly
Or Pantoprazole, oral 40 mg 12 hourly	1 g 12 hourly -----	500 mg 12 hourly 500 mg 12 hourly	----- 400 mg 12 hourly

§ Avoid treatment regimens including Amoxicillin in patients with penicillin allergy

REFERRAL CRITERIA

Refer for specialist care when there is failure of *H. Pylori* eradication

or if surgery is indicated as stated above.

12. Gastro-oesophageal Reflux Disease

Gastro-oesophageal Reflux Disease (GORD) is caused by backflow of gastric and/or duodenal contents past the lower oesophageal sphincter into the oesophagus without belching or vomiting.

The disease is classified into two groups based on endoscopy findings as non-erosive gastro-oesophageal disease (non-erosive GORD) and erosive gastro-oesophageal disease (erosive GORD). Failure to treat may result in oesophagitis, ulceration, strictures and rarely adenocarcinoma.

CAUSES

- Obesity
- Hiatus hernia
- Increased intra-abdominal pressure e.g. in pregnancy
- Long term use of nasogastric tube
- Agents that decrease lower oesophageal sphincter pressure e.g. alcohol, cigarettes, anticholinergics (e.g. Hyoscine butylbromide, Propantheline bromide), other drugs – Morphine, Diazepam, Pethidine and Calcium channel blockers
- Children with chronic neurological disease (e.g. cerebral palsy)

SYMPOTMS

- Heartburn (worsens with vigorous exercise, bending forward, lying; relieved by antacids and sitting upright)
- Dyspepsia
- Early satiety
- Retrosternal and epigastric pain (mimics angina pectoris by radiating to neck, jaws and arms. The pain is worse on bending down e.g. sweeping)
- Pain on swallowing
- Difficulty swallowing
- Nocturnal regurgitation (wakes patients up with coughing, choking and filling of the mouth with 'saliva')
- Asthma-like (may be worse at night)

In children

- Failure to thrive/refusing food
- Vomiting
- Coughing
- Forceful regurgitation which may lead to aspiration pneumonia
- Iron deficiency anaemia
- Wheezing

SIGNS

- May be none

- Epigastric tenderness occasionally
- Chest signs (e.g. wheezing)

INVESTIGATIONS

- Oesophago-gastro-duodenoscopy (OGD), i.e. upper gastro-intestinal tract endoscopy
- Chest X-ray to exclude other causes
- Abdominal ultrasound (to exclude other diseases)
- Barium swallow with fluoroscopy (especially useful in children)
- Oesophageal pH monitoring (in cases that are difficult to diagnose)
- Lower oesophageal sphincter manometry (in cases that are difficult to diagnose)

TREATMENT

Treatment objectives

- To relieve symptoms
- To prevent complications

| Non-pharmacological treatment

Lifestyle changes:

- Elevate head of bed by about 30 degrees or sleep on pillows
- Avoid sleeping within 3 hours after eating
- Avoid over-eating and heavy meals before bedtime
- Avoid foods that aggravate symptoms e.g. fatty and spicy food
- Avoid smoking and alcohol
- Avoid Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)
- Encourage moderate exercise
- Weight reduction in overweight and obese individuals
- Avoid corsets, instead wear loose clothing
- Surgical treatment: Fundoplication (for severe cases, treatment failures and complications)

| Pharmacological treatment

A. Non-erosive GORD

Evidence Rating: [B]

- Magnesium trisilicate, oral, 15 ml 8 hourly (in between meals and at bedtime to control dyspepsia)

Or

- Antacids containing Aluminum hydroxide, Magnesium hydroxide, Simethicone, Calcium alginates

Or

- Omeprazole, oral,

Adults

20 mg daily for 4-8 weeks

Children

> 20 kg;

20 mg daily for 4-8 weeks

10-20 kg;

10 mg daily for 4-8 weeks

5-10 kg;

5 mg daily for 4-8 weeks

Or

- Esomeprazole, oral,
Adults
40 mg daily for 4 to 8 weeks

Or

- Rabeprazole, oral,
Adults
20 mg daily for 4 to 8 weeks

B. Severe or Erosive GORD

- Omeprazole, oral,
Adults
20 - 40 mg daily for 8 weeks
Children
> 20 kg; 20 mg daily for 4-8 weeks
10-20 kg; 10 mg daily for 4-8 weeks
5-10 kg; 5 mg daily for 4-8 weeks

Or

- Esomeprazole, oral,
Adults
40 mg daily for 8 weeks
- Rabeprazole, oral,
Adults
20-40 mg daily for 8 weeks

C. Severe or Erosive GORD (with bloating)

- Use medications in Section B above for 'Severe GORD'
And
- Metoclopramide, oral,
Adults
10 - 20 mg 6-8 hourly
- Domperidone, oral,
Adults
10 mg 6-8 hourly

REFERRAL CRITERIA

Refer cases not responding to the measures above to a physician or surgical specialist, as well as severe cases, treatment failures and individuals with complications.

13. Pain Originating from the Oesophagus

Oesophageal pain is usually burning in quality and tends to be localised behind the sternum. Oesophageal pain may be associated with difficulty in swallowing (dysphagia). Dysphagia to water suggests achalasia,

while that to solids and not water suggests mechanical obstruction by tumour or stricture. It may sometimes be confused with other causes of chest pain (See section on 'Chest Pain').

CAUSES

- Irritation of the oesophageal mucosa by reflux of the acidic contents of the stomach (Gastro-oesophageal Reflux Disease (GORD))
- Oesophageal candidiasis
- Hiatus hernia
- Achalasia
- Spasm of the oesophageal muscle in response to obstruction.
- Oesophageal tumours

SYMPTOMS

- Retrosternal chest pain worsened by swallowing (pain worse on lying flat may suggest GORD)
- Regurgitation of ingested material
- Difficulty in swallowing

SIGNS

- Usually none
- Patient may be obese or severely underweight in the case of GORD
- Severe weight loss may suggest tumour or candidiasis from immune suppression
- There may be oral candidiasis in the case of oesophageal candidiasis

INVESTIGATIONS

- Barium swallow
- Oesophago-gastroduodenoscopy (upper GI endoscopy)
- Oesophageal manometry when achalasia is suspected

TREATMENT

Treatment objectives

- To relieve pain
- To treat identified cause

Non-pharmacological treatment

- Bland foods and milk (may sometimes relieve the pain)

Pharmacological treatment

A. For GORD

1st Line Treatment

Evidence Rating: [B]

- Omeprazole, oral,
Adults
20 mg 12 hourly for 14 days

Or

- Esomeprazole
Adults

20-40 mg daily for 14 days

B. For patients not responding to monotherapy with PPI

Evidence Rating: [B]

- Omeprazole, oral, 20 mg 12 hourly for 14 days

Or

- Esomeprazole, oral, 20-40 mg daily for 14 days

And

Magnesium trisilicate, oral, 10 ml 8 hourly for 10 days

C. For oesophageal candidiasis

Evidence Rating: [A]

- Nystatin, oral, (swish in mouth for several minutes and then swallow)

Adults

400,000-600,000 units 6 hourly for 7 days

Or

- Fluconazole, oral,

Adults

200 mg stat.

Then

100 mg daily for 14 days

REFERRAL CRITERIA

Refer to a specialist for confirmation of diagnosis and management.

14. Haemorrhoids

Haemorrhoids or “piles” are enlarged, displaced anal cushions derived from engorged veins, which primarily presents with anal bleeding.

First-degree haemorrhoids remain in the anal canal. Second-degree haemorrhoids prolapse, but reduce spontaneously, whereas third degree haemorrhoids prolapse and have to be replaced manually or remain prolapsed permanently until surgically treated.

The history is very important. The nature of the bleeding, associated pain and other symptoms help differentiate haemorrhoids from other more sinister conditions. Always do a digital rectal examination to exclude carcinoma and other conditions when a patient complains of pain or bleeding from the anus. Altered or dark blood, or blood mixed with stools, should raise suspicion of bleeding higher up in the rectum or colon.

No treatment is required for haemorrhoids that are asymptomatic. Avoid the use of purgatives.

CAUSES

- Increased intra-abdominal pressure e.g. chronic cough, pregnancy, intra-abdominal or pelvic tumours
- Excessive straining at stools from constipation or diarrhoea
- Familial predisposition

- Chronic liver disease with portal hypertension
- Anorectal tumours

SYMPOTMS

- Passage of bright red blood at defaecation
 - Not mixed with stools
 - May spray the toilet bowl or only found on the toilet paper after cleaning
- Mucoid discharge
- Swelling at anus
- Perianal irritation or itch (pruritus ani)
- Discomfort after opening bowels
- Anal pain (occurs during an acute attack of prolapse with thrombosis, congestion and oedema)
- Symptoms of anaemia

SIGNS

- May be none (inspection of the anus and digital rectal examination may be normal)
- Redundant folds of skin (skin tags) seen in the position of the haemorrhoids. Straining may show the haemorrhoids
- Swelling at the anus (in third degree haemorrhoids)
- Palpable thrombosed internal haemorrhoids on rectal examination
- Signs of complications (profuse bleeding with anaemia or haemorrhagic shock, prolapse, strangulation, thrombosis, infection or ulceration)
- Pallor

HAEMORRHOIDS

INVESTIGATIONS

- FBC
- Proctoscopy (the gold standard for diagnosis)
- Sigmoidoscopy (to exclude carcinoma of rectum)

TREATMENT

Treatment objectives

- To correct anaemia, if present
- To relieve symptoms
- To prevent complications

Non-pharmacological treatment

- Increase intake of fluid and roughage
- Avoid prolonged straining at defecation
- For prolapsed haemorrhoids, lie patient down and elevate the foot end of the bed. Try gentle digital reduction after application of local anaesthetic cream. If this fails, apply cold compresses. Sedation of the patient may be required
- For infected haemorrhoids, warm sitz baths 2-3 times a day
- Surgical treatment:

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- Rubber band ligation for second-degree haemorrhoids.
- Haemorrhoidectomy for third degree haemorrhoids.
- Haemorrhoids developing during pregnancy should be managed conservatively as most will resolve after delivery

Pharmacological treatment**A. When associated with constipation**

Evidence Rating: [C]

- Liquid paraffin, oral,
Adults
10-30 ml at night
Or
- Senna granules, oral,
Adults
1 sachet with water after supper

B. When associated with local itching or discomfort

- Soothing agent (with or without steroids), applied or inserted rectally,
Adults
One suppository 12 hourly for 7-10 days

C. For infected haemorrhoids1st Line treatment

Evidence Rating: [B]

- Gentamicin, IV,
Adults
40-80 mg 8 hourly for 5 to 7 days
And
- Metronidazole, oral,
Adults
400 mg 8 hourly for 5 to 7 days

2nd Line treatment

Evidence Rating: [B]

- Ciprofloxacin, oral,
Adults
500 mg 12 hourly
And
- Metronidazole, oral,
Adults
400 mg 8 hourly for 5 - 7 days

3rd Line treatment

Evidence Rating: [B]

- Amoxicillin, oral,
Adults
500 mg 8 hourly

And

- Metronidazole, oral,
Adults
400 mg 8 hourly for 5 to 7 days

D. When associated with anaemia

- Iron preparation (ferrous sulphate/fumarate) (See section on 'Anaemia')
Or
- Blood transfusion as indicated

REFERRAL CRITERIA

The patient should be referred to a facility with resources for rubber band ligation or operative treatment if indicated.

DISORDERS OF THE LIVER

8. Amoebic Liver Access

Amoebic liver abscess is a collection of typically brownish coloured fluid in the liver, occurring often as a single mass in the right lobe and a complication of intestinal infection with *Entamoeba histolytica*. Lung, heart and brain infections are uncommon sequelae. Occasionally, pyogenic abscesses may have a similar clinical presentation.

Treatment of amoebic abscesses should be initiated with a tissue agent active against the trophozoite form followed by a luminal agent to eliminate intra-luminal cysts.

CAUSES

- *Entamoeba histolytica*

SYMPTOMS

- Right upper abdominal pain referable to the epigastrium, right chest or right shoulder
- Fever
- Malaise
- Sweats
- Cough
- Hiccups
- Anorexia
- Weight loss
- Jaundice (uncommon)
- Concurrent diarrhoea (less than one-third of patients)

SIGNS

- Large tender liver
- Tenderness and/or bulging at right intercostal spaces
- Jaundice
- Dullness to percussion on the right lower chest zones with basal crepitations
- Amoebic empyema following extension into the chest cavity
- Peritonitis (uncommon)

INVESTIGATIONS

- Abdominal ultrasound
- Chest X-ray
- FBC
- ESR
- Stool examination
- Abdominal CT scan
- Serology (amoebic antibodies)

TREATMENT

Treatment objectives

- To eradicate *Entamoeba histolytica* infection
- To prevent further destruction of liver tissue
- To prevent further complications (e.g. rupture of abscess into pleural, pericardial or peritoneal space)

Non-pharmacological treatment

- Therapeutic aspiration may be required in patients with poor response to therapy

Pharmacological treatment

1st Line Treatment

Evidence Rating: [A]

- Metronidazole, oral,
Adults
800 mg 8 hourly for 10 days (tissue agent)
Children
15 mg/kg 8 hourly for 10 days (tissue agent)

Then

- Diloxanide furoate, oral,
Adults
500 mg 8 hourly for 10 days (luminal agent)
Children
6-8 mg/kg 8 hourly for 10 days (luminal agent)

2nd Line Treatment

Evidence Rating: [A]

- Tinidazole, oral,
Adults
2 g once daily for 5 days (tissue agent)
Children
> 3 years; 50 mg/kg (max. 2 g) once daily for 5 days (tissue agent)

Then

- Paromomycin, oral,
Adults
8-10 mg/kg 8 hourly for 7 days (luminal agent)
Children
8-10 mg/kg 8 hourly for 7 days (luminal agent)

REFERRAL CRITERIA

Patients with abscesses that are large or not responding to treatment will need to be referred to a specialist.

9. Jaundice

Jaundice refers to yellow pigmentation of skin, palms and the sclerae as a result of elevated levels of bilirubin in blood. It may be visible when serum levels exceed 35 micromol/L in adults and 100 micromol/L in children. The symptoms and signs that accompany jaundice often provide helpful clues to the underlying cause.

In adults and children, hyperbilirubinaemia may result in hepatic encephalopathy (See sections on 'Acute and Chronic Hepatitis' and 'Hepatic Encephalopathy'). Jaundice in neonates can result in kernicterus (bilirubin encephalopathy) because of the consequences of hyperbilirubinaemia on the brain of the newborn. (See section on 'Neonatal Jaundice')

CAUSES

Adults

- Hepatitis - viral, alcoholic, drug-induced including allopathic and herbal preparations
- Haemolysis - various causes including malaria, Glucose-6-Phosphate Dehydrogenase (G6PD) deficiency and sickle cell disease, allopathic drugs and herbal preparations
- Chronic liver diseases - decompensated cirrhosis, biliary cirrhosis, chronic hepatitis, hepatocellular carcinoma
- Liver malignancies - hepatocellular carcinoma, metastatic liver disease
- Hepatic congestion from heart failure
- Gall bladder diseases - stones, infections
- Carcinoma of head of pancreas
- Septicaemia

Children

- Haemolysis - sickle cell disease, G6PD deficiency, drugs
- Infections - malaria, hepatitis, urinary tract infections, typhoid fever and other septicaemic illnesses

Pregnancy

(See section on 'Jaundice in Pregnancy')

Neonates

(See section on 'Neonatal Jaundice')

SYMPTOMS

- Yellow or greenish discolouration of the eyes or skin
- Deep yellow discolouration of urine
- Itching
- Pale stools

SIGNS

- Pallor (may indicate haemolysis, chronic disease or malignancy)
- Scratch marks (indicative of cholestasis)
- Stigmata of chronic liver disease (e.g. palmar erythema, clubbing, spider naevi)
- Hepatomegaly (may be tender)
- Splenomegaly in portal hypertension
- Palpable gall bladder
- Ascites
- Bleeding (cephalhaematoma, subgaleal haematoma, upper gastrointestinal bleeding)
- Hepatic flap (indicative of liver failure)

INVESTIGATIONS

Adults and children

- FBC
- INR
- Sickling status
- G6PD status
- Blood film for red cell anomalies, malaria parasites
- Liver function tests
- Urea and electrolytes
- Hepatitis screen (HBsAg, HCV Antibody, Hepatitis A IgM, Hepatitis E IgM)
- Blood culture
- Urinalysis
- Abdominal ultrasound
- Abdominal CT scan

JAUNDICE

TREATMENT

Treatment objectives

- To identify and treat cause of jaundice
- To relieve symptoms associated with jaundice
- To prevent complications associated with elevated levels of bilirubin in the blood

Non-pharmacological treatment

Adults and children

(See section on 'Hepatic encephalopathy', Hepatitis')

- Avoid alcohol and other hepatotoxic agents
- Ensure adequate hydration

Pharmacological treatment

A. Cholestatic jaundice with severe pruritus while investigating for underlying aetiology

1st Line Treatment

Evidence Rating: [A]

- Cholestyramine, oral,
 - Adult
4 g 12 hourly (titrate dose to response and tolerance: max. 16 g/day)
 - Children and Adolescents
2-4 g 12 hourly (max. 8 g/day)

REFERRAL CRITERIA

Refer patients with unexplained jaundice to a specialist for further evaluation and management.

10. Acute Hepatitis

Hepatitis is defined as inflammation of the liver and has multiple causes. It may present as an acute illness with jaundice and altered liver function tests. When symptoms, signs or laboratory abnormalities persist for more than 6 months it is considered chronic.

CAUSES

- Viruses (Hepatitis A, B, C, D and E, Yellow Fever etc.)
- Drugs (allopathic, alternative and herbal preparations)
- Alcohol
- Autoimmune

SYMPTOMS

- Right hypochondrial pain
- Fever (occurring 1 to 4 weeks before the jaundice appears)
- Malaise
- Anorexia
- Nausea
- Vomiting
- Yellow or dark coloured urine
- Pale stools
- Itching
- Fatigue
- Confusion

SIGNS

- Jaundice
- Right hypochondrial tenderness
- Hepatomegaly
- Asterixis

INVESTIGATIONS

- FBC
- Liver function tests
- Hepatitis screen (HBsAg, HCV Antibody, Hepatitis A IgM, Hepatitis E IgM)
- Antinuclear Antibody, Anti-smooth muscle Antibody

- Abdominal Ultrasound

TREATMENT

Treatment objectives

- To identify and eliminate the precipitating cause
- To relieve symptoms

Non-pharmacological treatment

- Rest
- High calorie fluids (especially glucose drinks, fruit juice, light porridge, koko, rice-water, mashed kenkey)
- Intravenous fluids if volume deplete
- Any food that the patient can tolerate
- Avoid alcohol

Pharmacological treatment

- Supportive care (analgesia, fluid replacement, etc. as required)

Note 2-1

Avoid hepatotoxic drugs such as paracetamol and high doses of anxiolytic-hypnotics.

REFERRAL CRITERIA

Refer patients with rapidly progressing symptoms and signs to a physician specialist.

11. Chronic Hepatitis

This refers to chronic inflammation of the liver of more than 6 months duration, with persistently elevated liver function tests. Chronic hepatitis can progress to liver cirrhosis, portal hypertension with upper gastrointestinal bleeding, hepatic encephalopathy and hepatocellular carcinoma.

Immunisation against Hepatitis B is now available for children under the Expanded Programme on Immunisation (EPI). Adults in endemic areas including Ghana should be immunised against Hepatitis B infection after initial assessment of their immunological status regarding previous exposure to the virus.

Long-term monitoring for disease activity and hepatocellular carcinoma screening with six-monthly Hepatitis B viral DNA quantification, LFTs, abdominal ultrasound and alpha fetoprotein is mandatory for patients with chronic hepatitis B.

CAUSES

- Hepatitis B virus (HBV)
- Hepatitis C virus (HCV)
- Hepatitis E virus (genotype 3)

SYMPTOMS

- Usually asymptomatic
- Mild non-specific symptoms
- Recurrent fever
- Arthralgia
- Malaise
- Jaundice
- Lethargy

SIGNS

Stigmata of chronic liver disease

- Palmar erythema
- Clubbing
- Dupuytren's contracture
- Parotid enlargement
- Gynaecomastia
- Testicular atrophy
- Spider naevi

Signs of decompensated liver disease

- Jaundice
- Ascites
- Encephalopathy
- Peripheral oedema (hypoalbuminaemia)
- Purpura/skin bruising (coagulopathy)

INVESTIGATIONS

- FBC
- LFTs
- INR
- HIV
- Baseline Alpha-Feto-protein
- Abdominal ultrasound scan
- Liver biopsy

Chronic Hepatitis B

- Hepatitis B surface Antigen (HBsAg)
- HBc IgG
- Hepatitis-B-e-antigen (HBeAg) & Anti-HBe
- Hepatitis B Viral Load

Chronic Hepatitis C

- Hepatitis C Virus (HCV) antibody testing
- HCV RNA
- HCV genotyping

TREATMENT

Treatment objectives

- To prevent disease progression and complications
- To prevent hepatic encephalopathy

- To improve synthetic liver function through viral suppression
- To prevent transmission

Non-pharmacological treatment

- Prevention of transmission to partners (e.g. protected sex, not sharing of toothbrushes and sharps, blades, needles, body piercings, tattoos, cultural scarification practices, circumcisions etc.)
- Lifestyle/dietary advice
- Spouse/household screening

Pharmacological treatment

A. Chronic Active Hepatitis B (HBeAg positive or HBeAg negative)

1st Line Treatment

Evidence Rating: [A]

- Pegylated Interferon alfa-2a, subcutaneous,
Or
- Tenofovir, oral,
Or
- Entecavir, oral,

| 2nd Line Treatment

Evidence Rating: [A]

- Lamivudine, oral,

B. Decompensated liver cirrhosis/ Fulminant Liver failure from Chronic Hepatitis B

1st Line Treatment

Evidence Rating: [A]

- Tenofovir, oral,
Or
- Entecavir, oral,

| 2nd Line Treatment

Evidence Rating: [A]

- Lamivudine, oral,

C. Patients with Chronic Hepatitis B undergoing chemotherapy or immunosuppressive treatment

1st Line Treatment

Evidence Rating: [A]

- Tenofovir, oral,
Or
- Entecavir, oral,

| 2nd Line Treatment

Evidence Rating: [A]

- Lamivudine, oral,

REFERRAL CRITERIA

Refer all cases of chronic hepatitis B infection to a specialist, especially those who have failed first-line anti-viral therapy or had adverse reactions to anti-viral therapy or have liver-related complications (e.g. liver cirrhosis, liver failure, liver mass, signs of portal hypertension, ascites, peripheral oedema, hypoalbuminaemia). Pregnant individuals and patients with hepatitis B co-infections (e.g. HIV/Hepatitis C) as well as those requiring chemotherapy or other immunosuppressive therapy should also be referred to a specialist.

Post-exposure management of healthcare workers after occupational exposure to Hepatitis B infection

Table 2-1: Post-exposure management of healthcare workers after occupational exposure to Hepatitis B infection

*HCW Status	Post-Exposure Testing		Post-Exposure Prophylaxis		Post-Vaccination Anti-HBs
	Source Patient	*HCW Anti-HBs	§HBIG	HBV Vaccination	
Documented Responder (> 3 Doses Received)	No action required				
Documented Non-Responder (After > 6 Doses)	Positive	-	§HBIG Twice (One Month Apart)	-	No
	Negative	-	No Action Required		
Response Unknown (After > 3 Doses)	Positive/Unknown	<10 MIU/ml	§HBIG Once	Revaccinate	Yes
	Negative	<10 MIU/ml	None	Revaccinate	Yes
	Any Result	>10 MIU/ml	No action required		
Unvaccinated/Incomplete Vaccination	Positive/Unknown	-	HBIG once	Complete Vaccination	Yes
	Negative	-	None	Complete Vaccination	Yes

*HCW: Healthcare worker

§HBIG: Hepatitis B Immunoglobulin as soon as possible when indicated (0.06 ml/kg IM)

Note 2-2

Anti-HBs Titre should be performed 1-2 months after last dose of HBV vaccination series but ~ 4-6 months after HBIG to avoid detection of passively administered Anti-HBs.

Responder: person with Anti-HBs > 10 MIU/ml after 3 or more HBV vaccination doses

Non-responder: person with Anti-HBs < 10 MIU/ml after 6 or more HBV vaccination doses.

Note 2-3

All HCWS who have Anti-HBs < 10 MIU/ml, unvaccinated or incomplete vaccination and sustain exposure to a source patient who is HBsAg-positive/ unknown HBsAg status should undergo HBsAg screening as soon as possible after exposure and follow up testing ~ 6 months later (HBsAg + Anti-HBc).

A. Chronic Hepatitis C (Genotype 2 & 3)

1st Line Treatment

Evidence Rating: [A]

- Pegylated Interferon alfa-2a, subcutaneous,
Or
- Pegylated Interferon alfa-2b, subcutaneous,
And
- Ribavirin, oral,

B. Chronic Hepatitis C (Genotype 1 & 4)

1st Line Treatment

Evidence Rating: [A]

- Pegylated Interferon alfa-2a, subcutaneous,
Or
- Pegylated Interferon alfa-2b, subcutaneous,
And
- Ribavirin, oral,

REFERRAL CRITERIA

Refer all cases of chronic hepatitis C infection to a specialist, especially those who have failed first-line anti-viral therapy or had adverse reactions to anti-viral therapy or have liver-related complications (e.g. liver cirrhosis, liver failure, liver mass, signs of portal hypertension, ascites, peripheral oedema, hypoalbuminaemia). Pregnant individuals and patients with hepatitis C co-infections (e.g. HIV/Hepatitis B) as well as those requiring chemotherapy or other immunosuppressive therapy should also be referred to a specialist.

12. Hepatic Encephalopathy

This condition is a complication of either acute or chronic liver disease. It presents with disordered central nervous system function, due to inability of the liver to detoxify ammonia and other chemicals.

CAUSES

- Viral hepatitis
- Alcoholic hepatitis

- Cirrhosis of the liver
- Hepatocellular carcinoma
- Drugs e.g. halothane, isoniazid, paracetamol overdose, herbal preparations
- Fatty liver of pregnancy
- Precipitating factors in a patient with pre-existing liver disease:
 - Fever
 - Hypotension
 - Infection
 - Fluid and electrolyte imbalance (excessive use of loop diuretics)
 - Sedatives
 - Increased gastrointestinal tract (GIT) protein load e.g. heavy GIT bleeding, alcoholic binge

SYMPOTMS

- Jaundice
- Confusion
- Disturbed consciousness which progresses as follows: disorder of sleep, hypersomnia and inversion of sleep rhythm, apathy and eventually coma
- Personality changes

SIGNS

- Cyanosis
- Fetor hepaticus
- Signs of chronic liver disease
- Neurological abnormalities:
 - Speech impairment
 - Asterixis (a flapping tremor) indicates pre-coma and strongly supports the diagnosis of encephalopathy
 - Inability to draw or construct objects e.g. a 5-pointed star
 - Incoordination
 - Lethargy
 - Encephalopathy
 - Grade 1: Mild confusion, irritable, tremor, restless
 - Grade 2: Lethargic responses, decreased inhibitions, disorientation, agitation, asterixis
 - Grade 3: Stuporous but arousable, aggressive bursts, inarticulate speech and marked confusion
 - Grade 4: Coma

INVESTIGATIONS

- FBC
- Blood glucose
- Liver function tests
- Blood urea and electrolytes
- Hepatitis B-surface-Antigen
- Hepatitis C screen

- Prothrombin time, INR
- Infection screen (blood culture, urine RE, chest X-Ray, diagnostic ascitic tap)

TREATMENT

Treatment objectives

- To identify and correct precipitating factors promptly
- To treat underlying cause of liver disease

Non-pharmacological treatment

- Place in the coma position if unconscious
- Maintain fluid and electrolyte balance (avoid dehydration and electrolyte abnormalities such as hypokalaemia)
- Monitor temperature, pulse and respiratory rate, blood pressure, pupils, urine output and blood glucose regularly
- Avoid alcohol, paracetamol and other hepatotoxic agents
- Avoid sedatives such as benzodiazepines and drugs that impair the coagulation system
- Patients should NOT have their protein intake restricted
 - Maintain an adequate protein intake of 1.2-1.5 g/kg per day
- Encourage intake of high carbohydrate diet by mouth or NG tube

Pharmacological treatment

A. Measures to correct hydration status and nutrition

Evidence Rating: [A]

Adults

- Dextrose saline (5-10% dextrose in 0.9% saline), IV, 500 ml 8 hourly (according to requirements)

And

- High potency Vitamin B, IV, (formulated as two separate vials) One pair of vials daily (added to glucose IV solution)

Children

- Dextrose saline (4.3% in 0.18% saline), IV,

And

- High potency Vitamin B, IV, (formulated as two separate vials)

B. Measures to lower blood ammonia concentration

1st Line Treatment

Evidence Rating: [A]

- Lactulose, oral,

Adults

Start with 30-45 ml (20-30 g), 6-12 hourly

(Review dose to maintain 2-3 semi-solid stools per day)

Children and Adolescents

Start with 5-20 ml 6-12 hourly

(Review dose to maintain 2-3 semi-solid stools per day)

Neonates

Start with 0.5-5 ml 6-12 hourly

(Review dose to maintain 2-3 semi-solid stools per day)

Or

- Lactulose, rectal,
300 ml diluted in 700 ml water (via rectal balloon catheter) 4-6 hourly, retain in the rectum for 30-60 minutes.
(Review dose to maintain 2-3 semi-solid stools per day)

And

- Metronidazole, oral,

Adults

400 mg 8 hourly

Children

15 mg/kg 12 hourly

Neonates

> 2 kg;	15 mg/kg 12 hourly
---------	--------------------

1-2 kg;	7.5 mg/kg 12 hourly
---------	---------------------

2nd Line Treatment

Evidence Rating: [A]

- Rifaximin, oral,

Adults

550 mg 12 hourly

Children

> 12 years;	200 mg 8 hourly
-------------	-----------------

< 12 years;	not recommended
-------------	-----------------

C. Hepatic encephalopathy associated with active bleeding (INR > 1.5 or platelet count < 50 x 10⁹/L)

Adults and Children (liaise with Haematology)

- Fresh frozen plasma, IV, (for INR > 1.5)

Or

- Platelet concentrate, IV, (platelet count < 50 x 10⁹/L)

D. Antibiotic prophylaxis in Hepatic encephalopathy (associated with cirrhosis and upper gastro-intestinal haemorrhage)

Patients in whom oral administration is not possible,

Evidence Rating: [A]

- Ciprofloxacin, IV,

Adults

400 mg 8-12 hourly (administered over 60 minutes)

Or

- Ceftriaxone, IV, 1 g daily for 7 days

Or

- Ciprofloxacin, oral, 500 mg 12 hourly

Or

- Norfloxacin, oral, 400 mg 12 hourly for 7 days

E. Hepatic encephalopathy precipitated by bacterial infection

Note 2-4

A diagnosis of SBP is established if the neutrophil count in the ascitic fluid is > 250 cells/mL, culture results positive and surgically treatable causes are excluded.

Patients with suspected SBP should be started on empiric antibiotics immediately after ascitic fluid is obtained pending results:

Evidence Rating: [A]

1st Line treatment

- Ciprofloxacin, IV, 400 mg 8-12 hourly for 2 days (to be administered over 60 minutes)
Then
- Ciprofloxacin, oral, 500 mg 12 hourly for 5 days

Note 2-5

Avoid in patients with prior fluoroquinolone therapy as SBP prophylaxis or history of resistance.

2nd Line treatment

- Cefotaxime, IV, 2 g 8 hourly for 7 days
Or
- Ceftriaxone, IV, 2 g daily for 7 days

REFERRAL CRITERIA

Refer patients if the condition does not improve. All children with hepatic encephalopathy must be referred to a specialist.

13. Ascites

Ascites is the accumulation of excess fluid within the peritoneal cavity.

CAUSES

- Portal hypertension secondary to liver cirrhosis
- Renal failure
- Nephrotic syndrome
- Cardiac failure
- Abdominal tuberculosis
- Intra-abdominal or pelvic malignancies

SYMPTOMS

- Abdominal enlargement
- Abdominal discomfort or pain
- Difficulty breathing

SIGNS

- Distended abdomen

- Shifting dullness
- Fluid thrill
- Abdominal tenderness
- Signs relating to the underlying causes (See appropriate section)

INVESTIGATIONS

- FBC
- BUE & Creatinine
- LFTs
- INR
- Urinalysis
- Abdomino-pelvic ultrasound
- Chest X-ray
- Diagnostic paracentesis
 - Appearance and colour
 - Gram stain
 - Cell count and differential
 - Biochemistry e.g. Albumin
 - Microscopy, culture (with bedside inoculation of aerobic & anaerobic blood culture bottles)
 - Acid fast bacilli
 - Cytology

TREATMENT

Treatment objectives

- To relieve symptoms
- To identify and manage underlying cause

| ASCITES |

Non-pharmacological treatment

- Bed rest
- Salt restriction <2 g/day
- Fluid restriction to ≤1.5 L/day
- Avoid NSAID-use
- Alcohol abstinence
- Therapeutic paracentesis (sterile abdominal tap) if ascites is tense and/or there is respiratory embarrassment

Note 2-6

Removal of up to 5 litres of ascitic fluid without concomitant colloid infusion is a safe short-term option and unlikely to have haemodynamic consequences.

Pharmacological treatment

A. Control of ascitic fluid accumulation

1st Line Treatment

Evidence Rating: [A]

- Spironolactone, oral,
Adults
50-200 mg daily

Children

0.3-3 mg/kg daily

And

- Furosemide, oral,

Adults

20-80 mg daily

Children

1-2 mg/kg daily

B. Massive ascites in liver cirrhosis with respiratory embarrassment requiring more than 5 litres of fluid drainage

1st Line Treatment

Evidence Rating: [A]

- Salt-poor human albumin solution, IV, 6-8 g per litre of ascitic fluid drained

REFERRAL CRITERIA

Patients with the following conditions must be referred to a specialist. Poor response to diuretic therapy or diuretic-refractory ascites, complicated cirrhotic ascites with suspected spontaneous bacterial peritonitis, hepato-renal syndrome, and hepatic encephalopathy.

Also refer when an underlying cause cannot be identified.

|

VOMITING

14. Vomiting

Vomiting can be induced by a variety of disease processes including

- I gastrointestinal, neurologic, renal, psychiatric, cardiovascular, endocrine, pain and the effects of drugs. The best course of action in identifying the underlying cause is to carry out a detailed clinical evaluation and management plan, looking out for the aetiology, consequences and potential complications of vomiting.

Severe uncontrolled vomiting can result in significant dehydration and electrolyte imbalance accompanied by renal complications.

Anti-emetics should be prescribed only when the cause of vomiting is known as they may delay diagnosis.

CAUSES

- Disorders of the gastro-intestinal tract (GIT) and liver: intestinal obstruction, peptic ulcer, pancreatitis, cholecystitis, gastroenteritis, hepatitis
- Neurological disorders: severe pain, migraine, raised intracranial pressure (i.e. tumours, haemorrhage; meningitis); seizures, stroke
- Endocrine and metabolic: diabetic ketoacidosis, uraemia, hypercalcaemia, intestinal pseudo-obstruction
- Psychiatric: anxiety, depression, severe emotional upset, psychogenic vomiting
- Drugs: cancer chemotherapy, aspirin, allopurinol, digoxin,

erythromycin, anticonvulsants, opioids

- Infections: malaria, urinary tract infections
- Cardiovascular: acute myocardial infarction
- Renal: uraemia from acute or chronic kidney disease
- Miscellaneous: pregnancy, cyclical vomiting syndrome, myocardial infarction, labyrinthitis, otitis media

SYMPOTMS

Vomiting may be associated with:

- Abdominal pain
- Diarrhoea: gastroenteritis
- Abdominal distension: suspected bowel obstruction
- Heartburn: suspected gastro-oesophageal reflux disease
- Chest pain
- Jaundice: hepato-biliary disease
- Vertigo and nystagmus: suspected vestibular neuronitis
- Anxiety
- Depression

Vomiting may have diagnostic clues e.g.:

- Vomiting of food eaten several hours earlier: gastroparesis or gastric-outlet obstruction
- Vomiting with blood: oesophageal, gastric or duodenal lesion
- Early morning vomiting: pregnancy
- Faeculent vomiting: intestinal obstruction, gastro-colic fistula
- Projectile: if pyloric stenosis

SIGNS

- Abdominal tenderness
- Dehydration (reduced skin turgor, dry tongue, hypotension, tachycardia)
- Abdominal distension
- Succussion splash
- Jaundice
- Signs of peritonitis (rebound tenderness, rigidity, guarding)
- Miscellaneous: e.g. vertigo, nystagmus, focal neurological signs, Kussmaul breathing (uraemia, diabetic ketoacidosis)

INVESTIGATIONS

- FBC
- BUE and Creatinine
- LFT
- Blood glucose
- Serum amylase
- Urine RE
- Urine Pregnancy test
- ECG (if myocardial infarction suspected)
- Abdominal X-ray: Intestinal obstruction

- Erect Chest X-ray: bowel perforation with air under diaphragm

Persistent Vomiting:

- Upper gastro-intestinal endoscopy
- Serum calcium level
- CT scan of brain

TREATMENT

Treatment objectives

- To identify and treat the underlying cause
- To prevent dehydration and electrolyte imbalance
- To maintain nutrition by ensuring adequate dietary intake during illness
- To maintain personal hygiene
- To eliminate infecting organisms where appropriate

Non-pharmacological treatment

- Maintain adequate oral fluid intake (if tolerated)
- Maintain adequate nutrition
- Place naso-gastric tube when needed
- Surgical intervention in suspected intestinal obstruction, peritonitis

Pharmacological treatment

A. **Suggested Anti-Emetics for use in Migraine**

Evidence Rating: [B]

- Metoclopramide, oral/IV/IM,
Adults
10 mg 8 hourly
Or
- Domperidone, oral,
Adults
10 mg, 8 hourly
Children
> 12 years (Body weight \geq 35 kg); 10 mg 8-12 hourly (max. 30 mg per day)
1 month-12 years (Body weight \leq 35 kg); 250 micrograms/kg 8-12 hourly (max. 750 microgram/kg per day)
Or

Note 2-7

Domperidone should be used at the lowest effective dose for the shortest possible duration. The maximum duration of treatment should not exceed 7 days).

Or

- Promethazine, IV/IM
Adults
12.5-25 mg 6-8 hourly as needed (max. 100 mg in 24 hours)
Or
- Promethazine, oral,
Children

2-12 years; 0.25-1 mg 6-8 hourly as needed (max. 25 mg per dose)

< 2 years; Not recommended

B. Suggested Anti-Emetics for use in Vestibular Nausea and Vomiting

- Promethazine, oral,

Adults

20-25 mg 12 hourly

Children

2-12 years; 0.25-1 mg 6-8 hourly as needed (max. 25 mg per dose)

< 2 years; Not recommended

Or

- Promethazine, IV/IM

Adults

12.5-25 mg 6-8 hourly as needed (max. 100 mg in 24 hours)

Or

- Cyclizine, oral,

Adults

50 mg 8 hourly as needed

Children

6-12 years; 25 mg 8 hourly as needed (max. 75 mg in 24 hours)

Or

- Cinnarizine, IV/IM,

Adults and children > 12 years

30 mg 8 hourly as needed

Children

5-12 years; 15 mg 8 hourly as needed

< 5 years; not recommended

C. Suggested Anti-Emetics for use in Gastroenteritis

- Metoclopramide, oral/IV/IM,

Adults

10 mg 8 hourly

Or

- Domperidone, oral,

Adults

10 mg, 8 hourly

Children

> 12 years (Body weight \geq 35 kg); 10 mg 8-12 hourly (max. 30 mg per day)

1 month-12 years (Body weight \leq 35 kg); 250 micrograms/kg 8-12 hourly (max. 750 microgram/kg per day)

D. Suggested Anti-Emetics for use in Post-Operative Vomiting

- Metoclopramide, oral/IV/IM,

Adults

10 mg 8 hourly

Or

- Cyclizine, oral/IV/IM,

Adults

50 mg 8 hourly as needed

Children

6-12 years; 25 mg 8 hourly as needed (max. 75 mg in 24 hours)

E. Suggested Anti-Emetics for use in Chemotherapy-Induced Vomiting

- Ondansetron, IV,

Adults

8 mg/ 0.15 mg/kg (pre-chemotherapy) infused over 15 minutes

Children

> 6 months; 0.15 mg/kg (pre-chemotherapy) infused over 15 minutes, then repeated 4 and 8 hours after first dose. (max is 16 mg/dose)

Or

- Ondansetron, oral,

Adults

8 mg 12 hourly

Children

4-12 years; 4 mg 30 minutes before chemotherapy, then 4 mg 8 hourly for 24-48 hours as needed

< 4 years; not recommended

Or

- Granisetron, IV,

Adults

1mg/10 microgram/kg (30 minutes before Chemotherapy)

Children

2-16 years; same as adults

<2 years; not recommended

Or

- Granisetron, oral,

Adults

1mg 1 hour before chemotherapy, then 1 mg 12 hours after 1st dose

Or

2 mg 1 hour before chemotherapy

Children

Not recommended

Or

- Dexamethasone, oral/IV,

Adults

8-12 mg before chemotherapy, then 8 mg 24 hourly from days 2-4

Children

Not recommended

Or

- Lorazepam, oral/IV,

Adults

0.5-2 mg 6 hourly as required

Children

Consult a specialist

F. Suggested Anti-Emetics for use in Pregnancy

- Promethazine teoclinate, oral,
10-20 mg 8 hourly as needed
Or
- Promethazine, IM,
12.5-25 mg 8 hourly as needed
Or
- Metoclopramide, oral,
10 mg 8 hourly
Or
- Metoclopramide, IV/IM,
10 mg 8 hourly as needed

REFERRAL CRITERIA

Refer all patients in whom vomiting persists or who show signs of progression in disease, patients with unexplained or persistent vomiting, and patients with suspected surgical cause of vomiting for specialist or surgical assessment and management.

15. Hepatocellular Carcinoma

Hepatocellular Carcinoma (HCC) is a primary malignancy of the liver cell and must be differentiated from malignancies elsewhere that metastasize to the liver. Hepatocellular carcinoma occurs more commonly in men than in women and is often diagnosed several years after establishment of the initial causative condition. The disease has a poor prognosis resulting from metastatic or locally advanced disease. Complications include liver failure, variceal bleeding or tumour rupture with bleeding into the peritoneum. The tumour is often resistant to chemotherapy. Current strategies to prevent or treat hepatitis B and C infections and liver cirrhosis can potentially reduce the prevalence of HCC in the long term.

CAUSES

- Cirrhosis of the liver
 - Alcoholic liver disease
 - Chronic hepatitis B virus infection
 - Chronic hepatitis C virus infection
 - Chronic exposure to hepatic carcinogens e.g. aflatoxin

SYMPTOMS

- Jaundice
- Itching
- Anorexia

- Early satiety
- Feeling of a mass in the upper abdomen
- Right upper abdominal pain
- Weight loss
- Haematemesis
- Abdominal distension
- Bone pain
- Dyspnoea

SIGNS

- Jaundice
- Cachexia
- Hepatomegaly (irregular surface, multiple nodules, may be tender)
- Ascites
- Hepatic bruit

INVESTIGATIONS

- FBC
- LFTS
- INR
- Serum Alpha-Fetoprotein
- Hepatitis B-Surface Antigen (HBsAg)
- Hepatitis C Antibody (HCVab)
- Chest X-Ray
- Abdominal ultrasound scan
- CT/MRI scan (if ultrasound inconclusive)

HEPATOCELLULAR CARCINOMA

TREATMENT

Treatment objectives

Curative

- To assess for potential resectability

Palliative

- To relieve pain
- To relieve discomfort from gross ascites
- To prevent or treat hepatic encephalopathy (See section on 'Hepatic Encephalopathy')

Non-pharmacological treatment

- Surgical resection of non-metastatic localised lesions
- Paracentesis for tense ascites (See section on 'Ascites')
- Supportive care (multi-vitamin supplements)

Pharmacological treatment

A. Pain control in patients with Hepatocellular Carcinoma

1st Line Treatment

Evidence Rating: [B]

- Tramadol, oral, 50 mg 12 hourly (titrate further as tolerated to desired effect: maximum 300 mg daily)

Or

- Morphine sulphate, oral, 5-10 mg 8-12 hourly

REFERRAL CRITERIA

Refer all patients with suspected HCC, especially those with small solitary lesion (< 5 cm) who may be considered for percutaneous alcohol injection or surgical resection, to a specialist.

16. Drugs and the Liver

Drug-Induced Liver Injury (DILI) can occur following the use of a variety of either prescription or over-the-counter medications. A high index of suspicion is often necessary in establishing the diagnosis. Early recognition of drug toxicity is important to permit withdrawal of the offending drug, assessment of severity and monitoring for acute liver failure. Drug-induced liver injury can be dose-dependent or idiosyncratic.

The hallmark for the treatment of DILI is early withdrawal of the offending drug.

CAUSES

- Allopathic drugs (prescription, over-the-counter, anaesthetic agents, e.g. paracetamol, statins, isoniazid, halothane, amiodarone, azathioprine, carbamazepine, phenytoin, nevirapine, ketoconazole, flucloxacillin etc.)
- Herbal preparations
- Dietary supplements

SYMPTOMS

- Asymptomatic
- Right upper quadrant pain
- Nausea
- Anorexia
- Malaise
- Lethargy
- Pruritus

SIGNS

- Occasionally none
- Jaundice
- Scratch marks
- Bruising
- Asterixis
- Altered mental state
- Signs of pre-existing chronic liver disease

INVESTIGATIONS

- FBC
- LFTS
- BUE and Creatinine

- INR
- Serum glucose
- Urinalysis
- Hepatitis screen (A, B, C, E) for exclusion
- Abdominal ultrasound scan

TREATMENT

Treatment objectives

- To identify and withdraw the offending agent
- To report as adverse drug event to Food and Drugs Authority (FDA) promptly
- To assess severity of liver disease
- To administer antidote where applicable or feasible

Non-pharmacological treatment

(See section on 'Hepatic Encephalopathy')

Pharmacological treatment

A. Drug-induced liver injury following paracetamol toxicity

1st Line Treatment

Evidence Rating: [A]

- N-Acetylcysteine

(See section on 'Management algorithm for Acute Paracetamol Poisoning')

REFERRAL CRITERIA

All patients failing to improve or showing progression in liver injury despite withdrawal of offending drug should be referred to a specialist.

I Management algorithm for Acute Paracetamol Poisoning

Box 2-1: Management algorithm for Acute Paracetamol Poisoning

Clinical presentation

Nausea and vomiting are common early symptoms

Patients that subsequently develop hepatic injury and death may be asymptomatic for hours after an acute ingestion

Investigations

In all patients with suspected paracetamol toxicity, obtain the following:
Serum paracetamol concentration, baseline liver function tests (AST, ALT, total bilirubin), PT and INR, urea and electrolytes

In all patients with a suspected intentional overdose, obtain serum salicylate concentration, serum glucose, ECG, and pregnancy test in women of childbearing age

Treatment regimen

Secure airway, breathing, and circulation as necessary

Give activated charcoal (AC) 50 g to all adult patients presenting within 4 hours of ingestion, unless contraindicated; AC may be useful for co-ingestants beyond 4 hours

Treat with N-Acetylcysteine (NAC) If:

- Serum paracetamol concentration drawn at 4 hours or more after a single acute ingestion is above the “treatment” line of the treatment nomogram for paracetamol poisoning
- Serum paracetamol concentration is unavailable or will not return within 8 hours of time of ingestion and paracetamol ingestion is suspected
- Time of ingestion is unknown and serum paracetamol level is greater than 10 microgram/ml (66 micromol/L)
- There is evidence of any hepatotoxicity with a history of paracetamol ingestion
- Patient reports or clinician suspects repeated excessive paracetamol ingestions, patient has risk factors for paracetamol-induced hepatotoxicity, and the serum paracetamol concentration is greater than 10 microgram/ml (66 micromol/L)

Oral Dosing Of NAC:

- Oral dosing is acceptable for non-pregnant patients with a functional GI tract and no evidence of hepatotoxicity
- Dose 140 mg/kg loading dose, followed by 17 doses of 70 mg/kg every 4 hours
- If vomiting occurs within 1 hour of NAC dosing, a full NAC dose should be repeated as rapidly as possible
- Therapy may be terminated by 24 to 36 hours after ingestion if the paracetamol level is below 10 micrograms/ml, and the patient does not develop evidence of hepatotoxicity and remains clinically well

Intravenous (IV) dosing of NAC:

- In patients with no biochemical evidence of liver failure (i.e., those with INR <2), use 21 hour IV protocol: 150 mg/kg loading dose over 60 minutes, followed by 50 mg/kg infused over 4 hours, with the final 100 mg/kg infused over the remaining 16 hours
- In patients with biochemical evidence of liver failure (i.e., those with INR >2), administer the 21 hour IV protocol (150 mg/kg loading dose over 60 minutes, followed by 50 mg/kg infused over 4 hours, followed by 100 mg/kg infused over the next 16 hours) followed by a continuous IV NAC infusion at 6.25 mg/kg per hour until INR is < 2
- IV dosing is acceptable in all cases of paracetamol toxicity, but should be used instead of oral dosing in patients unable to tolerate oral NAC (e.g., intractable vomiting), patients with a medical condition precluding administration of oral NAC (eg, corrosive ingestion, GI bleed), patients with significant hepatotoxicity (INR >2), and pregnant patients

Antiemetic therapy:

- May give IV metoclopramide 10 mg 8 hourly

NUTRITIONAL DISORDERS

17. Malnutrition

Malnutrition occurs when there is a deficiency in intake of essential nutrients (i.e. proteins, carbohydrates, fats, vitamins and minerals). It is most commonly seen in children less than five years, particularly after weaning. Malnutrition reduces the individual's ability to fight disease and infection thereby increasing the likelihood of the patient presenting with diarrhoea, vomiting, fever, worm infestation, pneumonia, tuberculosis, otitis media, urinary tract infection etc. In adults, malnutrition frequently occurs in association with chronic alcoholism.

Protein energy malnutrition (PEM), when severe, presents in different forms such as marasmus, kwashiorkor or marasmic-kwashiokor.

Birth-spacing, through family planning, as well as exclusive breastfeeding for up to 6 months, followed by Introduction of a weaning diet at 6 months and continuation with complimentary foods for up to 2 years, may be helpful measures in preventing malnutrition in young children. Encouraging a balanced diet for the family, including pregnant and lactating women, and nutrition education in schools and villages may help reduce the prevalence of malnutrition in the community.

CAUSES

- Poverty
- Inadequate quality and/or quantity of food intake
- Social neglect
- Repeated or chronic infections
- Repeated diarrhoeal illness
- Worm infestations
- HIV, pulmonary tuberculosis, measles, pertussis
- Chronic illness and cancers
- Alcoholism (adults)

SYMPTOMS

- Poor weight gain
- Weight loss (drop or flattening in weight on the child health record)
- Body swelling (kwashiorkor)

CHAPTER 3: NUTRITIONAL DISORDERS

- Child plays less because of lack of energy
- Disinterest in food and surroundings

SIGNS**Marasmus**

- Thin (reduced muscle bulk)
- Prominent bones
- Hanging skin folds especially over the buttocks
- Unusually alert
- Looks like an old man

Kwashiorkor

- Thin and wasted arms
- Puffy face and legs due to oedema
- Brownish or reddish hair
- Flaky skin rash especially on the legs
- Sores on the oedematous parts of the body in severe cases
- Miserable and disinterested appearance
- Disinterest in food
- Anthropometric measurements

Moderate Acute Malnutrition

- Mid Upper Arm Circumference: 11.5 - < 12.5 cm
- Weight for Age: < - 2 Z - Score but > - 3 Z Score
- Weight for Height: < - 2 Z - Score but > - 3 Z Score

Severe Acute Malnutrition

- Mid Upper Arm Circumference: < 11.5 cm (Age 6-59 months)
- Weight for Age: < - 3 Z - Score
- Weight for Height: < - 3 Z - Score

INVESTIGATIONS

- FBC
- Urea and electrolytes
- Serum albumin
- Urine culture and sensitivity
- Blood culture and sensitivity
- Chest X-ray
- HIV testing
- Gastric lavage for acid fast bacilli
- Screen for common infections such as tuberculosis, pneumonia, urinary tract infections, etc. (See relevant sections)

TREATMENT**Treatment objectives**

- To identify and treat associated infections and complications
- To correct fluid and electrolyte imbalance and other complications
- To correct the nutritional deficiency including Vitamin A
- To prevent recurrence by educating caregivers
- To adequately manage chronic illnesses

Non-pharmacological treatment

- Nutritional rehabilitation
 - Out-patient Care
 - Malnourished children who have appetite, and do not have any overt medical condition, which requires admission, should be managed as outpatients with Ready-to-Use Therapeutic Food (RUTF)
 - In-patient Care
 - Admit all severely malnourished children who have medical conditions requiring inpatient care
 - Stabilisation Phase
 - Frequent feeding with F75
 - Introduce Ready-To-Use Therapeutic Food - RUTF
 - Progressively return to acceptable balanced family meals
 - Participation of parents and caregivers in nutrition education

Pharmacological treatment

A. Vitamin A supplementation (children)

Evidence Rating: [A]

- Vitamin A, oral,
Children
> 1 year; 200,000 units daily for 2 days
6-11 months; 100,000 units daily for 2 days
< 6 months; 50,000 units daily for 2 days

Note 3-1

Vitamin A supplementation should be given to replace body stores, EXCEPT if the child is on RUTF made according to WHO specifications, which already contains adequate vitamin A.

B. Treatment of underlying infections (children)

Inpatients

Evidence Rating: [B]

- Cefuroxime, IV, 20 mg/kg 8 hourly for 48-72 hours

Then

- Cefuroxime, oral,
3 months-12 years; 15 mg/kg 12 hourly for 5-7 days

Outpatients

Evidence Rating: [B]

- Amoxicillin, oral,
5-18 years; 500 mg 8 hourly for 10 days
1-5 years; 250 mg 8 hourly for 10 days
1 month-1 year; 125 mg 8 hourly for 10 days

C. Immunisation (children)

(See section on 'Immunisation' and National Expanded Programme

on Immunisation (EPI) guidelines)

D. Treatment of worm infestations

(See section on 'Worm Infestations')

REFERRAL CRITERIA

Refer to appropriate specialist for management of the underlying cause. Also refer to Reproductive and Child Health (RCH) unit for family planning services and Social welfare department within the health facility, district or region.

Chapter

4

HAEMATOLOGICAL DISORDERS

17. Anaemia

Anaemia is defined as decreased concentration of haemoglobin for the age and sex of the individual (i.e. below 13 g/dL in adult males, 12 g/dL in adult females, 11 g/dL in children, and below 13.5 g/dL in the 1st week of life). Anaemia always has a cause, which must be identified and properly managed. The cause must be investigated before initiating treatment. In an emergency, blood samples must be taken for investigations before blood transfusion.

CAUSES

Nutritional micronutrient and vitamin deficiency

- Iron
- Folic acid
- Vitamin B12

Bleeding

- Heavy menstruation
- Haemorrhoids (piles)
- Peptic ulcer
- Infestations e.g. hookworm, bilharzia
- Solid organ malignant tumours e.g. colonic cancer
- Haematological malignancies: e.g. leukaemia

Haemolysis

- Severe malaria
- Sickle cell disease
- G6PD deficiency
- Hypersplenism
- Autoimmune
- Drugs

Bone Marrow Failure

- Disease infiltration e.g. leukaemia, lymphoma, tuberculosis
- Aplasia – primary or secondary e.g. due to cytotoxics

Chronic Diseases

- Kidney disease
- Tuberculosis

- Hypothyroidism

Autoimmune Disease

- SLE
- Pernicious anaemia

SYMPTOMS

- Easy fatigability
- Dizziness
- Shortness of breath on exertion
- Palpitations
- Fresh blood in stools
- Black tarry stools (malaena)
- Haematuria
- Cola-like urine

SIGNS

- Pale mucous membranes and palms
- Angular stomatitis
- "Spoon shaped" and ridged finger and toe nails
- Spleen, liver and lymph nodes may be palpable
- Signs of heart failure (in severe anaemia)
- Jaundice (in haemolysis)
- Petechiae and purpura (bone marrow failure)
- Hyperpigmentation of palms and soles of feet

INVESTIGATIONS

- FBC
- Reticulocyte count and blood film comment
- Sickling test and HB electrophoresis if indicated
- Blood film for malaria parasites
- Kidney function tests
- Serum iron, Vitamin B12 and folate levels
- Direct Coomb's test
- Stool for hookworm ova
- Stool for occult blood
- Urine for schistosoma ova
- Specialized tests depending on the suspected cause e.g. bone marrow examination, antinuclear antibody (ANA) test, upper and lower GI endoscopy

TREATMENT

Treatment objectives

- To treat underlying cause of anaemia
- To restore haemoglobin levels to normal
- To replenish iron stores after correction of anaemia in iron deficiency
- To restore haemoglobin to steady state level in sickle cell disease patients
- To correct anaemia in proven vitamin B12 and folate deficiency and

maintain normal levels throughout life

Non-pharmacological treatment

- Advise on a balanced diet. Regular intake of leafy foods as well as fresh fruits and vegetables, beans, liver, meat, eggs, fish
- High fibre diets to reduce bleeding from haemorrhoids
- Surgical treatment
- Where applicable e.g. haemorrhoids, tumours, hypersplenism etc.

Pharmacological treatment

A. Iron Deficiency Anaemia

1st Line Treatment

Evidence Rating: [B]

- Ferrous sulphate (dried or anhydrous), oral,
Adults
200 mg (65 mg elemental iron) 8 hourly for 3-6 months
Children

> 10 years; 200 mg 12 hourly for 3-6 months

8-10 years; 200 mg daily for 3-6 months

5-7 years; 80-120 mg 8-12 hourly for 3-6 months

1-4 years; 45-90 mg 8-12 hourly for 3-6 months

< 1 year; 30-60 mg 8-12 hourly for 3-6 months

Or

- Ferrous fumarate, oral,
Adults
200 mg (65 mg elemental iron) 8 hourly
Children
3-6 mg elemental iron/kg per day for 3-6 months

2nd Line Treatment

Evidence Rating: [B]

Note 4-1

Parenteral iron has no advantage over oral iron preparations except in the rare case of malabsorption.

Or

- Iron sucrose, IV, (as a slow bolus injection over 2-5 minutes)
Adults
200 mg every 3 days for 5 doses
Children
0.5 mg/kg every 4 weeks for 12 weeks (max. 100 mg per dose), calculated based on body weight and iron deficit and the target Hb
Or
- Iron dextran, IV, (as a slow bolus or IM by deep intramuscular) injection
Adults
25-100 mg daily as needed
Children

Not recommended

B. Vitamin B₁₂ Deficiency

Evidence Rating: [B]

- Vitamin B₁₂ (Hydroxocobalamin), IM,
Adults

1 mg every other day for 6 doses

Then

1 mg every 3 months for life

Children

1 mg stat.

Then

1 mg every 3 months for life

C. Folate Deficiency

- Folic Acid, oral,

Adults

5 mg daily

Children

2.5-5 mg daily

D. Severe Symptomatic Anaemia

- Blood transfusion with packed cells

And

Treat for cardiac failure if signs of cardiac failure. (See section on 'Heart failure')

REFERRAL CRITERIA

Refer patients with haemoglobin levels that do not improve after two weeks on the above treatment or with severe anaemia from any cause, which recurs, to a specialist. Patients with suspected aplastic anaemia, anaemia due to uncontrolled bleeding, including heavy menstrual loss, would also require referral to a specialist.

18. Bleeding Disorders

Bleeding disorders may present at birth or develop later in life. The bleeding may be spontaneous or follow trauma or surgery and may be due to defective blood vessels, platelet disorders or clotting factor deficiency. Past episodes of excessive bleeding e.g. following circumcision, a family history of bleeding and drug therapy may be important clues to the diagnosis.

The pattern of bleeding is a helpful guide to its cause. In platelet and vessel wall defects, bleeding is usually into skin and mucosal surfaces like the gums, nose, gastrointestinal tract, whereas in coagulation factor deficiency (e.g. haemophilia), bleeding is into deep tissues like the brain, joints and muscles.

In newborns with vitamin K deficiency (which leads to multiple coagulation factor deficiency) spontaneous bleeding occurs from various sites such as the umbilical cord, gastrointestinal tract, scalp and brain.

CAUSES

- Haemophilia
- Von Willebrand disease
- Liver disease
- Vitamin K deficiency especially in newborns
- Bone marrow failure e.g. aplastic anaemia and leukaemia
- Low platelet count from any cause
- Disseminated Intravascular Coagulation (DIC) from any cause
- Drug induced - herbal preparations, aspirin, clopidogrel, warfarin, rivaroxaban, heparin

SYMPTOMS

- Spontaneous bleeding from mucous membranes or cuts
- Easy bruising, bleeding from orifices
- Excessive bleeding from cuts or incisions
- Deformed joints from recurrent joint bleeds
- Swelling at site of blood collection (pseudotumours)
- Pain limiting movement

SIGNS

- Pallor
- Excessive bleeding
- Localised swelling due to bleeding into body spaces e.g. Joints
- Tenderness
- Limitation of movement and joint deformities
- Purpura, petechiae, ecchymosis

INVESTIGATIONS

- FBC and blood film comment
- Platelet count
- Liver function tests
- Prothrombin time, INR, partial thromboplastin time
- Bleeding time

TREATMENT

Treatment objectives

- To prevent or arrest bleeding
- To identify and correct underlying cause

Non-pharmacological treatment

- Apply regulated pressure dressing and/or ice packs to minimise bleeding where possible
- Stop any event/drugs responsible for bleeding or which may aggravate bleeding
- Educate haemophiliacs on their disease, encouraging them to

CHAPTER 4: HAEMATOLOGICAL DISORDERS

minimise trauma-prone activities, and to inform doctors of their condition before any surgical procedure

- Avoid unnecessary injections and surgical procedures in all patients (especially, those with a family history of bleeding tendencies)
- Physiotherapy on affected joints
- Surgery

Pharmacological treatment

A. General Measures: fluid replacement following acute severe blood loss

Sodium Chloride 0.9%, IV,

Adults

(See Section on 'Shock')

Children and Neonates

20 ml/kg bolus stat.

Repeat if there is no clinical improvement

And

- Concentrated red cell transfusion, IV,
Adults, Children and Neonates
3 ml/kg for each expected 1 g/dL haemoglobin rise

B. Bleeding due to underlying liver disease

1st Line Treatment

Evidence Rating: [A]

- Vitamin K, IV,
Adults
5-10 mg stat.
Children
3-5 mg stat.
Neonates (irrespective of history of vitamin K injection)

Term; 1 mg stat.

Preterm; 500 micrograms stat.

And

- Fresh Frozen Plasma, IV,
Adults, Children, Neonates
15-20 ml/kg

C. Haemophilia A

- Recombinant Factor VIII, intravenous,
1 international unit raises % of Factor VIII on average by 2 per kg body weight
Required units = body weight (kg) x desired factor rise x 0.5
(Repeated as needed)

Or

- Desmopressin, Intranasal, 150 microgram spray into each nostril, 12 hourly. May be repeated for 3 days

D. Haemophilia B

- Recombinant Factor IX
Administration of 1 unit/kg factor IX (recombinant) generally increases factor IX levels by approximately 0.8% in adults and 0.7% in children <15 years of age

E. Von Willebrand Disease

- Desmopressin, Intranasal, 150 microgram spray into each nostril, 12 hourly. May be repeated for 3 days

F. DIC

Treat underlying cause.

- Fresh Frozen Plasma
Adults, Children, Neonates
15-20 ml/kg

Or

- Coagulation factor, red cell and platelet concentrates as needed

G. Thrombocytopaenia requiring platelet transfusion

- Platelet Concentrate
Adults, Children, Neonates
10 ml/kg (raises platelet count by $5 \times 10^9/L$)

Prevention of local fibrinolysis

- Tranexamic Acid, oral and IV,
100 mg/kg
Then
10 mg/kg
Adults
1300 mg oral 8 hourly

2nd Line Treatment

Evidence Rating: [A]

Haemophilia A

- Purified factor VIII
- Cryoprecipitate, IV,
Adults, Children, Neonates
1.5-2.0 packs/10 kg

Haemophilia B

- Purified factor IX
- Fresh frozen plasma

REFERRAL CRITERIA

Refer all haemophiliacs and all patients with unexplained recurring bleeding episodes and those requiring surgery to the physician specialist or hematologist for initial assessment, treatment plan and scheduled comprehensive review.

19. Sickle Cell Disease

This is an inherited disease characterized by the possession of two abnormal haemoglobins, at least one of which is haemoglobin S. There are various types, including HBSS, HBSC and HBS β thalassaemia. The possession of one normal haemoglobin (haemoglobin A) together with one abnormal haemoglobin (e.g. AS or AC) constitute a haemoglobinopathy trait and not sickle cell disease.

The use of the word «sickler» to describe patients with sickle cell disease must be avoided. Sick cell disease patients may present either in the steady state, in crises or with complications. The crisis is commonly vaso-occlusive bone pain crisis. Other types of crises include acute chest syndrome, hyper-haemolytic crisis, aplastic crisis and sequestration crises. In vaso-occlusive crises there is occlusion of small vessels by sickled cells causing infarction and pain; in Acute Chest Syndrome (ACS), the patient presents with sudden onset of cough, difficulty in breathing and fever; in aplastic crises, infection with parvovirus causes sudden severe anaemia with a low reticulocyte count; in sequestration crises the spleen and liver enlarge rapidly due to trapping of red blood cells.

Patients with sickle cell disease should be encouraged to have periodic check-ups at a sickle cell clinic.

CAUSES

- Inheritance of two abnormal haemoglobin genes from both parents, at least one of which is an S.
- Crises are typically precipitated by:
 - cold weather
 - dehydration
 - infection
 - physical exertion
 - mental stress

SYMPTOMS

- Joint and bone pain, especially during cold wet seasons
- Easy fatigability
- Pallor
- Jaundice
- Difficulty in breathing with or without chest pain
- Chronic leg ulcer
- Abdominal pain, especially in the splenic area
- Spontaneous sustained erection without sexual arousal in male patients (See section on 'Priapism')

SIGNS

- Jaundice
- Pallor
- Hepatomegaly

- Splenomegaly (may be absent in older patients)
- Old or recent scarification marks by traditional healers, particularly over the abdominal wall and joints
- Venous ulcers
- Bossing
- Dactylitis (hand and foot syndrome)
- Gnathopathy
- Growth delay or tall, lanky stature ('marfanoid' habitus)

INVESTIGATIONS

- FBC
- Blood film comment
- Reticulocyte count
- Sickling test
- Haemoglobin electrophoresis
- Urine examination
- Chest X-ray in case of ACS
- Blood and urine C/S when infection suspected
- G6PD assay

I TREATMENT

Treatment objectives

- To prevent the development of sickle cell crises
- To relieve pain
- To identify and manage the precipitating cause of crises
- To maintain a good steady state haemoglobin
- To prevent long term complications and organ damage
- To manage sickle cell crises and complications once developed

Non-pharmacological treatment

- Good hydration at all times by drinking adequate water/fluids
- Avoidance of common precipitating causes of crises such as malaria (bed nets etc.), dehydration, stress, excessive exercise, and exposure to extremes of weather
- Maintenance of good nutrition
- Client education
- Parental/guardian education
- Genetic counselling with voluntary family size restriction
- General public knowledge

Pharmacological Treatment

A. Vaso-occlusive bone pain crises

1st Line Treatment

Evidence Rating: [B]

Mild to moderate pain

- Paracetamol, oral,
Adults

500 mg-1 g 6 - 8 hourly

Children

6-12 years;	250-500 mg 6-8 hourly
1-5 years;	120-250 mg 6-8 hourly
3 months-1 year;	60-120 mg 6-8 hourly

Or

- Paracetamol, rectal,
Adults and Children

Doses as above

Or

- Ibuprofen, oral,
Adults

400 mg 6-8 hourly

Children

6-12 years;	200-400 mg 6-8 hourly
1-5 years;	100-200 mg 6-8 hourly
3 months-1 year;	not recommended

Or

- Diclofenac, oral,
Adults

50 mg 8 hourly or 100 mg 12 hourly

Children

> 12 years;	50 mg 12 hourly
< 12 years;	not recommended

Or

- Diclofenac, rectal,
Adults

100 mg daily up to a maximum of 200 mg daily in divided doses

Children

75-100 mg daily

Note 4-2

If the pain is not controlled by the measures above within 12 hours, consult a specialist. Pethidine is no longer the recommended drug of choice. Morphine may be used but specialist consultation is required.

- Morphine sulphate, oral/IV, consult specialist

Caution 4-1.

Caution: long term NSAIDS (for more than two weeks) e.g. Diclofenac and Ibuprofen may cause renal impairment, and gastritis

And

- Dextrose in Sodium Chloride, IV Infusion,
Adults
- 5% Dextrose in 0.9% Sodium Chloride 2-4 L daily
Children
- 5% Dextrose in 0.9% Sodium Chloride 150 ml/kg daily

Or**Adults**

Normal Saline alternating with 5% Dextrose 2-4L daily

Children

Normal Saline alternating with 5% Dextrose 150 ml/kg daily

Box 4-1: Fluid requirement in children according to age

< 1 year	50 ml/kg
1 year	140 ml/kg
2 years	130 ml/kg
4 years	110 ml/kg
6 years	100 ml/kg
8 years	90 ml/kg
10 years	85 ml/kg
12 years	70 ml/kg

Severe Pain**2nd Line Treatment**

Evidence Rating: [B]

- Diclofenac sodium, IM,
Adults
75-150 mg daily in divided doses

Then

- Codeine phosphate, oral,
Adults and Children over 12 years
30-60 mg 4-6 hourly

Or

- Tramadol, oral, 50-100 mg 8 hourly

And

- Blood transfusion (packed cells) when needed, but not routine.
Transfusion will be necessary if haemoglobin level is < 5 g/dL

B. Steady State

- Folic Acid, oral,

Adults

5 mg daily

Children

> 1 year; 5 mg daily

< 1 year; 2.5 mg daily

C. Severe Disease

Note 4-3

Patients with suspected acute chest syndrome should have an urgent chest X-ray, blood and urine C/S, blood for grouping and cross-matching

- Amoxicillin + Clavulanic Acid, IV, 1.2 g and urgently transferred to a tertiary centre
- Hydroxycarbamide, Aspirin, Opiates and /or Chronic transfusion therapy may be used under specialist care

D. Prevention of pneumococcal infections

- Pneumococcal conjugate vaccine 13 (PCV 13) vaccination in infancy, booster at 6 years

REFERRAL CRITERIA

Refer all sickle cell patients with bleeding into the eye, priapism, haematuria or renal disease and stroke to a specialist. The presence of osteomyelitis, aseptic necrosis of the hip, acute chest syndrome and persistent jaundice after initial management as recommended above should also warrant a referral to a specialist centre.

Patients with CNS events, unexplained high white cell and platelet counts (more than 15 and 500 x 10⁹/L respectively), intractable morbid pain, repetitive crises or recurrent severe anaemia interfering with their lives should be referred to a specialist.

20. Plasma Cell Myeloma

Plasma cell myeloma (previously referred to as multiple myeloma), is cancer affecting the plasma cells in the bone marrow. These abnormal plasma cells occur in increased numbers and produce abnormal non-functional immunoglobulins leading to impaired ability to fight infections in the patient affected, hyperviscosity and renal failure. In the bone marrow the increased plasma cells result in a reduction in normal blood cell production and erosion of bone with resultant peripheral blood cytopaenias, osteolytic lesions, pathological fractures and hypercalcaemia. The disease is commonest in the sixth decade and rare below the age of 40 years.

CAUSES

- Unknown
- Potential precipitants:
 - Chemicals e.g. dioxins, formaldehyde, and nitrobenzene found in solvents and cleaning agents
 - Ionizing radiation
 - Viruses e.g. Herpes Virus 8, Epstein-Barr, HIV, Hepatitis Virus

SYMPTOMS

- Bone pain
- Easy fatigability
- Excessive weakness
- Recurrent infections
- Bony swellings

SIGNS

- Pallor
- Fever
- Dehydration
- Bony lumps
- Paraplegia
- Paresis
- Renal Impairment
- Unprovoked fractures

INVESTIGATIONS

- FBC and blood film comment
- ESR
- Blood urea, electrolytes, creatinine
- Plasma calcium levels
- Serum uric acid
- Bone marrow aspirate
- Skeletal survey including skull X-ray
- Serum protein levels
- Serum protein electrophoresis
- Urine Bence Jones protein

PLASMA CELL MYELOMA

TREATMENT

Treatment objectives

- To reduce the number of abnormal plasma cells to normal and reduce their rate of increase
- To treat anaemia
- To reduce bone pain
- To manage pathological fracture
- To improve or maintain good bone mineral density
- To treat infections
- To prevent and treat renal complications

Non-pharmacological treatment

- Patients should drink at least 3 litres of fluid each day throughout the course of their disease
- Physiotherapy
- Orthopaedic supports

Pharmacological treatment

- A. To reduce number of plasma cells and rate of increase
Available at specialized centres only
- B. To reduce bone pain
Pain relief (avoid NSAIDS)
- C. To treat anaemia
Packed red cells transfusion and platelet transfusion when indicated
- D. To prevent and treat renal complications
IV and oral fluids
- E. To mitigate tumour lysis
Allopurinol to mitigate tumour lysis
- F. To treat infections
(See appropriate section)

REFERRAL CRITERIA

All patients suspected to have plasma cell myeloma should be referred to a haematologist at a specialised tertiary centre for further evaluation and definitive management. Subsequent follow-up can be done by a physician specialist with guidance from the haematologist.

21. Leukaemia

Leukaemia is cancer of the blood cells. There are two main types of leukaemia, which are lymphoid leukaemia and myeloid leukaemia. Each type of leukaemia can be classified as acute (where the patient falls suddenly ill) and chronic (where the patient may have been harbouring the disease for months without knowing). Thus in all, there are 4 main types of leukaemia: acute lymphoid leukaemia (ALL), chronic lymphoid leukaemia (CLL), acute myeloid leukaemia (AML) and chronic myeloid leukaemia (CML).

ALL is commonest in children especially boys, CLL is commonest in the elderly, AML and CML cut across all age groups and sexes.

The abnormal leukaemic cells especially in acute leukaemia, fill the marrow and prevent the marrow from producing the normal blood cells i.e. red cells, white cells and platelets leading to anaemia, neutropaenia and thrombocytopenia, respectively.

CAUSES

- Usually unknown
- Associated factors
 - Viruses e.g. human T lymphotropic virus type 1 (HTLV-1) and Epstein Barr virus (EBV)
 - Chemicals e.g. benzene, industrial solvents, pesticides (lin-

- Dane), dyes,
- Drugs e.g. alkylating agents such as melphalan
- Ionizing radiation

SYMPOTMS

Acute Leukaemia

- Fever
- Lymph node swelling
- Easy fatigability
- Bruising tendencies
- Bone and joint pain (especially in children)

Chronic Leukaemia

- Asymptomatic
- Dragging sensation (left side of abdomen)
- Easy satiety
- Lymph node swelling
- Weight loss
- Generalized itch
- Excessive sweating
- Priapism
- Hearing loss

SIGNS

Acute Leukaemia

- Pallor
- Fever
- Skin and mucosal haemorrhages
- Gum hypertrophy (AML subtype 5)
- Firm, rubbery, non-tender lymph nodes (lymphoid leukaemia)
- Splenomegaly

Chronic Leukaemia

- Splenomegaly
- Weight loss
- Pallor
- Generalized lymph node enlargement in CLL

LEUKAEMIA

INVESTIGATIONS

- FBC and blood film comment
- Bone marrow aspirate
- Uric acid levels
- LDH
- BUE and creatinine
- Liver function tests
- Septic screen (especially in acute leukaemia)
- LP for CSF cytology (especially in acute lymphoid leukaemia)

TREATMENT

Treatment objectives

- To aim for a cure in ALL in both children and adults
- To achieve remission and prolong good quality life in AML
- To aim for a complete haematological remission or cure in philadelphia positive CML
- To control white cell counts, symptoms and prolong good quality of life in philadelphia negative CML
- To provide supportive treatment (pain relief, transfusion support, treat infections, counselling)

Non-pharmacological treatment

- Ensure good hydration
- Ensure good nutrition and food hygiene
- Ensure good oral and personal hygiene

Pharmacological treatment

A. Treatment of the newly diagnosed patient

Supportive treatment

- Pain relief (avoid NSAIDS)
- Packed red cells transfusion and platelet transfusion when indicated
- IV and oral fluids
- Allopurinol to mitigate tumour lysis
- Treatment of infections

Specific treatment

- Available at specialized tertiary centres only

REFERRAL CRITERIA

Refer all patients to the haematologist at a specialized tertiary centre for confirmation of diagnosis and start of management. Follow-up can continue at a regional centre by a physician under the distant guidance of a haematologist.

22. Malignant Lymphoma

This refers to a group of disorders characterized by malignant proliferation of lymphoid tissue usually presenting as lymph node swellings. There are 2 major histological types distinguished by the presence or absence of the Reed Sternberg (RS) cell. The 2 main groups are Hodgkin's lymphoma (RS cell present) and non-Hodgkin's lymphoma (RS cell absent). No age is exempt although generally the incidence of non-Hodgkin's lymphoma (NHL) increases with age and immunosuppression while Hodgkin's lymphoma (HL) shows a bimodal peak, in that there is a high incidence in the third and seventh decades.

Burkitt's lymphoma, a subtype of NHL, is one of the fastest growing

tumours known in man. There are three clinical variants - the endemic, sporadic and immunodeficiency associated forms. The endemic form is found in tropical and malaria endemic regions like Ghana and commonly presents as a jaw swelling with loosening of the associated teeth. In Ghana, it is the commonest childhood malignancy. It has a peak age incidence at 4-7 years with a male preponderance.

CAUSES

- Often unknown
- Associated aetiological agents
 - Chronic antigenic stimulation by *Helicobacter pylori* infection in gastric lymphoma
 - Viruses e.g. herpes virus 8, epstein-barr virus, HTLV-1
 - Chemicals e.g. pesticides, herbicides
 - Wood dust

SYMPTOMS

- Lymph node swelling which may wax and wane
- Jaw swelling (in Burkitts)
- Fever
- Night sweats
- Weight loss
- Easy fatigability
- Abdominal distension, intestinal obstruction (in abdominal lymphomas)

SIGNS

- Firm, rubbery, non-tender lymph nodes
- Splenomegaly
- Superior vena cava syndrome (if bulky mediastinal masses are present)
- Pallor (if marrow has been involved)

INVESTIGATIONS

- Lymph node biopsy (of a significantly enlarged node)
- Fine needle aspiration (in Burkitts)
- FBC and blood film comment
- Chest X-ray, abdominal USG, CT scan when necessary
- Bone marrow aspirate and trephine biopsy

TREATMENT

Treatment objectives

- To provide a cure
- To provide supportive treatment (pain relief, transfusion support, treat infections, counselling)

Non-pharmacological treatment

- Ensure good hydration

- Counselling and education

Pharmacological treatment

A. Hodgkin's Lymphoma (HL) and Non-Hodgkin's Lymphoma (NHL)

1st Line Treatment

Evidence Rating: [A]

Supportive treatment

- Pain relief (avoid NSAIDS)
- Packed red cells transfusion and platelet transfusion when indicated
- IV and oral fluids
- Allopurinol to mitigate tumour lysis
- Treatment of infections

Specific treatment

- Available at specialized tertiary centres only

REFERRAL CRITERIA

All patients should be referred to a haematologist at a specialised tertiary centre.

Chapter

5

IMMUNISABLE DISEASES

23. Immunisation

Immunisation against vaccine preventable diseases through the national Expanded Programme for Immunisation (EPI) is one of the most effective measures of reducing morbidity, disability and mortality in the population, especially, in children.

Ghana currently has 12 (twelve) vaccines in the immunisation schedule, namely, BCG, oral poliomyelitis, diphtheria, pertussis, tetanus, hepatitis B, *haemophilus influenzae* type B, pneumococcus, rotavirus, measles, rubella and yellow fever. Newer vaccines may be introduced in the near future as they are discovered and found effective.

Immunisation is recommended for the following persons:

- High risk groups (e.g. during a disease outbreak or by virtue of being exposed)
- Young children
- Elderly
- The malnourished

The current schedule for routine Immunisation for children under 5 years is as follows:

Evidence Rating [A]

Table 5-1: Schedule for routine Immunisation of children under 5 years

Age	Vaccine (Dose)
BIRTH	BCG (0.05 ml Intradermally) Polio 'O' (2 Drops Orally)
6 weeks	"Five In One" (Or Penta-Vaccine) 1 (0.5 ml IM) Pneumococcal (PCV) 1 (0.5 ml IM) Polio '1' (2 Drops Orally) Rotavirus (Rotarix)

Age	Vaccine (Dose)
10 weeks	"Five In One"2 (Or Penta-Vaccine) 2 (0.5 ml IM) PCV 2 (0.5 ml IM) Polio '2' (2 drops orally) Rotavirus (Rotarix)
14 weeks	"Five In One"2 (Or Penta-Vaccine) 2 (0.5 ml IM) PCV 3 (0.5 ml IM) Polio '3' (2 drops orally)
9 months	Measles/Rubella (0.5 ml deep SC or IM) Yellow Fever (0.5 ml IM)
18 months	Measles (0.5 ml deep SC or IM)

*Five in One" Vaccine or Penta-Vaccine contains Diphtheria, Pertussis, Tetanus, *Haemophilus Influenzae* B and Hepatitis B Antigens in one vaccine.
Measles/Rubella is presented as a combined vaccine.

Box 5-1: Notes on Vaccine use

- Wrong method of administration reduces efficacy
- If Immunisation course is interrupted, resume with the same brand of vaccine, else restart with different brand
- There are no contraindications to the immunisation of the sick child if he/she is well enough to go home
- Children with diarrhoea who are due for oral vaccines: give but don't count, then repeat after 4 weeks and record this one as given
- Don't give OPV 0 after 15 days (disturbs regular immunisation schedule)
- Don't give Rotarix 1st dose after 12 weeks, 2nd dose after 24 weeks

Immunisation of preterm babies:

- Consider all premature babies for full immunisation course.
- Start immunisation in 2nd month after birth (after 4 weeks) irrespective of degree of prematurity. Give BCG on discharge.
- Delay OPV in neonatal unit since there is a small chance of transfer of OPV virus to other babies. Hence give OPV on discharge from nursery - not while still on admission.

Contraindications to Immunisation:

- Current serious febrile illness: delay vaccine
- History of severe reaction after previous dose (e.g. anaphylactic reaction) - avoid
- Evolving neurological disease (e.g. uncontrolled epilepsy) - avoid whole cell pertussis vaccine
- No DPT or DPT/HepB/Hib to child with convulsion/shock within 3 days of the most recent dose of DPT or DPT/HepB/Hib
- No DPT or DPT/HepB/Hib to child with recurrent convulsions or active CNS disease

- Yellow fever vaccine should not be given if there is history of anaphylaxis with ingestion of egg
- Individuals with symptomatic HIV infection should not receive BCG and yellow fever vaccines since these are live vaccines. BCG vaccine can be given at birth since the HIV infected newborn is asymptomatic

Live vaccines should not be given to the following:

- Pregnant women - for risk of teratogenic effect
- Patients with malignant disease e.g. leukaemia, Hodgkins disease
- Malignant disease of the reticuloendothelial system,
- Patients with immune suppression, including Symptomatic HIV patients
- Patients on chemotherapy (defer for 6 months after stopping chemotherapy treatment)
However:
- Measles vaccine should be given to HIV positive patients even though it is a live vaccine because the benefit outweighs the risk

REFERRAL CRITERIA

Refer all problems related to Immunisation to a paediatrician or EPI specialist.

24. Measles

Measles is an acute infectious disease, which usually occurs in children between 6 months and 3 years who have not been immunised, or completed the full immunisation schedule. It is prevented by 2 doses of measles vaccination at 9 and 18 months. The condition is very infectious from up to 7 days before, to 5 days after, appearance of the rash.

Complications include otitis media, with or without deafness, bronchopneumonia, croup, diarrhoea, vitamin A deficiency leading to xerophthalmia and blindness, malnutrition and activation of latent tuberculosis. Seriously ill measles patients requiring admission should be isolated. There is no specific treatment for measles. Antibiotics are not required, except for some specific complications.

Measles diagnosis is mainly clinical. The disease is now uncommon because of immunisation. However, high immunisation coverage needs to be maintained to keep the disease under control. Report all cases to the District Disease Control Officer for appropriate action.

CAUSE

- Measles virus

SYMPTOMS

- Runny nose
- Cough
- Red eyes

- Sore mouth
- High fever, present before the rash appears
- Rash - starts on face and neck
- Diarrhoea
- Child is generally miserable

SIGNS

- Fever
- Conjunctivitis
- Koplik spots (white grain-like spots on the buccal mucosa 2 days before rash)
- Rash - itchy, generalised maculo-papular

INVESTIGATIONS

- Usually none
- Measles immunoglobulin M (IgM) antibody assay if required

Treatment objectives

- To relieve symptoms
- To maintain good nutrition
- To prevent and treat complications

Non-pharmacological treatment

- Tepid sponging for fever
- Encourage oral hygiene with frequent saline mouth wash
- Continue feeding with soft high calorie foods
- Wash eyes with clean water
- Discourage use of harsh items on skin

Pharmacological treatment**A. For pain and fever**

Evidence Rating: [C]

- Paracetamol, oral,
Adults

500 mg-1g 6-8 hourly

Children

6-12 years; 250-500 mg 6-8 hourly

1-5 years; 120-250 mg 6-8 hourly

3 months-1 year; 60-120 mg 6-8 hourly

B. To prevent eye complications due to Vitamin A deficiency

Evidence Rating: [A]

- Vitamin A, oral,
Children

> 1 year; 200,000 units daily for 2 days

6-11 months; 100,000 units daily for 2 days

< 6 months; 50,000 units daily for 2 days

C. For management of associated diarrhoea with dehydration
(See section on 'Diarrhoea')

D. For management of associated pneumonia and otitis media
(See relevant sections)

E. For relief of skin irritation

- Calamine lotion (apply liberally to the whole skin)

REFERRAL CRITERIA

Refer patients with complications such as a black (haemorrhagic) rash, stridor, pneumonia, coma, great difficulty in eating or drinking, dehydration or malnutrition to the hospital.

25. Pertussis

This is a highly contagious bacterial respiratory tract infection common in children and adults. The incubation period is 7-21 days.

Complications include subconjunctival haemorrhage, otitis media, apnoea, pneumonia, bronchiectasis, activation of latent tuberculosis, dehydration, fever, convulsions, rectal prolapse, and malnutrition. Admit to hospital when complications are present.

Pertussis can be prevented by the “five-in-one” Immunisation recommended for all children (See section on ‘Immunisation’).

In the event of a child developing pertussis before immunisation, the “five in one” vaccine should still be given to protect against the four other diseases.

During epidemics, or when there is a clear history of contact in a child with catarrh, appropriate antibiotics may help reduce the period of infectivity and transmission. All cases should be reported to the District Disease Control Officer.

CAUSE

- *Bordetella pertussis*

SYMPTOMS

Catarrhal Phase: Initial 1-2 weeks

- Low grade fever
- Nasal discharge
- Mild cough

Paroxysmal phase: within the following 6-10 weeks

- Episodes of violent repetitive cough ending with inspiratory whoop or vomiting (whoop may be absent in babies and adults)

Recovery (convalescent) phase: next 2-3 weeks

- Gradual reduction in bouts of coughing

SIGNS

- Apnoea (long pause in breathing) common in babies
- Cyanosis

INVESTIGATIONS

- FBC - high total lymphocyte count
- Chest X-ray (to exclude other causes of chronic cough)

TREATMENT**Treatment objectives**

- To reduce transmission
- To prevent complications

Non-pharmacological treatment

- Feed frequently between coughing spasms
- Encourage adequate oral fluid intake

Pharmacological treatment**A. Patients and close contacts within 14 days of onset of symptoms**

1st Line Treatment

Evidence Rating: [A]

- Erythromycin, oral,
Adults

500 mg 6 hourly for 7 days

Children

8-12 years; 250-500 mg 6 hourly for 7 days

2-8 years; 250 mg of suspension 6 hourly for 7 days

6 months-2 years; 125 mg of suspension 6 hourly for 7 days

< 6 months; not recommended (risk of pyloric stenosis).

Consider Trimethoprim/Sulphamethoxazole instead. (See below).

Or

Evidence Rating: [B]

- Azithromycin, oral,
Adults

500 mg daily for 3 days

Children

10 mg/kg body weight daily for 3 days

(not recommended for children less than 6 months because of a risk of pyloric stenosis).

Consider Trimethoprim/Sulphamethoxazole instead. (See below).

Or

Evidence Rating: [C]

- Clarithromycin, oral,
Adults

500 mg 12 hourly for 7 days

Children

7.5 mg/kg 12 hourly for 7 days

2nd Line Treatment

Evidence Rating [C]

- Trimethoprim/Sulphamethoxazole, oral,

Adults

160/800 mg 12 hourly for 7 days

Children

4/20 mg/kg 12 hourly for 7 days

B. Oxygen therapy when oxygen saturation <92%

- Oxygen, intranasal or face mask, (if the patient has difficulty in breathing or is cyanosed)

REFERRAL CRITERIA

Refer infants who have an episode of apnoea or cyanosis after initial resuscitation to a specialist.

26. Tetanus

Tetanus is a disease caused by a bacterium, which produces a neurotoxin responsible for the clinical features. These bacteria live predominantly in the soil, so it is easy to get this infection whenever a break in the skin is not cleaned properly. Tetanus-prone wounds include burns, puncture injuries, or those contaminated by soil/manure, septic wounds, and those with much devitalised tissue and compound fractures.

- | The use of non-sterilised instruments or dressings on the umbilical cord predisposes to neonatal tetanus. The incubation period is 3-21 days.

TETANUS | Tetanus should be treated as a medical emergency. Tetanus immunisation is the key for prevention (See section on 'Immunisation').

CAUSE

- *Clostridium tetani*

SYMPTOMS

- Difficulty or inability to open mouth
- Constipation
- Stiff body
- Spasms- these are painful and are triggered by noise, bright light or touch; spontaneous in severe cases.

SIGNS

- Umbilicus may be infected
- Presence of wound (but may have healed)
- Irritability
- Cyanosis during spasms
- Sardonic (mocking) smile
- Lock jaw (cannot open the mouth)
- Opisthotonus (stiff arched back)
- Rigid abdomen and stiff neck and limbs

INVESTIGATIONS

- No confirmatory test (diagnosis is clinical)

TREATMENT

Treatment objectives

- To prevent further spasms
- To eliminate *Clostridium tetani* to stop further toxin production
- To neutralise circulating toxin
- To provide adequate hydration and nutrition
- To provide supportive care till spasms cease completely

Non-pharmacological treatment

- Always admit a suspected case of tetanus
- Maintain a clear airway
- Avoid noise, bright light and unnecessary physical examination of the patient
- Clean the infected umbilicus or wound with soap and water or antiseptic solution (See section on 'Wound management')
- Surgical debridement of the wound when necessary

Pharmacological treatment

A. Eradication of bacteria in a patient diagnosed to have tetanus

1st Line Treatment

Evidence Rating: [A]

- Metronidazole, IV,

Adults

500 mg 6 hourly for 7-10 days

Children

> 1 month 7.5 mg/kg 8 hourly for 7-10 day

Neonates

> 7 days; 7.5 mg/kg 12 hourly

< 7 days; 7.5 mg/kg 48 hourly

2nd Line Treatment

Evidence Rating: [B]

- Benzylpenicillin, IV,

Adults

50,000 units/kg stat, then 4 MU 6 hourly for 5 days

Children

50,000 units/kg 6 hourly for 5 days

Neonates

250,000 units 6 hourly for 7 days

And

- Gentamicin, IV, (neonates only), 4 mg/kg 24 hourly

B. To neutralize free circulating toxin

Evidence Rating: [B]

- Human Tetanus Immunoglobulin, IM or IV,

Adults and Children

500 units stat.

Neonates

250 units stat.

And

- Tetanus Toxoid, IM, (inject at different site from Human Tetanus Immunoglobulin)

Adults and Children

> 2 years; 0.5 ml stat. Repeat at 4-8 weeks (2nd dose) and at 6-12 months (3rd dose)

< 2 years; 3 doses of Pentavalent vaccine at intervals of four weeks

C. To control spasms

Evidence Rating: [C]

Adults

- Chlorpromazine, IM, 50 mg 4-8 hourly

And

- Diazepam, IV or IM, (by slow IV at a rate of not more than 5 mg/minute), 5-10 mg 3-6 hourly when required

Or

- Phenobarbitone, IM, 200 mg 8-12 hourly, gradually reduce sedation after about 2 weeks

Children

- Chlorpromazine, IM or oral (via nasogastric tube), 12.5-25 mg 8 hourly

And

- Diazepam, IV/IM/nasogastric tube/suppository, 0.3 mg/kg 3-6 hourly when required (by slow IV at a rate of not more than 5 mg/minute)

Or

- Phenobarbitone, IM or oral (via nasogastric Tube), 10 mg/kg stat., then 2.5 mg/kg 12 hourly

Neonates

- Chlorpromazine, IM or oral (via nasogastric tube), 7.5 mg 8 hourly

And

- Phenobarbital (Phenobarbitone), IM or oral (via nasogastric tube), 30 mg stat. then 7.5 mg 12 hourly

Neonates-if spasms are not controlled with the above treatment

Add

- Diazepam, rectal, 0.5 mg/kg 3-6 hourly when required

Box 5-2: Tetanus Immunisation

- Start Immunisation before discharge from hospital in all patients because tetanus infection does not provide immunity against future episodes
- An adult who has received a total of 5 doses of tetanus toxoid is likely to have life-long immunity

Box 5-2: Tetanus Immunisation

- A course of tetanus toxoid vaccinations should be given to any previously unimmunised patient older than 2 years of age. Dose: 0.5 ml, IM or deep SC, repeat at 4 weeks and 8 weeks (primary course)
- If 10 or more years (5 or more years for children below age 15 years) have elapsed since primary course or last booster, give booster dose of 0.5 ml
- In tetanus-prone wounds start the primary course in the non-immunised patient. A booster dose may be given if more than five years have elapsed since the last dose
- Survivors of neonatal tetanus should follow the normal schedule for "Five-in-One" (Penta-) vaccine
- Previously unimmunised children below the age of 2 years should receive 3 doses of 5 in 1 at intervals of four weeks.
- Cut umbilical cord with sterile instrument, clean with methylated spirit (alcohol) and leave uncovered
- To prevent tetanus in patients with potentially contaminated wounds (tetanus prone wound), provide adequate wound toileting (See section on 'Wounds') and also provide tetanus prophylaxis
- Tetanus Immunisation in pregnancy (See section on 'Antenatal Care')

REFERRAL CRITERIA

Refer patients to a specialist if spasms cannot be controlled.

27. Poliomyelitis

Poliomyelitis is a viral disease, which is spread by faecal-oral or oral-to-oral transmission. Insanitary disposal of excreta and use of unsafe drinking water contribute to the spread. The disease is characterised by varying degrees of acute flaccid paralysis, which commonly persists.

Paralysis commonly affects one lower limb but any group of skeletal muscles, including the muscles of respiration and bulbar cells in the brain may be affected.

Poliomyelitis is commonly acquired in childhood. The infection is often sub-clinical and may only appear as a mild flu-like illness. Only few cases progress to develop paralysis. However, injections during periods of the febrile illness are associated with an increased incidence of paralytic poliomyelitis.

Poliomyelitis is preventable by Immunisation. Prevention is almost certain if 4 doses of oral polio vaccine are given as in the EPI schedule. Rarely Vaccine-Associated Paralytic Poliomyelitis (VAPP) may occur in recipients of oral polio vaccines and their unimmunised contacts. This is usually associated with polio virus type 2.

Note 5-1

All cases of poliomyelitis should be reported to the District Disease Control Officer for follow-up.

CAUSES

- Poliovirus serotypes 1, 2 or 3

SYMPTOMS

- Fever
- Headache
- Sore throat
- Muscle pain
- Flaccid paralysis

SIGNS

- Acute flaccid paralysis of affected muscles
- Diminished or absent muscle reflexes

INVESTIGATIONS

- Two fresh stool samples taken 24-48 hours apart (to be sent on ice to the Regional Public Health Reference Laboratory for confirmation)

TREATMENT

Treatment objectives

- To provide supportive care till patient recovers from acute illness
- To avoid or limit the extent of paralysis
- To provide rehabilitation in paralytic cases

Non-pharmacological treatment

- Bed rest
- Avoid injections during febrile illness in children
- Physiotherapy
- Provision of appropriate appliances to aid mobility

Pharmacological treatment

- No specific antiviral treatment

REFERRAL CRITERIA

Refer all patients with difficulty in breathing and swallowing for hospital admission.

28. Diphtheria

The bacteria responsible for this disease produces a toxin that damages human body tissues and organs. It commonly affects the tonsils and sometimes the skin causing ulcers. It is spread mainly by respiratory droplets from person to person, and less commonly through skin contact.

Infected patients may recover after initial symptoms and signs or develop severe weakness and die within 6-10 days. Complications may develop in the early phase of the disease or weeks later such as abnormal heartbeat and heart failure, damage to valves of the heart, or respiratory obstruction leading to death.

The disease is now uncommon because of immunisation. However, high immunisation coverage needs to be maintained to keep the disease under control because it has a high mortality rate.

Note 5-2

All cases of diphtheria should be reported to the District Disease Control Officer.

CAUSES

- *Corynebacterium diphtheriae*

SYMPTOMS

- Sore throat
- Loss of appetite
- Slight fever
- Dysphagia
- Difficulty in breathing with or without stridor

SIGNS

- Greyish white membrane or patch in the throat and on tonsils within 2-3 days of the onset of symptoms. Membrane may bleed, become greyish green or black.

INVESTIGATIONS

- Throat/nasal swabs for culture for index case and close contacts
- Repeat swabs after antibiotic treatment course (treatment may need to be extended).

TREATMENT**Treatment objectives**

- To neutralise the effect of circulating antitoxins before they become fixed to the tissues
- To provide supportive care respiratory and feeding where indicated
- To eradicate the organism from the pharynx
- To prevent spread

Non-pharmacological treatment

- Bed rest
- Feeding by nasogastric tube for patients who cannot swallow
- Strict isolation of suspected patients

Pharmacological treatment**A. All patients clinically diagnosed with diphtheria**

Evidence Rating: [C]

- Diphtheria antitoxin, IV infusion, (following an intradermal test dose of 0.1 ml of 1 in 10 dilution of antitoxin in Sodium Chloride 0.9%)

Adults

10,000 to 20,000 units

Children

> 10 years; 10,000-20,000 units

< 10 years; 5,000-10,000 units

Note 5-3

Reactions are common so resuscitation facilities should be available immediately

And

- Benzyl Penicillin, IV,

Adults

1.2 g 6 hourly for 48 hours

Children and Neonates

1 month-18 years; 50 mg/kg 6 hourly for 48 hours

Then

- Amoxicillin, oral,

Adults

1 g 12 hourly for 5 days

Children

5-18 years; 500 mg 12 hourly for 10 days

1-5 years; 250 mg 12 hourly for 10 days

1 month-1 year; 125 mg 12 hourly for 10 days

Or

- Azithromycin, oral,

Adults

500 mg daily for 5 days

Children

10 mg/kg body weight daily for 5 days.

Not recommended for children less than 6 months because of a risk of pyloric stenosis.

B. All close contacts

- Amoxicillin, oral, for 14 days (refer dosing above)

Or

For patients who may not tolerate penicillins:

- Azithromycin, oral, for 5 days (refer dosing above)

REFERRAL CRITERIA

Refer patients with laryngeal obstruction or respiratory paralysis to an ENT specialist.

29. Yellow Fever

Yellow fever is caused by a virus transmitted to man by a species of mosquitoes (*Aedes aegypti*) from infected monkeys. The disease is not spread from person to person. Classical yellow fever is usually fatal.

After the onset of symptoms, there is a brief remission of 2-24 hours, following which the symptoms may recur with the development of epigastric pain, jaundice, renal insufficiency, cardiovascular instability and

CHAPTER 5: IMMUNISABLE DISEASES

bleeding from various sites (e.g. gums and needle-puncture sites).

Yellow fever vaccination is protective against the disease and needs to be repeated every ten years. Yellow fever vaccination is a requirement for travel from Ghana to several countries.

Note 5-4

All cases of yellow fever should be reported to the District Disease Control Officer.

CAUSES

- Yellow fever virus

SYMPTOMS

- Fever
- Muscle pain, particularly backache
- Headache
- Shivering
- Loss of appetite
- Nausea or vomiting
- Diarrhoea

SIGNS

- Congestion of the conjunctivae
- Jaundice
- Bleeding from various sites (petechiae, ecchymosis, etc.)
- Right upper abdominal quadrant tenderness
- Signs of renal failure

INVESTIGATIONS

- Urinalysis - proteinuria and raised urobilinogen levels
- Liver function test
- Blood urea, electrolytes and creatinine
- Blood sample for yellow fever virus serology (at the Regional Public Health Reference Laboratory)

TREATMENT**Treatment objectives**

- To provide supportive care for hepatic, renal and circulatory failure
- To manage bleeding disorder

Non-pharmacological treatment

- If yellow fever is suspected in a patient, admit immediately to an isolation ward
- Full supportive treatment for hepatic failure and acute renal failure

Pharmacological treatment**A. Antiviral therapy**

- There is no specific treatment

B. For bleeding patients

- Fresh frozen plasma

REFERRAL CRITERIA

Refer to a hospital, preferably one with an isolation unit.

30. *Haemophilus influenzae type b Disease*

The *Haemophilus influenzae* type b (Hib) bacterium is an important cause of infections such as acute bacterial meningitis, pneumonia, acute epiglottitis and otitis media in children less than 5 years old. Hib disease is not common beyond 5 years of age.

Hib infections are preventable by the five-in-one (penta-) vaccine (See EPI 'Schedule for routine Immunisation of children under 5 years').

CAUSES

- *Haemophilus influenzae* type b (Hib)

SYMPTOMS

- Fever
- Other symptoms associated with pneumonia, otitis media, meningitis, septicaemia

SIGNS

(See signs and symptoms of the specific diseases in other sections)

INVESTIGATIONS

- Culture and sensitivity of appropriate body fluids (e.g. pus from the ear in suppurative otitis media, cerebrospinal fluid in meningitis, pleural aspirate in empyema, blood).

Note 5-5

Blood culture is only relevant in invasive disease and would not be helpful in uncomplicated pneumonias.

TREATMENT**Treatment objectives**

- To eliminate the bacteria
- To provide supportive care

Non-pharmacological treatment

- Refer to relevant sections on the presenting illness e.g. meningitis, pneumonia

Pharmacological treatment

- Refer to relevant sections on the presenting illness e.g. meningitis, pneumonia

REFERRAL CRITERIA

All patients who fail to show remarkable signs of improvement in 3

days following drug treatment, or present with complications should be referred for higher-level care.

31. Pneumococcal Disease

Pneumococcal disease presents more commonly as non-invasive disease in the form of non-bacteraemic pneumonia, middle-ear infections, sinusitis, or bronchitis. However, it may also manifest as Invasive Pneumococcal Diseases (IPD) in the form of pneumonia with empyema and/or bacteraemia or meningitis as a result of haematogenic spread. In developing countries, non-bacteraemic pneumonia causes the majority of pneumococcal deaths. Ninety distinct serotypes have been identified.

Pneumococcal disease is effectively prevented with Pneumococcal Conjugate Vaccine (PCV) at 6,10 and 14 weeks for infants. Pneumococcal Polysaccharide Vaccine (PPSV23) is recommended for persons older than 2 years with underlying medical conditions such as Sickle Cell Disease. Adults with immunocompromising conditions, functional or anatomic asplenia, cerebrospinal fluid leaks, or cochlear implants should receive PCV13 followed by PPSV23.

CAUSES

- *Streptococcus pneumoniae*

SYMPTOMS

- Fever
- Other symptoms associated with pneumonia, otitis media, meningitis, septicaemia

SIGNS

- Please refer to signs and symptoms of the specific diseases in other sections

INVESTIGATIONS

- Culture and sensitivity of appropriate body fluids (e.g. pus from the ear in suppurative otitis media, cerebrospinal fluid in meningitis, pleural aspirate in empyema, blood).

Note 5-6

Blood culture is only relevant in invasive pneumococcal disease and would not be helpful in uncomplicated pneumonias.

TREATMENT

Treatment objectives

- To eliminate the bacteria
- To provide supportive care

Non-pharmacological treatment

(See relevant sections on the presenting illness e.g. meningitis, pneumonia)

Pharmacological treatment

(See relevant sections on the presenting illness e.g. meningitis, pneumonia)

REFERRAL CRITERIA

All patients who fail to show remarkable signs of improvement in 3 days following drug treatment, or present with complications should be referred for higher-level care.

32. Hepatitis

(See section on 'Acute and Chronic Hepatitis under Disorders of the Liver')

33. Rotavirus Disease

(See section on 'Rotavirus Disease and Diarrhoea' under Disorders of the Gastrointestinal Tract)

PROBLEMS OF THE NEWBORN (NEONATE)

34. Sick newborn

The term newborn (neonate) refers to a baby in the first month of life. At birth all healthy newborns are active with a strong cry. Any baby born ill will show signs of poor activity or may be described as "being flat" or floppy in severe cases. The newborn with one or more abnormal vital signs is unwell. These include colour, activity, temperature, respiration, heart rate, blood sugar, urine output, nature of bowel movements, signs of distress (pain).

CAUSES

- Birth asphyxia
- Prematurity
- Neonatal infections
- Congenital malformations e.g. heart, central nervous system, bowel etc.
- Birth injury
- Maternal sedation or analgesia during labour
- Metabolic e.g. hypoglycaemia, hypocalcaemia

SYMPTOMS

- Weak cry or inability to cry
- Difficulty in breathing or recurrent cessation of breathing (apnoea)
- Reduced spontaneous movements or being very floppy
- Refusal of feeds
- Vomiting
- Abdominal distension
- Convulsions
- Blood in stools
- Reduced urine output

SIGNS

- Raised body temperature ($> 37.5^{\circ}\text{C}$ axillary)
- Low body temperature ($< 36.5^{\circ}\text{C}$ axillary)
- Pallor
- Cyanosis

- Jaundice
- Bradycardia (< 100 beats/minute)
- Tachycardia (> 160 beats/minute)
- Heart murmurs
- Respiratory distress (> 60 breaths/minute, chest indrawing)
- Respiratory rate < 20 breaths/minute
- Apnoea
- Abdominal distension
- Drowsiness or unconsciousness
- Seizures
- Tenderness of any part of the body

INVESTIGATIONS

- FBC
- Random blood glucose
- Blood urea and electrolytes
- Blood cultures
- Urine culture
- Swab of any lesions for culture and sensitivity
- Chest X-ray
- Plain abdominal X-ray, erect and supine if indicated
- Cerebrospinal fluid biochemistry and culture and sensitivity

TREATMENT

Treatment objectives

- To diagnose and treat underlying cause appropriately
- To identify and urgently correct hypoglycaemia
- To prevent permanent organ damage

Non-pharmacological treatment

- Establish airway, ensure breathing and adequate circulation (ABC)
- Keep baby warm either wrapped up in dry clothes or in an incubator

Pharmacological treatment

Evidence Rating: [A]

A. Oxygen Therapy

- Oxygen by face mask or nasal prongs, 1-2 L/minute if available, (monitor and maintain oxygen saturation between 92-95%)

B. Maintenance Fluid

- Dextrose 10%, IV, on day of delivery, 2 drops/minute/kg (60 ml/kg/day)
- Normal Saline 0.18% with Dextrose 10% (60-150 ml/kg/day after day 1)

C. Correction of Hypoglycemia

If hypoglycaemic, correct (See section on 'Neonatal Hypoglycaemia')

CHAPTER 6: PROBLEMS OF THE NEWBORN (NEONATE)**D. For neonates having seizures (convulsions)**

- Phenobarbitone, IV/IM, 10 mg/kg stat. then 5 mg/kg 12 hourly

E. To treat sepsis (other than cord sepsis)

- Ampicillin, IM/IV,

Neonates

> 7 days of age; 50 mg/kg 8 hourly for 5-7 days

< 7 days of age; 50 mg/kg 12 hourly for 5-7 days

And

- Gentamicin, IM/IV, 4 mg/kg daily for 7 days (irrespective of age after birth)

Or

- Ampicillin, IM/IV,

Neonates

> 7 days of age; 50 mg/kg 8 hourly for 5-7 days

< 7 days of age; 50 mg/kg 12 hourly for 5-7 days

And

- Cefotaxime, IV, 25-50 mg/kg 8 hourly for 7 days (irrespective of age after birth)

F. For cord sepsis

- Cloxacillin, IM/IV,

Neonates

> 7 days of age; 25-50 mg/kg 8 hourly

< 7 days of age; 25-50 mg/kg 12 hourly

And

- Gentamicin, IM/IV, 4 mg/kg 24 hourly for 7 days (irrespective of age after birth)

G. For bowel related sepsis

- Ampicillin, IM/IV,

Neonates

> 7 days of age; 50 mg/kg 8 hourly for 5-7 days

< 7 days of age; 50 mg/kg 12 hourly for 5-7 days

And

- Gentamicin, IM/IV, 4 mg/kg daily for 7 days (irrespective of age after birth)

And

- Metronidazole, IV (over 20–30 minutes)

Neonate

> 34 weeks corrected gestational age; 15 mg/kg as a single loading dose followed after 8 hours by 7.5 mg/kg every 8 hours

26–34 weeks corrected gestational age; 15 mg/kg as a single loading dose followed after 12 hours by 7.5 mg/kg every 12 hours

< 26 weeks corrected gestational age; 15 mg/kg as a single loading

dose followed after 24 hours by 7.5 mg/kg daily

REFERRAL CRITERIA

Refer the patient urgently to a specialist for further investigations and treatment if no improvement after 48 hours.

35. Neonatal Hypoglycaemia

Neonatal hypoglycaemia refers to a random blood glucose level below 2.6 mmol/L in the newborn.

As the clinical signs may be variable, or indeed absent, for small or sick babies or infants of diabetic mothers the random blood glucose level should be checked every three hours for the first 24 hours until it stays above 3.5 mmol/L for a further 24 hours.

Neonatal hypoglycaemia may result in death if not promptly treated and should therefore be managed as soon as suspected. Successful treatment results in prompt response. To prevent hypoglycaemia, breastfeeding should be encouraged soon after birth. If the neonate is unable to suck, a nasogastric tube may be passed and expressed breast milk given. If enteral feeds are contraindicated, intravenous fluids should be started immediately.

CAUSES

- Prematurity
- Intra uterine growth retardation
- Baby born to a diabetic mother
- Infection
- Asphyxia

SYMPTOMS

- Irritability and restlessness
- Tremors
- Sweating
- Seizures
- Lethargy

SIGNS

- Sweating
- Tremor
- Tachycardia
- Seizures
- Unconsciousness

INVESTIGATIONS

- Random blood glucose (RBS)
 - Using bed-side glucose meter
 - Check within 2 hours after birth and at regular 3 hourly intervals in infants at risk

- Other investigations depend on the suspected underlying cause

TREATMENT

Treatment objectives

- To maintain blood glucose levels within normal limits
- To identify and treat underlying cause of hypoglycaemia
- To prevent complications e.g. brain damage

Non-pharmacological treatment

- Blood glucose monitoring $\frac{1}{2}$ to 2 hourly in hypoglycaemic infants until normal levels attained

Pharmacological treatment

Evidence Rating: [A]

A. Initial management

- Dextrose 10%, IV, 4 ml/kg as a bolus

B. Maintenance treatment following immediately after initial management

- Saline 0.18% in Dextrose 10%, 60-150 ml/kg/day depending on the age of the newborn (See table below).

Table 6-1: Maintenance fluid requirement

Day	Premature	Term
1	60 ml/kg/day	50 ml/kg/day
2	90 ml/kg/day	70 ml/kg/day
3	110 ml/kg/day	90 ml/kg/day
4	130 ml/kg/day	120 ml/kg/day
≥ 5	150 ml/kg/day	120 ml/kg/day

C. Additional management

Depends on the underlying cause.

REFERRAL CRITERIA

Refer to a specialist if patient does not respond promptly in spite of adequate treatment.

36. Neonatal Jaundice

Jaundice in the neonate may be visible when the serum bilirubin level exceeds 100 micromol/L. Neonatal jaundice is important because of the consequences of hyperbilirubinaemia on the brain of the newborn. This condition is called kernicterus (bilirubin encephalopathy) and may cause death. Infants who survive may be handicapped with cerebral palsy, and associated deafness, mental retardation and motor incoordination.

Approximately 80% of newborns will be jaundiced in the first week of life and most of this is physiological. This occurs on day 3 and lasts up to 10 days. This jaundice is mild and the baby remains healthy.

Jaundice in the neonate is likely to be pathological if it is present within the first day of life; or conjugated (direct) bilirubin is more than 40 micromol/L; or total bilirubin is more than 170 micromol/L in preterm and more than 260 micromol/L in the term infant; or the neonate is significantly jaundiced beyond 14 days or has jaundice with fever.

Exchange transfusion is the definitive treatment for hyperbilirubinaemia that has reached the level where kernicterus may occur.

CAUSES

- Physiological
- Haemolysis - Rhesus, ABO incompatibility, G6PD deficiency
- Blood extravasation - cephalhaematoma, subgaleal haematoma
- Sepsis
- Congenital infections
- Liver disease
- Metabolic disorders - galactosemia, hypothyroidism
- Enhanced extra hepatic circulation - GIT obstruction, inadequate feeding
- Congenital defects of bilirubin metabolism
- Breast milk related jaundice

SYMPTOMS

- Yellow eyes
- Yellow skin, hands and feet
- Pale stools (biliary atresia likely)

SIGNS

- Jaundice
- Yellow pigment in skin
- Yellow palms +/- yellow soles of feet
- Pale stools (biliary atresia likely)

INVESTIGATIONS

- Total and direct serum bilirubin concentration
- Other investigations as below, dependent on age at presentation and suspected cause:

Early onset (within first 24 hours of birth)

- Blood group and rhesus (Rh) group of both infant and mother
- Direct Coombs test, Indirect Coombs test, FBC, G6PD
- Blood film for red cell anomalies, malaria parasites
- Cultures of blood, urine, and spinal fluid may be indicated by the history, physical examination or initial laboratory findings

Prolonged jaundice (after 14 days)

- Liver Function tests

- Thyroid Function tests
- Urine for reducing substances
- Urine R/E and C/S
- TORCH (congenital infections) screen
- Hep B
- Abdominal ultrasound scan (exclude biliary atresia)

TREATMENT

Treatment objectives

- To prevent kernicterus (bilirubin encephalopathy)
- To detect and treat underlying cause

Non-pharmacological treatment

- Phototherapy (See note below on 'Phototherapy')
- Exchange blood transfusion (See note below on 'Exchange transfusion')

Box 6-1: Phototherapy

Phototherapy is started if:

- Jaundice is visible on day 1
- Jaundice involves palms and soles of feet
- Jaundice in prematurity
- After day 2, measured level of unconjugated bilirubin is more than 170 micromol/L in preterm or more than 260 micromol/L in term neonate.

A phototherapy unit with blue fluorescent tube lights is preferred. If unavailable, white fluorescent tubes may be used. The baby's eyes must be covered but should be examined daily for any infection. Continue breastfeeding during this time. Ensure adequate fluid intake. Prevent hypothermia or hyperthermia. Phototherapy should be continued till unconjugated bilirubin levels remain below phototherapy levels for at least 24 hours.

Box 6-2: Exchange transfusion

Use warm blood (37°C), cross-matched against maternal and infant serum (160 ml/kg over 2-3 hours). Monitor heart rate, respiratory rate, bilirubin and blood glucose levels during the procedure. Further exchanges may be needed if the bilirubin level continues to rise. Stop the exchange transfusion if the heart rate fluctuates by more than 20 beats/minute.

Lower levels of bilirubin than stated above should be considered for intervention by phototherapy or exchange transfusion in the following cases: sick or low birth weight babies, or following asphyxia, prolonged hypoxemia, acidosis and sepsis.

Since there is no exact test to determine the risk of kernicterus, and hence the level at which exchange transfusion is necessary, the following rule of thumb has proved useful as a guide;

- Serum bilirubin of more than 340 micromol/L in term infant more than 2 kg
- In newborns weighing less than 2 kg, serum bilirubin exceeding the following would require exchange transfusion
 - < 1 kg - 170 micromol/L
 - 1-2 kg - 250 micromol/L
 - Cord Hb < 12 g/dL or cord bilirubin > 80 micromol/L
 - Rapid progression of anaemia in presence of resolving jaundice
 - Hydrops foetalis (requires immediate exchange transfusion with packed cells)

Pharmacological treatment

A. Treatment of underlying sepsis (See section on 'the Sick Newborn')

REFERRAL CRITERIA

Refer immediately, all babies who develop jaundice within 24 hours of life or who have prolonged jaundice to a paediatrician.

Refer all patients requiring exchange transfusion to an appropriate facility.

37. Birth Injuries

Birth injuries include extensive caput succedaneum, cephalhaematoma, subgaleal haemorrhage, nerve palsies and fractures. The presentation varies depending on type and site of injury. Excessive traction may result in injury to the brachial plexus and may be associated with fracture or injury of the humerus or shoulder joint.

CAUSES

- Difficult delivery (including instrumental delivery)

SYMPTOMS

- Swelling of head
- Inability to move a limb properly
- Pallor

SIGNS

- Extensive Caput Succedaneum
- Diffuse swelling of the presenting part of the scalp that may extend beyond cranial suture lines
Cephalhaematoma
- Large swelling of the scalp that is restricted to one half and does not extend beyond the midline
Subgaleal haemorrhage
- Diffuse swelling of the scalp which may result in a distorted shape of the head and face
- Severe pallor

CHAPTER 6: PROBLEMS OF THE NEWBORN (NEONATE)

- Jaundice
- Nerve injuries
- Erbs Palsy - Whole upper limb does not move. There is movement only in the fingers
- Klumpke's Palsy - Fingers of the affected hand do not move (claw hand) but there is active movement in the arm and forearm
- Fractures
- Reduced movement of affected limb
- Swelling of the affected limb
- Abnormal position of limb
- Pain and tenderness on movement of limb

INVESTIGATIONS

- Haemoglobin level for subgaleal haemorrhage
- Serum bilirubin if jaundiced
- X-ray of relevant part if fracture is suspected

TREATMENT**Treatment objectives**

- To arrest further bleeding
- To treat complications of anaemia and jaundice
- To re-establish near normal movement in affected limb
- To promote normal healing of fracture

Non-pharmacological treatment**Extensive caput succedaneum**

- Reassure parents
- Leave swelling alone (spontaneous resolution over 3-4 days)

Cephalhaematoma

- Reassure parents
- Leave swelling alone (spontaneous resolution with time)
 - Do not perform incision and drainage
- Phototherapy if jaundiced

Subgaleal Haemorrhage

- Phototherapy if jaundice levels require this (See section on 'Neonatal Jaundice')

Nerve injuries

- Physiotherapy

Fractures

- May require splinting

Pharmacological treatment**A. Cephalhaematoma and Subgaleal haematoma**To reduce bleeding

Evidence Rating: [A]

- Phytomenadione (Vitamin K), IM, 1 mg stat. even if baby received a dose at birth
To correct Anaemia if Hb < 12 gm/dl
- Blood transfusion, 15-20 ml/kg

REFERRAL CRITERIA

Refer severe cases to an appropriate specialist facility.

38. Neonatal conjunctivitis

Neonatal conjunctivitis or ophthalmia neonatorum is an acute purulent conjunctivitis during the first month of life. It is usually contracted from infected genital secretions of the mother.

Cleaning of the neonate's eyes immediately after birth and the application of 1% tetracycline ointment into the eyes, is effective in preventing the condition. This must be implemented as a policy in all health facilities in which child deliveries are undertaken.

CAUSES

- *Neisseria gonorrhoea*
- *Chlamydia trachomatis*
- Staphylococci
- Streptococci
- Herpes Simplex virus
- Chemical e.g. silver nitrate

SYMPTOMS

- Eye discharge
- Swelling of the eye lids

SIGNS

- Eye discharge, which may be purulent
- Redness and swelling of the conjunctivae
- Oedema and redness of the eyelids

INVESTIGATIONS

- Conjunctival swabs for Gram staining and culture

TREATMENT

Treatment objectives

- To treat the infection
- To prevent blindness

Non-pharmacological treatment

- Clean the eyelids frequently (every 2 hours) with cotton wool dipped in sterile saline solution. In the absence of sterile saline solution, use boiled water that has been left to cool

Pharmacological treatment

A. Treatment of baby

Evidence Rating: [B]

- Ceftriazone, IM or IV, 50 mg/kg stat. (max. 125 mg)
Or
- Cefotaxime, IM, 100 mg/kg stat.

And

- Erythromycin, oral, 12.5 mg/kg 6 hourly for 14 days
And
- Chloramphenicol eye drops, 0.5% applied to each eye every 2 hours for 48 hours (after cleaning away discharge-saline irrigation)

Then

- Chloramphenicol eye drops, 0.5% applied to each eye 6 hourly
And
- Chloramphenicol eye ointment, 1% applied to each eye at night

B. Treatment of mother

Evidence Rating: [A]

- Ceftriazone, IM, 250 mg stat.
And
- Erythromycin, oral, 500 mg 6 hourly for 7 days
- **Treatment of mother's partner(s) for gonorrhoea and chlamydia**
• Ceftriazone, IM, 250 mg stat.
Or
- Cefixime, oral, 400 mg stat.
Or
- Ciprofloxacin, oral, 500 mg stat.

And

- Doxycycline, oral, 100 mg 12 hourly for 7 days
Or
- Tetracycline, oral, 500 mg 6 hourly for 7 days
Or
- Erythromycin, oral, 500 mg 6 hourly for 7 days
Or
- Azithromycin, oral, 1 g stat.

REFERRAL CRITERIA

Refer all neonates with corneal involvement and or severe neonatal conjunctivitis not responding to treatment to a paediatrician and or an ophthalmologist.

39. Retinoblastoma

Retinoblastoma is a congenital malignant tumour originating from the retina of the eye. This tumour may be hereditary, particularly the bilateral form which forms about 30% of cases. Most tumours however are sporadic (spontaneous mutation). This is the third commonest cancer seen amongst children in Ghana. Most children present before five years of age. It rarely occurs in older children. The prognosis with early presentation is excellent with a 95% chance of long term cure. There is a high rate of development of tumours of other organs later in life in the hereditary form.

CAUSES

- Genetic (up to 40% of cases)
- Sporadic (in about 60% of cases)

SYMPTOMS

- White, shiny spot (leukocoria) in the pupil, also known as the cat's eye reflex is usually the first symptom in most patients
- Squint (strabismus)
- Visual loss
- Protruding eyeball
- Redness of the eye

SIGNS

- Absent red reflex
- Tumour in the retina on fundoscopy
- Vitreous haemorrhage and retinal detachment on fundoscopy
- Increased intraocular pressure (glaucoma)
- Orbital cellulitis

INVESTIGATIONS

- Ultrasound scan of orbit
- Head CT or MRI scan
- Lumbar puncture for cerebrospinal fluid cytology
- Bone marrow aspirate

TREATMENT

Treatment objectives

- To arrest the progression of the tumour
- To prevent distant spread of tumour
- To achieve long term cure
- To provide adequate supportive and palliative care in advanced disease

Non-pharmacological treatment

- Enucleation of the affected eye is curative in the early stages
- Prosthetic eye insertion

- Laser therapy for focal control
- Radiotherapy for local spread of the tumour
- Counselling to help cope with psychological impact of the disease

Pharmacological treatment

A. Intraocular and extraocular retinoblastoma

Chemotherapy

Evidence Rating: [A]

- Vincristine, IV,
- Etoposide, IV,
- Carboplatin, IV,

Or

- Vincristine, IV,
- Etoposide, IV,
- Cyclophosphamide, IV,

B. Advanced disease with intracranial metastases

Palliative care with adequate pain and other symptom control
(See section on palliative care)

C. For treatment of vomiting

Evidence Rating: [A]

- Metoclopramide, IV or oral, 100-400 microgram/kg 8 hourly

Or

- Granisetron, IV, 40 microgram/kg (max. 3 mg) stat.
May repeat 12 hourly if necessary

Or

- Granisetron, oral,
20 microgram/kg (max. 1 mg) within 1 hour before start of treatment

Then

20 microgram/kg 12 hourly for up to 5 days

Or

- Ondansetron, IV,

Adult

5 mg/m² stat.

Repeat 8 hourly if necessary

Children

12-18 years; 8 mg stat. (immediately before chemotherapy)

Or

- Ondansetron, oral,

Adult

8 mg 8 hourly, administered 30 minutes before the start of chemotherapy

Children

12-18 years;

8 mg 8-12 hourly up to 5 days

1-12 years;

4 mg 8-12 hourly up to 5 days

D. For treatment of febrile neutropenia

- Ceftriaxone, IV, 100 mg/kg daily
And
- Gentamicin, IV, 5 mg/kg daily
And (if still febrile after 48 hours, add)
- Cloxacillin, IV, 25-50 mg/kg 6 hourly
And (if still febrile after 5 days, add)
- Fluconazole, oral, 10 mg/kg daily

E. For treatment of anaemia and thrombocytopenia

- Blood and blood product transfusions
(See section on 'Bleeding disorders')

REFERRAL CRITERIA

All patients should be referred to a tertiary centre that can effectively treat retinoblastoma.

40. Wilms Tumour

WILMS TUMOUR

Wilms tumour (nephroblastoma) is a malignant embryonal tumour of renal tissue. It is the fourth commonest cancer amongst children in Ghana. About 80% of children with Wilms tumour present before 5 years of age. It can present soon after delivery. It may be associated with congenital anomalies such as hemihypertrophy and the absence of the iris (aniridia). Wilms tumour has a very good prognosis with an over 80% chance of long-term cure.

CAUSES

- Sporadic gene mutation

SYMPTOMS

- Visible and or palpable abdominal mass
- Fever
- Blood in urine

SIGNS

- Abdominal mass (palpate with care to prevent rupture or dissemination)
- Haematuria (macroscopic or microscopic)
- Hypertension
- Associated congenital anomalies

INVESTIGATIONS

- Abdominal ultrasound scan
- Abdominal CT scan
- Chest X-ray
- Full Blood Count
- Blood Urea, electrolytes and creatinine

TREATMENT

Treatment objectives

- To obtain long term cure
- To provide adequate supportive and palliative care

Non-pharmacological treatment

- Nephrectomy
- Radiotherapy post-surgery for advanced cases

Pharmacological treatment

A. Pre-operative treatment

1st Line Treatment

Evidence Rating: [A]

- Vincristine, IV,
And
- Actinomycin D, IV,
And
- Doxorubicin, IV, (if presence of metastases)

B. Post-operative treatment

Evidence Rating: [A]

- Vincristine, IV,
And
- Actinomycin D, IV,
And
- Doxorubicin, IV, (depending on stage and risk category)
Or
- Carboplatin, IV,
- Etoposide, IV,
- Doxorubicin, IV, Cyclophosphamide IV in combination (For high risk tumours)

C. For treatment of vomiting

Evidence Rating: [A]

- Metoclopramide, IV or oral, 100-400 microgram/kg 8 hourly
Or
- Granisetron, IV, 40 microgram/kg (max. 3 mg) stat.
May repeat 12 hourly if necessary
Or
- Granisetron, oral, 20 microgram/kg (max. 1 mg) within 1 hour before start of treatment
Then
20 microgram/kg 12 hourly for up to 5 days
Or
- Ondansetron, IV,
Adults
5 mg/m² stat.
Repeat 8 hourly if necessary

Children

12-18 years; 8 mg stat. (immediatley before chemotherapy)

Or

- Ondansetron, oral,

Adults

8 mg 8 hourly, administared 30 minutes before the start of chemo-therapy

Children

12-18 years; 8 mg 8-12 hourly up to 5 days

1-12 years; 4 mg 8-12 hourly up to 5 days

D. For treatment of febrile neutropenia

- Ceftriaxone, IV, 100 mg/kg daily
And
- Gentamicin, IV, 5 mg/kg daily
And (if still febrile after 48 hours, add)
- Cloxacillin, IV, 25-50 mg/kg 6 hourly
And (if still febrile after 5 days, add)
- Fluconazole, oral, 10 mg/kg daily

E. For treatment of anaemia and thrombocytopenia

- Blood and blood product transfusions
(See section on 'Bleeding disorders')

REFERRAL CRITERIA

All patients should be referred to specialist centres for appropriate treatment.

DISORDERS OF THE CARDIOVASCULAR SYSTEM

41. Chest Pain

Chest pain is a common patient complaint and must be treated as a medical emergency until proven otherwise as there are several life-threatening underlying causes. The top priority is to exclude or promptly treat serious cardiac and non-cardiac causes. A good history and examination is very helpful in this endeavour.

CAUSES

Common Cardiac

- Stable Angina
- Acute Coronary Syndrome
- Pericarditis

Non-cardiac

- Gastro-oesophageal reflux disease
- Pulmonary Embolus (PE)
- Pneumonia
- Peptic Ulcer
- Oesophageal spasm
- Pleural effusion

Others to consider

- Aortic dissection
- Mitral valve prolapse (other valvular problem)
- Coronary vasospasm
- Sickle cell disease - acute chest syndrome
- Hiatus hernia
- Oesophageal tear with mediastinitis
- Biliary tree disease
- Costochondritis
- Nerve root compression
- Cardiac neurosis/DaCosta's syndrome
- Herpes Zoster

SYMPTOMS

	Myocardial Ischaemia	Aortic Dissection	Pericarditis	Pleuritic Pain	Peptic pain	Musculo-skeletal pain
Quality of Pain	Crushing, tight, heavy or band-like	Tearing	Sharp	Sharp	Burning	Sharp or dull
Site of Pain	Central anterior chest	Central	Central anterior	Anywhere in chest	Central	Anywhere on chest wall
Radiation	To throat, jaw, arms or nowhere	Back	Usually no radiation	Usually none	To throat occasionally	To arms or around chest to back
Exacerbating Factors	Exertion, anxiety, cold	None	Lying supine,	Exacerbated by inspiration, coughing,	Spicy food, alcohol	Pressure on chest or moving neck
Relieving Factors	Rest, nitrates	None	Sitting forward	None	Bland food and antacids	Restriction of movement
Associated features	Nausea, vomiting, sweating, dyspnoea, shock	Shock, cyanosis, sweating, right & left arm BP difference, new aortic regurgitation murmur	Fever, recent viral illness	Cough, haemoptysis, dyspnoea and shock (in massive PE)	Bloating, wind	Patient looks well

| CHEST PAIN

SIGNS

- Shock, pallor, sweating - MI, Dissecting aneurysm, PE
- Dyspnoea - MI with LVF, PE, Pneumonia
- Blood pressure
 - Normal or high
 - Low - suggests cardiogenic shock
 - Difference > 30 mmHg between arms suggests aortic dissection
- Pulse - rate high, low or normal; regular or irregular
- Murmurs - consider valvular heart disease
- Pericardial rub - suggests pericarditis
- Unequal chest expansion - pneumonia and pneumothorax
- Reduced/absent breath sounds - pneumothorax
- Bronchial breathing - pneumonia
- Pleural rub - consider pneumonia, PE
- Abdominal (epigastric) tenderness - Peptic Ulcer Disease
- Guarding - perforated ulcer, peritonitis
- Reduced bowel sounds - paralytic ileus
- Chest wall tenderness - musculo-skeletal cause

INVESTIGATIONS

(See sections for specific disease conditions)

TREATMENT**Treatment objectives**

- Symptomatic relief of chest pain
- Reassurance to minimise anxiety
- Treatment of underlying cause (See sections for specific disease conditions)

Non-pharmacological treatment

(See sections for specific disease conditions)

Pharmacological treatment

(See sections for specific disease conditions)

REFERRAL CRITERIA

Persistent unexplained chest pain.

42. Ischaemic Heart Disease

Ischaemic heart disease is a condition whereby there is reduced blood supply to the heart muscle. It comprises of stable angina pectoris and the acute coronary syndromes.

STABLE ANGINA PECTORIS

Stable angina pectoris is pain or discomfort that occurs in the front of the chest, and may radiate to the neck, shoulders, jaw or arms. The chest pain is typically induced by exertion or emotional stress and relieved by rest or glyceryl trinitrate. Individuals who experience stable angina pectoris are at a high risk of developing acute coronary syndromes or a heart attack. Risk factors include diabetes mellitus, hypertension, cigarette smoking, plasma lipid abnormalities, obesity, family history of heart disease and persistently elevated markers of inflammation such as C-reactive protein.

Risk factors for this condition include obesity, diabetes mellitus, hypertension, smoking, hyperlipidaemia.

CAUSES

- Atherosclerosis with narrowing of the coronary blood vessels
- Spasms of the coronary arteries

SYMPTOMS

- Central or precordial chest pain
 - May radiate into the left arm, neck or jaw
 - Relieved by rest
 - Relieved by glyceryl trinitrate

SIGNS

- No typical signs

INVESTIGATIONS

- 12-lead ECG

- Cardiac enzymes: creatinine kinase-MB (CK-MB) and troponins
- Blood glucose
- Blood lipid profile
- FBC
- Chest X-ray
- Stress ECG
- Echocardiography
- Coronary angiography

TREATMENT

Treatment objectives

- To minimise symptoms
- To prevent progression to acute coronary syndromes
- To identify and manage modifiable risk factors
- To improve quality of life

Non-pharmacological treatment

- Educate and reassure patient
- Healthy lifestyle modifications
 - Diet
 - Exercise
 - Weight management
 - Reduction in alcohol consumption
 - Avoid or quit smoking

Pharmacological treatment

A. Treating the acute chest pain

Evidence Rating: [A]

- Glyceryl trinitrate, sublingual, 500 microgram stat. then as required
 - And**
 - Aspirin, oral, 300 mg stat. then 75 mg daily
 - Or**
 - Clopidogrel, oral, 300 mg stat. then 75 mg daily

- And**
- Atenolol, oral, 50-100 mg daily
- Or**
- Bisoprolol, oral, 5-10 mg daily
- Or**
- Metoprolol, oral, 50-100 mg 8-12 hourly

Note 7-1

Avoid betablockers in bronchial asthma, bradycardia, and hypotension; avoid atenolol in heart failure.

Or

- Verapamil, oral, 80-120 mg 8 hourly

CHAPTER 7: DISORDERS OF THE CARDIOVASCULAR SYSTEM

Note 7-2

Avoid in bradycardia, hypotension and in patients already on beta-blockers

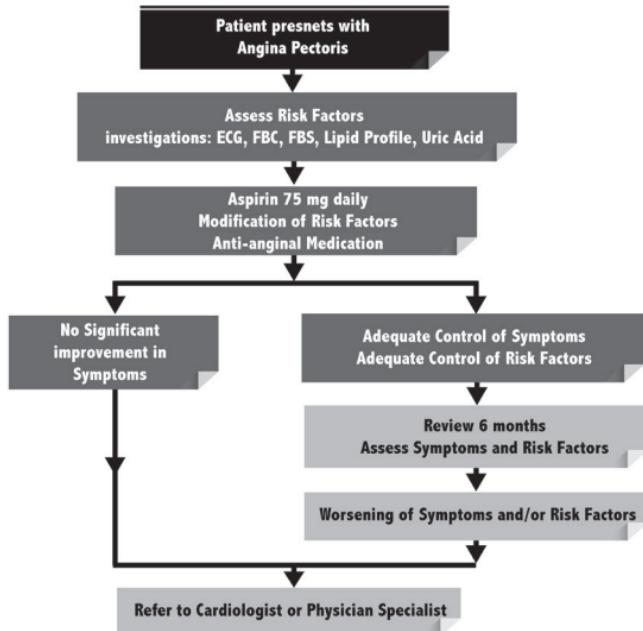
- Optimise or initiate treatment for hypertension
 - Optimise or initiate treatment for diabetes mellitus
 - Use statins to treat abnormal blood lipids to target levels
- B. If beta blockers or verapamil are contraindicated**
- Isosorbide dinitrate, oral, 10 mg 8-12 hourly

REFERRAL CRITERIA

Refer the following patients

- Those with no significant improvement in symptoms after the initial treatment above
- Those with worsening risk factors

FLOWCHART



Ghana National Drugs Programme, Ministry of Health
Email: gndp@ghnlp.org website: www.ghnlp.org

Fig 7-1: Flowchart: Angina Pectoris

ACUTE CORONARY SYNDROME

Acute Coronary Syndrome (ACS) is a term that describes symptoms resulting from severe acute myocardial ischaemia. The ischaemia may, or may not, lead to myocardial infarction (heart attack). ACS is classified

as ST segment elevation on an electrocardiogram (ST-segment elevation myocardial infarction - STEMI) or a non-ST-segment elevation myocardial infarction (NSTEMI) and unstable angina (an ACS without elevation of cardiac enzymes). The risk factors for ACS are identical to those for, and include previous episodes of, stable angina pectoris.

Risk factors for this condition include obesity, diabetes mellitus, hypertension, smoking and hyperlipidaemia.

CAUSES

- Atherosclerosis or obstruction of the coronary blood vessels leading to reduction in blood supply to the heart muscle

SYMPTOMS

- Chest pain
 - Sudden onset
 - Varying degree but often severe and described as tightness, heaviness or constrictive in nature.
 - Persisting for more than 30 minutes
 - Not relieved by rest or glyceryl trinitrate
 - May radiate to the left arm, the neck or jaw
- Nausea
- Vomiting
- Shortness of breath or fatigue (this may be the only presentation in diabetics and the elderly)
- Loss of consciousness

SIGNS

- Restlessness and apprehension
- Excessive sweating
- Peripheral or central cyanosis
- Pulse may be thready, fast, irregular, slow or normal
- Blood pressure may be high, low or unrecordable (following extensive damage to heart muscle)
- Bilateral crepitations in the chest (with left ventricular failure)
- Presence of a third or fourth heart sound (suggests heart failure)
- Confusion in the elderly

INVESTIGATIONS

- Standard 12 lead ECG
- Cardiac enzymes: CK-MB, troponins T and I
- Myoglobin
- Serum lipid profile
- Chest X-ray
- Random blood glucose
- FBC, ESR
- Serum uric acid
- Blood urea, electrolytes and creatinine
- C-reactive protein

CHAPTER 7: DISORDERS OF THE CARDIOVASCULAR SYSTEM

- Echocardiography
- Coronary angiography

TREATMENT**Treatment objectives**

- To relieve distress and pain
- To limit infarct size
- To prevent and treat complications
- To reverse cardiac remodelling
- To prevent re-infarction
- To identify and manage modifiable risk factors
- To improve quality of life

Non-pharmacological treatment

- Reassure patient and encourage bed rest in the first 48 hours
- Encourage cessation of smoking
- Ensure weight reduction (in overweight and obese individuals) in the long term

Pharmacological treatment**A. Initial treatment on admission**

Evidence Rating: [A]

- Oxygen, intranasal, by face mask or nasal cannula
And
- Aspirin, oral (chewable), 300 mg stat.
And
- Clopidogrel, oral, 300 mg stat.
And
- Glyceryl trinitrate, sublingual, 500 microgram stat.
And
- Morphine, IV, 5-10 mg stat.
And
- Metoclopramide, IV, 10 mg stat. (to prevent vomiting induced by morphine)

B. Maintenance treatment following immediately after initial treatment

- Aspirin, oral, 75-300 mg daily indefinitely
And
- Clopidogrel, oral, 75 mg daily (patients who receive revascularisation therapy will require treatment for up to 12 months)

C. Anticoagulation

- Enoxaparin, SC, 1 mg/kg (100 units/kg) 12 hourly

D. Prevention of cardiac arrhythmias and reduction of myocardial workload

- Atenolol, oral, 25-100 mg daily (avoid only if beta-blockers are con-

traindicated)

Or

- Bisoprolol, oral, 5-20 mg daily
- Or**
- Metoprolol, oral, 50-100 mg 8-12 hourly

And

- Lisinopril, oral, 2.5-20 mg daily
- Or**
- Losartan, oral, 25-50 mg daily
- Or**
- Candesartan, oral, 4-16 mg daily

And

In patients with STEMI:

- Fibrinolytic agents may be given as reperfusion therapy in patients presenting with STEMI under specialist care.
- Manage acute complications such as pulmonary oedema, cardiogenic shock and cardiac arrhythmias
- Manage hyperglycaemia with insulin. Change diabetic patients previously on oral hypoglycaemic agents to insulin

E. Long-term treatment (secondary prevention)

- Aspirin, oral, 75-150 mg daily indefinitely

And

- Atenolol, oral, 25-100 mg daily (avoid only if beta-blockers are contraindicated)
- Or**
- Bisoprolol, oral, 5-20 mg daily
- Or**
- Metoprolol, oral, 50-100 mg 8-12 hourly

F. To prevent cardiac remodelling and improve survival

- Lisinopril, oral, 2.5-20 mg daily
- Or**
- Losartan, oral, 25-50 mg daily
- Or**
- Candesartan, oral, 4-16 mg daily

Note 7-3

Avoid ACE inhibitors and Angiotensin receptor blockers in patients with BP < 100 mmHg

G. To stabilise the clot and reduce blood cholesterol levels

- Atorvastatin, oral, 20-40 mg daily
- Or**
- Rosuvastatin, oral, 10-20 mg daily
- Or**

- Simvastatin, oral, 40-80 mg daily. Statins are indicated irrespective of lipid levels
- H. To improve coronary dilatation and reduce myocardial workload
- Isosorbide dinitrate, oral, 10 mg 8-12 hourly
- I. Control of hypertension and hyperglycaemia, if present
(See appropriate sections)

REFERRAL CRITERIA

All patients with suspected ACS require an urgent ECG. If ECG is not available or cannot be interpreted, refer immediately to a higher facility.

Patients with confirmed STEMI in any facility should be referred urgently to a Physician Specialist or Cardiologist for reperfusion therapy (after an initial oral dose of 300 mg of aspirin).

Other patients with N-STEMI and unstable angina should be referred to a physician specialist or cardiologist after the initial management above.

43. Dyspnoea

Dyspnoea is an uncomfortable awareness of one's own breathing. It is often the main symptom of cardiopulmonary disease although the differential diagnosis extends beyond these two systems. Dyspnoea of sudden onset should be treated as a medical emergency.

DYSPNOEA

CAUSES

- Cardiac
 - Heart Failure
 - Coronary Heart Disease
 - Valvular Heart Disease - mitral stenosis, aortic stenosis
 - Cardiac Arrhythmias
 - Pericardial effusion
- Respiratory
 - Pneumonia
 - Pulmonary Embolus (PE)
 - Obstructive lung disease - Chronic Obstructive Pulmonary Disease (COPD), Asthma
 - Restrictive lung disease - Intestinal lung disease eg cryptogenic fibrolysing alveolitis and the occupational lung diseases
 - Pneumothorax
 - Pleural Effusion
 - Chest wall function limitation - myopathy, neuropathy, kyphoscoliosis
- Other
 - Anaemia
 - Psychogenic hyperventilation
 - Acidosis - e.g. uraemia, Diabetic Ketoacidosis, drug overdose

- Foreign body aspiration
- Massive abdominal distension

SYMPTOMS

- Breathlessness
 - Quality
 - continuous or intermittent
 - exertional - suggests cardiopulmonary cause
 - positional - suggests paroxysmal nocturnal dyspnoea, orthopnoea and a cardiac cause
 - nocturnal - suggests cardiac or bronchial asthma
 - Time since onset - recent (acute) or longstanding (chronic)
 - Duration of episode(s)
 - minutes to hours - suggests asthma, pneumothorax, pulmonary oedema, pneumonia, pulmonary oedema, anaesthesia
 - weeks to months - suggests pleural effusion, pericardial effusion, pulmonary fibrosis, lung cancer, recurrent PE, cardiac failure, anaemia, neuromuscular disease, tuberculosis
 - years - COPD, lung fibrosis
- Associated features
 - cough (suggests acute heart failure, pneumonia)
 - sputum, haemoptysis
 - wheeze (asthma, heart failure)
 - ankle oedema (heart, kidney, liver)

DYSPNOEA

SIGNS

- Fever - pneumonia, less commonly PE
- Pallor - severe anaemia acute heart failure, PE, myocardial infarction or cardiogenic shock
- Sweating - acute heart failure, pneumonia, PE, myocardial infarction
- Clubbing - infections, cyanotic congenital heart disease, lung fibrosis
- Cyanosis - hypoxia e.g. in COPD, heart failure, PE, pneumonia etc.
- Peripheral oedema - heart, liver or renal failure
- Wheeze - heart failure or bronchial asthma
- Barrel shaped chest - COPD
- Ascites - cardiac, renal, gastrointestinal, hepatic or intra-abdominal lesion
- Pulse - fast (suggests tachyarrhythmia, PE) or slow (bradyarrhythmia)
- Blood pressure - may be high, normal or low
- Heart murmurs - valvular heart disease
- Other signs - features of pneumonia, pneumothorax, pleural effusion

INVESTIGATIONS

- Full Blood Count
- Urea, Electrolytes, Creatinine
- Chest X-ray

- ECG
- Pulse oximetry
- Peak flow rate measurement
- Cardiac enzymes, Troponin T, CK-MB if ischaemic heart disease is suspected
- Echocardiogram
- Lung Function Tests (spirometry)
- CT pulmonary angiogram useful for confirming PE

TREATMENT

Treatment objectives

- Treat underlying cause - see relevant chapters
- Maintain oxygen saturation above 95% - caution if there is underlying COPD, as these patients are dependent on hypoxic drive

Non-pharmacological treatment

- Based on underlying cause. (See relevant sections)

Pharmacological treatment

- Based on underlying cause. (See relevant sections)

REFERRAL CRITERIA

Refer to the next level of care if cause cannot be identified

44. Deep Vein Thrombosis (DVT)

Deep Vein Thrombosis (DVT) is a common disease although often asymptomatic. The deep veins of the lower limbs are affected most commonly, but thrombosis may affect other sites, including the upper limbs, intracranial and splanchnic veins. Complications include pulmonary thromboembolism, which can be life-threatening. It is therefore essential to have a reliable method for establishing the DVT risk of patients and to take active steps to provide prophylactic treatment as necessary. Common risk factors for DVT include obesity, smoking, prolonged immobility (e.g. bed rest, long haul flights), major surgery e.g. orthopaedic, abdominal and pelvic surgery, pregnancy and the puerperium, after caesarean section, malignancies, inherited blood disorders, oestrogen therapy and medical conditions, e.g. congestive cardiac failure, myocardial infarction, nephrotic syndrome, stroke, systemic lupus erythematosus.

In cases of confirmed DVT, treatment with anticoagulants must not be delayed unnecessarily unless there are significant contraindications to their use such as recent intracerebral bleed, severe liver disease, active peptic ulcer, bleeding disorders, and severe hypertension.

CAUSES

- Stagnation of blood in the vein
- Increased viscosity of blood
- Inflammation of the blood vessel causing damage

SYMPTOMS

- Swelling or firmness of affected limb (usually unilateral)
- Pain in the affected limb
- Mild fever

SIGNS

- Swelling of affected limb
- Differential warmth
- Tenderness
- Redness
- Pitting oedema
- Prominent superficial veins

Box 7-2: Well's Scoring for DVT probability

The Well's scoring system for DVT probability objectifies clinical suspicion of DVT risk and provides criteria for initiating treatment.

The presence or absence of the clinical features below are computed to give a pre-testing probability score for that particular patient which is used to prioritise investigation and treatment.

- Paralysis, paresis or recent orthopedic casting of lower extremity (1 point)
- Recently bedridden (more than 3 days) or major surgery within past 4 weeks (1 point)
- Localized tenderness in deep vein system (1 point)
- Swelling of entire leg (1 point)
- Calf swelling 3 cm greater than other leg (measured 10 cm below the tibial tuberosity) (1 point)
- Pitting oedema greater in the symptomatic leg (1 point)
- Collateral non varicose superficial veins (1 point)
- Active cancer or cancer treated within 6 months (1 point)
- Alternative diagnosis more likely than DVT (Baker's cyst, cellulitis, muscle damage, superficial venous thrombosis, post phlebitic syndrome, inguinal lymphadenopathy, external venous compression) (-2 points)

Table 7-1: Well's Score Interpretation for DVT

3-8 Points:	High probability of DVT
1-2 Points:	Moderate probability
-2-0 Points:	Low Probability

Low probability: D-Dimer test is recommended. Low pre-test probability combined with a negative D-Dimer test essentially rules out a DVT.

Moderate or High Probability: D-Dimer test with additional Doppler/compression ultra sound scan is recommended.

INVESTIGATIONS

- D-Dimer test
- Doppler ultrasound
- Thrombophilia screen e.g. protein C, protein S levels (in patients with recurrent DVT)
- FBC

TREATMENT

Treatment objectives

- To prevent clot propagation and pulmonary embolism
- To prevent recurrence

Non-pharmacological treatment

- Avoidance of prolonged recumbency and dehydration
- Avoidance of excess amounts of coffee, tea and alcohol, especially on long journeys
- Increase water intake during long journeys or periods of immobility
- Regular exercise during long journeys e.g. stopping on road journeys to take a walk or moving about on a plane during long flights and leg flexing exercises while seated
- Avoid crossing legs for long periods on long journeys
- Use of elastic compression stockings

Pharmacological treatment

A. DVT Prophylaxis

1st Line treatment

Evidence Rating: [A]

- Heparin, SC,
Adults
5,000 units 8-12 hourly
Children
1 month-18 years; 250 units/kg 12 hourly

2nd Line Treatment

Evidence Rating: [A]

- Enoxaparin, SC,
Adults
40 mg daily
Children
2 months-18 years; 500 microgram /kg 12 hourly (max 40 mg)
1-2 months; 750 microgram /kg 12 hourly

B. DVT Treatment

1st Line Treatment

Evidence Rating: [A]

- Heparin, SC,
Children
1 month-18 years; 250 units /kg 12 hourly

Or

- Heparin, IV,
Adults
80 units/kg stat. continue with 18 units/kg / hour
Or
250 units/kg, SC, continue with 250 units /kg 12 hourly

Children

1-18 years; 75 units/kg stat. continue with 20 units/kg/hour

1 month-1 year; 75 units/kg stat. continue with 25 units/kg/ hour

Neonates (term baby); 75 units/kg stat. continue with 25 units/kg/ hour

Neonates (< 35 weeks); 50 Units /kg stat. continue with 25 units/kg/hour

2nd Line Treatment

Evidence Rating: [A]

- **Enoxaparin, SC,**

Adults

1.5 mg/kg (150 units/kg) daily

Children

2 months-18 years; 1 mg/kg 12 hourly

1-2 months; 1.5 mg/kg 12 hourly

Neonates; 1.5-2 mg/kg 12 hourly

Or

- **Dalteparin, SC,**

Adults

200 mg/kg (max. of 18,000 units) daily

Children

12-18 years; 200 units/kg once daily (max 18,000 units daily)

1 month-12 years; 100 units/kg 12 hourly

Neonates; 100 units/kg 12 hourly

And

- **Warfarin, oral,**

Adults**Loading Dose**

DAY	DOSE	INR
1	10 mg	-
2	10 mg	-
3	5 mg	Check INR

Note 7-4

Warfarin is not to be given in pregnancy.

Continue 5 mg daily INR until a target INR of 2 to 3 is achieved. After this the low molecular weight heparin is stopped and a maintenance warfarin dose of 2.5 mg to 5 mg (some patients may require 7.5 mg) is continued guided at all times by a target INR of 2 to 3.

Long-term treatment requires continuation of warfarin for three to six months if the risk factor is temporary or unknown. Recurrent DVT and permanent risk factors such as thrombophilia may require long-term anticoagulation.

REFERRAL CRITERIA

Refer to physician specialist for management and monitoring.

45. Pulmonary Embolism

Pulmonary Embolism (PE) results from thrombi, often from the deep veins of the lower limbs or pelvis, which are transported via the right heart into the pulmonary vasculature. Large emboli may cause obstruction to blood flow and result in life-threatening hypoxia and high mortality. PE should therefore be managed as a medical emergency.

The risk factors and management for PE are similar to those for DVT. (See section on 'DVT').

CAUSES

(See section on 'DVT')

SYMPTOMS

- Dyspnoea
- Pleuritic pain
- Cough
- Haemoptysis (due to pulmonary infarction)
- Presyncope, syncope or collapse (massive PE)
- Unilateral swelling of a limb

SIGNS

- Tachypnoea
- Tachycardia (may be regular or irregular)
- Blood pressure - low/unrecordable (suggests massive PE), normal or high
- Pleural effusion
- Low oxygen saturation on pulse oximetry <90%
- Pleural rub
- Cyanosis
- Unilaterally swollen calf or thigh of DVT

Box 7-3: Well's scoring for PE probability

- Symptoms of DVT (3 points)
- No alternative diagnosis better explains the illness (3 points)
- Tachycardia with pulse > 100 (1.5 points)
- Immobilization (>= 3 days) or surgery in the previous four weeks (1.5 points)
- Prior history of DVT or pulmonary embolism (1.5 points)
- Presence of hemoptysis (1 point)
- Presence of malignancy (1 point)

Table 7-2: Well's Score Interpretation for PE

Score > 6:	High probability
Score >= 2 and <= 6:	Moderate probability
Score < 2:	Low Probability

Low probability: D-Dimer test is recommended.

Moderate or High Probability: D-Dimer test with additional CT Pulmonary angiogram is recommended.

INVESTIGATIONS

- Chest X-ray
- ECG
- D-Dimer
- CT Pulmonary angiogram
- Echocardiography
- Doppler Ultrasound of the affected limb and pelvis
- FBC

TREATMENT

Treatment objectives

- To stabilise cardio-respiratory function
- To prevent further clot formation and embolisation
- To prevent recurrence and development of pulmonary hypertension

Non-pharmacological treatment

- Elevate affected leg on a pillow if DVT present
- Apply compression stockings - after pain subsides if DVT present
- Surgical techniques e.g. embolectomy, inferior vena caval filters etc.

Pharmacological treatment

A. Clinical suspicion of pulmonary embolus

1st Line Treatment

Evidence Rating: [A]

- Oxygen, by face mask or nasal prongs or via non-rebreather mask (keep oxygen saturation > 95%)
And
- Morphine, IV, 5-10 mg stat.

And

- Enoxaparin, SC,
Adults
1.5 mg/kg (150 units/kg) daily
Or
- Dalteparin, SC,
Adult
200 mg/kg (max. 18,000 units) daily

- Warfarin, oral, simultaneously (NOT in pregnancy)
 - Adults**
 - Loading Dose**

DAY	DOSE	INR
1	10 mg	-
2	10 mg	-
3	5 mg	Check INR

Note 7-5

Continue 5 mg daily INR until a target INR of 2 to 3 is achieved. After this the low molecular weight heparin is stopped and a maintenance warfarin dose of 2.5 mg to 5 mg (some patients may require 7.5 mg) is continued guided at all times by a target INR of 2 to 3.

Long-term treatment requires continuation of warfarin for three to six months if the risk factor is temporary or unknown. Recurrent embolisms and permanent risk factors such as thrombophilia requires long term anticoagulation.

REFERRAL CRITERIA

Refer all patients with suspected pulmonary embolism, where facilities are unavailable for confirmation, to a physician specialist or cardiologist for expert management after stabilisation.

46. Stroke

A stroke can be defined as a sudden global or focal neurological deficit resulting from spontaneous haemorrhage or infarction of the central nervous system, with objective evidence of an infarction or haemorrhage, irrespective of the duration of clinical symptoms. A CT or MRI scan is required to make the diagnosis and exclude other intracranial lesions that could present similarly.

A Transient Ischaemic Attack (TIA), on the other hand, is a transient episode of neurologic dysfunction caused by focal brain, spinal cord, or retinal ischemia. There is no objective evidence of acute infarction in the affected region of brain or retina.

In adults, hypertension, diabetes, dyslipidaemia, atrial fibrillation and smoking, increase the risk for strokes. In children sickle cell disease and cyanotic heart disease are important risk factors for strokes.

Patients should ideally have multidisciplinary care.

CAUSES

- Cerebral infarction
 - Thrombosis of a cerebral vessel
 - Embolism from a distant site (e.g. atrial fibrillation)
- Intracerebral haemorrhage
- Subarachnoid haemorrhage

SYMPOTMS

- Weakness of one side of the body including the face
- Inability to rise up from a sitting or lying position
- Sudden fall/collapse
- Loss of speech
- Loss of vision
- Severe headache and/or neck pain (subarachnoid haemorrhage)
- Unconsciousness in some patients
- Seizures

SIGNS

- Paralysis of a limb
- Facial paralysis (lower half)
- Initial flaccidity of limbs, but later spasticity and exaggerated reflexes
- Hemianopia (loss of one-half of visual field)
- Hemi-anaesthesia (loss of sensation of one-half of body)
- Extensor plantar response
- Dysarthria/dysphasia (alteration of speech)
- Neck stiffness (in subarachnoid haemorrhage)

INVESTIGATIONS

- STROKE
- FBC, ESR
 - Blood glucose
 - Serum lipid profile
 - Blood urea, electrolytes and creatinine
 - Uric acid
 - ECG
 - CT scan/MRI of the head
 - Chest X-ray

TREATMENT

Treatment objectives

- To limit the area of brain damage
- To protect patients from the dangers of unconsciousness and immobility
- To prevent aspiration
- To treat the underlying cause if possible
- To identify and manage modifiable risk factors (hypertension, high cholesterol, diabetes mellitus etc.)
- To institute measures to improve functional recovery
- To support and rehabilitate patients who survive with residual disability
- To minimise adverse effects of drug therapy

Non-pharmacological treatment

- Admit and monitor patient's vital signs and neurological signs frequently (4 hourly)

CHAPTER 7: DISORDERS OF THE CARDIOVASCULAR SYSTEM

- Establish adequate airway in unconscious patients
- Swallowing test in an upright position (use 10-15ml of water)
- Insert nasogastric tube as early as possible for feeding and medications in unconscious patients or those with swallowing difficulties to prevent aspiration
- Nurse in the lateral position with suctioning where necessary
- Elevate head of bed to 30 degrees to reduce intracranial pressure
- Prevent pressure sores by regular turning (every 2 hours) in bed
- Maintain adequate hydration
- Keep patient clean and dry by frequent use of bedpan/urine pot, diapers, condom catheter as required. Urethral catheter should be used only if absolutely necessary
- Start physiotherapy as soon as practicable

Pharmacological treatment
A. Infarctive Strokes and TIAs

1st Line Treatment

Evidence Rating: [B]

- Aspirin, oral,
Adults

300 mg stat.

Then

75 mg daily

Children

> 16 years; same as adult dose

< 16 years; not recommended

And

- Atorvastatin, oral,

Adults

40-80 mg daily

Children

Not recommended

Or

- Rosuvastatin, oral,

Adults

20-40 mg daily

Children

Not recommended

B. Haemorrhagic Stroke with evidence of cerebral oedema present

1st Line Treatment

Evidence Rating: [B]

- Mannitol, IV,
Adults

0.5-1 g/kg 6 hourly (up to 2 g/kg per dose)

Children

1 month-18 years; 0.5-1.5 g/kg Or 2.5-7.5 ml/kg of 20% solution
 (See treatment flowchart for acute medical management of stroke below)

C. Control of co-morbidities (e.g. hypertension, diabetes etc.)

(See appropriate sections)

REFERRAL CRITERIA

Patients with worsening symptoms and signs should be urgently referred for specialist evaluation and care. All stable patients with neurological deficits should be referred to a speech therapist, occupational therapist or physiotherapist as appropriate.

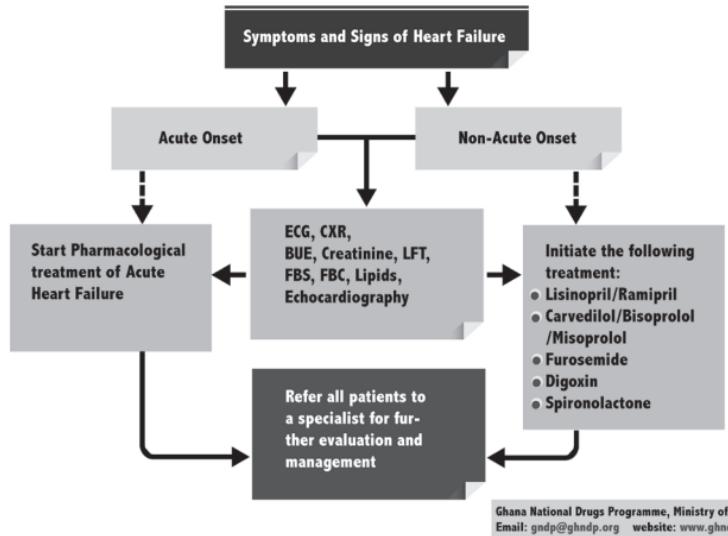
FLOWCHART

Fig 7-4: Flowchart: Stroke

Table 7-3: Treatment flowchart for acute medical management of stroke

History and examination	Identify risk factors, site and extent of the stroke Consider sources of embolism
Investigations	FBC, Urine R/E, BUE, +Cr, Fasting glucose, Fasting cholesterol, CT Scan, CXR, ECG
Hydration	Aiming for euvolaemia (2.5-3 L per day on average) Use normal saline or dextrose saline Avoid dextrose 5% or 10% unless hypoglycaemic.

Table 7-3: Treatment flowchart for acute medical management of stroke

Stress ulcer prophylaxis	Give proton pump inhibitor
Glucose control	Keep RBS (4-10) mmol/L May need insulin sliding scale to control or supplement oral medications (avoid oral metformin if diabetic)
Pyrexia	If > 37.5 oC manage with regular paracetamol to control pyrexia Consider source (chest, urine, malaria, other) and manage accordingly
Blood pressure management	Often rises as direct result of stroke and may partially settle with no action. If > 180/110 mmHg aim for gradual reduction of no more than 20% over 24 hours. Continue pre-stroke medication if indicated. DO NOT USE SUBLINGUAL NIFEDIPINE. Sudden reduction in BP can lead to extension of stroke.
Treatment of infarcts	Start aspirin 300 mg stat as soon as infarct identified via (oral/NG) if no contraindications. Reduce dose to 75 mg daily after 1 week, and consider further anti-platelet medication.
Atrial Fibrillation	Consider rhythm control for acute onset; anticoagulation
Mobilisation of patients	Early referral of all patients to the physiotherapist (even if unconscious)
Aspiration pneumonia	Look for signs of this regularly (rising respiratory rate, tachycardia, chest signs). Treat with IV Amoxicillin + Clavulanic Acid and IV metronidazole for first 48 hours then review
DVT and Pulmonary embolism	Prophylactic heparin if infarct detected on CT scan
Seizures	Terminate seizures as per protocols. Regular anticonvulsant if more than one seizure occurs
Change in conscious level	Urgently consider possibilities such as; cerebral oedema/hypoglycaemia/metabolic/drug causes that can be reversed
Rising ICP	Nurse at 30 degrees head up, IV mannitol +/- Dexamethasone as required
High cholesterol	Start high dose statins as per guidelines

47. Heart Failure

This is a condition in which the heart is unable to produce adequate cardiac output, and in so doing, is unable to meet the body's metabolic requirements. The cardiac dysfunction may predominantly involve the left or the right ventricle individually or both ventricles simultaneously. This latter case is termed Biventricular Failure (BVF) or Congestive Cardiac Failure (CCF).

The functional classification of heart failure using the New York Heart Association (NYHA) Classification is described in the table below.

Table 7-4: New York Heart Association (NYHA) Classification for Heart Failure

CLASS I	No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, or dyspnoea
CLASS II	Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in fatigue, palpitation or Dyspnoea
CLASS III	Marked limitation of physical activity. Comfortable at rest, but slight activity causes fatigue, palpitation or dyspnoea
CLASS IV	Unable to carry out any physical activity without discomfort. Symptoms of cardiac insufficiency are present at rest. If any physical activity is undertaken, discomfort is increased

HEART FAILURE

CAUSES

- Systemic arterial hypertension
- Rheumatic heart disease
- Cardiomyopathies
- Severe anaemia
- Ischaemic heart disease
- Thyrotoxicosis
- Congenital heart disease
- Pulmonary arterial hypertension
- Cardiac arrhythmia

SYMPTOMS

Left Heart Failure

- Breathlessness
 - On exertion
 - On lying flat (orthopnoea)
 - At night (paroxysmal nocturnal dyspnoea)
- Easy fatigability
- Cough with frothy blood-stained sputum
- Wheezing

Right Heart Failure

- Swelling of the feet and lower extremities (may be absent in children below 6 months)
- Abdominal swelling

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- Right hypochondrial pain from an enlarging liver

SIGNS**Left Heart Failure**

- Tachypnoea
- Tachycardia
- Basal crepitations
- Gallop rhythm
- Displaced apex beat
- Cardiac murmur
- Rhonchi

Right Heart Failure

- Tachycardia
- Pitting pedal oedema (may be absent in children below 6 months)
- Ascites
- Tender, smooth, soft hepatomegaly
- Raised jugular venous pressure
- Gallop rhythm
- Cardiac murmur

In children

- Failure to thrive
- Difficulty in feeding

INVESTIGATIONS

- FBC
- ECG
- Chest X-ray
- Blood urea, electrolytes and creatinine and eGFR (estimated glomerular filtration rate)
- Liver function test
- Fasting blood sugar
- Fasting lipids
- Echocardiography
- Thyroid function tests
- Cardiac enzymes, if myocardial infarction is suspected
- Coronary angiography

TREATMENT**Treatment objectives**

- To relieve symptoms and improve quality of life
- To treat the precipitating cause
- To treat complications
- To prevent recurrence of symptoms
- To reduce need for hospital re-admissions
- To reduce mortality

Non-pharmacological treatment

- Reduce salt intake

- Reduce weight in overweight and obese individuals
- Avoid alcohol
- Avoid or quit smoking
- Encourage moderate exercise
- Bed rest (only in acute heart failure or exacerbations of chronic heart failure)
- Prop up in bed

Pharmacological treatment

A. Acute heart failure - initial treatment

1st Line Treatment

Evidence Rating: [A]

- Oxygen, by nasal cannula or face mask if there is hypoxaemia ($\text{SpO}_2 < 90\%$)
And
- Furosemide, IV,
Adults
40-80 mg, repeat after 30 minutes if necessary

Children

12-18 years; 20-40 mg repeated 8 hourly as necessary

1 month-12 years; 0.5-1 mg/kg repeated 8 hourly (max 4 mg/kg/dose)

B. Acute heart failure - maintenance treatment after stabilisation

- Furosemide, IV,

Adults

40-80 mg 12 hourly

Children

12-18 years; 20-40 mg repeated 8 hourly as necessary

1 month-12 years; 0.5-1 mg/kg repeated 8 hourly (max 4 mg/kg/dose)

C. Acute heart failure - patient not improving after initial treatment

- Furosemide (Frusemide), IV,

Adults

40-80 mg 12 hourly

Children

12-18 years; 20-40 mg repeated 8 hourly as necessary

1 month-12 years; 0.5-1 mg/kg repeated 8 hourly (max 4 mg/kg/dose)

And

- Morphine, IV,

Adults

5-10 mg slowly

Children

Not recommended for this condition as safety is not well established

And

CHAPTER 7: DISORDERS OF THE CARDIOVASCULAR SYSTEM

- Metoclopramide, IV,
Adults
10 mg to prevent vomiting
Children
Not required

D. Acute heart failure - patient improving after initial treatment

- Furosemide, oral,

Adults

40-80 mg 12 hourly

Children

0.5-2 mg/kg 8-12 hourly

E. Acute heart failure - patient with fast atrial fibrillation or in sinus rhythm with systolic dysfunction

Evidence Rating: [C]

- Digoxin, oral,

Elderly

125 micrograms 12 hourly for 24-48 hours

Adults

250 micrograms 12 hourly for 24-48 hours

Then

250 micrograms daily

Then

125 micrograms daily

Children > 10 years

0.5-1 mg in 3 divided doses over 24 hours

Then

62.5-250 microgram daily

Children 2-10 years

20-30 microgram/kg in 3 divided doses over 24 hours

Then

8-10 microgram/kg daily

Children < 2 years

30-40 microgram/kg in 3 divided doses over 24 hours

Then

10-12 microgram /kg daily

Neonates (full term)

20 microgram/kg in 3 divided doses in 24 hours

Then

8-10 microgram/kg daily

Neonates (< 1.5 kg)

25 microgram/kg in 3 divided doses in 24 hours

Premature

15 microgram/kg daily

Then

5 microgram/kg daily

- F. Acute heart failure - patients in cardiogenic shock (adult systolic blood pressure <85 mmHg) with hypotension and or hypoperfusion
- Dobutamine, IV infusion,
Adults
2.5-10 micrograms/kg per minute

Note 7-6

ECG should be monitored continuously because inotropic agents can cause arrhythmias and myocardial ischaemia

G. Prophylactic anticoagulation against venous thrombosis

- Enoxaparin, SC,
Adults
1.5 mg/kg (150 units/kg) daily
Children
2 months-18 years; 1 mg/kg 12 hourly
1-2 months; 1.5 mg/kg 12 hourly
Neonates; 1.5-2 mg/kg 12 hourly
- Identify and treat (if possible) precipitating causes such as hypertension, myocardial infarction, anaemia or thyrotoxicosis

H. Symptomatic Heart Failure

1st Line Treatment

- Furosemide, oral,
Evidence Rating: [C]
Adults
40-80 mg daily
Children
1-2 mg/kg daily

And

- Lisinopril, oral,
(only when systolic blood pressure > 100 mmHg)
Evidence Rating: [A]

Adults

2.5-20 mg daily

Or

- Ramipril, oral,
(only when systolic blood pressure > 100 mmHg)
Evidence Rating: [A]

Adults

2.5-10 mg daily

And

- Carvedilol, oral,
Evidence Rating: [A]

Adults

3.125-12.5 mg 12 hourly (maximum 25mg 12 hourly)

Or

- Bisoprolol, oral,
Evidence Rating: [A]

Adults

1.25-10 mg daily

Or

- Metoprolol, oral,
Evidence Rating: [A]

Adults

25-100 mg daily

I. Patients not tolerating ACE inhibitors (replace Lisinopril or Ramipril with the following in the 1st line treatment above)

- Losartan, oral,
Evidence Rating: [A]

Adults

25-50 mg daily

Or

- Candesartan, oral,
Evidence Rating: [A]

Adults

4-16 mg daily

J. Patients with fast atrial fibrillation or in sinus rhythm with systolic dysfunction;

Add

- Digoxin, oral,
Evidence Rating: [B]

Elderly

125 micrograms 12 hourly for 24-48 hours,

Then

125 micrograms 24 hourly

Adults

250 micrograms 12 hourly for 24-48 hours,

Then

250 micrograms once daily

Children

5 micrograms/kg 12 hourly

K. Symptomatic patients, inspite of the above medications

And

- Spironolactone, oral,
Evidence Rating: [A]

Adults

25-50 mg daily

REFERRAL

All patients must be referred to a specialist when clinically stable

for the identification and treatment of the underlying cause of the heart failure and for long-term maintenance therapy.

FLOWCHART

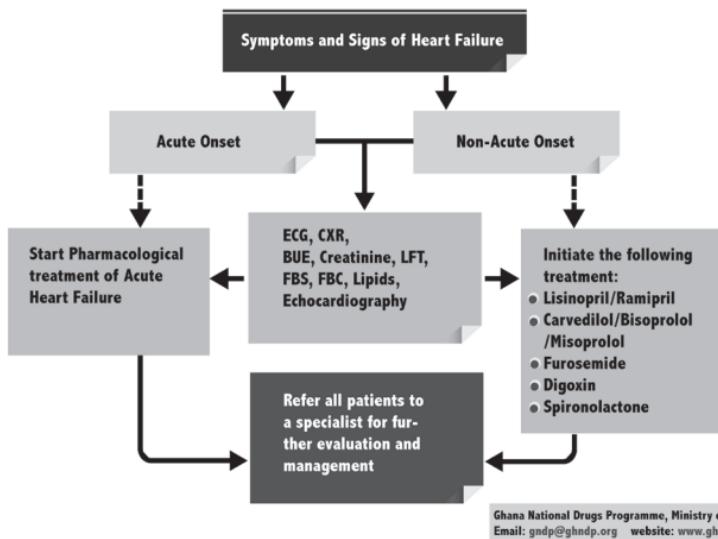


Fig 7-5: Flowchart: Heart Failure

48. Congenital Heart Disease

Congenital malformation of the heart, commonly referred to as "Hole-in-Heart", is quite a common malformation with an incidence of 8 out of 1000 live births. There are two main groups of congenital heart disease namely, acyanotic and cyanotic. The acyanotic types include ventricular septal defect, atrial septal defect, patent ductus arteriosus as well as aortic stenosis, pulmonary stenosis and coarctation of the aorta. The cyanotic types are associated with a mixing of deoxygenated blood with oxygenated blood and include Tetralogy of Fallot (TOF) and Transposition of the Great Arteries (TGA).

Early recognition of the specific type and appropriate medical or surgical intervention is important in improving the quality of life and reducing morbidity from complications.

CAUSES

- Idiopathic
- Genetic (higher risk with increasing maternal age)

CHAPTER 7: DISORDERS OF THE CARDIOVASCULAR SYSTEM

- Maternal infections due to viruses in early pregnancy, notably rubella
- Maternal diabetes
- Alcohol, smoking, and use of drugs during early pregnancy
- Exposure to X-rays and other radiation during early pregnancy
- Prematurity
- Multiple pregnancy

SYMPTOMS**Acyanotic**

- Easy fatigability
- Breathlessness
- Poor feeding/Interruption of sucking in babies during feeding
- Poor growth
- Cold sweat on forehead
- Puffy eyelids, swollen feet (however, these are uncommon in infants)
- Distended abdomen
- Exertion may lead to chest pains, syncope or sudden death

Cyanotic

- All symptoms of acyanotic heart disease, plus the following:
- Blue tongue and fingernails (cyanosis) at birth or becoming worse with exertion in older children
- Squatting several times during play in toddlers

SIGNS**Acyanotic**

- Signs of heart failure for moderate to severe lesions:
 - Cold sweaty skin
 - Puffy eyelids
 - Distended neck veins and ankle oedema (in older children)
 - Tachycardia
 - Tachypnoea
 - Weak thready pulse
 - Cardiomegaly
 - Gallop rhythm
 - Crepitations, rhonchi
 - Hepatomegaly
- Heart murmur (not always present)

Cyanotic

- Signs of heart failure as above, plus
- Finger clubbing
- Cyanosis (low peripheral oxygen saturation measured by pulse oximetry)
- Heart murmur
- Hypercyanotic attack i.e. respiratory distress with deepening cyanosis, loss of consciousness and convulsions

INVESTIGATIONS

- FBC
- Chest X-ray
- ECG
- Echocardiography

TREATMENT**Treatment objectives**

- Early recognition of the problem
- Prompt treatment of heart failure
- Early surgical correction if indicated
- Prevention of endocarditis

Non-pharmacological treatment

- Ensure good nutrition, good oral and dental hygiene
- Avoid excessive physical exertion (notify parents and teachers)

Pharmacological treatment**A. Symptomatic congenital heart disease**

Evidence Rating: [C]

- Oxygen, by face mask or nasal prongs, 2 L/minute if available, (monitor oxygen saturation)

Note 7-7

For patients in heart failure or with hypoxic attack

B. Treatment of heart failure in symptomatic congenital heart disease
(See section on 'Heart Failure')**C. To improve blood flow into the lungs for patients with Tetralogy of Fallot**

- Propranolol, oral,
Children 1 month-12 years
0.25-1 mg/kg 6-8 hourly (max. 5 mg/kg daily)
Neonates
0.25-1 mg/kg 8-12 hourly (max. 2mg/kg 8 hourly)
- Propranolol, slow IV with ECG monitoring,
Children 1 month - 12 years
15-20 microgram/kg 6-8 hourly (max. 200 microgram/kg) repeated every 6-8 hours if necessary
Neonates
15-20 microgram/kg (max. 100 microgram/kg) repeated every 12 hours if necessary

D. Congenital heart disease with hypoxic attack
(See section on 'Hypoxic Attack')

REFERRAL CRITERIA

Refer all children with congenital heart disease to a paediatric cardiologist or paediatrician for further clinical assessment and management.

49. Hypercyanotic attack

This is a life threatening paediatric cardiac emergency.

It usually occurs in infants with a peak incidence between 4 and 6 months. A severe episode may lead to limpness, seizures, cerebrovascular accident or even death. Spells may be brief (1-2 minutes) and self-correct or may progress to a severe, life-threatening episode. Prompt recognition by parents and medical staff is important. The attack is often early in the morning with no apparent reason. It may be precipitated following a bath, by prolonged crying, defaecation, dehydration, febrile illness or induction of anaesthesia.

CAUSES

- Congenital heart disease e.g. Tetralogy of Fallot, pulmonary stenosis, double outlet right ventricle, tricuspid atresia, Eisenmenger syndrome

SYMPTOMS

- Irritability and prolonged crying
- Deep rapid breathing
- Increased severity of cyanosis

SIGNS

- Tachycardia
- Systolic murmur
- Coma
- Convulsions
- Hemiparesis

INVESTIGATIONS

- FBC
- Chest X-ray
- ECG
- Echocardiography

TREATMENT**Treatment objectives**

- To recognise the problem early
- To reverse obstruction
- To correct metabolic derangement in severe hypoxia
- To prevent complications and death from severe hypoxia

Non-pharmacological treatment

- Hold in knee chest position (teach parents)

- The above actions increase peripheral vascular resistance and help to reduce cyanosis.

Pharmacological treatment

A. All children with hypercyanotic attack

Evidence Rating: [C]

- Oxygen (100%), by face mask or nasal prongs, 2 L/minute (monitoring oxygen saturation if possible)-to all patients to reduce hypoxia

And

- 0.9% Normal Saline or Ringers' Lactate, IV, 10 ml/kg, over 30 minutes then assess response

And

- Morphine sulphate, slow IV (preferred), or IM, if IV line not accessible, 100-200 micrograms/kg stat.

B. For patients with poor response to above measures, Add

- Propranolol, oral,

Children 1 month-12 years

500 microgram/kg 8 hourly (max. 5 mg/kg daily)

Neonates

500 microgram/kg 8 hourly (max. 2 mg/kg 8 hourly)

C. To correct acidosis in cyanotic patients with no improvement after 10 minutes of above treatment, Add

- Sodium Bicarbonate, IV,

For all age groups

1-2 mmol/kg

Note 7-8

Emergency surgical shunt may be required

D. Maintenance treatment to prevent recurrent attacks pending surgery

- Propranolol, oral,

Children 1 month-12 years

0.25-1 mg/kg 6-8 hourly (max. 5 mg/kg daily)

Neonates

0.25-1 mg/kg 8-12 hourly (max. 2 mg/kg 8 hourly)

- Propranolol, slow IV with ECG monitoring,

Children 1 month-12 years

15-20 microgram/kg 6-8 hourly (max. 200 microgram/kg) repeated every 6-8 hours if necessary

Neonates

15-20 microgram/kg (max. 100 microgram/kg) repeated every 12 hours if necessary

REFERRAL CRITERIA

Hypercyanotic attack is an indication for early surgery. Refer urgently to a paediatric specialist or cardiothoracic surgeon

50. Pericarditis

Pericarditis is inflammation of the pericardium. It may be dry, fibrinous, effusive or constrictive. It may be acute or chronic (>3 months).

CAUSES

- Viral
- Bacterial
- Tuberculous
- Fungal
- Rheumatic fever
- Post-cardiotomy
- Postmyocardial infarction
- Uraemia
- Autoimmune diseases

SYMPTOMS

- Retrosternal or left precordial chest pain (worsens with lying down and improves with sitting and leaning forward)
- Palpitation
- Fatigue

SIGNS

- Fever
- Malaise
- Myalgia
- Pericardial friction rub
- Fast and regular heart rate
- Distant heart sounds (if there is a large effusion)

INVESTIGATIONS

- FBC and ESR
- ASO titre
- 12-lead ECG
- Chest X-ray
- Echocardiogram
- Chest CT scan

TREATMENT

Treatment objectives

- To relieve pain
- To treat underlying cause
- To prevent cardiac tamponade

Non-pharmacological treatment

Bed rest

Pericardiocentesis (indicated when there is cardiac tamponade, large or symptomatic pericardial effusion). Evidence Rating: [B]

Pharmacological treatment

A. Acute pericarditis

1st Line Treatment

Evidence Rating: [B]

- Ibuprofen, oral,

Adults

300-800 mg 6-8 hourly

Children

7-18 years;	200 mg 6-8 hourly
2-7 years;	100 mg 6-8 hourly
1-2 years;	50 mg 6-8 hourly
6-12 months;	50 mg 8 hourly
1-6 months;	5 mg/kg 6-8 hourly

And

- Colchicine, oral,

Adults

0.5 mg 12 hourly

Children

Not recommended

Or

- Prednisolone, oral, (restricted to connective tissue diseases and uraemic pericarditis)

Adults

40 mg daily for 14 days and taper off

Children

2 mg/kg daily for 14 days and taper off

B. For treatment of underlying cause

(See appropriate section)

REFERRAL CRITERIA

Refer all patients to a Cardiologist for further evaluation after the initial treatment. Patients with large effusions or cardiac tamponade require urgent pericardiocentesis under echocardiographic guidance and they should be referred immediately.

51. Hypertension

Hypertension or 'high blood pressure' carries an increased risk of early death from stroke, heart attack, heart failure and kidney failure if it is not detected early and properly controlled. Owing to this, the focus must

be on when to initiate treatment, rather than how hypertension should be defined.

Since there are often no specific symptoms associated with hypertension, there is the need for regular blood pressure (BP) screening in the adult population for early detection.

In the general adult population, treatment must be initiated at a BP of 140/90 mmHg or higher for individuals below 60 years of age, and 150/90 mmHg or higher in those above 60 years. For individuals with diabetes mellitus or non-diabetics with Chronic Kidney Disease (CKD), treatment for hypertension must be initiated at a BP of 140/90 mmHg, irrespective of age.

In the majority of patients with hypertension, no specific underlying cause is identified (primary hypertension). In these individuals, increasing age, family history, excess body weight, lack of physical activity and excessive alcohol intake may be possible predisposing factors. In about 10% of cases of hypertension, there may be an underlying kidney disease, endocrine disorder, renal artery stenosis or coarctation of the aorta (secondary hypertension).

Once a diagnosis of hypertension is made, the individual should be evaluated to exclude secondary causes and to identify other existing cardiovascular risk factors e.g. diabetes, dyslipidaemia, hyperuricaemia, etc.

Box 7-6: Cardiovascular Risk Factors

- Age (men \geq 55 years; women \geq 65)
- Family history of premature cardiovascular disease (men aged $<$ 55 years; women aged $<$ 65)
- Dyslipidaemia
- Obesity ($BMI \geq 30 \text{ kg/m}^2$)
- Diabetes mellitus
- Smoking
- Pulse pressure (in the elderly) $\geq 60\text{mmHg}$
- Microalbuminuria or proteinuria
- Left ventricular hypertrophy
- Left bundle branch block and other electrocardiographic features suggestive of ischaemic heart disease
- Previous stroke or transient ischaemic attack
- Periperal arterial disease
- Heart failure
- Coronary artery disease
- Chronic kidney disease
- Advanced retinopathy: haemorrhages or exudates, papilloedema

CAUSES

- Primary hypertension
- Secondary hypertension
 - Kidney related- CKD, polycystic kidney disease
 - Endocrine - phaeochromocytoma, Cushing's syndrome, Conn's syndrome, hypothyroidism, hyperthyroidism, acromegaly

- Vascular - renal artery stenosis, coarctation of the aorta

SYMPOTMS

- Usually none
- Occasionally,
 - Headaches
 - Palpitations
 - Dizziness
 - Easy fatiguability

SIGNS

- Blood pressure $\geq 140/90$ mmHg
- Displaced apex beat
- Signs pointing to a specific cause for secondary hypertension

INVESTIGATIONS

- FBC
- Urinalysis
- Blood urea, electrolytes and creatinine
- Blood glucose
- Serum lipids
- Serum uric acid
- Chest X-ray
- 12-lead ECG
- Ultrasound scan of kidneys and adrenals (in suspected secondary hypertension)
- Echocardiogram

HYPERTENSION

TREATMENT

Treatment objectives

- To reduce blood pressure levels to recommended targets:
 - $< 140/90$ mmHg for age below 60 years, diabetes, CKD
 - $< 150/90$ mmHg for age above 60 years
- To manage co-morbid conditions e.g. obesity, diabetes, lipids etc.
- To prevent cardiovascular, cerebrovascular and renal complications
- To promote therapeutic lifestyle changes e.g. smoking cessation, regular physical activity, reduction in alcohol intake
- To identify and manage secondary hypertension appropriately

Non-pharmacological treatment

- Reduce salt intake
- Reduce animal fat intake
- Ensure regular fruit and vegetable intake
- Weight reduction in obese and overweight individuals
- Regular exercise e.g. brisk walking for 30 minutes 3 times a week
- Reduction in alcohol consumption
- Avoid or quit smoking

Pharmacological treatment

A. Treatment of hypertension

1st Line Treatment

Evidence Rating: [A]

Box 7-7: Notes on anti-hypertensive medicines

Any of the five classes of major antihypertensive drugs can be used as first-line treatment. These are:

- Thiazide Diuretics
- Calcium Channel Blockers
- Angiotensin Converting Enzyme Inhibitors
- Angiotensin Receptor Blockers
- Beta-blockers

In the general black population thiazide diuretics or calcium channel blockers, either as monotherapy or in some combination therapy, is preferable. Angiotensin converting enzyme Inhibitors are not recommended as first-line drugs for uncomplicated hypertension in black patients.

Dual therapy should be started earlier when the blood pressure exceeds 180/110 mmHg.

Additional anti-hypertensive drugs should be used if target blood pressure levels are not achieved. Add-on drugs should be chosen from first-line choices bearing in mind compelling indications and contraindications.

Compelling indications for the choice of antihypertensives

- Left ventricular hypertrophy: ACE-I or ARB, CCB preferably Amlodipine
- Microalbuminuria: ACE-I or ARB
- Renal dysfunction: ACE-I or ARB; Caution- if eGFR <15min/ml without renal replacement therapy
- Previous stroke: Any of the first-line drugs, especially ACE-I
- Coronary artery disease (Angina/Myocardial infarction): ACE-I or ARB, Beta-blocker, CCB.
- Heart failure: ACE-I or ARB, Cardio-selective B-Blockers- bisoprolol, metoprolol, carvedilol; Loop diuretics, Spironolactone in advanced heart failure
- Peripheral artery disease: CCB, ACE-I or ARB
- Diabetes mellitus: ACE-I or ARB
- Atrial fibrillation: ARB or ACE-I or B-blockers

Compelling Contraindications

- Gout: Thiazide diuretics
- Beta-blockers: Asthma, 2 and 3 AV block
- CCB: Heart failure
- ACE-I or ARB: Bilateral renal artery stenosis and hyperkalaemia

Thiazide Diuretics:

- Bendroflumethiazide, oral, 2.5 mg daily
Or
- Hydrochlorothiazide, oral, 12.5 mg-25 mg daily

And/Or

Calcium Channel Blockers:

- Amlodipine, oral, 5-10 mg daily
Or
- Nifedipine retard, oral, 10-40 mg 12 hourly

And/Or

Angiotensin-converting enzyme (ACE) inhibitors

- Lisinopril, oral, 5-40 mg daily
Or
- Ramipril, oral, 2.5-10 mg daily

Or

Angiotensin receptor blockers

- Losartan, oral, 25-100 mg daily
Or
- Candesartan, oral, 4-32 mg daily
Or
- Valsartan, oral, 80-160 mg daily

And/Or

Beta-blockers:

- Atenolol, oral, 50 -100 mg daily
Or
- Bisoprolol, oral, 5-20 mg daily
Or
- Metoprolol, oral, 50-200 mg 12 hourly
Or
- Carvedilol, oral, 12.5-50 mg daily
Or
- Labetalol, oral, 100-400 mg 12 hourly

2nd Line Treatment

Evidence Rating: [C]

Centrally acting agents

- Metyldopa, oral, 250 mg-1g 8-12 hourly

And/Or

Vasodilators

- Hydralazine, oral, 25-50 mg 12 hourly

And/Or

Alpha-blockers

- Prazosin, oral, 0.5 mg 8-12 hourly and increasing gradually to a max. dose of 20 mg

And/Or

Aldosterone antagonists

- Spironolactone, oral, 25-50 mg daily

REFERRAL CRITERIA

Refer the following categories of hypertensive patients to an appropriate specialist:

- Those not achieving the target blood pressure (BP) level after several months of treatment
- Those on three or more anti-hypertensive drugs, yet have poor BP control
- Those with worsening of BP over a few weeks or months
- Those with plasma creatinine levels above the upper limit of normal
- Those with diabetes mellitus
- Those with multiple risk factors (diabetes, dyslipidaemia, obesity, family history of heart disease)
- Those not on diuretics but have persistently low potassium on repeated blood tests
- All children, young adults and pregnant women with elevated BP

FLOWCHART

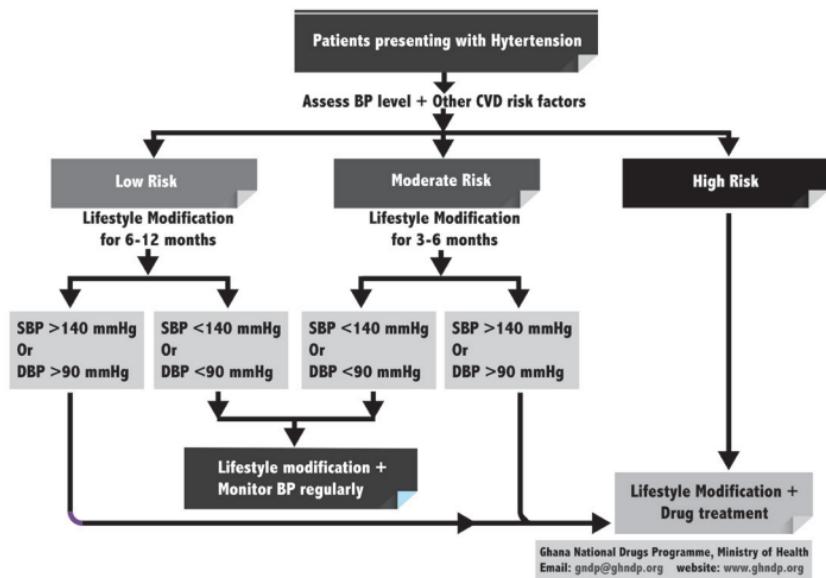


Fig 7-8: Flowchart: Hypertension

52. Hypertension in children and adolescents

Hypertension in children is defined as an average systolic and/or diastolic blood pressure that is \geq 95th percentile for gender, age, and height on 3 or more separate occasions taken in the right arm (in view of possibility of coarctation of aorta). An appropriate cuff size that covers two thirds (%) of the length of the arm (between shoulder and elbow) and encircling the whole arm, should be used.

In general, a blood pressure of $> 110/70$ mmHg in children aged 2-5 years and $> 115/76$ mmHg in those aged 6-12 years and more than $128/82$ mmHg in adolescents is considered abnormal and would require a referral to, and evaluation by a paediatrician.

Most adolescent and childhood hypertension, especially in infants and younger children, is due to secondary causes (See section on 'Hypertension in Adults'). Adolescents, however, may have early onset primary hypertension.

CAUSES

- Renal e.g. chronic pyelonephritis, hydronephrosis
- Vascular e.g. coarctation of aorta, renal artery stenosis
- Endocrine e.g. phaeochromocytoma, Cushing's syndrome, adrenal disorders
- Obesity
- Primary hypertension

SYMPTOMS

- Chest pain
- Headaches
- Dyspnoea on exertion
- Excessive sweating
- Leg swelling
- Palpitations
- Haematuria
- Unconsciousness (hypertensive encephalopathy)

SIGNS

- BP $> 110/70$ mmHg in children aged 2-5 years
- $> 115/76$ mmHg in children aged 6-12 years
- $> 128/82$ mmHg in adolescents
- Signs pointing to a specific cause for secondary hypertension

INVESTIGATIONS

(See section on 'Hypertension in Adults')

TREATMENT

Treatment objectives

- To reduce blood pressure (BP) to a target of < 95 th percentile for age, gender and height in the absence of end organ-damage (to < 90 th

CHAPTER 7: DISORDERS OF THE CARDIOVASCULAR SYSTEM

percentile if end organ damage present)

- To prevent complications
- To manage underlying secondary cause
- To encourage weight reduction in obese and overweight children

Non-pharmacological treatment

- Therapeutic lifestyle changes
 - weight control
 - regular exercise
 - low fat intake
 - low sodium diet
 - regular fruit and vegetable intake

Pharmacological treatment

Evidence Rating: [A]

Angiotensin-converting enzyme (ACE) inhibitors

- Enalapril, oral,
 - Children
12-18 years; initially 2.5 mg daily (increased to max. 10-20 mg daily in 1-2 divided doses)
20 mg daily in 1-2 years; initially 100 micrograms per kg daily (increased to max. 1 mg/kg daily in 1-2 divided doses)
 - Neonate
10 microgram/kg daily (increased to max. 500 microgram/kg daily in 1-3 divided doses)

Diuretics

- Bendroflumethiazide, oral,
 - Children
12-18 years; 2.5 mg daily
2-12 years; 50-100 microgram/kg daily
1 month-2 years; 50-100 microgram/kg daily

Beta blockers

- Propranolol, oral,
 - Children
12-18 years; 80-160 mg 12 hourly
1 month-12 years; 250 microgram-1 mg/kg 8 hourly
 - Neonate; 250 microgram/kg 8 hourly

Or

- Atenolol, oral,
 - Children
0.5-1 mg/kg daily (max. 2 mg/kg daily)

Calcium channel blockers

- Nifedipine, oral,
 - Children
12-18 years; 5-20 mg 8 hourly
1 month-12 years; 200-300 microgram/kg 8 hourly (max. 100 mg daily)

Or

- Amlodipine, oral,
Children
12-18 years; 5-10 mg daily
1 month-12 years; 100-400 microgram/kg daily (max. 10 mg daily)

Vasodilators

- Hydralazine, oral,
Children
12-18 years; 25 mg 12 hourly increased to usual max. 50-100 mg 12 hourly
1 month-12 years; 250-500 microgram/kg 8-12 hourly increased as necessary to max. 7.5 mg/kg daily (not exceeding 200 mg)
Neonate
250-500 microgram/kg 8-12 hourly increased as necessary to max. 2-3 mg/kg every 8 hours
IV, 250-500 microgram/kg diluted in 10 ml normal saline given over 20 minutes, then 100-200 microgram/kg 4-6 hourly (max 3 mg/kg in 24 hours)

Angiotensin-receptor blockers

- Losartan, oral,
Children
Initial dose; 0.7 mg /kg daily (max. 50 mg)
Maintenance dose; 1.4 mg /kg daily (max. 100 mg)

REFERRAL CRITERIA

Refer all cases of hypertension in children to a specialist for investigation and further treatment.

53. Hypertension in Pregnancy

(See section on 'Hypertension in Pregnancy' under 'Obstetric care and Obstetric Disorders')

54. Hypertensive Emergencies

A hypertensive crisis is a severe and potentially life threatening increase in blood pressures (BP) which may result in an acute stroke, subarachnoid haemorrhage, seizures (hypertensive encephalopathy), heart attack, acute dissection of aorta, heart failure, renal damage or eclampsia (during pregnancy). The underlying cause may be primary hypertension; however, secondary causes of hypertension must be excluded.

In adult patients this often occurs with a BP > 180/120 mmHg, while in children this may occur at lower BP levels.

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These patients need careful examination to exclude target organ damage. Rapid correction of blood pressure with careful monitoring to avoid a precipitous drop is indicated to prevent organ damage.

SYMPOTMS

- Headache
- Chest pain
- Shortness of breath
- Nausea
- Vomiting
- Confusion
- Seizures
- Unconsciousness

SIGNS

- Severely elevated blood pressure (for age)
- Unconsciousness
- Seizures
- Neck rigidity
- Lung crepitations

INVESTIGATIONS

- Chest X-ray
- 12-lead ECG
- FBC
- Urinalysis
- Blood urea, electrolytes and creatinine
- Brain CT scan (for stroke)
- Chest CT scan with angiography (for suspected aortic dissection)
- Cardiac enzymes: creatinine kinase-MB (CK-MB), serum aspartate transaminase (AST), serum lactic dehydrogenase (LDH) and troponins (for acute coronary syndrome)
- Echocardiography

TREATMENT**Treatment objectives**

- To limit further organ-related complications by controlled reduction of BP
- To control and subsequently prevent seizures if present
- To manage identified target organ damage

Non-pharmacological treatment

- Strict bed rest

Pharmacological treatment

Evidence Rating: [A]

- Labetalol, IV,
Adults
20-50 mg stat. (over a 2 minute period)

Repeat at 10 minute intervals, if necessary, to a max. of 200 mg
Children

12-18 years; 10-30 mg stat. (over a 2 minute period). Repeat at 15 minute intervals, if necessary (max. 200 mg)

1 month-12 years (by IV infusion); initially 500-1000 microgram /kg body weight / hour adjusted at intervals of at least 15 minutes according to response. Max. 3 mg /kg/hour.

Note 7-9

Monitor BP every 5 minutes following each injection for all age groups.

Cease Labetalol injections if BP < 140/90 mmHg and/or pulse <60 BPM in adults, (for children consult a paediatrician) or wheezing and bronchospasm occurs.

Or

- **Hydralazine, IV,**

Adults

5-10 mg slowly (over a 2 minute period), diluted with 10 ml Normal Saline (0.9%).

Repeat at 20-30 minute intervals, if necessary

Children

12-18 years; 5-10 mg stat.

Repeat every 4-6 hours, if necessary

1 month-12 years; 100-500 microgram/kg

Repeat every 4-6 hours, if necessary; max. 3 mg/kg daily (not exceeding 60 mg per day)

< 1 month; 100-500 microgram/kg

Repeat every 4-6 hours, if necessary; max. 3 mg/kg daily

Note 7-10

Monitor BP every 5 minutes following each injection for all age groups.

Do not use short-acting nifedipine (e.g. sublingual) in the management of hypertensive crises as it lowers the BP too rapidly and may cause ischaemia of vital organs.

REFERRAL CRITERIA

Refer all patients to a physician specialist for further evaluation.

55. Arrhythmias

Arrhythmias are disorders of cardiac rate, rhythm and conduction. They can be classified as bradyarrhythmias (heart rate < 60 per minute) and tachyarrhythmias (heart rate > 100 per minute).

Bradyarrhythmias include sinus bradycardia, sinus pauses and atrioventricular blocks. The tachyarrhythmias can further be classified into supraventricular and ventricular arrhythmias, based on their site of origin. Tachyarrhythmias include atrial fibrillation, atrial flutter, paroxysmal supraventricular tachycardia, ventricular tachycardia and ventricular fibrillation.

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Prior to drug treatment of a suspected cardiac arrhythmia, a 12-lead ECG must be done to confirm the rhythm abnormality. It is dangerous to use an antiarrhythmic drug without doing an ECG. Refer symptomatic patients to hospital immediately. The choice of drug treatment depends on the type of arrhythmia and severity of symptoms.

CAUSES

- Rheumatic heart disease
- Other valvular heart diseases
- Hypertensive heart disease
- Ischaemic heart disease
- Thyrotoxicosis
- Hypothyroidism
- Cardiomyopathies
- Complete heart block
- Electrolyte abnormalities particularly hypokalaemia
- Pericardial disease
- Drugs
- Smoking, alcohol, coffee, tea, etc.
- Pulmonary embolism
- Post cardiac surgery
- Idiopathic

SYMPTOMS

- Palpitations
- Dizziness
- Chest discomfort/pain
- Fatigue
- Difficulty in breathing
- Sudden collapse
- Sudden death

SIGNS

- Pulse
 - Rate may be fast, slow or normal
 - Rhythm

Regular	Regularly irregular	Irregularly irregular
Sinus tachycardia		Atrial fibrillation
Sinus bradycardia		Atrial flutter (with variable atrio-ventricular block)
Complete heart block		Multiple supraventricular or ventricular ectopic beats
Supraventricular tachycardia	Supraventricular or ventricular ectopic beats	
Ventricular tachycardia		

- Pulse deficit (apical rate faster than radial pulse rate; seen in fast atrial fibrillation or flutter)
- Hypotension or blood pressure may be unrecordable
- Signs of heart failure (may be present)

INVESTIGATIONS

- 12-lead ECG
- Serum electrolytes (including magnesium, calcium)
- Thyroid function tests
- Chest X-ray
- Ambulatory ECG (Holter)
- Echocardiography

TREATMENT

Treatment objectives

- To control ventricular rate
- To restore sinus rhythm
- To relieve symptoms
- To improve functional capacity and quality of life
- To prevent or treat associated complications
- To treat the underlying condition e.g. thyrotoxicosis
- To prevent stroke or systemic thromboembolism
- To reduce morbidity and mortality

Non-pharmacological treatment

- | ● Reassure the patient
- | ● Avoid excessive intake of alcohol, coffee or tea and stop smoking (if these are possible precipitating factors)
- | ● Massage of the carotid sinus on one side for a few seconds. This may terminate an attack of paroxysmal supraventricular tachycardia
- | ● Electrical cardioversion

Pharmacological treatment

A. Fast atrial fibrillation or atrial flutter-for rate control

1st Line Treatment

Evidence Rating: [A]

- Atenolol, oral,

Adults

50-100 mg daily

Children

12-18 years; 25-50 mg daily

1 month-12 years; 12.5-50 mg daily

Neonates

Refer to a paediatrician

Or

- Bisoprolol, oral,

Adults

2.5-10 mg daily

Children

Safety not established in children

Or

- Metoprolol tartrate, oral,

CHAPTER 7: DISORDERS OF THE CARDIOVASCULAR SYSTEM**Adults**

50-100 mg 8 or 12 hourly daily (max. 300 mg daily)

Children

12-18 years; 50 mg 8 or 12 hourly daily (max. 300 mg daily)

< 12 years; refer to a paediatrician

Note 7-11

Avoid if beta-blockers are contraindicated e.g. bronchial asthma, hypotension

Or

- Verapamil, oral,

Adults

40-120 mg 6-8 hourly (max. 480 mg daily)

Children

Refer to a paediatrician

Note 7-12

Avoid use in patients already on beta-blocker

2nd Line Treatment

Evidence Rating: [A]

- Digoxin, oral,

Adults

125-250 micrograms daily

Children

Refer to a paediatrician

B. Fast atrial fibrillation or atrial flutter-for rhythm control

This is required to restore sinus rhythm.

Refer to a cardiologist, physician specialist or paediatrician as appropriate.

C. Paroxysmal supraventricular tachycardia

1st Line Treatment

Evidence Rating: [A]

- Atenolol, oral,

Adults

50-100 mg daily

Children

12-18 years; 25-50 mg daily

1 month-12 years; 12.5-50 mg daily

Neonates

Refer to a paediatrician

Or

- Bisoprolol, oral,

Adults

2.5-10 mg daily

Children

Safety not established in children

Or

- Metoprolol tartrate, oral,
Adults
50-100 mg 8 or 12 hourly daily (max. 300 mg daily)
Children
12-18 years; 50 mg 8 or 12 hourly daily (max. 300 mg daily)
<12 years; refer to a paediatrician

Note 7-13

Avoid if beta-blockers are contraindicated e.g. bronchial asthma, hypotension

Or

- Verapamil, oral,
Adults
40-120 mg 6-8 hourly (max. 480 mg daily)
Children
Refer to a paediatrician

Note 7-14

Avoid use in patients already on beta-blocker

2nd Line Treatment

Evidence Rating: [A]

- Digoxin, oral,
Adults
125-250 micrograms daily
Children
Refer to a paediatrician

D. Prevention of stroke or systemic thromboembolism in atrial fibrillation or flutter

Patients should be given long-term anticoagulation.

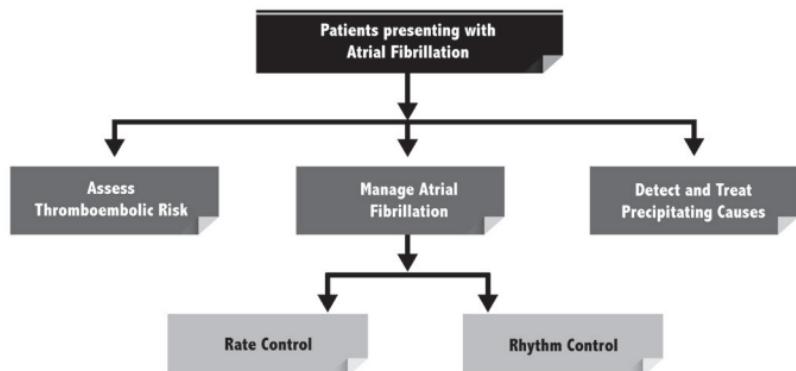
(See options for long-term anticoagulation in section on 'DVT' or 'Pulmonary Embolism').

REFERRAL CRITERIA

Refer all patients to a cardiologist, physician specialist or paediatrician for further evaluation and management after the initial treatment.

All symptomatic patients, as well as those who cannot have an ECG done or interpreted, or who present with heart failure, should be referred immediately.

FLOWCHART



Ghana National Drugs Programme, Ministry of Health
Email: gndp@ghndp.org website: www.ghndp.org

Fig 7-9: Flowchart: Arrhythmias

56. Acute Rheumatic Fever

Acute rheumatic fever is an illness caused by an immunological reaction to group A streptococcal infection of the throat. The onset of symptoms occurs 1-3 weeks after an untreated or inadequately treated throat infection. The disease occurs mainly in children and adolescents with a peak age of 5-15 years. Acute rheumatic fever often results in lasting damage to heart valves leading to the chronic form, which is known as rheumatic heart disease.

Individuals who have had acute rheumatic fever previously are more likely to have subsequent episodes. These recurrences may cause further heart valve damage. Following treatment of an acute episode, secondary prophylaxis should be continued for a minimum of 10 years after the recent episode of acute rheumatic fever or until age 21 years (whichever is longer). For those with severe rheumatic heart disease secondary prophylaxis should be continued indefinitely.

Rheumatic heart disease is an important cause of heart failure and premature death. In Ghana, acute rheumatic fever may mimic malaria, typhoid fever and other febrile conditions, while the joint symptoms may mimic sickle cell disease.

Jones criteria is used for diagnosis of rheumatic fever.

Box 7-10: Jones criteria for diagnosis of Acute Rheumatic Fever

For diagnosis of initial acute rheumatic fever:

Evidence of preceding group A streptococcal infection,

And

2 major criteria

Or

1 major criterion and 2 minor criteria

For diagnosis of recurrent acute rheumatic fever:

Evidence of preceding group A streptococcal infection,

And

2 major criteria

Or

1 major criterion and 2 or 3 minor criteria

(See symptoms and Signs below for major and minor criteria)

CAUSES

- Group A streptococcal infection

ACUTE RHEUMATIC FEVER | SYMPTOMS

- Fever
- Malaise
- Joint pain which moves from one joint to another (knees, ankles, wrists, elbows)
- Palpitations
- Easy fatigability
- Chest pain
- Skin rash
- Abnormal body movements (chorea)

SIGNS

- Fever $> 38^{\circ}\text{C}$ (minor criteria)
- Single joint tenderness and/or swelling (minor criteria)
- Rapid heart rate ($> 100/\text{minute}$), murmur, heart failure, pericardial rub (suggests carditis) (major criteria)
- Skin rash
- Subcutaneous nodules over bony prominences

INVESTIGATIONS

- FBC
- ESR > 30 or C-reactive protein $> 3 \text{ mg/dL}$ (minor criteria)
- Sickling status
- Chest X-ray
- Throat swab for culture
- Anti-streptolysin O titre
- 12-lead ECG (prolonged PR interval for age - minor criteria)
- Echocardiogram evidence of carditis (major criteria)

TREATMENT**Treatment objectives**

- To eradicate streptococcal throat infection
- To suppress inflammatory response
- To prevent recurrent episodes of rheumatic fever and further heart valve damage
- To treat heart failure if co-existent

Non-pharmacological treatment

- Bed rest

Pharmacological treatment**A. Treatment of Acute Rheumatic Fever**1st Line Treatment

Evidence Rating: [C]

- Benzathine benzylpenicillin, IM,
≥ 30 kg body weight; 1,200,000 U as a single dose
< 30 kg body weight; 600,000 U as a single dose

Or

- Phenoxymethyl penicillin (Penicillin V), oral,
Adults

500 mg 12 hourly for 10 days

Children6-12 years; 250 mg 12 hourly for 10 days
1-5 years; 125 mg 12 hourly for 10 days**Or**

- Erythromycin, oral, (for patients allergic to penicillin)
Adults

500 mg 12 hourly for 10 days

Children8-12 years; 500 mg 12 hourly for 10 days
3-8 years; 250 mg 12 hourly for 10 days
1-2 years; 125 mg 12 hourly for 10 days**And**

Evidence Rating: [B]

- Aspirin, oral,

Adults

300-900 mg 4-6 hourly until joint symptoms relieved, and gradually withdraw over 1-2 weeks.

Children

1 month-18 years; 25 mg/kg 6 hourly until joint symptoms relieved, and gradually withdraw over 1-2 weeks.

Or

Evidence Rating: [B]

- Ibuprofen, oral,

Adults

200-800 mg 6-8 hourly (max. 2400 mg daily)

Children

10-15 mg/kg 6-8 hourly (max. 40 mg per kg daily)

B. Treatment of Acute Rheumatic Fever with Carditis

As in 'treatment option A' above

And

- Prednisolone, oral,
Adults and Children

2 mg/kg daily for 2 weeks and then gradually taper off by 20-25% per week for 1-3 weeks.

C. Treatment of Acute Rheumatic Fever with Heart Failure

As in 'treatment option A' above

And

Treatment for heart failure (See section on 'Heart failure')

D. Secondary prevention (prophylaxis) of acute rheumatic fever and rheumatic heart disease

1st Line Treatment

- Benzathine benzylpenicillin, IM,
≥ 30 kg body weight; 1,200,000 U
< 30 kg body weight; 450 mg (600,000 U) 4-weekly

2nd Line Treatment

- Phenoxyethyl penicillin (Penicillin V), oral,
Adults

500 mg 12 hourly daily

Children

6-12 years;	250 mg 12 hourly
1-5 years;	125 mg 12 hourly

Or

- Erythromycin, oral, (for patients allergic to penicillin)
Adults

500 mg 12 hourly

Children

8-12 years;	500 mg 12 hourly
3-8 years;	250 mg 12 hourly
1-2 years;	125 mg 12 hourly

REFERRAL CRITERIA

Refer all patients to a paediatrician, physician specialist or cardiologist as necessary for further management.

57. Dizziness and Blackouts

Dizziness is a nonspecific term that refers to abnormal sensation of body orientation or position in space. These include feeling of unsteadiness, light-headedness and vertigo. Patients often find these

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sensations difficult to describe. Dizziness is almost always associated with other symptoms, therefore a careful history and focused physical examination should be performed in all cases to identify the cause.

Like dizziness, “blackouts” is a vague, descriptive term implying either altered consciousness, visual disturbance or a sensation of falling. A careful history, particularly from an eye-witness, is essential.

Episodes of transient disturbance of consciousness and falls are common clinical problems. It is usually possible to distinguish between a fit (a seizure), an episode of fainting and other types of attack from the history given by the patient and the account of an eye witness.

CAUSES

Cardiovascular

- Vasovagal - (fainting)
- Postural hypotension
- Acute haemorrhage
- Cardiac arrhythmias
- Severe aortic stenosis
- Complete heart block with Stokes-Adams attacks
- Vertebro-basilar insufficiency

Cerebral

- Transient Ischaemic Attacks (TIA)
- Stroke
- Epilepsy

Others

- Drug-induced
- Severe anaemia
- Hypoglycaemia
- Middle ear disease
- Meniere's disease
- Conversion disorder (Hysterical fainting/Hyperventilation)

SYMPTOMS

- Light-headedness
- Loss of consciousness
- Sense of motion or spinning of body
- Unsteadiness
- Nausea
- Vomiting
- Tinnitus

SIGNS

- Sweating (suggests vasovagal episode/hypoglycaemia)
- Tachycardia or bradycardia (suggest cardiac arrhythmia)
- Hypotension
- Postural hypotension
- Pallor

- Nystagmus, dysdiadochokinesis, ataxia, hypotonia, dysarthria (suggests cerebellar cause)
- Focal neurological signs suggests stroke, TIA

INVESTIGATIONS

- These vary depending on the cause
- FBC
- Random blood sugar
- X-ray of cervical spine
- ECG

TREATMENT

Treatment objectives

- To identify and appropriately manage the possible underlying cause(s)

Non-pharmacological treatment

- Postural hypotension - review medications
- Hyperventilation syndrome - breathing control exercise
- Counseling
- Cervical collar
- Moulded cervical pillows

Pharmacological treatment

- Treat the underlying cause. (See appropriate section)

REFERRAL CRITERIA

Refer patients to a physician specialist for evaluation if the cause is difficult to determine. If the cause is identified, refer to the appropriate specialist for further evaluation and management.

DISORDERS OF THE RESPIRATORY SYSTEM

58. Common Cold

This is a self-limiting infection of the upper respiratory tract, particularly the nasopharyngeal mucosa and sinuses. It is contagious and spread by airborne droplets, as well as from hands and contact with contaminated surfaces. The symptoms resolve without antibiotic treatment, usually within a week.

If the 'cold' lasts longer than a week and there is persistent fever and cough, a diagnosis of influenza may be considered. With influenza, fever, systemic symptoms and prostration are more pronounced. Secondary bacterial infection may be associated with purulent phlegm or offensive nasal discharge and fever.

Occasionally, the common cold is complicated by otitis media and pharyngotonsillitis, particularly in children, in which case one should refer to the appropriate sections for treatment.

CAUSES

- Rhinoviruses
- Corona viruses
- Respiratory Syncytial Virus (RSV)

SYMPTOMS

- Runny nose (rhinorrhea)
- Sneezing
- Nasal congestion
- Mild fever
- Headaches
- Sore throat
- Muscle aches
- Cough
- Fatigue
- Malaise

SIGNS

- Low grade fever
- Nasal discharge

- Nasal mucosa reddening
- Watering of eyes

INVESTIGATIONS

- No investigations required

TREATMENT

Treatment objectives

- To relieve symptoms
- Resolution of infection in the shortest possible time

Non-pharmacological treatment

- Rest
- Encourage adequate fluid intake
- Gargle lukewarm salt solution
- Steam inhalation

Pharmacological treatment

A. Uncomplicated common cold

1st Line Treatment

Evidence Rating: [C]

- Paracetamol, oral,

<u>Adults</u>	500-1g 6-8 hourly
<u>Children</u>	10-15 mg/kg/dose 6-8 hourly
6-12 years;	250-500 mg 6-8 hourly
1-5 years;	120-250 mg 6-8 hourly
3 months-1 year;	60-120 mg 6-8 hourly

And

- Sodium Chloride 0.9%, nasal drops,
Adult and Children
 2 drops, into each nostril, 4 hourly to relieve congestion as necessary

Or

- Xylometazoline, nasal,
Adults (0.1% preparation)
 1-2 drops 12 hourly into each nostril
Children (0.05% preparation)
 > 3 months; 1-2 drops 12 hourly into each nostril

And

- Cetirizine, oral,
Adults
 10 mg daily
Children
 > 12 years; 10 mg daily
 6-2 years; 5 mg daily
 2-6 years; 2.5 mg daily

Or

- Chlorpheniramine maleate, oral,
Adult
 4 mg 12 hourly
Children
 6-12 years; 2 mg 6-12 hourly daily (max. 12 mg daily)
 2-6 years; 1 mg 6-8 hourly (max. 6 mg daily)
 1-2 years; not recommended

Note 8-1

Antibiotics are not indicated for common cold.

REFERRAL CRITERIA

Refer cases suspected to have measles, influenza or complications to a paediatrician or physician for management.

59. Pneumonia

Pneumonia is an infection of the lung tissue caused by various bacteria, viruses or fungi. Identification of the causative organism and drug sensitivity testing is the key to correct treatment. However, because of the serious nature of the infection, antibiotic treatment should be started immediately based on knowledge of the most probable causative organism and the antibiotics used for its treatment. Local knowledge of drug resistance patterns are also taken into account. Treatment may be maintained or changed based on culture results and assessment of the patient's response to initial treatment. In the event that the cultures of blood or sputum prove negative, empiric treatment is continued with clinical response as a guide.

The severity of the illness is a key factor in the decision for admission, and the choice of first or second-line treatment.

Box 8-1: Severity score for community acquired pneumonia (CURB-65)

Severity score may be based on the following, assigning one point to each of the following factors (maximum 5 points);

- Confusion, restlessness, or excessive drowsiness
- Blood Urea Nitrogen ($> 7 \text{ mmol/L}$)
- Respiratory rate (≥ 30 per minute in adults, and ≥ 50 in children)
- Low BP (Systolic BP < 90 and/or diastolic BP $< 60 \text{ mmHg}$)
- Patients at the extremes of age, ($< 5\text{yr}$ or $\geq 65\text{yr}$)

0-1; consider home treatment

2-3; consider short inpatient hospitalisation

> 3 ; admit and consider intensive care

Box 8-1: Severity score for community acquired pneumonia (CURB-65)

In the presence any of the following additional factors, all cases of pneumonia would warrant hospitalisation.

Additional factors

- Coexisting diseases such as chronic lung disease, heart failure or renal disease
- Extensive disease, multiple lobes involved
- Low oxygen saturation $\text{SpO}_2 < 92\%$ on room air
- Severe tachycardia

CAUSES**Community acquired pneumonia**

- *Streptococcus pneumonia*
- *Streptococcus pyogenes*
- *Haemophilus influenza*
- *Klebsiella pneumoniae*
- Mycoplasma pneumonia and *Legionella pneumophila* (tend to occur in epidemics)
- *Staphylococcus aureus* (in children after viral illness like measles, in diabetics or in the elderly during 'flu' epidemics)

Aspiration pneumonia

- Anaerobic and/or gram negative organisms (associated with aspiration e.g. stroke, seizures, unconsciousness)

Hospital acquired pneumonia

- Gram-negative bacteria e.g. *Pseudomonas aeruginosa*
- MRSA (Methicillin resistant)
- VRSA (Vancomycin resistant)
- *Staphylococcus aureus*

Others

- *Pneumocystis jiroveci* pneumonia and other fungi (in immunocompromised states e.g. haematological malignancies, HIV/AIDS)
- Viruses

SYMPTOMS

- Fever - short history
- Productive cough
- Sputum - rusty or blood stained, yellowish, greenish
- Pleuritic chest pain - worse on deep breathing or coughing
- Breathlessness
- Sweating
- Muscle aches
- Elderly and immunocompromised patients may have minimum or no symptoms

SIGNS

- Rapid breathing

- Grunting (in children)
- Use of accessory muscles of respiration and flaring of the nasal margins
- Lower chest wall indrawing (in children)
- Restricted movement of the affected side of the chest (due to pain)
- Fever
- Rapid pulse rate
- Blood pressure may be normal or low
- Signs of consolidation or pleural effusion on chest examination
- Restlessness or confusion, drowsiness
- Low blood oxygen saturation by pulse oximetry < 92%

COMPLICATIONS

- Pleural effusion
- Lung abscess
- Empyema
- Pericardial effusion/pericarditis
- Pneumothorax particularly *Staph. aureus* infection, *Pneumocystis jiroveci* pneumonia
- Meningitis
- Septicaemia with multi organ failure
- Adult respiratory distress syndrome (ARDS)

INVESTIGATIONS

- FBC
- C-reactive protein (CRP)
- Chest X-ray
- Sputum gram stain and culture and sensitivity
- Ziehl-Neelsen stain for acid-fast bacilli (to exclude TB)
- Blood culture and sensitivity
- Blood urea and electrolytes

TREATMENT

Treatment objectives

- To identify patients at greater risk who require in-hospital management
- To alleviate symptoms
- To treat and eradicate the infection
- To prevent and/or manage complications

Non-pharmacological treatment

- Nurse in comfortable position, usually with head raised
- Sponging to control fever, especially in children < 5 years (who are at risk of febrile convulsions)
- Adequate oral hydration (if it can be tolerated)
- Chest physiotherapy

Pharmacological treatment

A. Ambulatory patient: low severity score < 2 (see above)

1st Line Treatment

Evidence Rating: [A]

- Amoxicillin (Amoxycillin), oral,

Adults

1 g 8 hourly for 7 days (high dose)

Children

5-12 years; 500 mg 8 hourly for 7 days

1-5 years; 250 mg 8 hourly for 7 days

6 months-1 year; 125 mg 8 hourly for 7 days

And

- Azithromycin, oral,

Adult

500 mg daily for 6 days

Children

10 mg/kg daily for 6 days

Or

- Erythromycin, oral, (if patient is allergic to penicillin)

Adult

500 mg 6 hourly for 7 days

Children

8-18 years; 250-500 mg 6 hourly for 7 days

2-8 years; 250 mg 6 hourly for 7 days

6 months-2 years; 125 mg 6 hourly for 7 days

2nd Line Treatment

Evidence Rating: [A]

- Cefuroxime, oral,

Adults

500 mg 12 hourly for 7 days

Children

3 months-12 years; 30 mg/kg/day in two divided doses for 7 days

> 12 years; 250-500 mg 12 hourly for 7 days

Or

- Doxycycline, oral,

Adults

100 mg 12 hourly for 7-14 days depending on severity

Note 8-2

Not recommended in pregnancy, lactating mothers and in children < 8 years of age.

B. Hospitalised patient: Severity score, ≥ 2 or with additional factors as mentioned above

- Oxygen, by face mask or nasal prongs,
Adults and Children
Maintain oxygen saturation > 92%
And
- IV fluids as normal saline and dextrose saline to replace estimated insensible loss
And
- Paracetamol, oral,
Adults
500 mg-1g 6-8 hourly
Children
6-12 years; 250-500 mg 6-8 hourly
1-5 years; 120-250 mg 6-8 hourly
3 months-1 year; 60-120 mg 6-8 hourly
Or
- Paracetamol suppository
Adults and children
doses as above
And
- Amoxicillin + Clavulanic Acid, IV, (change to oral route when patient improves)
Adults
1.2 g 8 hourly for 7-10 days
Children
3 months-18 years; 30 mg/kg 8 hourly, max. 1.2 g 8 hourly for 7-10 days
< 3 months; 30 mg/kg 12 hourly for 7-10 days
And
- Azithromycin, oral,
Adult
500 mg daily for 3-7 days
Children
10 mg/kg once daily for 3-7 days
Or
- Azithromycin, IV,
Adult
500 mg daily for 3 days
Revert to oral azithromycin, when clinically stable to complete 7 days of treatment. (See section on treatment for ambulatory patients above).
Children
IV route not recommended in children for pneumonia treatment

Note 8-3

Azithromycin infusion should not be given in shorter than 1 hour. It should not be given as an IV bolus or as an intramuscular injection.

2nd line treatment

Evidence Rating: [A]

- Ceftriaxone, IV,

Adult

2 g daily for 7-10 days

Children

All ages 25 mg/kg 12 hourly (max. 75 mg/kg daily)

And

- Azithromycin, IV (as above)

C. Treatment for aspiration pneumonia

1st Line treatment

Evidence Rating: [B]

- Ceftriaxone, IV,

Adult

2 g daily for 7-10 days

Children

All ages 50-75 mg/kg/day in divided 12 hourly doses

Or

- Amoxicillin + Clavulanic Acid, IV, (change to oral route when patient improves)

Adults

1.2 g 8 hourly for 7-10 days

Children

3 months-18 years; 30 mg/kg 8 hourly, max 1.2 g 8 hourly for 7-10 days

< 3 months; 30 mg/kg 12 hourly for 7-10 days

Or

- Ciprofloxacin, IV, (to be administered over 60 minutes)

Adults

400 mg 8-12 hourly for 7 days

Children

10 mg/kg (max. 400 mg) 12 hourly for 7 days

And

- Metronidazole, IV,

Adults

500 mg 8 hourly for 7 days

Children

7.5 mg/kg 8 hourly for 7 days

Or

- Clindamycin, IV,

Adults

300-600 mg 6 hourly for 7 days

Children

3-6 mg/kg 6 hourly for 7 days

REFERRAL CRITERIA

Refer to the paediatrician or physician specialist if no improvement occurs (i.e. fever remains high, patient is still breathless, or repeat X-rays show complications or no resolution).

60. Bronchial Asthma

Asthma is a chronic inflammatory disease of the bronchial airways, which manifests as recurrent episodes of wheeze, cough, chest tightness and shortness of breath, which is usually reversible with treatment. It is characterised by increased sensitivity to many environmental agents. Asthma is variable and may be associated with seasons like the rainy season or harmattan. Bronchial asthma occurs at all ages but peaks in childhood. It is classified as an allergic disease, and may be associated with a personal or family history of allergic rhinitis (hay fever), eczema or allergic conjunctivitis.

Complications of asthma include pneumomediastinum, pneumothorax, subcutaneous emphysema and pneumonia.

CAUSES

- Allergens e.g. house dust mite, cockroach droppings, grass, pollen and animal hair
- Environmental factors e.g. air pollution, climatic changes, strong scents and smoke (including cigarette smoke and car fumes)
- Viral infections
- Exercise
- Emotions and hyperventilation
- Drugs e.g. aspirin, NSAIDS and beta-blockers such as propranolol
- Occupational exposure to industrial chemicals, dust and drug manufacturing

SYMPTOMS

- Episodic breathlessness
- Tightness of the chest
- Cough - often nocturnal
- Wheeze
- Nocturnal symptoms. Any of the above symptoms waking up the patient at night

SIGNS

- Tachypnoea (fast breathing)
- Use of accessory muscles of respiration; neck and/or abdominal muscles
- Rhonchi/wheeze

- Signs of severe attack
 - Inability to complete full sentences in one breath
 - Rapid pulse > 110/minute in adults and adolescents or >130/minute in children 2-5 years
 - Rapid respiration > 30/minute in adults and adolescents or > 50/minute in children 2-5 years
 - Peak Expiratory Flow Rate (PEFR) is reduced < 50% of expected (for age, sex and height)
- Signs of a life-threatening attack are:
 - Cyanosis
 - Pulsus paradoxus
 - Silent chest on auscultation
 - Drowsiness or confusion
 - Exhaustion
 - Peak Expiratory Flow Rate (PEFR) less than 33 % of expected value
 - SpO₂ less than 92% on room air

INVESTIGATIONS

- No investigation required in most cases
- FBC, mildly high eosinophil count
- Chest X-ray (only for the exclusion of other diagnoses or complications)
- Spirometry - reduction in FEV1 and FEV1/FVC ratio with reversibility demonstrated after bronchodilator use (a normal spirometry between attacks does not exclude asthma).
- Tests for atopy - skin prick test or specific IgE for common allergens
- Stool examination, exclude helminthiasis

TREATMENT

Treatment objectives

- To relieve bronchospasm
- To prevent complications and recurrence
- To treat underlying inflammation or infection

Non-pharmacological treatment

- Avoid known triggers/allergens, such as dust (dust mite) where possible
- Avoid smoking
- Education on asthma self management, device use and technique

Pharmacological treatment

A. Acute Exacerbation of Asthma: Initial Management in the Community

Evidence Rating: [C]

- Salbutamol inhaler, using pressurized metered dose inhaler (pMDI) with a spacer
Adults and Children
Give 1-2 puffs via a spacer and mask if needed (e.g. Volumatic Or

Aerochamber, or large plastic mineral water bottle) with the patient taking 3-4 breaths after each puff.

Repeat after every 15-30 minutes maximum 10 doses.

If there is no improvement seek care at a health facility with a nebuliser.

B. Acute Moderate/Severe Exacerbation of Asthma: Initial Management in Hospital

1st Line Treatment

Evidence Rating: [A]

- Oxygen

By nasal prongs 2-6 L/min

Or

Face mask 4-8 L/min

Or

Non-rebreather mask 10-15 L/min

And

- Salbutamol, nebulised,

Adults

2.5-5 mg repeated initially after 15-30 minutes, then every 2-4 hours until improved

Children

2.5-5 mg every 2-4 hours until improved

And

- Ipratropium bromide, nebulised,

Adults

500 microgram 4-6 hourly

Children

6-12 years; 250 microgram 4-6 hourly

1-5 years; 125 microgram 4-6 hourly

(max. dose for children is 1 mg/24 hours)

And

- Hydrocortisone, IV,

Adults

200 mg stat. then 100 mg 6 hourly until clinical improvement

Children

12-18 years; 100 mg 6-8 hourly

1 month-12 years; 2-4 mg/kg 8 hourly

Then

C. Acute Moderate/Severe Exacerbation of Asthma: Maintenance Treatment in Hospital

- Salbutamol, nebulised,

Adults

2.5-5 mg repeated every 6 hours until improved

Children

2.5-5 mg every 6 hours until improved

And

- Ipratropium bromide, nebulised,

Adults

500 microgram 4-6 hourly

Children

6-12 years; 250 microgram 4-6 hourly

1-5 years; 125 microgram 4-6 hourly

(max. dose for children 1 mg/24 hours)

Note 8-4

For children < 12 years with severe symptoms consider;

Ipratropium bromide, 250 microgram repeated every 20-30 minutes, for the first 2 hours, then 4-6 hourly as necessary

And

- Prednisolone, oral, initial dose given on admission and subsequently given as a morning dose. (Once on prednisolone, stop IV hydrocortisone after 24 hours)

Adults

30-40 mg daily for 7 days until stable. Taper off dose over a period of 2 weeks if patient has been on long term steroids.

Children

1-2 mg/kg for 3-5 days

D. Acute Moderate/Severe Exacerbation of Asthma: Maintenance Treatment in Hospital (where patient is still distressed after 3-4 initial doses of nebulised salbutamol)

- Aminophylline, IV,

Adults

250 mg slow injection over 20 minutes

Repeat after 30 minutes with a continuous infusion by perfusor, if necessary, at a rate not exceeding 0.5 mg/kg/hour over 24 hours

Or

- Aminophylline, IV infusion, 250 mg in 500 ml of 5% Dextrose or 0.9% Sodium Chloride, 6 hourly for 24 hours

Children

5 mg/kg over 20 minutes as a slow infusion or by perfusor at 1mg/kg/hour (max. 500 mg)

E. Chronic Asthma - Initial management

Evidence Rating: [A]

- Salbutamol, inhaled,

Adults and children

100 microgram, 2 puffs as often as needed

And

(If inhaled Salbutamol is needed more than once daily)

- Budesonide, inhaled,

Adults

200 microgram (one puff 12 hourly)

Children

> 10 years; 200 microgram (one puff 12 hourly)
< 10 years; 100 microgram (one puff 12 hourly)

Or

- Fluticasone, Inhaled - MDI,

Adults

125-250 microgram (2 puffs 12 hourly)

Children

50 microgram (2 puffs 12 hourly)

Or

- Beclometasone (Beclomethasone), inhaled,

Adults and Children

100 microgram (2 puffs 12 hourly)

F. Chronic Asthma - Maintenance treatment

- Salbutamol, inhaled,

Adults and children

100 microgram, 2 puffs as often as needed

And

- Fluticasone/Salmeterol, inhaled,

Adults and children over 5 years

100/50-250/50 microgram; 1 puff 12 hourly

Or

- Budesonide/Formoterol , inhaled,

Adults

160/4.5 microgram (1-2 puffs 12 hourly)

Children over 5 years

80/4.5 microgram (1-2 puffs 12 hourly)

And

- Montelukast, oral,

Adult

10 mg daily

Children

4 or 5 mg granules daily

And

- Prednisolone, oral,

Adults

30-40 mg daily and tail down slowly over 2-3 week period to a low maintenance daily dose of 5 mg daily.

Children

1 mg/kg tailed off by 5 mg every third day, reducing to 5-10 mg daily or alternate daily, lowest dose possible without provoking attacks

Note 8-5

Review treatment every 3-6 months with a view to stepping down treatment if client is symptom-free or has minimal symptoms (<1-2 times a month). All patients with chronic Asthma should receive continuous education and counselling by the medical team.

REFERRAL CRITERIA

In acute exacerbation, refer patients if not improving or rapidly deteriorating after initial management to a specialist.

All discharged clients should be followed up within one week and referred to a specialist clinic for continued care.

For chronic asthma refer patients with persistent symptoms to a specialist clinic in a regional or tertiary hospital, and patients who have recurrent acute exacerbations within a few days/ weeks of each other for specialist care and review of their treatment.

Also refer when a patient requires more than one course of oral prednisolone in 3 months.

61. Acute Bronchitis

ACUTE BRONCHITIS This refers to an acute inflammation of the bronchial mucosa. It is often found in association with upper respiratory tract infection. Most cases do not require antibiotics, however, they may be prescribed if the patient's SPO₂ is less than 92% or if there is an underlying co-morbidity like malnutrition, measles, rickets, anaemia, diabetes mellitus, chronic bronchitis or HIV/AIDS.

CAUSES

- Viruses e.g. Influenza virus, Corona virus (common cold)
- Bacteria e.g. *Streptococcus pneumoniae*, *H. influenza*, *Moraxella catarrhalis*, *Staph. aureus* (tends to cause post-influenza chest infections, including bronchitis)

SYMPTOMS

- Dry cough
- Sputum production
- Sore throat
- Pleuritic chest pain
- Low grade fever

SIGNS

- Fever
- Rhinorrhoea
- Rhonchi (wheeze)
- Crepitations (rare)

INVESTIGATIONS

- FBC

CHAPTER 8: DISORDERS OF THE RESPIRATORY SYSTEM

- Sputum culture and gram stain
- Sputum AFBs (2 samples) for tuberculosis if symptoms have lasted more than 2 weeks
- Sinus X-ray for rhinosinusitis (with post nasal drip) as a possible cause for prolonged cough

TREATMENT**Treatment objectives**

- To relieve symptoms
- To treat suspected bacterial infection if any

Non-pharmacological treatment

- Bed rest
- Oral fluids to keep well hydrated
- Humidified air or steam inhalation if necessary

Pharmacological treatment**A. Uncomplicated acute infections**

1st Line Treatment

Evidence Rating: [C]

- Paracetamol, oral,
Adults
500 mg-1g 6-8 hourly
Children
6-12 years; 250-500 mg 6-8 hourly
1-5 years; 120-250 mg 6-8 hourly
3 months-1 year; 60-120 mg 6-8 hourly

Or

- Paracetamol, rectal,
Adults
500 mg-1g 6-8 hourly
Children
6-12 years; 250-500 mg 6-8 hourly
1-5 years; 120-250 mg 6-8 hourly
3 months-1 year; 60-120 mg 6-8 hourly

B. Uncomplicated acute infections-for irritating or chesty coughs

- Guaifenesin containing expectorant, oral,
Adult
200-400 mg 4 hourly (max. 2.4 g per day)
Children
>12 years; 100-400 mg 4 hourly (max. 2.4 g per day)
6-11 years; 100-200 mg 4 hourly (max. 1.2 g per day)
2-5 years; 50-100 mg 4 hourly (max. 600 mg per day)
6 months-2 years; 25-50 mg 4 hourly (max. 300 mg per day)
- Simple linctus, oral,
Adults (adult formulation)
5 ml 6-8 hourly

Children (paediatric formulation)

1 month-12 years; 2.5-5 ml 6-8 hourly

Or

- Carbocysteine, oral,

Adult

500-750 mg 6-8 hourly

Children

2-5 years; 62.5-125 mg 6 hourly

<2 years; not recommended

C. Uncomplicated acute infections-for non-productive or dry cough

- Dextromethorphan containing cough preparations

Adult

10-20 mg 6-8 hourly

Children

7-12 years; 15 mg 6-8 hourly (max. 60 mg per day)

4-6 years; 7.5 mg 6-8 hourly (max. 30 mg per day)

< 4 years; not recommended

Or

- Codeine containing cough preparations

Adult

7.5 -20 mg 4-6 hourly as needed (max. 120 mg per day)

Children

7-12 years; 1-1.5 mg/kg per day in 4-6 divided doses
(max. 60 mg per day)

2-6 years; 1-1.5 mg/kg per day in 4-6 divided doses (max. 30 mg per day)

< 2 years; not recommended

D. For complicated acute infections with co-morbidities or secondary bacterial infection

1st Line Treatment

Evidence Rating: [C]

- Amoxicillin (Amoxycillin), oral,

Adults

500 mg 8 hourly for 5-7 days

Children

6-12 years; 250 mg 8 hourly for 7 days

1-5 years; 125 mg 8 hourly for 7 days

<1 year; 62.5 mg 8 hourly for 7 days

Or

- Amoxicillin + Clavulanic Acid, oral,

Adults

1 g 12 hourly for 5-7 days

Children

> 12 years; One 500/125 tablet 12 hourly for 7 days

4-12 years; 5 ml of 400/57 suspension 12 hourly for 7 days

1-4 years; 5 ml of 200/28 suspension 12 hourly for 7 days

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3 months-1 year; 20 mg/kg (of amoxicillin) 12 hourly for 7 days

< 3 months; 15 mg/kg (of amoxicillin) 12 hourly for 7 days

For children double the dose of the above antibiotic in severe infections (bronchopneumonia)

Or

- Erythromycin, oral, (for individuals allergic to penicillin)

Adults

250-500 mg 6 hourly for 7 days

Children

8-18 years; 250-500 mg 6 hourly 7 days

2-8 years; 250 mg 6 hourly 7 days

6 months-2 years; 125 mg 6 hourly 7 days

Or

- Azithromycin, oral,

Adults

500 mg once daily for 3 days

Children

10 mg/kg once daily for 3 days

And

- Oxygen

By nasal prongs, 2-6 L/min

Or

Face mask, 4-8 L/min

Or

Non-rebreather mask, 10-15 L/min

REFERRAL CRITERIA

Refer all complicated cases of acute bronchitis to a specialist.

62. Chronic Bronchitis

This is chronic inflammation of the bronchial mucosa due to irritants such as tobacco smoke. It occurs after the age of 40 years and is part of the syndrome of chronic obstructive pulmonary disease (COPD). There is progressive worsening with age, eventually resulting in chronic respiratory failure. It is aggravated by recurrent viral and bacterial infections.

Oxygen therapy in these patients must be given with caution to prevent carbon dioxide retention due to depression of respiration. High flow rates remove the central hypoxic drive that maintains respiratory effort and can be harmful.

CAUSES

- Cigarette smoking
- Industrial dust
- Chemical irritants
- Inhaled smoke from use of biomass fuels (eg. charcoal, wood)

SYMPOTOMS

- Shortness of breath, particularly on exertion
- Wheeze
- Fever
- Cough with production of sputum for most of the year
- Infective exacerbation associated with increased quantity of thick purulent sputum

SIGNS

- May be none
- Barrel chest
- Pursed lip breathing
- Clubbing
- Cyanosis
- Increased respiratory rate
- Use of accessory muscles i.e. neck and/or abdominal muscles, for breathing
- Hyperresonance on percussion and loss of cardiac dullness
- Wheeze or rhonchi
- Reduced Peak Expiratory Flow Rate (PEFR)

CHRONIC BRONCHITIS

INVESTIGATIONS

- FBC
- Spirometry, shows reduced lung volumes, particularly FEV1 which is not reversed post-bronchodilator administration
- Chest X-ray
- Sputum culture and gram stain

TREATMENT

Treatment objectives

- To minimise or stop cough
- To prevent or minimise wheeze and shortness of breath
- To reduce quantity of sputum produced
- To prevent infective exacerbations

Non-pharmacological treatment

- Smoking cessation
- Physical exercise
- Good nutrition
- Use of face mask in high risk occupations

Pharmacological treatment

A. Stable chronic bronchitis

Evidence Rating: [B]

- Salbutamol, inhaled, (via pMDI)
Adults
100 microgram (2 puffs) 4-6 hourly as required

CHAPTER 8: DISORDERS OF THE RESPIRATORY SYSTEM**Children (by nebulisation)**

2.5-5 mg 4-6 hourly as required

And

- Tiotropium, inhaled (dry powder inhaler),

Adults

18 microgram (2 puffs) daily

Children

> 12 years; 18 microgram (2 puffs) daily

< 12 years; not recommended

And

- Fluticasone/salmeterol, inhaled (via accuhaler or pMDI),

Adults

100/50 microgram or 250/50 microgram or 500/50 microgram, 1 puff 12 hourly

Children

4-12 years; 100/50 microgram, 1 puff 12 hourly

< 4 years; safety not established

Or

- Budesonide/formoterol, inhaled (via accuhaler or pMDI),

Adults

160/4.5 microgram 1-2 puffs 12 hourly

Children

>12 years; 160/4.5 microgram 1-2 puffs 12 hourly

<12 years; efficacy not established

B. Chronic bronchitis with infective exacerbation

Evidence Rating: [C]

- Oxygen

By nasal prongs, 2-6 L/min

Or

Face mask, 4-8 L/min

Or

Non-rebreather mask, 10-15 L/min

And

- Salbutamol, nebulised,

Adults

2.5-5 mg repeated initially after 15-30 minutes, then every 2-4 hours until improved

Children

2.5-5 mg 4-6 hourly

And

- Ipratropium bromide, nebulised,

Adults

500 microgram 4-6 hourly, until improved

Children

6-12 years; 250 microgram 4-6 hourly

1-5 years; 125 microgram 4-6 hourly
(max. dose for children 1 mg/24 hours)

And

- Amoxicillin (Amoxycillin), oral,
Adults
500 mg 8 hourly for 7-14 days
Children
6-12 years; 250 mg 8 hourly for 7-14 days
1-5 years; 125 mg 8 hourly for 7-14 days
<1 year; 62.5 mg 8 hourly for 7-14 days
- **Or**
- Erythromycin, oral,
Adults
500 mg 6 hourly for 7-14 days
Children
8-18 years; 250-500 mg 6 hourly 7-14 days
2-8 years; 250 mg 6 hourly 7-14 days
6 months-2 years; 125 mg 6 hourly 7-14 days

Or

- Azithromycin, oral,
Adult
500 mg daily for 6 days
Children
10 mg/kg daily for 6 days
- **Or**
- Amoxicillin + Clavulanic Acid, oral,
Adults
1 g 12 hourly for 7-10 days
Children
> 12 years; One 500/125 tablet 12 hourly for 7-10 days
4-12 years; 5 ml of 400/57 suspension 12 hourly for 7-10 days
1-4 years; 5 ml of 200/28 suspension 12 hourly for 7-10 days
3 months-1 year; 20 mg/kg (of amoxicillin) 12 hourly for 7-10 days
< 3 months; 15 mg/kg (of amoxicillin) 12 hourly for 7-10 days

And

- Prednisolone, oral,
Adults
30-40 mg for 7 days

Then

20 mg daily for 5 days, 10 mg daily for 5 days, 5 mg daily for 5 days.
Tail down over 2-3 weeks and stop.

Children

1-2 mg/kg for 3-5 days. Tail down over 2-3 weeks and stop.

And

- Acetylcysteine, oral,

Adults

10 ml 8 hourly for 5-7 days

Children (paediatric formulation)

5-10 ml 8 hourly for 5-7 days

Or

- Carbocysteine, oral,

Adult

500-750 mg 6-8 hourly

Children

2-5 years; 62.5-125 mg 6 hourly

< 2 years; not recommended

REFERRAL CRITERIA

Refer all patients not improving on initial management, with acute exacerbation, recurrent infective exacerbations or rapidly deteriorating to a specialist.

63. Bronchiectasis

In bronchiectasis, the medium and smaller sized bronchi and bronchioles are damaged. Their ciliated epithelium is destroyed by inflammation and scarring, which in a vicious cycle of infection and further scarring leads to permanent dilatation and bronchial wall thickening. The mucus lining of these airways become colonized by bacteria and generate copious amounts of purulent and often offensive sputum. The disease, if not treated is characterized by frequent infective exacerbations with progressively worsening lung function.

I
BRONCHIECTASIS

CAUSES

- Childhood pneumonia e.g. whooping cough, post measles
- Post-pulmonary tuberculosis
- Chronic rhinosinusitis with post-nasal drip
- Asthma and COPD
- Fibrosing lung disease of any cause e.g. rheumatoid lung disease
- Immune deficiency states e.g. HIV infection, agammaglobulinaemia
- Inherited disorders e.g. cystic fibrosis, primary ciliary dyskinesia should be considered in young children presenting with bronchiectasis

SYMPTOMS

- Persistent cough over many months
- Copious purulent sputum which is sometimes offensive
- Haemoptysis in over one third of cases during exacerbations
- Intermittent systemic symptoms - fever, night sweats and weight loss
- Chest pain
- Difficulty in breathing

SIGNS

- Weight loss

- Fever
- Clubbing
- Dull percussion note
- Bronchial breath sounds
- Coarse crepitations

INVESTIGATIONS

- FBC, ESR
- Sputum culture and sensitivity, gram stain
- Sputum AFBs
- Chest X-ray
- CT scan of the chest
- Pulse oximetry

TREATMENT

Treatment objectives

- To treat infection
- To aid sputum clearance
- To minimize cough and sputum production
- To prevent exacerbations
- To diagnose and treat underlying disorders

Non-pharmacological treatment

- Chest physiotherapy - Postural drainage, Sputum clearance techniques
- Breathing exercises
- Improve nutrition
- Encourage adequate fluid intake
- Encourage physical exercise

Pharmacological treatment

A. Acute infective exacerbation

1st Line Treatment

Evidence Rating: [C]

- Amoxicillin + Clavulanic Acid, oral,

Adults

1 g 12 hourly for 14 – 21 days

Children

>12 years; One 500/125 tablet 12 hourly

6-12 years; 5ml of 400/57 suspension 12 hourly

1-6 years; 2.5ml of 400/57 suspension 12 hourly

1 month-1 year; 0.25ml/kg body weight of 125/31

suspension 8 hourly

< 1 month; 0.25ml/kg body weight of 125/31

suspension 8 hourly

And

- Azithromycin, oral, (for patients allergic to penicillin, given as mono-therapy)

Adults

500 mg once daily for 6-14 days

Children

10 mg/kg once daily for 6-14 days

REFERRAL CRITERIA

Refer all suspected cases to a specialist for confirmation and further management.

64. Lung Abscess

A lung abscess is defined as necrosis of the pulmonary parenchyma and formation of cavities containing necrotic tissue or purulent fluid, usually caused by microbial infection. Antibiotic management should be considered as soon as it is diagnosed, while awaiting confirmation of the causative organism and must be continued for 4-6 weeks.

CAUSES

- Aspiration of infected secretions or tissue from the mouth and upper respiratory tract in the unconscious or semi-conscious patient e.g. in alcoholics, epileptics, anaesthetised or dental patients
- Foreign body aspiration e.g. inhaled peanut, dentures, fish bone
- Inadequately treated bacterial pneumonia especially, gram negative bacteria like *Klebsiella pneumoniae*, and beta-haemolytic streptococci
- *Staphylococcus aureus* causing multiple lung abscesses
- Penetrative lung injury
- Partial obstruction of an airway by tumour or lymph node
- Septic emboli from other infected areas of the body e.g. right sided bacterial endocarditis
- Bronchiectasis
- Infected bullae in chronic lung disease

SYMPTOMS

- Fever with swinging temperatures
- Cough, productive of copious amounts of purulent foul smelling sputum
- Haemoptysis
- Chest pain
- Breathlessness
- Easy fatigability

SIGNS

- Fever
- Tachycardia
- Tachypnoea
- Chest wall tenderness
- Dull percussion note

- Diminished breath sounds
- Increased vocal resonance

INVESTIGATIONS

- FBC
- Sputum culture and sensitivity, gram stain
- Sputum AFBs
- Chest X-ray

TREATMENT

Treatment objectives

- To drain abscess collection
- To treat underlying infection
- To treat predisposing conditions

Non-pharmacological treatment

- Chest physiotherapy
- Improve nutritional status
- Ensure adequate fluid intake
- Surgical drainage of abscess

Pharmacological treatment

A. Initial treatment

1st Line Treatment

Evidence Rating: [B]

- Cloxacillin, IV,
Adults
500 mg 6 hourly for 4 weeks

Children

5-12 years; 250 mg 6 hourly for 2-4 weeks

1-5 years; 125 mg 6 hourly for 2-4 weeks

< 1 year; 62.5 mg 6 hourly for 2-4 weeks

And

- Amoxicillin + Clavulanic Acid, IV,
Adults
1.2 g 8 hourly for 4 weeks

Children

3 months -18 years; 30 mg/kg 8 hourly, max. 1.2g 8 hourly

< 3 months; 30 mg/kg 12 hourly for 2-4 weeks

And

- Ceftriaxone, IV,
Adult
2 g daily for 4 weeks

Children

All ages 50-75mg /kg per day in divided 12 hourly doses for 4 weeks

Or

- Gentamicin, IV,
Adults

40-80 mg 8 hourly for 14 days

Children

1-12 years;	2.5 mg/kg 8 hourly for 14 days
< 1 year;	2.5 mg/kg 12 hourly for 14 days

And

- Metronidazole, IV,

Adults

500 mg 8 hourly for 4 weeks

Children

7.5 mg/kg 8 hourly for 4 weeks

Or

- Clindamycin, IV,

Adults

300-600 mg 6 hourly for 4 weeks or until clinical improvement

Children

3-6 mg/kg 6 hourly for 2-4 weeks

B. Continuation treatment

- Flucloxacillin, oral,

Adults

500 mg 6 hourly for 2 weeks

Children

5-12 years; 250 mg 6 hourly for 2 weeks

1-5 years; 125 mg 6 hourly for 2 weeks

< 1 year; 62.5 mg 6 hourly for 2 weeks

And

- Amoxicillin + Clavulanic Acid, oral,

Adults

1 g 12 hourly for 14-21 days.

Children

> 12 years; One 500/125 tablet 12 hourly

6-12 years; 5 ml of 400/57 suspension 12 hourly

1-6 years; 2.5 ml of 400/57 suspension 12 hourly

1 month-1 year; 0.25ml/kg body weight of 125/31 suspen-
sion 8 hourly

< 1 month; 0.25 ml/kg body weight of 125/31 suspen-
sion 8 hourly

And

- Clindamycin, oral,

Adult

300 mg 6 hourly for 14 days

Children

> 3 months; 15-40 mg/kg/day, in 3 divided doses,
(Minimum dose - not less than 300 mg/day)

REFERRAL CRITERIA

Refer to a specialist or higher-level facility if there is no clinical

improvement within the first 2 weeks of initiating antibiotic therapy.

DISORDERS OF THE CENTRAL NERVOUS SYSTEM

65. Headache

Headache is caused by traction, displacement, inflammation, vascular spasm or distension of the pain sensitive structures in the head or neck. Headaches that are new in onset and clearly different from any the patient has experienced previously are commonly a symptom of serious illness and therefore demand prompt evaluation. The precipitating factors, associated symptoms and clinical findings on examination, together with the results of appropriate investigations, can provide a guide to the cause of the headache.

CAUSES

Acute

- Subarachnoid haemorrhage and other cerebrovascular diseases
- Infections e.g. malaria, typhoid fever, viral infections
- Meningitis or encephalitis
- Ocular disorders (glaucoma, acute iritis, refractive errors)
- Post-seizures
- Post-lumbar puncture
- Hypertensive encephalopathy

Subacute

- Lesions of the middle ear (otitis media, mastoiditis)
- Intracranial mass (tumour, subdural haematoma, abscess)
- Idiopathic intracranial hypertension
- Trigeminal neuralgia
- Post-herpetic neuralgia
- Severe hypertension
- Atypical facial pain
- Medication
- Post trauma
- Giant cell temporal arteritis

Chronic

- Migraine
- Cluster headache
- Tension headache

- Cervical spine disease
- Sinusitis
- Dental disease
- Psychogenic causes

SYMPTOMS

- Visual e.g. photophobia, flashes of light, floaters
- Aura e.g. visual, auditory, gustatory, tactile
- Accompanying features e.g. nausea, vomiting, fever, collapse
- Site of pain e.g. occipital, ocular, unilateral, bilateral
- Characteristics e.g. pulsating, throbbing, sharp, dull
- Relieving or exacerbating factors e.g. cough, coitus, lying flat

SIGNS

- Usually none
- Local tenderness
- Fever
- Neck stiffness
- Positive Kernigs
- Markedly elevated blood pressure
- Drowsiness
- Excessive lacrimation
- Conjunctival redness
- Papilloedema
- Focal neurologic deficit e.g. cranial nerve deficit, hemiparesis

HEADACHE

INVESTIGATIONS

- FBC
- ESR
- Skull X-ray
- Cervical X-ray
- X-ray of the paranasal sinuses
- Lumbar puncture (meningitis, subarachnoid bleed)
- Eye tests (tonometry, refraction, fundoscopy)
- Cranial CT scan or MRI if warranted

TREATMENT

Treatment objectives

- To relieve pain
- To identify and treat underlying cause
- To prevent complications relating to the underlying cause
- To improve quality of life

Non-pharmacological treatment

- Relaxation techniques
- Avoidance of stress
- Psychotherapy
- Identification and elimination of trigger factors

Pharmacological treatment

- A. Acute symptomatic treatment of headaches
- 1st Line Treatment
Evidence Rating: [B]
- Paracetamol, oral,

<u>Adults</u>	500 mg-1 g 6 - 8 hourly
<u>Children</u>	6-12 years; 250-500 mg 6-8 hourly
	1-5 years; 120-250 mg 6-8 hourly
	3 months-1 year; 60-120 mg 6-8 hourly

Or
 - Diclofenac, oral,

<u>Adults</u>	50 mg 8 hourly or 100 mg 12 hourly
<u>Children</u>	>12 years; 50 mg 12 hourly
	<12 years; not recommended

Or
 - Ibuprofen, oral,

<u>Adults</u>	400 mg 6-8 hourly
<u>Children</u>	6-12 years; 200-400 mg 6-8 hourly
	1-5 years; 100-200 mg 6-8 hourly
	3 months-1 year; not recommended

Or
 - Tramadol, oral,

<u>Adults</u>	50-100 mg 4-6 hourly (max. 400 mg daily)
<u>Children</u>	> 12 years; 50-100 mg 4-6 hourly
	< 12 years; not recommended
- B. Prophylaxis for Migraine headaches
- 1st Line Treatment
Evidence Rating: [B]
- Propranolol, oral,

<u>Adults</u>	Initial; 40 mg 12 hourly, maintenance; 80-120 mg 12 hourly
<u>Children</u>	Initial; 20-40 mg 12 hourly, maintenance; 40-80 mg 12 hourly

REFERRAL CRITERIA

Refer recurrent, unresolving or unexplained headaches to a specialist for evaluation and appropriate management.

66. Seizures

A seizure is a clinical event caused by a transient disturbance of brain function due to an abnormal paroxysmal neuronal discharge in the brain. If these episodes are recurrent without an identifiable cause, they are commonly described as epilepsy. The term status epilepticus is used for repeated seizures, which occur without the patient regaining consciousness between attacks. (See section on 'Epilepsy and Status epilepticus').

The clinical presentation depends on the part of the brain affected. Patients may sometimes describe the warning signals (termed a prodrome or aura), which they experienced before the event. A detailed description by a witness is key.

General anaesthesia and ventilation may be required in severe cases and where high doses of anticonvulsants are required.

CAUSES

- Congenital, prenatal or perinatal injury
- Fevers, especially in children aged 6 months to 6 years (febrile convulsion)
- Cerebral malaria
- Infections e.g. meningitis, TB, HIV, abscesses in the brain
- Metabolic causes: hypoglycaemia, hypocalcaemia, hyponatraemia, hyperosmolar diabetic state, uraemia, hepatic failure
- Idiopathic epilepsy (See section on 'Epilepsy')
- Eclampsia
- Vascular diseases: hypertensive encephalopathy, stroke, myocardial infarction
- Space occupying lesions: tumour or malformations of the brain
- Head trauma
- Drugs and toxins: alcohol, antidepressants, metronidazole, drug and alcohol withdrawal
- Degenerative diseases e.g. dementia
- Psychogenic: (See section on 'Psychogenic Seizures')

SYMPTOMS

- Loss of consciousness
- Tongue biting
- Foaming at the mouth
- Incontinence of stool and/or urine
- Aura (may include a strange gut feeling, somatosensory manifestations - visual, olfactory, gustatory or auditory e.g. strange smells/flashing lights)
- Muscle twitching and movements which may be focal or generalized
- After a seizure, the patient may be confused (post-ictal confusion) or may sleep for some time (post-ictal sleep)

SIGNS

- A prodrome or aura with automatism (lip smacking, picking at items)
- Muscle twitching and movements which may be focal or generalized
- Post-ictal sleep
- Post-ictal confusion
- Todd's paralysis (stroke-like weakness) may rarely occur
- Examine carefully for evidence of neurological localizing signs, tongue laceration and evidence of trauma to the face or other parts of the body

INVESTIGATIONS

- FBC, ESR
- Blood glucose
- BUE
- Calcium
- LFTs
- Chest X-ray
- Electroencephalogram (EEG)
- CT scan (head)

TREATMENT**Treatment objectives**

- To stop the seizure
- To treat underlying cause
- To prevent injury

Non-pharmacological treatment

- Move sharp objects, fire etc. away from patient during seizures
- Ensure clothing around the neck is loose
- Ensure the airway is clear, wipe or suction any secretions or vomitus from the mouth or nose.
- Do not force a spoon or tongue depressor into mouth!
- Remove false teeth if present
- After convulsions cease, turn the patient into semi-prone position by turning the patient on the side, with one leg bent and the other leg straight
- Monitor fits (fits chart)

Pharmacological treatment

- A. Acute Seizures (immediate emergency measures)
- 1st Line Treatment
 - Evidence Rating: [A]
 - Oxygen
By nasal prongs, 2-6 L/min
 - Or
Face mask, 4-8 L/min
 - Or
Non-rebreather mask, 10-15 L/min

And

- Lorazepam, slow IV,
Adults
4 mg as a single dose, repeated once after 10 minutes if necessary.
Given into a large vein slowly over 3-5 minutes.
Children
12-18 years; 4 mg as a single dose, repeated once after 10 minutes if necessary. Given into a large vein slowly over 3-5 minutes.
1 month-12 years; 100 microgram/kg (max. 4 mg) as a single dose, repeated once after 10 minutes if necessary.
Neonates; 100 microgram/kg (max. 4 mg) as a single dose, repeated once after 10 minutes if necessary.

Or

- Midazolam, IV,
Adults
150-300 microgram/kg, may repeat every 10-15 minutes as required
Children
1 month-18 years; initially 150-200 microgram, followed by followed by continuous infusion of 60 microgram/kg per hour. May increase by 60 microgram /kg per hour every 15 minutes until seizures are controlled. (max. 300 microgram/kg per hour)
Neonates; 150-200 microgram/kg followed by continuous infusion of 60 microgram/kg per hour. May increase by 60 microgram /kg per hour every 15 minutes until seizures are controlled. (max. 300 microgram/kg per hour)
- Or
- Midazolam, buccal,
Adults
10 mg
Repeat after 10 minutes if necessary.
A third dose must not be given sooner than 12 hours after the second dose.
Children
6 months-18 years; 200-500 microgram/kg (max. single dose 10 mg)
Repeat after 10 minutes if necessary.
A third dose must not be given sooner than 6 hours after the second dose in children < 40 kg.

2nd Line Treatment

- Diazepam, IV,
Adults
10 mg slowly over 2-3 minutes (approximately 2.5 mg every 30 seconds)
Children
200-300 microgram/kg slowly over 2-3 minutes.
This may be repeated 10 minutes later if the fit continues.

Or

- Diazepam, rectal,

Children

>12 years;	0.2 mg/kg
6-12 years;	0.3 mg/kg
2-6 years;	0.5 mg/kg
1 month-2 years;	2.5 mg
<u>Neonates;</u>	1.25-2.5 mg

This may be repeated 10 minutes later if the fit continues. (max. 10 mg)

Note 9-1

If a rectal formulation is not immediately available, draw up the injectable form directly into a syringe and administer it into the rectum (after removing the needle).

- B. If seizures continue (Status Epilepticus)

- Phenytoin, IV, (with ECG monitoring)

Adults

15 mg/kg slowly at rate no greater than 50 mg/minute. (max. 2 g loading dose),

Then

Maintenance, 100 mg 6-8 hourly

Children

1-12 years; initially, 18 mg/kg slowly at a rate no greater than 50 mg/minute.

Then

Maintenance, 5-10 mg/kg daily (max. 300 mg daily)

1-6 months; initially, 18 mg/kg slowly at a rate no greater than 1 mg/kg/minute.

Then

Maintenance, 2.5-5 mg/kg 12 hourly

Neonates; initially, 18 mg/kg slowly at a rate no greater than 1 mg/kg/minute.

Then

Maintenance, 2.5-5 mg/kg 12 hourly

Note 9-2

May cause cardiac arrhythmias if given faster than 25 mg/minute.

Caution 9-1.

Never mix phenytoin with 5% Dextrose, to minimise the risk of crystallisation. Instead, phenytoin must be put in Normal Saline.

Or

- Phenobarbitone, IV,

Adults

10-20 mg/kg, repeat dose at 20 minute intervals if necessary (max. total dose 30 mg/kg)

Then (starting 12 hours after initial dose)

0.5-1.5 mg/kg 12-24 hourly

Children

1 month-12 years; 10 mg/kg at a rate not more than 1 mg/kg/minute. Repeat after 15 minutes if necessary.

Neonates

Initially, 15-20 mg/kg stat.

May repeat dose of 5-10 mg /kg at 20 minute intervals (max. total dose 40 mg/kg)

Then (starting 12 hours after initial dose)

3-4 mg/kg 24 hourly

REFERRAL CRITERIA

If seizures remain uncontrolled within 30 minutes after they began, refer immediately for specialist attention. Note that oxygenation should be continued during transfer.

67. Epilepsy

EPILEPSY

Epilepsy is a disorder of the central nervous system (CNS), which is characterized by spontaneous recurrent seizures or the tendency to have seizures. Epilepsy is now classified as Generalized (tonic, clonic, absence,

| atonic or myoclonic) with aura and loss of consciousness or Focal.

Traditionally, a single seizure has been regarded as an indication for investigation and assessment, but not for drug treatment unless the circumstances of the seizure necessitate it.

| Drug treatment should certainly be considered after two seizures, or if the second seizure follows closely from the first. The type of drug used depends on the type of seizure.

Drug treatment of epilepsy should be guided by the following general principles. Begin with a single drug at the lowest dosage range and increase dose gradually to the upper limit of dosage range or until side-effects appear, if seizures are not controlled.

Subsequently, if seizures still remain uncontrolled, change to a different drug by gradually reducing the dose of the initial agent while simultaneously introducing the new one. This usually takes 3-4 weeks.

Try three separate drugs in this fashion if no clinical response is observed, before resorting to drug combinations.

Anticonvulsant drug treatment can be totally withdrawn (gradually) in a patient with epilepsy only after a 2-year seizure-free period and after a full evaluation and discussion with the patient.

Patients with epilepsy should be advised not to drive a vehicle if not certified to be seizure-free, swim alone, work at heights, operate machines, cook by open fire alone, nor ingest alcohol excessively.

CAUSES

- Idiopathic

SYMPTOMS

(See section on 'Seizures')

SIGNS

(See section on 'Seizures')

INVESTIGATIONS

(See section on 'Seizures')

TREATMENT**Treatment objectives**

(See section on 'Seizures')

Non-pharmacological treatment

(See section on 'Seizures')

Pharmacological treatment**A. Management of Epilepsy - Acute Generalized seizures**

- **Phenytoin, IV,**
Adult
10-15 mg/kg stat. over 20-30 minutes

Then

100 mg 6-8 hourly PRN

Children

3-5 mg/kg

Or

- **Phenobarbital (daily), IM,**
Adult
60-180 mg at night
Children
2.5-5 mg/kg daily by slow IV or oral

Or

- **Carbamazepine**
Adult
100-200 mg once or 12 hourly

Then

Increase gradually to 0.8-1.2 g 8-12 hourly

Children

1 month-12 years; 2.5-5 mg/kg at night or 12 hourly
Increase when necessary

Then (maintenance)

5 mg/kg 8-12 hourly

Or

- **Sodium valproate (12 hourly)**
Adult
600 mg (max. 2 g)

Children

> 12 years; 600 mg (max. 2g)
1 month-12 years; 10-15 mg/kg, daily or two divided doses

Then (maintenance)

25-30 mg/kg daily in two divided doses

Or

- Lamotrigine

Adult

25-50 mg 12 hourly

Children

25-50 mg daily

Or

- Levetiracetam

Adult

25-50 mg 12 hourly

Children

25-50 mg daily

B. Management of Epilepsy - Generalized absence seizure

- Sodium valproate (8-12 hourly)

Adult

600 mg (max. 2 g)

Children

> 12 years; 600 mg (max. 2 g)

1 month-12 years; 10-15 mg/kg, daily or two divided doses

Then (maintenance)

25-30 mg/kg daily in two divided doses

Or

- Ethosuximide (daily)

Adult

250 mg 12 hourly, increase by 250 mg every 5-7 days to 1-1.5 g daily in two divided doses

Children

> 6 years; 250 mg 12 hourly, increase by 250 mg every 5-7 days to 1-1.5 g daily in two divided doses

1 month-6 years; 5 mg/kg (max. 125 mg 12 hourly)

C. Management of Epilepsy - Focal seizure

- Carbamazepine, oral,

Adult

100-200 mg once or 12 hourly,

Then

Increase gradually to 0.8-1.2 g 8-12 hourly

Children

1 month-12 years; 2.5-5 mg/kg at night or 12 hourly.

Increase when necessary

Then (maintenance)

5 mg/kg 8-12 hourly

Or

- Sodium valproate (8-12 hourly)

Adult

600 mg (max. 2 g)

Children

> 12 years; 600 mg (max. 2 g)
1 month-12 years; 10-15 mg/kg, daily or two divided doses
Then (maintenance)
12.5-15 mg/kg 12 hourly

Note 9-3

Where available slow release preparations are preferred

All patients with epilepsy should receive continuous education and counselling by the Pharmacist.

REFERRAL CRITERIA

Refer all patients with intractable seizures to the specialist

68. The Unconscious Patient

Unconsciousness is a common clinical problem and may be associated with diseases of several organs in the body. The cause of unconsciousness is often not immediately evident, and a systematic approach to its diagnosis and management is therefore important. Obtaining a thorough history from accompanying relatives, friends and the police is essential.

CAUSES

- Infections e.g. meningitis, cerebral malaria
- Hypoglycaemia (diabetes-related or alcohol induced)
- Diabetic ketoacidosis
- Severe hypertension with encephalopathy
- Cerebrovascular Accident (CVA) or stroke
- Drug ingestion or overdose e.g. alcohol, salicylates, barbiturates, cocaine
- Electrolyte imbalance
- Epilepsy - status epilepticus
- Head injury
- Major organ failure e.g. hepatic failure, renal failure and myocardial infarction
- Hypoxia from severe anaemia
- Poisoning e.g. kerosene, pesticides, herbicides

SYMPOTMS

- Depends on the underlying cause (See appropriate sections)

SIGNS

- Depends on the underlying cause (See appropriate sections)

INVESTIGATIONS

Tests depend on suspected cause

- FBC
- BF for MPs
- Blood glucose
- Urea and electrolytes

- Liver function tests
- Blood culture and sensitivity
- Urine culture and sensitivity
- ECG
- Toxicology: drug screen, alcohol levels
- Lumbar puncture
- Head CT scan

TREATMENT

Treatment objectives

- To support life until consciousness is regained
- To prevent complications e.g. aspiration, hypoxia
- To determine the underlying cause and manage it appropriately

Non-pharmacological treatment

- Ensure the airway is patent and clear of secretions
- Examine and stabilize the cervical spine if any history or sign of injury
- Catheterise and monitor urine output if necessary
- Place the patient in a position that would prevent aspiration in case of vomiting or pass an NG tube if no contraindications exist

Pharmacological treatment

Table 9-1: Guide to pharmacological treatment of the unconscious patient

Complaints	Diagnosis	Action
History of diabetes, use of oral anti-diabetic or ingestion of alcohol	Hypoglycaemia *	(See section on 'Hypoglycaemia')
History of ingestion of medication (tablets or liquid). There may be smell of alcohol or other substance on breath	Drug overdose e.g. Alcohol	Support respiration IV Dextrose 10% 50-100 ml to prevent hypoglycaemia. In chronic alcoholics. Precede IV Dextrose by IV/IM Thiamine 100 mg IV, then 50-100 mg IM until regains consciousness
	Paracetamol	Start N-acetylcysteine (as indicated below) and refer IV continuous infusion: Body weight > 20 kg: 100 ml of Dextrose 5% given over 15 min, Followed by

CHAPTER 9: DISORDERS OF THE CENTRAL NERVOUS SYSTEM

Complaints	Diagnosis	Action
		50 mg/kg in 250 ml of Dextrose 5% over 4 hours. Then 100 mg/kg in 500 ml of Dextrose 5% over 16 hours.
		Children < 20 kg: 150 mg/kg in 3 ml/kg of Dextrose 5% given over 15 min. Followed by 50 mg/kg in 7 ml/kg of Dextrose 5% given over 4 hours. Then 100 mg/kg in 14 ml of Dextrose 5% over 16 hours.
Presence or absence of history of diabetes; polyuria, polydipsia. Hyperventilation, gradual onset of illness, evidence of infection Urine sugar and ketone positive Blood glucose > 18 mmol/L	Diabetic ketoacidosis *	(See section on DKA)
High-grade fever, seizures, headache, neck stiffness, altered consciousness etc.	Meningitis * Cerebral Malaria	Treat with appropriate antibiotics and anti-malarial until either diagnosis confirmed. (See appropriate section).
History of previous seizures, sudden onset of convulsions; with or without incontinence.	Epilepsy *	Give Diazepam, IV (slowly over 2-3 minutes), to abort seizures and continue or start with anti-epileptic drug treatment. (See appropriate section)
Patient with sudden onset of paralysis of one side of body.	Stroke *	Check blood pressure and blood glucose. (See appropriate section)
Patient with hypertension, headaches, seizures	Hypertensive encephalopathy *	Check blood pressure If > 180/110 mmHg, give oral or parenteral anti-hypertensive to reduce BP gradually
Sudden onset associated with cardiac arrhythmia or emotional crisis.	Syncope	Unconsciousness is usually brief. Prompt awakening occurs. Monitor vital signs, ECG Reassure

Complaints	Diagnosis	Action
History of injury, or alcoholism, signs of trauma	Head Injury	Treat lacerations, Stabilise Cervical spine X-ray skull for fractures, Head CT scan
History of heavy alcohol ingestion over many years. History of jaundice and gradual onset of changes in sensorium	Hepatic Failure *	Manage as hepatic encephalopathy
Diaphoresis, cold clammy skin, weak pulses	Shock Hypovolaemic Haemorrhagic Cardiogenic Septic	(See appropriate sections)

* (See appropriate section)

| REFERRAL CRITERIA

Refer to a specialist for further definitive management if not responding to standard measures of resuscitation.

69. Attention Deficit Hyperactivity Disorder (ADHD)

Attention Deficit Hyperactivity Disorder is the most common neurobehavioural disorder affecting children. It may present in infancy and can continue into adulthood. It affects 5-8% of children and nearly three times as many boys as girls. Nearly half the children presenting with ADHD may also have an associated learning problem.

The term is commonly applied wrongly to the normal child who is always on the go and never sits still. Recognized causes of hyperactivity in children include normal variation, boredom or understimulation or excessive restraint, learning difficulties, autism, partial seizures and drugs like clonazepam, phenobarbitone and phenytoin.

ADHD is also wrongly attributed to poor parenting, too much TV, poor schools, poor home environment, excess sugar or food allergies.

No specific tests confirm a diagnosis of ADHD. A full physical and neurological examination must be done in all cases. The behavioural deficits and excesses that constitute a diagnosis of ADHD must be present in multiple settings such as home and school.

CAUSES

- Unknown
- Related factors:
 - Hereditary
 - Imbalance of neurotransmitters

SYMPTOMS

- Inattention
 - child often fails to finish things he or she starts
 - often does not seem to listen
 - has difficulty concentrating on school work
- Impulsivity
 - child often acts before thinking
 - hits others when upset
 - inability to wait for his or her turn in a game
 - engages in dangerous activities without consideration of the consequences

- has difficulty organizing work (this not due to cognitive impairment)
- Hyperactivity
 - child tries to do several things at once
 - talks incessantly,
 - struggles to sit still at a desk and fidgets
- Distractibility is evidenced by
 - not listening when spoken to
 - an inclination to daydream
 - not being able to work independently
 - disorganized

SIGNS

- Similar to symptoms above

INVESTIGATIONS

- Usually none

TREATMENT

Treatment objectives

- To reduce hyperactivity
- To improve attention
- To improve compliance to instruction

Non-pharmacological treatment

Behaviour management techniques - Evidence Rating: [A]

- A class helper in class to sit with child and focus attention to school work
- Parenting class to help parents cope
- Desist from punitive physical interventions e.g. caning

Pharmacological treatment

1st Line Treatment

Evidence Rating: [A]

- Methylphenidate, oral,
Adults

10 mg 8-12 hourly (max. 60 mg)

Then

Increase weekly by 5-10 mg, if necessary, to max. of 30 mg 12 hourly
Children

6-18 years; 2.5-5 mg 12 hourly

Increase weekly by 5-10 mg, if necessary, to max. of 30 mg 12 hourly
4-6 years; 2.5 mg 12 hourly

Increase weekly by 2.5 mg daily to max. of 1.4 mg/kg if necessary in 2 to 3 divided doses.

< 4 years; not recommended

Or

- Atomoxetine, oral,
Adults

40 mg once daily for 7 days

Then

Increase according to response to a max. of 100 mg

Children

> 6 years (weight > 70 kg); 40 mg once daily for 7 days

Then

Increase according to response to a max. of 80 mg

> 6 years (weight < 70 kg); 500 micrograms/kg daily for 7 days

Then

Increase according to response to a max. of 1.2 mg/kg daily

< 6 years; not recommended

2nd Line Treatment

Evidence Rating: [B]

- Imipramine, oral,

Adults

75 mg daily

Then

Increase to 150 mg daily if necessary (max. 200 mg per day)

Children

6-18 years; 10-30 mg 12 hourly

REFERRAL CRITERIA

Refer to a clinical psychologist for behaviour management. An occupational therapist, remedial teacher, speech therapist following a needs assessment.

Refer to a specialist if there is no clinical improvement after a month of the above recommended therapy.

70. The Acutely Disturbed Patient

The acutely disturbed patient presents in an excited, agitated or aggressive state. There may be delusions and perceptual changes like hallucinations that overwhelm the patient. Disorientation and alteration in consciousness are often prominent when the cause is organic. The patients are usually brought in restrained by more than one person or by the police. The condition must be regarded as an emergency since a few cases are potentially fatal.

CAUSES

Acute (Functional) Psychiatric Disorders

- Mania or hypomania
- Schizophrenia and like states
- Other psychotic disorders
- Agitated depression
- Acute psychosis

Acute (Organic) Psychiatric Disorders

- Toxic psychosis secondary to drug intoxication (amphetamines, cocaine, marijuana, heroin etc.)
- Abnormal reaction to alcoholic Intoxication
- Acute Alcoholic Withdrawal Syndrome (delirium tremens)
- Infective causes e.g. typhoid, malaria, meningitis, HIV, encephalitis, hepatitis

Acute Metabolic Disorders

- Hypoglycaemia
- Thyroid disease
- Porphyria

Others

- Head trauma
- Subdural hematoma

SYMPTOMS

(See relevant sections for symptoms of specific disorders)

- Sleeplessness
- Restlessness - agitated or even combative patient
- Talking excessively and loudly, or low toned, reduced speech, even mute in some cases
- Disinhibited behaviour or speech
- Hearing or seeing "imaginary" people or objects.
- Expression of fear, undue suspicion, inappropriate guilt or bizarre beliefs
- Destructiveness

SIGNS

(See relevant sections for signs of specific disorders)

- Elated, irritable, angry or depressed mood
- Physical aggression, agitation or restlessness
- Lack of insight
- Pressured or retarded speech
- Hyperactivity or reduced motor activity
- Disinhibition - social and sexual
- Delusions of grandeur, guilt or paranoia
- Auditory hallucinations
- Visual hallucinations (especially in toxic, infectious and withdrawal states)
- Fever (infective conditions)
- Drowsiness, altered consciousness (mainly in alcohol withdrawal)
- Disorientation and confusion (mainly in alcohol withdrawal)
- Sweating
- Tremors (mainly in alcohol withdrawal)

INVESTIGATIONS

- Usually none
- Urine screen (for substances like amphetamines, cocaine, heroin, cannabis)

CHAPTER 10: PSYCHIATRIC DISORDERS

- FBC, Rapid Diagnostic Test for malaria parasites (when there is fever and suspected infections)
- Random Blood Sugar
- Blood culture

TREATMENT**Treatment objectives**

- Rapid tranquillisation - to calm down the patient as quickly as possible using the safest drugs available without necessarily inducing sleep
- To treat underlying cause

Non-pharmacological treatment

- Restrain patient when necessary without causing injuries
- Talk to the patient in a firm but reassuring manner
- Avoid long periods of silence especially in paranoid patients
- Remove and store away any offensive weapons on or around patient.

Pharmacological treatment

Evidence Rating: [C]

- Lorazepam, IV/IM,
Adults

2-4 mg stat.

Repeated once after 10 minutes if necessary.

Children

> 12 years;	500 microgram-2 mg (max. 4 mg)
< 12 years;	500 microgram-1 mg (max. 2 mg)

Or

- Haloperidol, IM,
Adults

2-5 mg stat. may repeat in 4-8 hours (max. 20 mg per day)

Children

13-18 years;	2-5 mg 4-8 hourly as required
6-12 years; mg/kg per day)	1-3 mg 4-8 hourly as required (max. 0.15
< 5 years;	not recommended

Note 10-1

Patient should be switched to oral as soon as possible

Then

- Haloperidol, oral,
Adults

3-5 mg 8-12 hourly (max. 30 mg per day)

Children

> 12 years;	3-5 mg 8-12 hourly as required (max. 30 mg per day)
3-12 years (15-40 kg); < 3 years;	0.25-0.5 mg per day (max. 0.5 mg per day) not recommended

Or

- Chlorpromazine, IM, (for very agitated patients)

Adults

50-150 mg stat. repeated after 30-40 minutes if necessary

Children

12-18 years;	25-50 mg 6-8 hourly
6-12 years; per day)	500 microgram/kg 6-8 hourly (max. 75 mg)
1-6 years; per day)	500 microgram/kg 6-8 hourly (max. 40 mg)

Note 10-2

Never give chlorpromazine intravenously! It may lead to severe hypotension.

Or

- Olanzapine, IM,

Adults

10-20 mg stat. subsequent doses of 10 mg may be given 2 hours after initial dose, if necessary and 4 hours after 2nd dose (max. 30 mg per day)

Children

Not recommended

Or

- Chloral hydrate, oral or rectal,

Adults

500 mg-1g

Children

12-18 years;	500 mg-1 g
1 month-12 years;	30-50 mg/kg (max. 1g)
<u>Neonate;</u>	30-50 mg/kg

Or

- Diazepam, IV,

Adults

10 mg slowly over 2-3 minutes (approximately 2.5 mg every 30 seconds)

Children

200-300 microgram/kg slowly over 2-3 minutes.

This may be repeated after 10 minutes if necessary (max 10 mg)

Or

- Diazepam, rectal,

Children

> 12 years;	0.2 mg /kg
6-12 years;	0.3 mg/kg
2-6 years;	0.5 mg/kg
1 month-2 years;	2.5 mg
<u>Neonates;</u>	1.25-2.5 mg

This may be repeated after 10 minutes (max 10 mg)

Note 10-3

If a rectal formulation is not immediately available, draw up the injectable form directly into a syringe and administer it into the rectum (after removing the needle).

Diazepam IV must be administered with care if the cause of the acute disturbance is thought to be organic.

REFERRAL CRITERIA

Refer all acutely disturbed patients to a specialist.

71. Psychogenic Seizures

Psychogenic seizures or pseudo seizures are non-epileptic seizures, which mimic epilepsy but actually have an underlying psychological cause. In patients with this form of disorder, there may be a history of physical, sexual or psychological abuse. The symptoms may be precipitated by stress and the signs are often variable and may include resistance to eye opening upon examination. The diagnosis requires a high level of suspicion since it is often difficult to separate from epileptic seizures and may, in fact co-exist with epilepsy.

SYMPTOMS

- Recurrent tonic clonic-like seizures
- Attacks usually occur only when attention of other people can be attracted
- Patients hardly ever get injured, even when they fall (unlike in true seizures)
- Thrusting pelvic movements are common during “seizure” attacks
- Tongue biting, if it occurs is usually at the tip of the tongue instead of the sides as in true seizures
- May have urinary incontinence as in normal seizures

INVESTIGATIONS

- Serum prolactin
- EEG

TREATMENT

Treatment objectives

- To stop seizures
- To restore normalcy

Non-pharmacological treatment

- Reassure parents, guardians etc.
- Counselling
- Psychotherapy

Pharmacological treatment

- Anti-epileptic medicines do not appear to have any beneficial effect on frequency of attacks

REFERRAL CRITERIA

Refer all cases for evaluation by psychologist or psychiatrist.

72. Insomnia

Insomnia is defined as a subjective report of difficulty with sleep initiation, duration, consolidation, or quality that occurs despite adequate opportunity for sleep, and that results in some form of daytime impairment. Insomnia symptoms occur quite commonly in the general population. Risk factors for insomnia include increasing age, female sex, co-morbid disorders such as medical, psychiatric, substance use, and shift work. Patients with psychiatric and chronic pain disorders have relatively high rates of insomnia.

CAUSES

- Behavioural - spending more time in bed in an effort to “catch up” on sleep
- Stress
- Learned habits which do not enhance sleep
- Cognitive distortions (e.g. if one does not sleep throughout the night, one has not slept at all)
- Medicines (e.g. for treatment of common cold, hypertension, asthma)
- Caffeine-containing beverages (e.g. coffee, tea)
- Withdrawal from alcohol and other drugs of abuse (e.g. cocaine, marijuana, amphetamines)
- Medical condition (e.g. sleep apnea, airway obstruction, liver disease, renal disease, thyroid disorders)
- Psychological and environmental factors
- Other psychiatric disorders such as anxiety and mood disorders
- Travel (especially across time zones leading to jet lag)
- Shift work

SYMPTOMS

- Prolonged average time for falling asleep - longer than 30 minutes
- Total sleep time less than 6.5 hours
- Difficulty falling asleep
- Frequent awakenings
- Difficulty returning to sleep
- Awakening too early in the morning
- Sleep that does not feel restful, refreshing or restorative
- Anticipating poor sleep hours before bedtime, and becoming more alert and anxious as bedtime approaches
- Daytime effects of poor sleep:
 - Fatigue and sleepiness
 - Mood disturbances and cognitive difficulties
 - Poor quality of life (worsened by interpersonal difficulties, or

- avoidance of day activities)
- Exacerbation of co-morbid conditions such as depression, high blood pressure, etc.
- Day-to-day variability

Box 10-1: History taking and assessment of patients with Insomnia

- Characterization of the sleeping environment (couch/bed, light/dark, quiet/noisy, room temperature, alone/bed partner, TV on/off), patient's state of mind (sleepy vs. wide awake, relaxed vs. anxious)
- Identify perpetuating negative behaviours and cognitive processes
- Assess Sleep-Wake Schedule with sleep dairy: time to fall asleep (sleep latency), number of awakenings, Wake time After Sleep Onset (WASO), sleep duration
- Assess
- Breathing-related sleep disorders (snoring, gasping, coughing)
- Sleep related movement disorders (kicking, restlessness)
- Parasomnias (behaviors or vocalization)
- Co-morbid medical/neurological disorders (reflux, palpitations, seizures, headaches)
- Other physical sensations and emotions associated with wakefulness (such as pain, restlessness, anxiety, frustration, sadness)

Assess Daytime Activities and Daytime Function:

- Napping (frequency/day, times, voluntary/involuntary)
- Work (work times, work type such as driving or with dangerous consequences, disabled, caretaker responsibilities)
- Lifestyle (sedentary/active, homebound, light exposure, exercise)
- Travel (especially across time zones)
- Quality of life and exacerbation of co-morbid disorders

INVESTIGATIONS

- FBC
- BUE and creatinine
- LFTs
- Blood glucose
- Thyroid function tests

TREATMENT

Treatment objectives

- Reduction of waking symptoms
- Improvement of daytime function
- Reduction of distress
- Treatment of co-morbid conditions

Non-pharmacological treatment

- Stimulus control therapy (avoid stimulating sleep environments such as leaving lights, TV and radio on)
- Relaxation training
- Cognitive Behavior Therapy
- Avoidance of day-time sleep
- Avoidance of excessive stimulant consumption pre-bed time (e.g.

coffee, tea, alcohol etc.)

Pharmacological treatment

1st Line Treatment

Evidence Rating: [C]

- Lorazepam, oral,
Adults
1-4 mg at bedtime
Children
Not recommended
- Or
- Triazolam, oral,
Adults
Elderly; 125-250 microgram at bedtime
< 60 years; 125-500 microgram at bedtime
Children
Not recommended

2nd Line Treatment

Evidence Rating: [B]

- Melatonin, oral, (particularly for children)
Adults
3-5 mg daily, 1-2 hours before bedtime (max. 10 mg)
Children
1 month-18 years; 2-3 mg at bedtime
Increase if necessary after 1-2 weeks to 4-6 mg daily (max. 10 mg)
- Or
- Evidence Rating: [B]
- Amitriptyline, oral,
Adult
25-50 mg at night for two weeks
Children
Not recommended

REFERRAL CRITERIA

Refer to clinical psychologist for those patients who do not respond to the common non-pharmacological and pharmacological interventions for cognitive behaviour therapy. Refer patients with underlying physical causes to the appropriate specialists.

73. Depression

Depression is a mood disorder, which may occur in all age groups, although the symptoms may differ in children. It is a relatively common condition and has a tendency to recur. Some affected persons may turn out to have bipolar disorder, in which case, episodes of mania occur.

Clinically significant depression, also called major depression, is

twice as common in women as in men. Many affected individuals seek help from spiritual and traditional healers. For a good proportion of those who go to hospitals, their condition is not recognised.

Depression is a significant cause of morbidity all over the world and most people who attempt or successfully complete suicide have depression. One should not dismiss or take for granted statements made by patients such as "I want to die", "life is not worth living", or "I am fed up with life". All cases of attempted suicide should be referred to a psychiatrist after initial management of the presenting complication e.g. self-inflicted injuries or poisoning.

Recurrent depression or unipolar depression is treated differently (with antidepressants) from bipolar depression, which responds more to mood stabilizers.

The diagnostic criteria for major depression relies on the presence of at least five (5) of the symptoms listed in the section on symptoms below, experienced every day for at least two weeks.

In the treatment of depression, maximum tolerable doses of antidepressant medications must be given for at least 6 weeks before deciding a particular medication is not effective.

After an episode of depression, treatment must be continued for at least 6 months, as there is a high risk of relapse within this period.

Antidepressants must be stopped immediately if a manic swing occurs. Patients with suicidal tendencies must be admitted and kept under close observation.

CAUSES

- Genetic
- Familial
- Environmental
- Psychosocial factors
- Endocrine disorders e.g. hypothyroidism, Cushing's syndrome

SYMPOTMS

- Depressed mood, often reported as feeling 'out of sorts'
- Loss of interest or lack of pleasure in things previously of interest
- Significant weight loss or weight gain
- Insomnia or sleeping too much
- Psychomotor agitation or retardation
- Fatigue or loss of energy
- Feelings of worthlessness or excessive guilt
- Impaired thinking
 - Poor concentration;
 - indecisiveness;
 - worrying excessively
- Multiple bodily complaints
- Suicidal ideas or thoughts of death

- Hallucinations or delusions of morbid themes in severe cases

In children

- Truancy or refusal to go to school
- Poor school performance
- Bedwetting in a previously 'dry' child
- Odd behaviour, aggression or defiance
- Irritability
- Appetite changes
- Some of the 'adult' symptoms listed above

SIGNS

- Depressed mood
- Evidence of weight loss or weight gain
- Agitation or retardation
- Hallucinations

INVESTIGATIONS

- FBC
- BUE and Creatinine
- FBS
- Thyroid function and cortisol levels if indicated
- Administer a standardized scale of depression such as the PHQ (patient health questionnaire 9 item scale)

TREATMENT

Treatment objectives

- To reduce symptoms
- To prevent disruption to normal life at home, work or school
- To prevent suicide

Non-pharmacological treatment

- Counselling
- Psychotherapy, specifically Cognitive Behaviour Therapy
- Electroconvulsive therapy

Pharmacological treatment

1st Line Treatment

Evidence Rating: [A]

- Fluoxetine, oral,

Adults

20 mg once daily for 2-4 weeks,

Then

Increase if necessary to max. of 80 mg

Children

8-18 years;

10 mg once daily for 1-2 weeks

Then

Increase if necessary to max. 20 mg once daily.

< 8 years; not recommended

Note 10-4

Use with caution in children with epilepsy. Stop if seizure occurs.

Or

- Sertraline, oral,

Adults

50 mg once daily,

Then

Increase if necessary by increments of 50 mg at intervals of at least 1 week, to max. of 200 mg daily.

Children

13-18 years; 50 mg once daily

Then

Increase if necessary by increments of 50 mg at intervals of at least 1 week, to max. of 200 mg daily.

6-12 years; 25 mg daily,

Then

Increase if necessary to 50 mg daily after 1 week.

Further increase if necessary in steps of 50 mg at intervals of at least one week to a max. of 200 mg daily

< 6 years; not recommended

Or

- Citalopram, oral,

Adults

20 mg once daily, increase if necessary in steps of 20 mg daily, at intervals of 3-4 week, max. 40 mg.

Children

> 12 years; 10 mg once daily,

Then

Increase if necessary to 20 mg once daily in the evening, over 2-4 weeks (max. of 40 mg once daily)

< 12 years; not recommended

Or

- Imipramine, oral,

Adults

25-50 mg once daily (early evening),

Then

Increase by 25 mg every 3-5 days up to max. of 150 mg.

Children

Not recommended

Or

- Amitriptyline, oral,

Adults

25-50 mg once daily (early evening),

Then

Increase by 25 mg every 3-5 days up to a max. of 150 mg.

Children

> 16 years;	5-15 mg 12 hourly
< 16 years;	not recommended

A. Management of patients with depression requiring night sedation

- Lorazepam, oral,

Adults

2-3 mg 8-12 hourly, max. 10 mg daily

Children

2-18 years; 0.05 mg/kg 8 hourly, max. 2 mg daily

Or

- Diazepam, oral,

Adults

5-10 mg 6-12 hourly

Children

12-18 years; 10 mg 12 hourly

5-12 years; 5 mg 12 hourly

REFERRAL CRITERIA

Refer patients with atypical or unusual symptoms, hysterical or phobic features, and those who do not respond to adequate anti-depressant treatment within 2 months, to a psychiatrist, as should children suspected to suffer from depression.

Patients requiring Cognitive Behaviour Therapy should be referred to a psychologist.

74. Schizophrenia

Schizophrenia is probably the most severe and potentially disabling form of mental illness in every community worldwide. It may present as an acute or chronic illness. The clinical features include characteristic 'positive' or 'negative' symptoms, deterioration in social, work or interpersonal relationships and continued evidence of disturbed behaviour for at least 6 months.

The clinical features may be numerous and can change over time. Psychosis associated with substance abuse and mood disorders with psychotic features may mimic schizophrenia.

For this illness, a few people may recover completely after an episode or two. Treatment must be started once symptoms are present. A definitive diagnosis and establishment of a treatment plan is best carried out by a psychiatrist. Treatment for acute episodes can be started by a psychiatrist and follow up treatment continued by most health care givers. Treatment must be for at least 18 months after remission of symptoms for a first episode. However, life long treatment is probably the best strategy to avoid recurrence.

Side effects such as extra-pyramidal reactions (slowness, drooling, stiffness, tremors, rigidity, muscle spasms including tongue sticking

out, neck bending, etc.) to antipsychotics may occur especially when administered at high doses. These adverse reactions can be prevented or managed with anticholinergic agents, which must be used sparingly as they may contribute to the development of another adverse event, called tardive dyskinesia, in the long term. (See section on 'Adjunct Treatment' below)

CAUSES

- Largely unknown
- Possible associations:
 - Bio-Genetic (to do with dopamine and serotonin receptors)
 - Bio-Psycho social determinants; genetic predisposition coupled with stress (economic, disruptive family environments, etc.) Birth defects in brain associated with season of birth, possible viral infections, etc.
 - Environmental triggers
 - Illicit drugs (marijuana, amphetamines etc.)

SYMPOTMS/SIGNS

'Positive' symptoms

- Hallucinations (e.g. hearing voices)
- Delusions (stated beliefs which cannot be substantiated)
- Incoherent speech or illogicality
- Odd or disorganised behaviour
- Patient believes his or her thoughts are controlled by outside forces

'Negative' symptoms

- Poverty of speech or content of speech (few words or with little substance)
- Apathy
- Reduced social contact or withdrawal
- Flattened affect (showing little facial expressive responses)
- Delusions
 - May be persecutory, such as undue suspicion, or totally bizarre, like being controlled or being made to feel emotions or sensations
 - Grandiose delusions may also occur but without the elevated mood seen in manic patients
- Hallucinations
 - commonly auditory (but may involve any of the other senses)
 - Auditory hallucinations of multiple voices commenting on patients' actions, arguing about the patient are almost diagnostic
- Motor disorders like posturing, excitement or stupor may occur but are not essential for diagnosis

INVESTIGATIONS

- Usually none required for diagnosis
- Tests to rule out organic causes of psychosis
- Baseline full blood count, blood sugar, lipids, liver and kidney function

tests, for purposes of guiding treatment

- For Olanzapine and Risperidone, ensure that fasting blood sugar, lipid profiles, liver and kidney function test are carried out at least twice a year.

TREATMENT

Treatment objectives

- To abolish symptoms
- To restore functioning to the maximum level possible
- To reduce the chances of recurrence
- To monitor blood glucose, lipid profiles, liver and kidney function at least twice a year for patients on olanzapine and risperidone

Non-pharmacological treatment

- Supportive psychotherapy
- Rehabilitation
- Family therapy
- Psychoeducation about cause, course, treatment, side effects and relapse prevention
- Behaviour Therapy e.g. social skills training, progressive muscle relaxation, coping skills, etc.

Pharmacological treatment

1st Line Treatment

Evidence Rating: [A]

A. Management of acute attacks

- Olanzapine, IM or oral,

Adults

5-10 mg stat.

Then

5-10 mg daily, max. 20 mg daily

Children

> 12 years; 5-10 mg stat.

Then

5-10 mg daily, max. 20 mg daily

< 12 years; not recommended

Or

- Chlorpromazine, IM,

Adults

25-50 mg 6-8 hourly, adjusting to max. of 400 mg daily

Children

12-18 year; 25-50 mg 6-8 hourly, adjusting to max. of 400 mg daily

6-12 years; 500 microgram/kg 6-8 hourly to max. of 75 mg daily

1-6 year; 500 microgram/kg 6-8 hourly to max. of 40 mg daily

Or

- Chlorpromazine, oral,

Adults

25 mg 8 hourly or 75 mg at night

Then

Adjust according to response to 75-300 mg daily

Children

> 12 years; 25 mg 8 hourly or 75 mg at night

Then

Adjust according to response to max. of 75-300 mg daily

6-12 years; 10 mg 8 hourly

Then

Adjust according to response to max. of 75 mg daily

1-6 years; 500 microgram/kg 4-6 hourly

Then

Adjust according to response to max. of 40 mg daily

Or

- Haloperidol, IM,

Adults

2-5 mg stat.

Then

Repeat 4-8 hourly according to response, to maximum of 20 mg daily

Children

6-12 years; 1-3 mg 4-8 hourly as required

< 6 years; not recommended

Or

- Haloperidol, oral,

Adults

0.5-5 mg 8-12 hourly daily

Then

5-10 mg 8-12 hourly (max. of 30 mg)

Children

> 12 years; 0.5-5 mg 8-12 hourly daily

Then

5-10 mg 8-12 hourly (max. of 30 mg)

3-12 years or body weight 15-40 kg; 0.25-0.5 mg daily

Then

Increase by 0.5 mg daily every 5-7 days

< 3 years; not recommended

B. Maintenance

- Risperidone, oral,

Adults

1-4 mg 12-24 hourly (start at low dose and adjust daily according to patient response)

Or

- Olanzapine, oral,

Adults

5-10 mg, max. 20 mg daily

Children

> 12 years; 5-10 mg, max. 20 mg daily
< 12 years; not recommended

Or

- Chlorpromazine, oral,
Adults
25 mg 8 hourly or 75 mg at night, adjust to max. of 200 mg 8 hourly
Children
12-18 years; 25 mg 8 hourly or 75 mg at night, adjust to max. of 200 mg 8 hourly
< 12 years; not recommended

Or

- Haloperidol, oral,
Adults
1-3 mg 8 hourly, adjusted to max. daily dose of 20 mg
Children
12-18 years; 1-3 mg 8 hourly, adjusted to max. daily dose of 20 mg
3-12 years; 500 micrograms 12 hourly, adjust up to a max. of 5 mg 12 hourly

| SCHIZOPHRENIA

C. Maintenance treatment for patients with recurrent or chronic illness (depot preparations)

- Fluphenazine decanoate, IM,
Adults
25 mg monthly
Children
Not recommended
- Or**
• Flupenthixol decanoate, IM,
Adults
Give test dose of 5-20 mg, and after at least 7 days, give 40 mg monthly
Children
Not recommended

D. Adjunct treatment for management or prevention of antipsychotic drug side effects

- Trihexyphenidyl (Benzhexol), oral,
Adults
2.5-5 mg 6-8 hourly max. 20 mg daily
Children
6-18 years; 0.5-1 mg 12-24 hourly,
Then
Increase every 3-7 days by 1 mg daily according to response
Or
• Benzatropine (Benztropine), oral,
Adults

1-2 mg 8-12 hourly

Children

> 3 years; 20-50 microgram/kg 12-24 hourly

Or

- Biperidine, oral,

Adults

1 mg 12 hourly,

Then

adjust to 2 mg 8 hourly up to 4 mg 8 hourly.

Children

not recommended

Or

- Biperidine, slow IV/IM,

Adults

2.5-5 mg adjust to a max. of 20 mg in 24 hours

Or

- Benztropine, IV/IM,

Adults

1-2 mg slowly over 2-4 minutes, repeat if symptoms persist after 8-12 hours

Or

- Diazepam, oral,

Adults

5-10 mg 6-12 hourly

Children

12 -18 years; 10 mg 12 hourly

5 - 12 years; 5 mg 12 hourly

Or

- Diazepam, IV,

Adults

5-10 mg slowly over 2-3 minutes (approximately 2.5 mg every 30 seconds)

Children

200-300 microgram/kg slowly over 2-3 minutes.

This may be repeated 10 minutes.

Or

- Promethazine hydrochloride, oral or IM,

Adults

12.5-25 mg initially, may repeat dose if symptoms persist after 6 hours

Children

> 6 years; 6.25-12.5 mg

Then

Repeat dose after 6 hours

< 6 years; not recommended

REFERRAL CRITERIA

Refer all patients to a psychiatrist after an acute episode if treatment

was initiated without a psychiatrist's supervision.

Likewise refer all patients with recurrent episodes and those whose symptoms cannot be controlled to a psychiatrist for further drug treatment or Electroconvulsive Therapy.

75. Bipolar Disorder

Bipolar disorder is a form of mood disorder. The term refers to a condition in which patients experience mood swings between the two extremes of depression and mania. Bipolar disorder is referred to in older literature as manic-depressive illness. It is important to note that the affected patient usually presents with one predominant mood state at a time, either depression or mania.

A single manic episode and a history of depression qualify for classification as bipolar disorder. A current episode of depression without a past manic episode is not diagnosed as a bipolar disorder. Repeated depressive episodes are diagnosed as recurrent depression.

CAUSES

- | • Largely unknown
- | • Possible associations:
 - Tendency to run in families
 - Genetic factors

SYMPTOMS

- | • Persistently elevated mood:- euphoria, expansiveness, feeling 'high' or irritable
- | • Overactivity
- | • Talking fast and excessively
- | • Grandiose claims
- | • Reduced sleep
- | • Reckless spending and being overly generous
- | • Sexual and social disinhibition
- | • Auditory hallucinations, in severe cases (patients may hear voices, often reinforcing their grandiose beliefs)
- | • Undue suspicion (paranoia) may exist
- | • Impaired judgement

SIGNS

- | • None typical of bipolar disorder
- | • Same as symptoms above

INVESTIGATIONS

- | • Usually no specific investigations
- | • Rarely, thyrotoxicosis may mimic mania and must be excluded

TREATMENT**Treatment objectives**

- To treat symptoms of mania or depression, whichever is present with current episode
- To reduce the level of activity in mania to a manageable state
- To elevate mood to a normal state in depression
- To abolish psychotic symptoms (delusions and hallucinations), if present

Non-pharmacological treatment

- Psychotherapy
- Psychoeducation

Pharmacological treatment**A. Management of the manic patient**

- Risperidone, oral,

Adults

1-4 mg 12-24 hourly, to a max. of 8 mg daily

Children

>12 years; 500 micrograms stat.

Then

Adjust daily in steps of 500 micrograms - 1 mg daily to a max. of 6 mg daily

< 12 years; not recommended

Or

- Olanzapine, oral,

Adults

5-15 mg 12-24 hourly to max. 20 mg daily

Children

12-18 years; 2.5 mg daily, up to max. of 20mg daily

<12 years; not recommended

Or

- Haloperidol, oral,

Adults

5-10 mg 12 hourly up to a max. of 20 mg daily

Or

- Chlorpromazine, oral,

Adults

25 mg 8 hourly or 75 mg at night,

Then

Increase by 25 mg daily to 50-100 mg 8 hourly

Or

- Sodium valproate, oral,

Adults

250-750 mg 12 hourly (controlled release preferable)

Children

< 18 years; not recommended

Or

- Carbamazepine, oral,
Adults
200-800 mg 12 hourly (controlled release preferable)
Children
< 18 years; not recommended

B. Management of significantly aggressive patient
(See section on 'The Acutely Disturbed Patient').

C. Management of the depressive phase

- Lamotrigine, oral,
Adults
25 mg daily for 2 weeks

Then

Increase by 25 mg every 2 weeks to a max. of 200 mg daily as required

- Children
< 18 years; not recommended

And

- Lorazepam, oral,
Adults
2-3 mg 8-12 hourly, max. 10 mg daily
Children
2-18 years; 0.05 mg/kg 8 hourly, max. 2 mg daily
- Or
Diazepam, oral,
Adults
5-10 mg 6-12 hourly
Children
12-18 years; 10 mg 12 hourly
5-12 years; 5 mg 12 hourly

Note 10-5

The benzodiazepines are withdrawn as soon as the patient is calm, but this should be done by slowly tapering the dose.

D. Maintenance management after control of the acute phase

- Lithium, oral,
Adults
200-600 mg 6-8 hourly (max. 2400 mg daily)
Children
12-18 years; 200-600 mg 8 hourly (max. 2400 mg daily)
6-12 years; 5-20 mg /kg 8 hourly
< 6 years; not recommended

Note 10-6

Lithium levels should be monitored 12 hours after dose, twice weekly until condition stabilises, then once every month.

Or

- Sodium valproate, oral,
Adults
 250-750 mg 12 hourly (controlled release preferable)
Children
 < 18 years; not recommended

Or

- Carbamazepine, oral,
Adults
 200-800 mg 12 hourly (controlled release preferable)
Children
 < 18 years; not recommended

REFERRAL CRITERIA

Refer all patients suffering a first episode, not responding to treatment after one month and all children to a psychiatrist.

76. Alcohol Withdrawal Syndromes

These occur following sudden withdrawal from alcohol. They are often seen 12 to 18 hours after the last drink, but may be earlier and are worst between 24 to 48 hours after onset. This commonly occurs in patients admitted to hospital for other problems e.g. arising from accidents or physical illnesses, which keeps them from drinking. The presentation varies from minimal tremors to states of full-blown agitation and confusion, which are potentially fatal.

CAUSES

- Abrupt cessation or significant reduction in alcohol intake in an individual with heavy drinking over many months or years

	Minor Withdrawal	Alcoholic Hallucinosis	Alcoholic Seizures
Onset	12 to 18 hours after last drink, but may be earlier. Peaks between 24-48 hours	12-24 hrs after cessation of drinking and generally stops within 48 hours	7-36 hours after the last drink but may be earlier.
Symptoms	Shaky hands Headaches Insomnia Mild anxiety Nausea, Vomiting Sweating	Sensation of objects crawling on body “Seeing” objects not really present “Hearing” noises or voices nobody else can hear.	sudden generalised seizures in a chronic alcoholic

	Minor Withdrawal	Alcoholic Hallucinosis	Alcoholic Seizures
Signs	Increased pulse rate Raised blood pressure	The vivid hallucinations occur in clear consciousness. Pulse, Blood Pressure and respiration are within normal limits	generalised seizures

TREATMENT

Treatment objectives

- To stabilise pulse and blood pressure
- To prevent dehydration
- To treat presenting conditions like malaria etc.
- To relieve pain, tremors and seizures
- To stop hallucinations

Non-pharmacological treatment

- Sit or lie in a quiet place
- Physical restraints may be required temporarily for very agitated patients
- Encourage intake of fluids as can be tolerated to prevent dehydration

Pharmacological treatment

1st Line Treatment

Evidence Rating [A]

- Haloperidol, oral/IM,
Adults
5 mg 8 hourly as required until hallucinations cease.

Children

Refer to specialist

Or

- Olanzapine, oral,
Adults
5-10 mg 24 hourly (max. of 10 mg 12 hourly)

Children

> 12 years; 2.5-5 mg stat.

Then

May be increased up to 10 mg (max. 5 mg 12 hourly)

REFERRAL CRITERIA

Refer all patients with alcohol withdrawal syndromes to a psychologist or psychiatrist. Also refer all children to a paediatrician.

77. Alcoholic Delirium Tremens

This is the most dramatic withdrawal syndrome. It usually starts 2-3 days after drinking stops. On average, the syndrome lasts 3 days but may continue for much longer. Without good supportive care and adequate treatment, Delirium Tremens (DT) is associated with significant mortality.

Risk factors include long history of heavy alcohol use, previous history of DT, concurrent illness, significant alcohol level during withdrawal, long duration since last drink (over 48 hours) and age over 30 years.

CAUSES

- Sudden withdrawal of alcohol from a long-term chronic user of alcohol

SYMPTOMS

- Restlessness
- Shaking of hands, whole limbs or body
- Sweating
- Confusion
- Inappropriate behaviour
- Unintelligible speech
- Misidentification
- Seeing or talking to imaginary objects

SIGNS

- Tremors
- Psychomotor agitation or retardation
- Sweating
- Vomiting
- Disorientation
- Intermittent visual, tactile or auditory hallucinations or illusions (Visual hallucinations are frequently of small objects or frightening 'animals' on walls etc.)
- Fever $> 38^{\circ}\text{C}$.
- Pulse > 100 beats/minute, Blood Pressure $> 160/100\text{mmHg}$

INVESTIGATIONS

- Full Blood Count
- Liver Function Tests
- Screen for malaria and common infections

TREATMENT

Treatment objectives

- To relieve agitation and calm patient
- To correct fluid and electrolyte imbalance
- To prevent complications like seizures, development of amnesia and encephalopathy
- To prevent or manage heart complications if present

Non-pharmacological treatment

- Seclusion of the patient
- Application of restraints as necessary
- Psychotherapy and psychoeducation

Pharmacological treatment

Evidence Rating: [A]

A. For control of seizures

- Lorazepam, IV, IM or oral,
Adults

Days 1 to 3: 2-4 mg once daily

Days 4 and 5: 1-2 mg once daily

Or

- Diazepam, IV, (administer slowly-over 2-3 minutes, approximately 2.5 mg every 30 seconds)

Adults

Day 1: 10-20 mg 6 hourly

Day 2: 10-20 mg 8 hourly

Day 3: 10-20 mg 12 hourly

Day 4: 5-10 mg 8 hourly

Day 5: 5-10 mg 12 hourly then stop

Note 10-7

It is best to give benzodiazepines as needed rather than on a fixed dose schedule.

Withhold if patient is asleep or has slurred speech, ataxia, nystagmus or over sedated.

Or

- Chlordiazepoxide, oral,
Adults

50-100 mg 4 hourly as required (max. 300 mg)

And

- Thiamine, oral, IM or IV,
Adults (oral, IM, IV)

100 mg daily for 3 days (before any IV Glucose load)

And

- Folic Acid, oral,
Adults

1 mg daily as needed

And

- Dextrose saline (5% glucose in 0.9% saline), IV,
Adults

As necessary

B. For patients with seizures not controlled by benzodiazepines alone

- Lorazepam, IV, IM or oral,

Adults

Days 1 to 3:	2-4 mg once daily
Days 4 and 5:	1-2 mg once daily

Or

- Diazepam, IV, (administer slowly-over 2-3 minutes, approximately 2.5 mg every 30 seconds)

Adults

Day 1:	10-20 mg 6 hourly
Day 2:	10-20 mg 8 hourly
Day 3:	10-20 mg 12 hourly
Day 4:	5-10 mg 8 hourly
Day 5:	5-10 mg 12 hourly then stop

And

- Phenobarbitone, slow IV or IM,

Adults

0.5-1.5 mg/kg 12 hourly

REFERRAL CRITERIA

Refer patients whose symptoms are difficult to control within 3 days or who remain agitated despite being given over 20 mg diazepam within 4 hours to a specialist.

Refer patients to a psychiatrist or clinical psychologist for consideration of other treatment options to assist long-term abstinence and rehabilitation after acute phase is over.

78. Anxiety Disorders

Anxiety is a common symptom that occurs in all psychiatric disorders including depressive illness and most psychoses. Physical diseases like hyperthyroidism, cardiac disease or hypertension may also present with anxiety and therefore must be excluded.

There are various forms of anxiety disorders (e.g. generalized anxiety disorders, panic disorders, phobias, obsessive compulsive disorder, acute stress disorder, post traumatic stress disorder, etc.), but the common ones seen in general practice are generalized anxiety disorders and panic disorders.

In all cases of suspected anxiety disorders, it is important to assess the scope of the anxiety, including the antecedents, behaviour and consequences of anxiety for the patient through an indepth interview. It is also important to ask about the presence of obsessive thoughts and/or compulsions as these are increasingly common and tend not to be reported out of embarrassment but which lead to much personal distress. In this case refer to a psychiatrist.

In generalized anxiety disorders, there is excessive anxiety and worry about events or activities, such as performance at school or work,

occurring on most days, for at least 6 months.

A panic disorder refers to a pattern of recurrent unexpected attacks of intense fear or discomfort over a discrete period more than 3 times a week. During attacks 4 or more of the symptoms listed below develop abruptly and reach a peak within 10 minutes. Panic disorders are accompanied by persistent concern about having another attack or worrying about implications of having an attack.

In children especially, partial complex seizures may mimic panic attacks. Medications are required to treat panic disorders only if the attacks occur frequently enough to cause distress.

GENERALIZED ANXIETY DISORDERS

CAUSES

- Multiple negative life experiences
- Environmental factors
- Personality trait
- Genetic predisposition

SYMPTOMS

- Excessive anxiety and worry occurring on most days, for at least 6 months
- Anxiety or worry associated with at least 3 of the following:
 - Muscle tension (often reported as pain in various parts like neck, trunk or headaches)
 - Crawling and burning sensation around the body
 - Restlessness or feeling on edge
 - Being easily fatigued
 - Difficulty concentrating or mind going blank
 - Irritability
 - Sleep disturbance (difficulty falling asleep or frequent wakening)
 - Palpitations

SIGNS

- Restlessness
- Sweating
- Anxious mood
- Tachycardia
- Tremors

INVESTIGATIONS

- None to confirm the diagnosis.
- Tests to exclude probable differential diagnoses such as hyperthyroidism, phaeochromocytoma, cardiac arrhythmias etc.

TREATMENT

Treatment objectives

- To reduce anxiety

- To attain relief of somatic symptoms

Non-pharmacological treatment

- Reassurance about the absence of physical disease once they are ruled out
- Teach relaxation methods
- Encourage regular physical exercise if possible
- Encourage healthy social activities
- Cognitive Behaviour Therapy

Pharmacological treatment

A. For anxiety with somatic complaints

1st Line Treatment

Evidence Rating: [B]

- Sertraline, oral,

Adults

50 mg as a single oral evening dose;

Then

Increase by 25 mg at 1 week intervals, if necessary, to a max. of 200 mg

Children

12-18 years; 50 mg daily

6-12 years; 25 mg daily

< 6 years; not recommended

Or

- Fluoxetine, oral,

Adults

10 mg daily,

Then

Increase up to 60 mg daily if necessary

Children

7-18 years; 10 mg daily

Then

Increase to 20 mg after 1-2 weeks if necessary

Or

- Amitriptyline, oral,

Adults

25-50 mg daily (as a single evening dose)

Children

> 12 years; 10 mg daily (as a single evening dose) max.

20 mg

Or

- Imipramine, oral,

Adults

25-50 mg daily (as a single evening dose)

Children

Not recommended for this indication

B. For anxiety with prominent somatic complaints

- Propranolol, oral,
Adults
10-80 mg 12 hourly

C. Additional treatment for anxiety with significant distress

- Diazepam, oral,
Adults
2-5 mg 12 hourly for 2 weeks and gradually tailed off over the next 2 weeks.
(Do not give for more than one month continuously)
Children
1-12 years; 1.25-5 mg 6 hourly as needed

REFERRAL CRITERIA

Refer to a clinical psychologist for Cognitive Behaviour Therapy and other non-pharmacological treatment modalities. Refer to a psychiatrist in severe cases not responsive to drug treatment.

PANIC DISORDERS

CAUSES

- Largely unknown
- Misinterpretation of normal internal body stimuli (e.g. a quickened heart beat interpreted as a heart attack or serious illness, etc).
- Misinterpretation of external stimuli (crowds, enclosed spaces such as moving vehicles, lifts, etc.) as signalling danger
- Contributing factors:
 - Stress
 - Genetic predisposition

SYMPTOMS

- Fear of dying or going 'crazy'
- Palpitations, pounding heart or rapid heart rate
- Trembling or shaking
- Sensation of shortness of breath
- Feeling of choking
- Chest pain or discomfort
- Feeling dizzy, unsteady or faint
- Numbness or tingling sensations
- Chills or hot flushes
- Derealisation (feeling of unreality) or depersonalisation (feeling detached from oneself)
- Nausea or abdominal distress

SIGNS

- Tachycardia
- Tremors
- Sweating

INVESTIGATIONS

- None diagnostic

TREATMENT**Treatment objectives**

- To stop the attacks of panic or at least reduce the frequency and intensity of symptoms to a minimum
- To help return to normal activities of daily living
- To prevent recurrence of symptoms

Non-pharmacological treatment

- Rebreathing in and out of a paper bag closed around lips and nose (avoid polythene bags, try large paper envelopes)
- Eliminate caffeine-containing foods e.g. coffee, tea, cola and chocolates, from their diet, as they tend to worsen anxiety
- Relaxation training
- Cognitive Behaviour Therapy

Pharmacological treatment**A. Initial management for patients unresponsive to non-pharmacological treatment**

1st Line Treatment

Evidence Rating: [B]

- Fluoxetine, oral,
Adults

10 mg daily (as a single morning dose)

Then

Increase up to 60 mg daily if necessary

Children

6-18 years; 10 mg daily

Then

Increase up to 20 mg after 1-2 weeks if necessary

Or

Sertraline, oral,

Adults

25 mg daily (as a single evening dose)

Then

Increase to 50 mg after 1 week if necessary

Then

50 mg weekly to a max. of 200 mg daily if necessary

Children

Not recommended

Or

- Imipramine, oral,
Adults

25-50 mg daily (as a single evening dose) max. 150 mg daily

Children

Not recommended for this indication

B. For very frequent panic attacks

- Lorazepam, oral,
Adults
1-4 mg daily for 2 weeks
Children
2-18 years; 0.05 mg/kg daily for 2 weeks

C. For anticipated anxiety attacks

- Lorazepam, oral,
Adults
1-4 mg stat.
Children
0.25-0.5 mg stat.

D. For Acute Symptomatic Control

- Lorazepam, oral,
Adults
1-4 mg 8-12 hourly as required (max. 10 mg daily)
Children
Not recommended for this indication
Or
- Alprazolam, oral,
Adults
0.25-0.5 mg 6-8 hourly
Increase if necessary every 3-4 days, max. 4 mg daily
Children
< 18 years; not recommended
Or
- Diazepam, oral,
Adults
2-5 mg 12 hourly for 2 weeks and gradually taper off over the next 2 weeks.
(Do not give for more than one month continuously)
Children
1-12 years; 1.25-5 mg 6 hourly as needed

Note 10-8

Duration of treatment for recurrent cases should be at least 6 weeks and should be continued for up to 6 months or more after attacks have remitted to prevent early relapse. Wean off slowly over a month or more.

REFERRAL CRITERIA

Refer children with symptoms suggestive of a panic disorder to a paediatrician. Also refer patients to a psychologist for Cognitive Behaviour Therapy and to a psychiatrist for additional drug therapy where indicated.

79. Substance Use Disorders

Abuse of substances such as marijuana, benzodiazepines, heroine, cocaine etc. is prevalent in many communities around the country. Typically, individuals with such disorders request help only after they are forced to do so by family members. They may also begin to have withdrawal symptoms when on admission for serious physical illness. This is because they have no access to the substance being abused. This may complicate treatment of the primary disease for which they were admitted.

CAUSES

- Social factors
 - Peer pressure (e.g. family members, friends)
 - Lack of coping skills (e.g. with life's difficulties, aids to coping in times of trouble)
- Addiction
- Tolerance (increased requirement of substance to maintain the same feeling)
- Withdrawal effects (unpleasant effects lead to a return to drug use)

SYMPTOMS

Cannabis withdrawal

- Insomnia
- Shakiness
- Irritability
- Restlessness
- Anxiety
- Anger
- Onset: Within 24 hours of drug use
- Duration: 1-2 weeks

Benzodiazepine withdrawal

- Anxiety
- Headache
- Insomnia
- Muscle aching and twitching
- Perceptual changes
- Feelings of unreality
- Depersonalization
- Seizures
- Onset: 1-10 days (depending on half-life of drug)
- Duration: 3-6 weeks (may be longer)

Opioid withdrawal

- Anxiety

- Craving
- Muscle tension
- Muscle and bone ache
- Muscle cramps and sustained contractions
- Sleep disturbance
- Sweating
- Hot and cold flushes
- Piloerection
- Yawning
- Lacrimation and rhinorrhoea
- Abdominal cramps
- Nausea, vomiting and diarrhoea
- Palpitations
- Elevated pulse and blood pressure
- Dilated pupils
- Onset: 6-24 hours (may be later with longer-acting opioids)
- Duration: peaks 2-4 days, ceases 5-10 days (more prolonged for longer-acting opioids)

Psychostimulant withdrawal

- Crash (fatigue, flat affect, increased sleep, reduced cravings)
- Withdrawal (fluctuating mood and energy levels, cravings, disturbed sleep, poor concentration)
- Extinction (persistence of withdrawal features, gradually subsiding)
- Onset: 6-12 hours (cocaine); 12-24 hours (amphetamines)
- Duration: Several weeks for withdrawal phase, then months for extinction

SIGNS

Cannabis withdrawal

- Same as symptoms

Benzodiazepine withdrawal

- Same as symptoms

Opioid withdrawal

- Same as symptoms

Psychostimulant withdrawal

- Same as symptoms

INVESTIGATIONS

- Toxicology screen for suspected substances

Box 10-2: Screening of patients suspected of substance abuse**Physical appearance**

- Sweating, tremor, agitation, problem with coordination, gait. Rate these appearances and reassess them at regular intervals to monitor the progress of symptoms. If symptoms are increasing in severity, notify a senior staff member, or if available, a doctor

Suicide risk assessment

- To determine the level of risk at a given time and to provide appropriate clinical care and management. Possible suicidal behaviour includes thinking about suicide, harming oneself or attempting suicide.
- Screening questions of suicide risk:
- Have things been so bad lately that you have thought you would rather not be here?
- Have you had any thoughts of harming yourself?
- Are you thinking of suicide?
- Do you have any plans to commit suicide?
- Have you ever tried to harm yourself?
- Have you made any current plans?
- Do you have access to any thing with which to hurt yourself?

Mental state examination

- To determine:
- The need for other psychological therapies
- Concomitant psychiatric conditions which place the patient or others at risk
- The patient's capacity for informed consent and active participation in treatment planning

Assessment of psychosocial factors affecting withdrawal

- Ask patient about:
- Reasons for presenting for withdrawal management at this time
- Past experiences, current knowledge and fears of withdrawal
- Perceived ability to cope with withdrawal and its treatment.
- Family supports and social networks available for withdrawal treatment:
- Potential barriers to successful withdrawal
- Care of children (assess possible neglect or physical or sexual abuse of children or exposure to such harm from others and intervene to protect as soon as possible or refer to appropriate agency)
- Drug use of cohabitants
- Current legal issues
- Financial problems
- Work commitments

TREATMENT**Treatment objectives**

- To provide supportive care (information, stress reduction, reassurance)
- To teach coping skills (relaxation techniques, dietary guidelines, methods to reduce craving for the substance, sleep disturbance management)
- To manage difficult behavior (anxiety, agitation, panic and aggression)

- To manage confusion, disorientation and hallucinations
- To plan an organised discharge, follow up and after-care to prevent relapse

Non-pharmacological treatment

- Cognitive Behaviour Therapy
- Stress management to reduce craving

Pharmacological treatment

A. Management of withdrawal symptoms - cannabis

- Requires no medical intervention

B. Management of withdrawal symptoms - stimulants

- Requires observation but does not require a specific intervention

C. Management of withdrawal symptoms - benzodiazapines

- Substitute with equivalent dose of benzodiazepine for a few days, then taper off dose over 2-3 weeks

D. Management of withdrawal symptoms - opiates

- Oral rehydration fluids or IV fluids may be required
- Long acting benzodiazepines e.g. diazepam, to control insomnia and muscle cramps (See drug doses under appropriate sections)
- Anti-emetics e.g. promethazine etc., for nausea and vomiting (See drug doses under appropriate sections)
- Methadone, buprenorphine and clonidine may be used, where available and with caution, to reduce the severity of symptoms (See drug doses under appropriate sections)
- NSAIDs e.g. ibuprofen, diclofenac etc., for pain relief (See drug doses under appropriate sections)

REFERRAL CRITERIA

Refer for specialist psychiatrist/clinical psychologist care and management if withdrawal symptoms are particularly distressful and do not respond to treatment or when there are repeated relapses.

Refer for Cognitive Behaviour Therapy to a clinical psychologist.

80. Autistic Spectrum Disorder

Autism is a neurodevelopmental disorder characterized by qualitative impairments occurring in a child before the age of 36 months, in three key areas; social interaction (often the earliest features of Autistic Spectrum Disorder-ASD), communication, interests and activities.

The clinical presentation is varied and may encompass children with severe manifestations of the above features or with more subtle behavioural deficits, hence the use of the term Autistic Spectrum Disorder. Learning disability in this condition is very common and the risk of epilepsy is significant.

ASD is increasingly being recognized in Ghana.

CAUSES

- No clear aetiology
- Genetic

SYMPTOMS

- Absence of joint attention (i.e. failure to show interest, follow gaze, lack of social smiling and limited use of gestures e.g. shaking head, waving or clapping)
- Communication deficit
 - Receptive: fails to acquire language or delays in understanding language
 - Expressive: delays in use of language
- Limited range of interests (limited play with toys and other objects)
- Repetitive activities (e.g. spinning objects)
- Global developmental delays (e.g. walking, speech etc.)
- Learning difficulties
- Attention deficit
- Sleeping difficulties
- Feeding difficulties

SIGNS

- Lack of pointing to objects by 24 months
- No single words by 18 months
- No two word spontaneous phrase by 24 months
- Loss of language
- Avoidance of eye contact

INVESTIGATIONS

- Usually none required
- Electroencephalogram (EEG) if seizures suspected
- Brain CT or MRI only in special circumstances e.g. abnormal physical features present

TREATMENT

Treatment objectives

- To correct social communication difficulties using a multidisciplinary behavioural and educational approach

Non-pharmacological treatment

- Applied Behaviour Analysis (ABA) - teaching based on teacher request, prompt assistance to child, child response and feedback

Pharmacological treatment

A. For aggression, irritability or self-mutilation

Evidence Rating: [B]

- Risperidone, oral,
Children

5-18 years (body weight > 50 kg); 0.5 mg daily. May increase by 0.5 mg on alternate days (max. 1 mg daily)
5-18 years (body weight < 50 kg); 0.25-0.5 mg daily. May increase by 0.25 mg on alternate days (max. 0.75 mg daily)
< 5 years; not recommended

B. For sleep problems

Evidence Rating: [B]

- Melatonin, oral,
Children

1 month-18 years; 2-3 mg daily (before bedtime)

Then

Increase if necessary after 1-2 weeks to 4-6 mg (daily before bedtime) max. 10 mg

C. For significant hyperactivity-in children \geq 4 years

Evidence Rating: [B]

- Methylphenidate, oral,
Children

6-18 years; 5 mg 12-24 hourly

Then

Increase if necessary at weekly intervals by 5-10 mg (max. of 20 mg 8 hourly)

4-6 years; 2.5 mg 12 hourly

Then

Increase if necessary by 2.5 mg at weekly intervals (max. 0.4-0.5 mg/kg 8 hourly)

Note 10-9

Discontinue if there is no response after a month

REFERRAL CRITERIA

All suspected cases of autism should be referred to a Tertiary centre.

Chapter

11

DISORDERS OF THE SKIN

Bacterial Skin Infections

81. Boils

A boil or furuncle is a deep bacterial infection of the hair follicles. A more superficial infection is termed folliculitis. Several boils grouped in an area and discharging pus from several points is termed a carbuncle. Patients with recurrent boils or carbuncles should be screened for diabetes mellitus and skin disorders such as scabies, pediculosis or eczema while patients with repeated folliculitis in the shaving areas, e.g. face and armpits should be educated on shaving techniques.

CAUSES

- *Staphylococcus aureus*

SYMPTOMS

- Single or multiple painful swellings on the skin which may discharge pus
- Fever

SIGNS

- Swellings - purulent, warm, fluctuant and/or tender (in single or multiple areas of skin)

INVESTIGATIONS

- FBC
- Fasting blood glucose (if diabetes suspected)
- Swabs for culture and sensitivity in persistent or recurrent infection

TREATMENT

Treatment objectives

- To treat infection
- To relieve pain
- To identify and treat any predisposing condition
- To prevent scars and keloids

Non-pharmacological treatment

- Incision and drainage - if boil becomes fluctuant and large
- Wound dressing

Pharmacological treatment1st Line Treatment

Evidence Rating: [B]

A. For boils or furunculosis in patients without penicillin allergy

- Flucloxacillin, oral,

Adults

250-500 mg 6 hourly for 7 days

Children

5-12 years; 250 mg 6 hourly for 7 days

1-5 years; 125 mg 6 hourly for 7 days

<1 year; 62.5 mg 6 hourly for 7 days

B. For boils or furunculosis in patients with penicillin allergy

- Erythromycin, oral,

Adults

500 mg 6 hourly for 7 days

Children

6-12 years; 250 mg 6 hourly for 7 days

1-5 years; 125 mg 6 hourly for 7 days

<1 year; 62.5 mg 6 hourly for 7 days

And

- Paracetamol, oral,

Adults

500 mg -1 g 6 to 8 hourly for 3-5 days

Children

6-12 years; 250-500 mg 6 to 8 hourly for 3-5 days

1-5 years; 120-250 mg 6 to 8 hourly for 3-5 days

3 months-1 year; 60-120 mg 6 to 8 hourly for 3-5 days

C. For Folliculitis

- Mupirocin ointment, topical,

Adults and children

12 hourly for 7 days

REFERRAL CRITERIA

Refer to a specialist if the underlying condition requires further management.

82. Impetigo

Impetigo is a highly contagious superficial bacterial skin infection. It is common in neonates and children and may be associated with conditions such as scabies, eczema, lice infestation and herpes simplex infection as

secondary infection. The condition does not cause any symptoms until four to 10 days after initial exposure. It usually improves within a week of treatment.

There are two types of impetigo. The non-bullous type typically affects the skin around the nose and mouth, causing lesions to develop, that quickly burst to leave a yellow-brown crust. The other type, bullous impetigo, typically affects the trunk causing fluid-filled blisters (bullae) to develop that burst after a few days to leave a yellow crust.

Both types of impetigo may leave behind marks when the crusts have cleared up, but these usually improve over the following days or weeks.

Its prevention involves good hygiene, regular hand-washing, trimming of fingernails to reduce breaking of the skin through scratching, and discouraging the sharing of towels and clothing.

CAUSES

- *Staphylococcus aureus*
- *Streptococcus pyogenes*

SYMPTOMS

- Pus-filled blisters and sores on the body or scalp

SIGNS

- Superficial, fragile fluid-filled blisters
- Irregular spreading ulcers with yellow crusts

INVESTIGATIONS

- Often no test required
- Microscopy and culture of the exudate from the blisters (except in recurrent or severe cases)

TREATMENT

Treatment objectives

- To eradicate infection
- To prevent transmission
- To reduce the risk of developing complications (e.g. cellulitis, septicaemia)
- To identify and treat any predisposing condition

Non-pharmacological treatment

- Antiseptic baths for all cases

Pharmacological treatment

A. Mild cases (few pustules without fever or systemic manifestations)

Evidence Rating: [B]

- Mupirocin ointment, topical,
Adults and children
Apply 12 hourly for 7 days

B. Moderate to severe or extensive cases in patients without penicillin allergy1st Line Treatment

- Cloxacillin, IV,

Adults

500 mg 6 hourly for 3 - 5 days

Children

10-18 years;

250-500 mg 6 hourly for 3-5 days

2-10 years;

125-250 mg 6 hourly for 3-5 days

< 2 years;

62.5-125 mg 6 hourly for 3-5 days

Then

- Flucloxacillin, oral,

Adults

500 mg 6 hourly for 5-7 days

Children

10-18 years;

250-500 mg 6 hourly for 5-7 days

2-10 years;

125-250 mg 6 hourly for 5-7 days

< 2 years;

62.5-125 mg 6 hourly for 5-7 days

Or

- Amoxicillin + Clavulanic Acid, oral,

Adults

625 mg 12 hourly for 5-7 days

Children

11-18 years;

625 mg 12 hourly for 5-7 days

6-10 years;

457 mg 12 hourly for 5-7 days

1-5 years;

228 mg 12 hourly for 5-7 days

< 1 year;

114 mg 12 hourly for 5-7 days

2nd line treatment

Evidence Rating: [B]

- Cefuroxime IV,

Adults

750 mg 8 hourly for 3-5 days

Children

1 month-18 years;

20 mg/kg 8 hourly for 3-5 days

Then

- Cefuroxime, oral,

Adults

250 mg 12 hourly

Children

12-18 years;

250 mg 12 hourly

2-12 years;

15 mg/kg 12 hourly, max. 250 mg 12 hourly

3 months-2 years;

10 mg/kg max. 125 mg 12 hourly

C. Moderate to severe or extensive cases in patients with penicillin allergy:

- Azithromycin, oral,

Adult

500 mg daily for 3-5 days

Children

10 mg/kg body weight daily for 3 days

< 6 months; not recommended because of a risk of pyloric stenosis

REFERRAL CRITERIA

Refer for hospital care and treatment if spreading rapidly or cellulitis, osteomyelitis or septicaemia develops.

83. Cellulitis and Erysipelas

(See section on 'Cellulitis' in Disorders of the Musculoskeletal system)

84. Buruli Ulcer

This is a chronic painless necrotising ulcer with undermined edges, which can lead to debilitating skin and soft tissue infection and permanent disfigurement. While it is known that this ulcer is caused by a bacterium, the mode of transmission remains unclear. However, trauma, insect bite and inhalation have been suggested.

When detected early, the majority can be cured with a combination of antibiotics. Thus, early identification and appropriate management reduce morbidity and disability from this condition.

CAUSES

- *Mycobacterium ulcerans*

SYMPTOMS

- Painless subcutaneous nodule
- Painless swelling of the legs, arms or face
- Extensive skin ulceration

SIGNS

- Nodule: Painless firm lesion 1-2 cm in diameter situated in the subcutaneous tissue and attached to the skin
- Diffuse painless swelling of the legs, arms or face
- Large painless area of induration
- Extensive skin ulceration

INVESTIGATIONS

- Wound swab for AFBs, bacterial cultures and sensitivity
- Skin biopsy for histopathology

TREATMENT**Treatment objectives**

- To limit the extent of tissue destruction

- To prevent disability
- To treat both primary and secondary bacterial infection

Non-pharmacological treatment

- Complete excision of nodules, preferably with primary closure if possible
- Skin grafting of ulcers if facilities are available

Pharmacological treatment

1st Line Treatment

Evidence Rating: [A]

- Rifampicin, oral, 10 mg/kg daily for 8 weeks

And

- Streptomycin, IM, 15 mg/kg daily for 8 weeks

2nd Line Treatment

Evidence Rating: [C]

- Rifampicin, oral, 10 mg/kg daily for 8 weeks

And

- Clarithromycin, oral, 7.5 mg/kg 12 hourly for 8 weeks

REFERRAL CRITERIA

Refer to centres with expertise for managing buruli ulcer.

| Yaws

85. Yaws

Yaws is a chronic infection by a bacterium that affects mainly the skin, bone and cartilage. Most people affected are children under 15 years of age but adults are not exempt. It is transmitted mainly through skin contact with an infected person. A single skin lesion develops at the point of entry of the bacterium after 24 weeks. Without treatment, multiple lesions appear all over the body. The disease is rarely fatal, however it can lead to chronic disfigurement and disability in about 10% of affected individuals if left untreated. Treatment with antibiotics is curative and relapse is rare.

Overcrowding, poor personal hygiene and poor sanitation facilitate the spread of the disease.

CAUSES

- *Treponema pertenue*

SYMPTOMS

- Raised skin lesions
- Painless skin ulcer
- Bone pain

SIGNS

- Papular skin lesions
- Painless skin ulcer with scab
- Deformities of the nose, bones

- Palmar or plantar skin thickening

INVESTIGATIONS

- VDRL

TREATMENT

Treatment objectives

- To eradicate the organism and ensure cure
- To prevent spread of the infection
- To prevent long term complications

Non-pharmacological treatment

- None

Pharmacological treatment

Evidence Rating: [A]

A. Single Dose Treatment for Yaws

- Azithromycin, oral,
Adults
30 mg/kg body weight (max. 2 g) as a single dose
Children
> 15 years; 2 g
10-15 years; 1.5 g
6-9 years; 1 g
6 months-6 years; 500 mg (syrup preferable)
< 6 months; not recommended

B. For Non-response or Non-availability of Azithromycin

- Benzathine Penicillin, IM,
Adults
1.2 million units stat.
Children
> 10 years; 1.2 MU stat.
< 10 years; 600 000 units stat.

|
YAWS

REFERRAL CRITERIA

Refer intractable cases to the dermatologist.

Fungal Skin Infections

86. Superficial Fungal Skin Infections

These are fungal infections that affect the outer layers of the skin, the nails and hair. When florid, it may be associated with immunosuppression such as in diabetes and retroviral infection and corticosteroid abuse.

CAUSES

- Dermatophytes (tinea) i.e. microsporum, epidermophyton, trichophyton
- Yeasts i.e. candida, malassezia

SYMPTOMS

- Itchy scaly ring shaped rash on the skin
- Scaly bald patches of the scalp
- Distorted, discoloured finger or toe nails
- Itchy and sore skin folds
- Scaly patches of skin with altered pigmentation

SIGNS

- Round scaly patches with thickened edges and clear centre on the skin
- Scaly bald patches of the scalp
- Distorted discoloured nails
- Altered pigmentation of skin (hypopigmented or brownish appearance)
- Pustular rash in the flexures

INVESTIGATIONS

- Skin scrapings for microscopy and culture (mycology)
- Nail and/or hair clippings for microscopy and culture
- FBS and HIV status (if infection is florid and/or oral candidiasis present)

TREATMENT

Treatment/management objectives

- To eradicate infection
- To prevent transmission
- To identify and treat any predisposing conditions

Non-pharmacological treatment

- Good personal hygiene
- Use of loose clothing
- Open footwear

Pharmacological treatment

A. Dermatophyte infection of scalp (tinea capitis)

Evidence Rating: [C]

1st Line Treatment

- Griseofulvin, oral,

Adults

500 mg daily (double in severe infection) for 4 weeks

Children

1 month-12 years; 10 mg/kg (max. 500 mg) once daily or in two divided doses for 4 weeks

12-18 years; 500 mg once daily or in two divided doses (may be doubled in severe infections) for 4 weeks

2nd Line Treatment

- Terbinafine, oral,

Adults

Not recommended

Children

Children over 1 year;

Body weight > 40 kg; 250 mg once daily for 4 weeks

Body weight 20-40 kg; 125 mg once daily for 4 weeks

Body weight 10-20 kg; 62.5 mg once daily for 4 weeks

B. Dermatophyte infection of body (tinea corporis), perineum (tinea cruris), hands (tinea manuum) and feet (tinea pedis)

Evidence Rating: [C]

1st Line Treatment

- Benzoic Acid compound ointment (Whitfield's ointment), topical,

Adults and children

Apply twice daily to patches up to one or two weeks after the last visible rash has cleared

Or

- Clotrimazole 1%, topical,

Adults and children

Apply twice daily to patches up to one or two weeks after last visible rash has cleared

Or

- Miconazole 2%, topical,

Adults and children

Apply twice daily to patches up to one or two weeks after last visible rash has cleared

Or

- Ciclopirox olamine 1%, topical,

Adults and children

Apply twice daily to patches up to one or two weeks after last visible rash has cleared

2nd Line Treatment

- Griseofulvin, oral,

Adults

500 mg daily (double in severe infection) for 4 weeks

Children

12-18 years;

500 mg once daily or in two divided doses

(may be doubled in severe infections) for 4 weeks

1 month-12 years; 10 mg/kg (max. 500 mg) once daily or in two divided doses for 4 weeks

Or

- Itraconazole, oral,

Adults

200 mg once daily or 12 hourly for 7 days

Children

12 years-18 years; 200 mg daily for 7 days

1 month-12 years; 3-5 mg/kg (max. 100 mg) once daily for 15 days or 30 days (for tinea pedis and manuum)

Or

- Terbinafine, oral,

Adults

250 mg daily for 2-6 weeks

Children

Children over 1 year;

| Bodyweight > 40 kg; 250 mg once daily for 4 weeks,

6 weeks-3 months in nail infections

Body weight 20-40 kg; 125 mg once daily for 4 weeks

Body weight 10-20 kg; 62.5 mg once daily for 4 weeks

C. Dermatophyte infection of nails (onychomycosis)

Evidence Rating: [C]

1st Line Treatment

- Itraconazole, oral,

Adults

200 mg 12-24 hourly for 7 days, repeated courses after 21 days interval (max.of 2 courses for finger nails and 3 courses for toe nails)

Children

| 12 years-18 years; 200 mg 12 hourly for 7 days, repeated courses after 21 days interval (finger nails 2 courses, toe nails 3 courses)

1 year-12 years; 5 mg/kg (max 200 mg) daily for 7 days, repeated courses after 21 days interval (finger nails 2 courses and toe nails 3 courses)

Or

- Terbinafine, oral,

Adults

200 mg daily for 6 weeks-3 months

Children

Children over 1 year;

Bodyweight over 40 kg; 250 mg once daily for 6 weeks – 3 months

Body weight 20-40 kg; 125 mg once daily for 6 weeks – 3 months

Body weight 10-20 kg; 62.5 mg once daily for 6 weeks – 3 months

2nd Line Treatment

- Griseofulvin, oral,

Adults

500 mg daily (double in severe infection) for 4 weeks

Children

12-18 years; 500 mg once daily or in two divided doses
(may be doubled in severe infections) for 4 weeks

1 month-12 years; 10 mg/kg (max. 500 mg) once daily or in two divided doses for 4 weeks

D. For Candida intertrigo

Evidence Rating: [C]

- Benzoic Acid compound ointment (Whitfield's ointment), topical,
Apply twice daily to patches up to one or two weeks after the last visible rash has cleared.
- **Or**
- Clotrimazole 1%, topical,
Apply twice daily to patches up to one or two weeks after last visible rash has cleared
- **Or**
- Miconazole 2%, topical,
Apply twice daily to patches up to one or two weeks after last visible rash has cleared
- **Or**
- Ciclopirox olamine 1%, topical,
Apply twice daily to patches up to one or two weeks after last visible rash has cleared.

E. For Oral candidiasis and Pityriasis versicolor

Please refer to section on oral candidiasis and pityriasis versicolor

REFERRAL CRITERIA

Refer to a dermatologist if patient fails to respond to treatment.

87. Pityriasis Versicolor

Pityriasis versicolor is a common yeast infection of the skin, in which flaky discoloured patches appear on the chest and back. It is sometimes called tinea versicolor. It is more common in hot climates, and often affects people that perspire heavily. It is a disorder of the healthy but florid cases are seen in the immunosuppressed such as those with diabetes mellitus, HIV/AIDS and topical steroid abuse.

CAUSES

- *Pityrosporum orbiculare*
- *Pityrosporum ovale (malassezia furfur)*

SYMPTOMS

- Asymptomatic
- Mildly Itchy

- Pale or dark skin patches

SIGNS

- Hypopigmented macules and/or patches
- White scaly patches

INVESTIGATIONS

- Skin scraping for microscopy
- Fasting blood glucose (for florid cases)
- Retroscreen (for florid cases)

TREATMENT

Treatment Objectives

- To eradicate infection
- To prevent transmission
- To address predisposing factors

Non-Pharmacological Treatment

- Good personal hygiene
- Avoid sharing bath towels, sponges and clothing

Pharmacological Treatment

A. For Mild Tinea Versicolor

Evidence Rating: [C]

- Miconazole, 2%, topical,
Adults
12 hourly for 4 weeks
Children
> 2 years; 12 hourly for 4 weeks
< 2 years; 12 hourly for 4 weeks

Or

- Clotrimazole, 1%,
Adults
12 hourly for 4 weeks
Children
> 2 years; 12 hourly for 4 weeks

Or

- Whitfield's ointment, topical,
Adults
12 hourly for 4 weeks

Children

Not recommended

Or

- Selenium sulphide, shampoo 2.5%, topical,
Adults
Once daily for 5-7 days (washed off after 30 minutes to prevent irritation)
Children
Once daily for 5-7 days

< 5 years; not recommended

B. For Severe Tinea Versicolor

Evidence Rating: [B]

- Itraconazole, oral,
Adults

200 mg daily for 7 days

Children

> 12 years; 200 mg daily for 7 days

1 month-12 years; 3-5 mg /kg daily for 7 days

Caution 11-1.

Use of itraconazole is associated with potentially life-threatening liver-toxicity.
Monitor liver function while on long term therapy.

REFERRAL CRITERIA

Refer intractable cases to a dermatologist.

Viral Skin Infections

88. Herpes Simplex Infections

These are acute self-limiting viral infections of the skin and mucous membranes resulting in blistering eruptions usually seen on the face (called “cold sores”) or the genitalia. Recurrence is common on previously affected skin areas and is due to proliferation of virus within the epidermis of the affected dermatome. Extensive lesions may be associated with an immunocompromised state or atopy.

CAUSES

- Herpes simplex virus type 1
- Herpes simplex virus type 2

SYMPTOMS

- Fever
- Tingling, discomfort, or painful sensation over affected skin area
- Grouped small blisters
- General malaise

SIGNS

- Fever
- Tender grouped vesicles
- Regional lymphadenopathy
- Genital ulcers
- Oral ulcers

INVESTIGATIONS

- Usually none

- Diagnosis is mainly clinical
- HSV serology (if necessary)

TREATMENT

Treatment objectives

- To relieve pain and discomfort
- To limit extent of disease spread in the immunocompromised and atopic eczema patients
- To prevent secondary infection

Non-pharmacological treatment

- No specific measures

Pharmacological treatment

A. Perioral or genital lesions

Evidence Rating: [B]

- Aciclovir cream 5%, topical,
 - Adults
4 hourly (five times daily) for 4-5 days
 - Children
4 hourly (five times daily) for 4-5 days

Note 11-1

Start immediately the premonitory symptoms are felt or within 48 hours of onset.

B. For severe primary infections, disseminated herpes simplex, frequent recurrences and immunosuppressed patients

- Aciclovir, oral,
 - Adults
400 mg 4 hourly (five times daily) for 5-7 days
 - Children
> 2 years; 200 mg 4 hourly (five times daily) for 5-7 days
1 month-2 years; 100 mg 4 hourly (five times daily) for 5-7 days
 - And**
 - Paracetamol, oral,
Adults
500 mg-1 g 6-8 hourly for 3-5 days
 - Children
6-12 years; 250-500 mg 6-8 hourly for 3-5 days
1-5 years; 120-250 mg 6-8 hourly for 3-5 days
3 months-1 year; 60-120 mg 6-8 hourly for 3-5 days

REFERRAL CRITERIA

Refer complicated cases to a dermatologist.

89. Herpes Zoster Infections

This is an acute painful blistering viral infection of the skin. It can occur in childhood but is much more common in adults, especially the elderly, sick or immunosuppressed. The primary infection presents as chickenpox (varicella), usually during childhood. Like herpes simplex, the virus persists usually in the anterior horn cells before it is reactivated. Post-herpetic neuralgia is a common complication and defined as persistence or recurrence of pain more than a month after the onset of shingles.

CAUSES

- Varicella-zoster virus

SYMPTOMS

- Fever
- Severe pain over areas involved
- Headache
- Blisters

SIGNS

- Fever
- Tender vesicles spread within one or more dermatomes unilaterally
- Regional lymphadenopathy

INVESTIGATIONS

- Usually none
- HIV screen (for recurrence and/or multi-dermatomal cases)

TREATMENT

Treatment objectives

- To provide adequate pain relief
- To prevent secondary bacterial infection
- To limit extent of disease spread in immuno-compromised patients
- To prevent complications

Non-pharmacological treatment

- Bed rest

Pharmacological treatment

Evidence Rating: [B]

A. Mild Herpes Zoster Infection

- Aciclovir cream 5%, topical,
 - Adults
4 hourly (five times daily) for 4-5 days
 - Children
4 hourly (five times daily) for 4-5 days

Note 11-2

Start immediately the premonitory symptoms are felt or within 48 hours of onset.

And

- Diclofenac, oral,
Adult
50 mg 8 hourly for 7 days

Or

- Ibuprofen, oral,
Children
5-10 mg/kg 6 hourly for 7 days

And

- Povidone iodine 10%, topical,
Adults
Apply to blisters daily till lesions resolve
Children
Apply to blisters daily till lesions resolve

B. Severe Herpes Zoster Infection

Evidence Rating: [B]

- Aciclovir, oral,
Adults
800 mg 4 hourly (five times daily) for 5-7 days
Children
> 12 years; 800 mg 4 hourly (five times daily) for 5-7 days
6-12 years; 800 mg 6 hourly for 5-7 days
2-6 years; 400 mg 6 hourly for 5-7 days
< 2 years; 200 mg 6 hourly for 5-7 days

And

- Diclofenac, oral,
Adults
50 mg 8 hourly for 7 days
Or
- Ibuprofen, oral,
Children
5-10 mg/kg 6-8 hourly for 7 days

And

- Povidone iodine 10%, topical,
Adults
Apply to blisters daily till lesions resolve
Children
Apply to blisters daily till lesions resolve

C. Post Herpetic Neuralgia

- Amitriptyline, oral,
Adults
25-50 mg daily till resolution
Children
Not indicated for this condition

Or

- Carbamazepine, oral,
Adults
50-150 mg 12 hourly till resolution (maximum 600 mg 12 hourly)

Children

12-18 years; 50-100 mg 12 hourly

Then

Increase to 600 mg 12 hourly if necessary

1 month-12 years; 2.5 mg/kg 12 hourly

Then

Increase slowly to 5 mg/kg 12 hourly

Or

- Pregabalin, oral,
Adults
75 mg 12 hourly till resolution
Children
Not recommended

REFERRAL CRITERIA

Refer complicated cases to a specialist.

90. Chicken pox

Chicken pox and shingles are caused by the same virus (Varicella or Herpes Zoster). Humans are the only source of infection for chicken pox and shingles. Person-to-person transmission occurs by direct contact with vesicular fluid from patients with either condition. Chicken pox may additionally be transmitted by airborne spread from respiratory tract secretions. There is a risk of infection up to 21 days after contact.

Chicken pox is a highly contagious viral illness usually occurring in epidemics. It is generally a benign, self-limiting disease in immunocompetent children but tends to be more severe in adolescents and adults and also in immunosuppressed patients e.g. patients on steroids. Complications include bacterial super-infection of skin lesions, pneumonia, central nervous system involvement (acute cerebellar ataxia, encephalitis), thrombocytopenia, and other rare complications such as glomerulonephritis, arthritis, and hepatitis.

Exposure to the virus during the second 20 weeks of pregnancy can result in congenital varicella syndrome characterised by skin scarring, abnormalities of limbs, brain, eyes and low birth weight. Varicella infection can be fatal for an infant if the mother develops varicella from 5 days before to 2 days after delivery.

Shingles presents with skin lesions in a dermatomal distribution and in immunocompromised individuals, can be very extensive. It may be complicated by pain persisting for weeks to years after the infection

(postherpetic neuralgia).

CAUSES

- Varicella-Zoster (or Herpes Zoster) virus

SYMPTOMS

Chicken pox

- Fever
- Malaise
- Anorexia
- Headache
- Itchy skin rash

Shingles

- Painful rash
- Fever

SIGNS

Chickenpox

- Vesicular rash eventually becoming crusted
 - Rash in different stages (papules, vesicles, crusted lesions)
 - Appear first on face, scalp or trunk and spreads to rest of body, more concentrated on trunk
 - Persists for 5-7 days
 - Presence of pus in lesions suggests secondary bacterial infection

Shingles

- Vesicular rash
 - Along a dermatome
 - Rash eventually crusts

INVESTIGATIONS

- Usually none (diagnosis is mainly clinical)
- Polymerase Chain Reaction (PCR) or cell culture from vesicular fluid, crusts, saliva, cerebrospinal fluid or other specimens (if diagnosis in doubt)

TREATMENT

Treatment objectives

- To relieve the intense itching or pain
- To prevent or treat secondary infection
- To prevent dehydration in children

Non-pharmacological treatment

- Avoid scratching
- Regular bathing with soap and water
- Avoid intentionally breaking up vesicles

Pharmacological treatment

A. To relieve pain and fever

1st Line Treatment