CHAPTER 1
ALIMENTARY TRACT

1.1 GASTROINTESTINAL DISORDERS

1.1.1 BOWEL PREPARATIONS

DESCRIPTION
Bowel preparation is essential for colonoscopy. LoE:IIa[i]

GENERAL MEASURES
Health care professionals should provide both oral and written patient education instructions and emphasise the importance of adherence to the bowel preparation.

MEDICINE TREATMENT
Start bowel preparation as a split-dose regimen the day before the scheduled procedure: half the dose the night before and half the dose on the day of colonoscopy.
Commence a low residue diet the day before.

Preparations containing ingredients such as polyethylene glycol (PEG) and sodium sulphate are adequate for bowel cleansing. LoE:II[ii]

- PEG/sodium sulphate oral, solution:
  - Prescribe 2 litres the night before the procedure and 2 litres the following morning, two hours prior to the procedure. LoE:I[iii]

Note:
Routine use of adjunctive agents (e.g. bisacodyl, senna, prokinetics) for bowel cleansing before colonoscopy is not recommended. LoE:III[iv]

1.1.2 DIVERTICULOSIS
K57.0-5/K57.8-9

DESCRIPTION
Colonic diverticulosis becomes increasingly common with age. Acute diverticulitis is suspected in patients with lower abdominal pain (typically in the left lower quadrant). The pain is usually constant and is often present for several days prior to presentation. Nausea and vomiting are often present due to a bowel obstruction or an ileus as a result of peritoneal irritation. This may be associated with changes in bowel habits.

Diverticulosis can be complicated by haemorrhage or diverticulitis. Acute diverticulitis is inflammation of diverticulae and may, uncommonly, be

accompanied by polymicrobial infection. Acute diverticulitis is defined as complicated in the presence of bowel obstruction, abscess, fistula, or perforation.

GENERAL MEASURES
Increase dietary fibre intake.

MEDICINE TREATMENT
Not all patients require antibiotics. If antibiotic treatment is required, the total duration is ten days depending on clinical response.

Uncomplicated diverticulitis:
- Amoxicillin/clavulanic acid, oral, 875/125 mg 12 hourly.

If unable to tolerate oral therapy: *LoE:III[v]*
- Amoxicillin/clavulanic acid, IV, 1.2 g 8 hourly.
  - Switch to oral therapy once able to tolerate.

REFERRAL
» Acute diverticulitis with clinical deterioration or failure to improve on medical therapy.
» Peritonitis.
» Complicated diverticulitis (to a centre which can perform colonic surgery).
» Massive haemorrhage.

1.1.3 GASTRO-OESOPHAGEAL REFLUX DISEASE (GORD) AND DYSPEPSIA
K21.0/K21.9/K22.7/K30

DESCRIPTION
GORD is a disorder which develops as a consequence of the reflux of gastric and duodenal contents into the oesophagus. It is usually characterised by heartburn and regurgitation.

Dyspepsia is the sensation of epigastric discomfort. It may be a feature of potentially severe diseases such as peptic ulcer disease or gastric cancer. It may also be a symptom of *H. pylori* gastritis or NSAID gastritis.

Intermittent indigestion, heartburn or dyspepsia may be associated with:
» use of NSAIDs e.g. aspirin, ibuprofen, pain powders.
» spicy food, alcohol, carbonated drinks.
» smoking.

Complications that may develop in severe GORD are strictures, ulceration, Barrett's oesophagus and adenocarcinoma of the oesophagus. Two thirds of patients have a normal endoscopy which is termed non-erosive reflux disease

(NERD) or non-ulcer dyspepsia (NUD) depending on the predominant symptom.

GENERAL MEASURES

LoE:IIIb[vi]

» Stop smoking.
» Limit alcohol intake.
» Eat small frequent meals.
» Avoid late night meals.
» Avoid fatty meals.
» Avoid carbonated beverages.
» Lose weight if overweight.
» Sleep with upper body elevated.
» Sleep on the left side.
» Avoid excessive exercise.
» Stop the use of potential ulcerogenic medicines, e.g. NSAIDs.
» If pale, check haemoglobin, and refer if anaemic.

All patients with alarm symptoms, i.e. weight loss, haematemesis or melaena, dysphagia, or anaemia, chest pain, or patients older than 60 years of age with new onset dyspepsia should have an endoscopy.

LoE:IVb[vii]

MEDICINE TREATMENT

New onset symptoms

Empiric therapy with a proton pump inhibitor (PPI) may be initiated **in the absence of alarm symptoms** (see referral section). Improvement of symptoms confirms acid-related disease.

- PPI, e.g.: LoE:I[viii]
- Pantoprazole, oral, 40 mg daily for 4 weeks. LoE:I[ix]
  - Ensure adherence to promote healing.

Recurrence of symptoms

<u>After endoscopic confirmation of disease:</u>

- PPI, e.g.:
- Pantoprazole, oral, 40 mg daily.
  - Decrease dose of PPI after 4 weeks, e.g: pantoprazole, oral, 20 mg daily except for severe endoscopic GORD (Grade C or D LA classification) and Barret's oesophagus or specific advice from the endoscopist.

Barrett's oesophagus K22.7

- Restart PPI, e.g.:
- Pantoprazole, oral, 40 mg daily.

<u>Note:</u>

» Patients with Barrett's oesophagus usually need maintenance PPI therapy.
» There is no convincing evidence that long-term treatment of Barrett's oesophagus with PPIs reduces dysplasia or progression to malignancy.

REFERRAL

Discuss the following with a specialist:

» young patients who are PPI dependent and will require life-long therapy;
» patients unable to take PPIs;
» patients requiring high doses of PPIs;
» patients with large hiatus hernias and “volume reflux”;
» a rolling hiatus hernia with obstructive symptoms – requires surgery;
» All patients with alarm symptoms:
  – Evidence of gastrointestinal bleeding,
  – Iron deficiency anaemia,
  – Anorexia,
  – Unexplained weight loss,
  – Dysphagia,
  – Odynophagia (painful swallowing),
  – Persistent vomiting, haematemesis, and/or melaena
  – Gastrointestinal cancer in a first-degree relative.

1.1.4 HIATUS HERNIA

K44.0/K44.1/K44.9

GENERAL MEASURES

Manage GORD. See Section 1.1.3: Gastro-Oesophageal Reflux Disease (GORD) and dyspepsia.

1.1.5 INFLAMMATORY BOWEL DISEASE

K50.0-1/K50.8-9/K51.0-5/K51.8-9/K52.0-3/K52.8-9

DESCRIPTION

Inflammatory bowel disease is a chronic inflammatory disorder of the gastrointestinal tract that includes both Crohn’s disease (CD) and ulcerative colitis. Abdominal pain, rectal bleeding, diarrhoea and weight loss characterise both CD and ulcerative colitis.

REFERRAL

Discuss all patients with a potential diagnosis of Crohn’s disease or ulcerative colitis with a specialist.

1.1.6 PANCREATITIS, ACUTE

K85.0-3/K85.8-9

DESCRIPTION

Acute inflammatory condition of the pancreas.

Acute pancreatitis is based on the fulfilment of ‘2 out of 3’ of the following criteria:

» clinical (upper abdominal pain),

» laboratory (serum amylase or lipase >3x upper limit of normal), and/or
» imaging (CT, MRI, ultrasonography) criteria.

Intense local inflammation results in pain, and local as well as systemic, complications. Disseminated intravascular coagulopathy (DIC), metabolic derangements and shock may occur.
Measurement of renal function and electrolytes measurements (including calcium) can be used to determine severity.

GENERAL MEASURES

» Parenteral fluid replacement to correct metabolic and electrolyte disturbances.
» Parenteral nutrition is associated with adverse outcomes and should only be considered in patients that cannot receive or tolerate nasogastric or enteral nutrition.
» Drainage of abscess/pseudocyst, if required.

MEDICINE TREATMENT

Pain:

- Morphine, IV, to a total maximum dose of 10 mg (See Appendix II, for individual dosing and monitoring for response and toxicity).

Acute symptomatic hypocalcaemia: E83.5

- Calcium gluconate 10%, IV infusion, 10 mL as a bolus over 10 minutes.
  - Follow with 60–120 mL diluted in 1 L sodium chloride 0.9%, administered over 12–24 hours. *LoE:III*
  - Monitor serum calcium at least 12 hourly.

<u>If serum magnesium <0.5 mmol/L:</u>
ADD

- Magnesium sulfate, IV infusion, 25–50 mmol in 12–24 hours.
  - 1 mL magnesium sulfate 50% = 2 mmol magnesium.

Antimicrobial therapy
Routine administration of prophylactic antibiotics are not necessary.

<u>For infected necrosis of the pancreas:</u>
Broad spectrum IV antibiotics: *LoE:III*[x]

- Amoxicillin/clavulanic acid, IV, 1.2 g 8 hourly for 10 days, depending on clinical response.

REFERRAL

Severe complications, e.g. necrosis; haemorrhagic or systemic complications; or infective pancreatitis.

1.1.7 PANCREATITIS, CHRONIC

K86.0-3/K86.8-9

DESCRIPTION

Chronic inflammatory condition of the pancreas with severe abdominal pain, which results in functional and structural damage. In most patients, this is a chronic, progressive disease that leads to exocrine and/or endocrine insufficiency.

GENERAL MEASURES

» Abstinence from alcohol reduces abdominal pain in the early stages of the disease.
» Stop smoking.
» Small frequent meals and restricted fat intake reduces pancreatic secretion and pain.
» When weight loss is not responding to exogenous enzymes and diet, consider supplementation with medium chain triglycerides.
» There is a risk of developing cancer of the pancreas. Consider this in patients who develop worsening pain, new onset diabetes or deterioration in exocrine function.
» Dietary advice by dietician.

MEDICINE TREATMENT

Treatment is aimed at:
» pain,
» exocrine dysfunction (malabsorption, and diarrhoea),
» endocrine function. See section 8.5.2: Type 1 Diabetes mellitus.

Analgesia

See Section 26.1: Pain, chronic.

Note: Pancreatic enzymes may reduce pain by negative feedback on pancreatic secretion.

Malabsorption

Supplementation of fat-soluble vitamins may be indicated.

- Pancreatic enzyme replacement e.g. Lipase, oral, equivalent to lipase 30 000 units per day, in divided doses with meals and/or snacks.
  - Titrate pancreatic enzyme replacement therapy until symptom control has been achieved.

REFFERAL

» Presence of pseudocyst for surgical intervention.
» Autoimmune chronic pancreatitis.

1.1.8 PEPTIC ULCER

K25.0-7/K25.9/K26.0-7/K26.9/K27.0-7/K27.9

DESCRIPTION

Ulcer in the stomach mucosa (gastric ulcer: GU) or first few centimetres of the duodenum (duodenal ulcer: DU), which penetrates into, or through the muscularis mucosa. Diagnosis is made after endoscopy as all GUs require biopsy to exclude malignancy.

GENERAL MEASURES

» Advise patient to avoid ulcerogenic medications, e.g. NSAIDs.
» Advise patient to stop smoking and drinking alcohol.
» Dietary advice by dietician.
» Patients with GUs and complicated DUs, those that have bled, perforated or are recurrent, must be rescoped at appropriate intervals until the ulcer has healed. *H. pylori* can be assessed at scope by rapid urease testing (RUT) or biopsy.

MEDICINE TREATMENT

***H. pylori* positive:**

The vast majority of GUs and DUs are associated with *H. pylori* infection and eradication therapy is indicated if infection is present. This will greatly reduce the rate of recurrent ulceration. Empiric eradication of *H. pylori* **is not recommended**.

H. pylori eradication: K25.0-7/K25.9/K26.0-7/K26.9/K27.0-7/K27.9 + (B98.0)

- Amoxicillin, oral, 1 g 12 hourly for 14 days. *LoE:Ib*[xi]

OR

For severe penicillin allergy: (Z88.0)

- Azithromycin, oral, 500 mg daily for 3 days.

AND

- Metronidazole, oral, 400 mg 12 hourly for 14 days.

Proton pump inhibitors (PPIs):

- PPI, e.g.:
- Pantoprazole, oral, 40 mg 12 hourly for 14 days.

Continue with PPI therapy as follows: *LoE:IIIb*[xii]

- PPI, e.g.:
- Pantoprazole, oral, 40 mg daily.
  - Duodenal ulcer: for up to 2 weeks
  - Gastric ulcer: for up to 6 weeks

***H. pylori* negative:**
» These are usually a consequence of NSAID use.
» Stop NSAID until ulcer has healed.
» If patient is unable to stop NSAID, refer to specialist for guidance.

- PPI, e.g.:
- Pantoprazole, oral, 40 mg daily.
  - Duodenal ulcer: for up to 4 weeks
  - Gastric ulcer: for up to 8 weeks.

LoE:IIIb[xiii]

Resistant disease
» Ulcer not healing.
» High-risk patients, i.e. poor surgical risk and the elderly or concomitant disease.

Maintenance therapy:

LoE:III[xiv]

- PPIs, e.g.:
- Pantoprazole, oral, 40 mg daily. Specialist initiated.

REFERRAL
» Failure of *H. pylori* eradication: Discuss with specialist.

1.2 HEPATIC DISORDERS

DESCRIPTION
Hepatitis (inflammation of the liver) may be infectious (caused by viral, bacterial, fungal, and parasitic organisms) or non-infectious (triggered by alcohol, drugs, autoimmune diseases, and metabolic diseases).

Causes of hepatitis includes idiosyncratic drug reactions, viral hepatitis (A, B, C, D, E), alcoholic hepatitis, non-alcoholic fatty liver disease, autoimmune hepatitis, Wilson's disease, ischaemic hepatopathy, Budd-Chiari syndrome, veno-occlusive disease, acute fatty liver of pregnancy/HELLP syndrome, malignant infiltration, partial hepatectomy, toxin exposure, including mushroom poisoning, sepsis, heat stroke or haemophagocytic lymphohistiocytosis.

1.2.1 HEPATITIS, NON-VIRAL
K70.1/K71.0-9/K73.0-2/K73.8-9/K75.4
* Notifiable medical condition if caused by agricultural chemicals or insecticides.

DESCRIPTION
Any form of hepatitis not caused by the common hepatotropic viruses.

Liver biopsy is indicated if hepatitis persists or diagnosis is unclear.

GENERAL MEASURES

» Diet: If no hepatic encephalopathy, then normal protein intake is appropriate. With clinical monitoring of hepatic encephalopathy, maintain 1 to 1.5 g/kg daily protein intake.
» Avoid alcohol and other hepatotoxic agents.
» Monitor blood glucose regularly given potential risk of hypoglycaemia.

MEDICINE TREATMENT

If the patient is jaundiced with a prolonged INR (INR>2)

- Vitamin K1, IV, 10 mg
  - Administer as a slow IV injection.
  - Do not dilute or mix with other injectables.

LoE:IVb

If the patient is bleeding, give

LoE:IIb[xv]

- Lyophilised plasma, IV, 15mL/kg over 20-30 minutes.

OR

- Fresh Frozen Plasma, IV, 15mL/kg over 20-30 minutes.

AND

Discuss further management with a specialist.

Hepatitis due to infections

Antibiotic therapy based on culture, serology or suspected aetiology e.g. leptospirosis.

Alcohol-induced hepatitis

- Thiamine, oral, 300 mg daily.

Other vitamins if indicated.

Drug-induced hepatitis

Stop all potentially hepatotoxic medication immediately, in consultation with a specialist.

Auto-immune hepatitis K75.4

Patients with persistent hepatitis, negative viral markers and no hepatotoxins. Biopsy and/or various parameters are required to make the diagnosis.

<u>If autoimmune hepatitis:</u>

- Corticosteroids (intermediate-acting) e.g.:
- Prednisone, oral, 0.5 mg/kg daily.
  - Taper dose to a suitable maintenance dose. (Refer to Appendix II for an example of a dose reduction regimen).

AND (in consultation with gastroenterologist or hepatologist)

- Azathioprine, oral, 0.5 mg/kg daily, titrated up to 1 mg/kg daily depending on response and WCC.

REFERRAL
» Where patients cannot be managed locally or biopsy cannot be done, i.e. diagnosis is unclear.
» Non-resolving hepatitis.

Note: Refer timeously before extensive liver damage occurs.

1.2.2 LIVER FAILURE, ACUTE
K72.0/K72.9

DESCRIPTION
Acute liver failure refers to the development of severe acute liver injury with encephalopathy and impaired synthetic function (INR of ≥1.5) in a patient without cirrhosis or pre-existing liver disease. There are many causes, but the commonest are viral hepatitis, alcohol, drug-induced liver injury, toxins or ischaemic hepatitis.

GENERAL MEASURES
» Patient education.
» Avoid hepatotoxic drugs and alcohol.
» Rest and reduce physical activity.
» Protein restriction is indicated for encephalopathy, however, severe protein restriction may accentuate catabolism. Use increments of 20 g protein per day, aiming for 1 g/kg/day as tolerated.
» Monitor blood glucose regularly because hypoglycaemia is common.
» Correct electrolyte disturbances.
» Exclude GI bleed and infection.
» Avoid factors (especially medications) that may worsen or precipitate functional deterioration.
» Avoid vigorous paracentesis.
» If the patient is bleeding, check INR and correct coagulopathy with FFP or lyophilised plasma.

MEDICINE TREATMENT
- Lactulose, oral, 10–30 mL 8 hourly, titrated to attain 2–3 soft stools per day.

Note: Do not give antibiotics unless there is evidence of bacterial sepsis.

REFERRAL
» All cases of severe acute liver failure should be discussed with a specialist.

1.2.3 PORTAL HYPERTENSION AND CIRRHOSIS
R18/K72.9/K74.6+(I98.2*/I98.3*)

DESCRIPTION
The complications of portal hypertension include:

» variceal bleeds,
» ascites,
» hepatic encephalopathy (HE),
» splenomegaly with hypersplenism,
» hepatorenal syndrome,
» hepato-pulmonary syndrome or porto-pulmonary hypertension.

GENERAL MEASURES

» Ascites: Perform diagnostic paracentesis if indicated. Restrict sodium intake, i.e. ≤ 2 g/day or ≤ 88 mmol/day.
» Monitor weight regularly.
» Encephalopathy: with acute HE, protein restrict (ideally under advice of dietician), otherwise 1–1.5 g/kg protein per day.
» Exclude infection, high protein load, occult bleed, sedatives, electrolyte disturbances and hepatocellular carcinoma.
» Variceal bleeding: endoscopic variceal ligation and/or immediate referral for advanced management.

MEDICINE TREATMENT

Ascites R18

- Spironolactone, oral, 100 mg daily.
  AND
- Furosemide, oral, 40 mg daily.

For spironolactone and furosemide:

- Increase spironolactone and furosemide dose by 100 mg and 40 mg, respectively, every 3–5 days, to a maximum dose of 400 mg spironolactone and 160 mg of furosemide depending on serum Na^+, K^+, urea and creatinine.
- Spironolactone may cause hyperkalaemia.
- Rapid fluid shifts may precipitate acute liver and/or renal failure.

Monitoring of sodium, potassium and renal function is essential in patients taking spironolactone. Avoid spironolactone if eGFR <30 mL/minute.
LoE:III[xvi]

Measure response to diuretics by weighing patient daily. Aim for maximal weight loss of:

» Patients without oedema: 500 g/day
» Patients with oedema: 1 000 g/day

Tense ascites R18

Albumin replacement must be given if ≥5 L of fluid is drained by paracentesis, or if there is pre-existing renal dysfunction:

- Albumin, IV, 40 g (20%), as an infusion. LoE:II[xvii]
  - Refer to specialist unit to consider transjugular intrahepatic portosystemic (TIP) shunt or potential transplant.
- Introduce diuretics and titrate doses as necessary to prevent recurrence of ascites (see above).

Note:
» Avoid NSAIDS and ACE-inhibitors.
» Exclude spontaneous bacterial peritonitis in patients with new onset ascites.

Refractory ascites R18
Defined as:
» No response to optimal diuretic therapy despite sufficient sodium restriction (≤2 g/day or ≤88 mmol/day) and avoidance of NSAIDs.
» Ascites that recurs rapidly following therapeutic paracentesis.

Perform serial large volume paracentesis, as an outpatient, usually not more frequently than every 2 weeks.
Haemodynamic collapse is more likely in patients who have intravascular volume depletion. Check renal function before paracentesis.

Albumin replacement must be given if ≥5 L of fluid is removed by paracentesis:
- Albumin, IV, 40 g (20%), as an infusion. LoE:II[xviii]

Encephalopathy
- Lactulose, oral, 10–30 mL 8 hourly, depending on stool number and consistency (aim for 2 soft stools/day).

Look for precipitating factors: Sepsis, protein load, GIT bleed, over diuresis, sedation.

Oesophageal varices I85.0/I85.9
To reduce the risk of bleeding:
- Beta-blocker, e.g.: LoE:III[xix]
- Propranolol, oral, 20–40 mg 12 hourly. Titrate to resting pulse rate of 50–60 beats per minute. Monitor pulse and BP.

REFERRAL
Refer to specialist unit to consider TIP shunt, endoscopic variceal ligation or potential transplant.

1.2.4 HEPATITIS, VIRAL

*Notifiable medical condition.

DESCRIPTION

Hepatitis caused by one of the hepatotropic viruses, hepatitis A, B, C, D and E.

1.2.4.1 HEPATITIS B, ACUTE

B16.0-2/B16.9

GENERAL MEASURES

» Bed-rest until acute phase has resolved.
» Avoid alcohol during the illness and for ≥ 6 months after clinical recovery.
» Screen sexual contacts of patients with acute hepatitis B. Non-immune contacts (negative for hepatitis B surface antibodies) should receive hepatitis B active immunisation (see Section 9.2: Adult vaccination).

MEDICINE TREATMENT

For nausea and vomiting: (R11)

- Metoclopramide, IV/oral, 10 mg 8 hourly as required.

Hepatitis B virus: prophylaxis following exposure e.g. needle stick injury
S61.0 + (W46.22+Z20.5+Z29.8)

» Persons at risk can be protected by passive immunisation with hyper immune serum globulin prepared from blood containing anti-HBs.
» It is essential that all categories of healthcare workers (HCW) at risk of contact with bodily fluids, including cleaning staff and home-based or family caregivers, are screened and fully vaccinated against hepatitis B if nonimmune.
» All occupational exposure incidents must be adequately documented for possible subsequent compensation.
» Recommended post-exposure management for HCW exposed to infectious material from patients with infectious hepatitis B (either surface antigen or e antigen positive).

Check vaccination status and antibody response of HCW (See table below for management depending on immunity):

Vaccination status and antibody response status of HCW	Source patient status & treatment		
	HBsAg positive	HBsAg negative	HBsAg unknown
Unvaccinated **OR** vaccination incomplete	• HBIG, IM, 500 units* • Hep B vaccine (3 doses at monthly intervals)	• Initiate Hep B vaccination (month 0, 1 and 6)	• HBIG, IM, 500 units* • Hep B vaccine (3 doses at monthly intervals)
Vaccinated **AND** HBsAb ≥10 units/mL[#]	No treatment	No treatment	No treatment
Vaccinated **AND** HBsAb <10 units/mL	• HBIG, IM, 500 units* • Repeat Hep B vaccine (3 doses at monthly intervals)	• Initiate Hep B vaccination (month 0, 1 and 6)	• HBIG, IM, 500 units* • Repeat Hep B vaccine (3 doses at monthly intervals)

* HBIG and first dose of vaccine to be given simultaneously, but at different sites.
[#] If the delay in obtaining HBsAb results is more than 24 hours initiate treatment as for vaccinated AND HBsAb <10 units/mL.
Table 1.1: Prophylaxis following Hepatitis B exposure

1.2.4.2 HEPATITIS B, CHRONIC (NON-HIV COINFECTION)

B18.0-2/B18.8-9

Consult the most recent Hepatitis Guidelines from the National Department of Health for comprehensive monitoring recommendations.

DESCRIPTION

» HBV is most commonly transmitted horizontally in children <5 years of age. Vertical mother to child transmission and adult transmission, sexually or through a parenteral route, can also occur.
» Acute infection may be asymptomatic or present as acute hepatitis.
» A proportion of patients develop chronic hepatitis (defined as abnormalities listed in the table below persisting for >6 months), which can result in cirrhosis and hepatocellular carcinoma.
» It is essential to know the HIV status of all patients with chronic hepatitis B before considering therapy.
» Antiviral therapy is not indicated for acute hepatitis B infection.

There are 5 potential phases of chronic hepatitis B infection which determine the need for treatment:

Phase	Serology	Viral load (HBV DNA) IU/mL	ALT	Management *LoE:III*[px]
1. HBeAg-positive chronic HBV infection *Immune Tolerant*	» HBsAg positive » HBeAg positive	>20 000 (usually >200 000)	Normal	» Treatment not routinely needed, but should be followed up. » Treat only if on immunosuppressive therapy to prevent hepatitis B flares.
2. HBeAg-positive chronic hepatitis B *Immune clearance*	» HBsAg positive » HBeAg positive	>20 000	Elevated	» Treatment required.
3. HBeAg-negative chronic HBV infection *Immune Control*	» HBsAg positive » HBeAg negative	<2 000	Normal	» Treatment not routinely needed, but should be followed up. » Treat only if on immunosuppressive therapy to prevent hepatitis B flares.
4. HBeAg-negative chronic hepatitis B *Immune Escape*	» HBsAg positive » HBeAg negative	>2 000	Elevated	» Treatment required.
5. Occult hepatitis B	» HBsAg negative » HBsAb negative » HB IgG core Ab positive	<200	-	» No follow-up required. » Treat only if on immunosuppressive therapy to prevent hepatitis B flares.

HBsAg: hepatitis B surface antigen; *HBsAb:* hepatitis B surface antibody; *HBIG:* hepatitis B immunoglobulin

Table 1.2: Phases of Chronic Hepatitis B infection

Treat all patients with cirrhosis regardless of ALT level, HBeAg status and HBV viral load, to prevent hepatitis B flares that will lead to decompensation. Screen all categories of healthcare workers (HCW) at risk of contact with bodily fluids, including cleaning staff, home-based or family caregivers and vaccinate against hepatitis B if not immune (see Section 24.1.5: Management of close contacts of patients with hepatocellular carcinoma).

MEDICINE TREATMENT

<u>If eGFR > 50mL/min:</u>

- Tenofovir disoproxil fumarate (TDF), oral, 300 mg daily.

LoE:III[pxi]

<u>If eGFR 15-50mL/min (or on haemodialysis):</u>

- Tenofovir alafenamide (TAF), oral, 25 mg daily.

LoE:IIb[pxii]

Aims of treatment

HBeAg-positive disease:

» Sustained HBsAg loss off therapy, with/without the development of anti-HBs, **and**
» Suppression of HBV DNA to undetectable or low (<2000 IU/mL) levels, **and**
» Normalisation of ALT, **and**
» Sustained HBeAg loss and seroconversion to anti-HBe.

HBeAg-negative disease:

» Sustained HBsAg loss off therapy, with/without the development of anti-HBs, **and**
» Suppression of HBV DNA to undetectable or low (<2000 IU/mL), **and**
» Normalisation of ALT.

Monitoring whilst on tenofovir

Monitoring test	When to perform test
Serum phosphate and urine protein	Baseline
INR	Baseline, Week 4
Serum creatinine	All patients: Baseline Patients on TDF: Week 4, then 3 months, 6 months, and 12 months after initiation; then, every 12 months thereafter.
ALT	Baseline, Week 4, and every 12 weeks thereafter
FBC+Diff	Baseline, Week 4, and every 12 weeks thereafter
HBeAg and Anti-HBe	HBeAg-positive patients: Every 12 months
HBsAg	HBeAg-positive patients: HBsAg every 6 months after anti-HBe seroconversion HBeAg-negative patients: HBsAg every 6 months with persistently undetectable HBV DNA
HBV DNA levels	HBeAg-positive patients: 12 months after HBeAg seroconversion

Table 1.3: Monitoring tests whilst on tenofovir

Adapted from: National Department of Health, National guidelines for the management of viral hepatitis, 2019. Available at www.health.gov.za

Duration of tenofovir treatment:

» HBeAg-positive patients: discontinue 12 months after HBeAg seroconversion and in association with persistently normal ALT levels and undetectable HBV DNA levels.
» HBeAg-negative patients: Long-term therapy unless HBsAg

seroconversion is achieved.
» Cirrhotic patients: Lifelong treatment.

REFERRAL
Failure of, or contraindications to, tenofovir disoproxil fumarate and tenofovir alafenamide.

1.2.4.3 HEPATITIS B, CHRONIC (HIV CO-INFECTION)
See chapter 10: HIV and AIDS.

1.2.4.4 HEPATITIS C, CHRONIC
Consult a specialist.

1.2.5 LIVER ABSCESS, PYOGENIC
K75.0

DESCRIPTION
Focal bacterial infection, usually polymicrobial, of the liver with pus. Multiple abscesses are not uncommon.

GENERAL MEASURES
Drainage is essential in all cases. This should preferably be done percutaneously by inserting a catheter under ultrasound guidance.

MEDICINE TREATMENT
Empiric antibiotic therapy
- Amoxicillin/clavulanic acid, oral, 875/125 mg 12 hourly.

If unable to tolerate oral therapy:
- Amoxicillin/clavulanic acid, IV, 1.2 g 8 hourly.

Duration of antibiotic therapy is ill defined, but may need to be for as long as 12 weeks in cases of multiple abscesses. Continue until drainage is complete and CRP has returned to normal values. Monitoring response to therapy by ultrasound is not useful due to slow resolution of abscesses on imaging.

1.2.6 LIVER ABSCESS, AMOEBIC
A06.4

DESCRIPTION
Focal hepatic infection due to *E. histolytica*. Only about a third of cases have concomitant amoebic colitis. Diagnosis can be excluded if the serological test is negative. It is essential to exclude pyogenic infection (a diagnostic aspirate should be taken under ultrasound guidance in all cases where there is doubt).

GENERAL MEASURES
Drainage is recommended for abscesses that are large (i.e. >10 cm diameter), involve the left lobe, or are near the surface of the liver. Drainage can be achieved by percutaneous aspiration under ultrasound guidance.

MEDICINE TREATMENT
- Metronidazole, oral, 800 mg 8 hourly for 10 days. *LoE:III*[xxiii]

1.2.7 CHOLECYSTITIS, ACUTE AND CHOLANGITIS, ACUTE
K81.0/K83.0

GENERAL MEASURES
Surgical drainage/cholecystectomy according to indication and/or patient's condition.

MEDICINE TREATMENT
Acute cholecystitis
Mild and asymptomatic cases without risk factors may not require antibiotic treatment. If signs of infection present and/or risk factors for severe disease are present, such as:
» Elderly patients (>60 years of age)
» Co-morbid conditions
» Immune compromised

Acute cholecystitis and acute cholangitis
- Amoxicillin/clavulanic acid, oral, 875/125 mg 12 hourly.

<u>If unable to tolerate oral therapy:</u>
- Amoxicillin/clavulanic acid, IV, 1.2 g 8 hourly.

REFERRAL
» Clinical deterioration or failure to improve.
» Fistulae or perforation.
» Need for complicated surgery.

1.3 DIARRHOEA

1.3.1 CHOLERA
A00.0-1/A00.9
*Notifiable medical condition.

DESCRIPTION
Diarrhoea due to *Vibrio cholerae*, often in outbreaks.

GENERAL MEASURES

Rehydration is the cornerstone of management. Oral rehydration is preferred.

MEDICINE TREATMENT

- Oral rehydration solution (ORS) by mouth or nasogastric tube.
  - If enteral administration not possible, e.g., patient is vomiting, profoundly dehydrated, or stuporous:

IV treatment if unable to tolerate oral rehydration: *LoE:IVb*[xxiv]

- Ringers lactate, IV (preferred).

OR

- Sodium chloride, 0.9%, IV.

AND

Antibiotic therapy: *LoE:III*[xxv]

- Ciprofloxacin, oral, 1 g as a single dose.
  - Adjust antibiotic choice, according to the sensitivity of the isolate responsible for the local epidemic.

CAUTION

Dextrose 5% should not be used for fluid replacement in patients with cholera as it does not contain electrolytes, which are required to ensure adequate fluid resuscitation.

1.3.2 DYSENTERY (ACUTE INFLAMMATORY DIARRHOEA)

A02.0/A02.9/A03.0-3/A03.8-9/A04.2/A04.5/A04.8-9

DESCRIPTION

Diarrhoea with neutrophils, blood and/or mucus.

GENERAL MEASURES

» Rehydration is the cornerstone of management. This should be done with oral rehydration solution (ORS) unless the patient is vomiting or profoundly dehydrated.
» Perform a stool culture.

MEDICINE TREATMENT

CAUTION

Loperamide is contraindicated as it may result in toxic megacolon.

Antibiotic therapy

Consider in patients with signs of sepsis, severe cases, or significant underlying disease:

- Ceftriaxone, IV 1 g daily.

Switch antibiotic when clinically appropriate:
- Ciprofloxacin, oral, 500 mg 12 hourly, ideally based on culture and sensitivity if available.

For uncomplicated dysentery in patients with no co-morbidity:
- Ciprofloxacin, oral, 500 mg 12 hourly for 3 days.
  - Extend treatment duration to 7 days in patients with significant co-morbidity, e.g. immunocompromised patients.

REFERRAL
Persistent diarrhoea with blood and mucus for longer than 2 weeks.

1.3.3 DIARRHOEA, ACUTE NON-INFLAMMATORY
A04.1

DESCRIPTION
Diarrhoea without macroscopic blood or mucus, or neutrophils on microscopy. Common causes include viruses and enterotoxigenic strains of *E. coli*.
Note: Neutropenic patients may have inflammatory diarrhoea in the absence of neutrophils.

GENERAL MEASURES
Rehydration is the cornerstone of management. This should be done with oral rehydration solution (ORS) unless the patient is vomiting or profoundly dehydrated.

MEDICINE TREATMENT
- Loperamide, oral, 4 mg immediately, followed by 2 mg after each loose stool. *LoE:III*[xxvi]
  - Maximum dose: refer to dose table below

Weight band	Maximum daily dose (equivalent maximum number of 2 mg tablets per day)
34-39 kg	10 mg (5 tablets)
40-46 kg	12 mg (6 tablets)
47-53 kg	14 mg (7 tablets)
≥ 54 kg	16 mg (8 tablets)

1.3.4 CLOSTRIDUM DIFFICILE (*CLOSTRIDIOIDES DIFFICILE*) DIARRHOEA
A04.7
*Notifiable medical condition.

DESCRIPTION
» Diarrhoea caused by altered bowel flora due to antibiotic exposure.

» *Clostridium difficile* (*Clostridioides difficile*) infection may result in severe disease and/or the development of pseudomembranous colitis.
» Diagnosis is confirmed in the laboratory on a stool sample. Patients with unexplained and new-onset diarrhoea of more than 3 unformed stools in 24 hours should be tested. Repeat testing (within 7 days) is not recommended.

GENERAL MEASURES

» The most important aspect of management is discontinuation of antibiotics.
» Rehydration may be necessary. This should be done with oral rehydration solution (ORS) unless the patient is vomiting or profoundly dehydrated.
» Patients with known or suspected *Clostridium difficile* infection should be placed on contact precaution according to institutional infection control and prevention measures.
» Contact precautions should be maintained for at least 48 hours after diarrhoea has resolved.
» Healthcare workers and all close contacts should perform regular handwashing with soap and water. Alcohol-based hand sanitizer does not kill spores.

MEDICINE TREATMENT

CAUTION
Loperamide is contraindicated as it may result in toxic megacolon.

Mild to moderate infection
Laboratory results confirm toxigenic *Clostridium difficile* infection but diarrhoea does not settle on antibiotic withdrawal:

- Metronidazole, oral, 400 mg 8 hourly for 10 days.

Severe infection
Laboratory results confirm toxigenic *Clostridium difficile* infection, WCC >15 $x10^9$/L or serum creatinine >132 micromol/L, or other risk predictors of severity (immunodeficiency, intensive care admission, serious comorbidity, age >65 years of age).

- Vancomycin, oral, 125 mg 6 hourly (give parenteral formulation orally) for 10 days.

Fulminant infection
<u>If ileus or toxic megacolon or hypotension/shock:</u>

- Vancomycin, oral, 125 mg 6 hourly (give parenteral formulation orally) for 10 days.

AND

- Metronidazole, IV, 500 mg 8 hourly for 10 days.

Switch to oral metronidazole, if/when possible, to complete 10 day course.

Recurrence
If metronidazole was used during the first episode:
- Vancomycin, oral, 125 mg 6 hourly (give parenteral formulation orally) for 10 days.

If vancomycin was used during the first episode, administer oral vancomycin as a tapered and pulsed regimen:
- Vancomycin, oral, 125 mg (give parenteral formulation orally) as follows:
  - 6 hourly for 10 days, then
  - 12 hourly for 7 days, then
  - once daily for 7 days, then
  - every 2nd or 3rd day for 2 to 8 weeks.

LoE:I[xxvii]

REFERRAL
» Surgical consult should be obtained in all patients with complicated *Clostridium difficile* infection (e.g. bowel perforation, hypotension requiring vasopressor therapy, clinical signs of sepsis).
» Failure to improve on medical therapy after 5 days.

1.3.5 AMOEBIC DYSENTERY
A06.0-1

DESCRIPTION
Diarrhoea with blood and/or mucus due to *E. histolytica*. Organism must be demonstrated on a warm stool specimen with microscopy.

GENERAL MEASURES
» Rehydration may be necessary. This should be done with oral rehydration solution (ORS) unless the patient is vomiting or profoundly dehydrated.
» Surgery for bowel perforation.

MEDICINE TREATMENT
LoE:III[xxviii]
- Metronidazole, oral, 800 mg 8 hourly for 10 days.

CAUTION
Loperamide is contraindicated as it may result in toxic megacolon.

1.3.6 GIARDIASIS
A07.1

DESCRIPTION
Infection with the protozoan parasite, *G. lamblia* which colonises the proximal small intestine. Does not typically present with acute diarrhoea.

GENERAL MEASURES
Fluid and electrolyte replacement in severe diarrhoea.

MEDICINE TREATMENT

- Metronidazole, oral, 2 g daily for 3 days.

1.3.7 TYPHOID

See section 9.11: Typhoid fever.

1.3.8 BACTERIAL PERITONITIS

K65.0/K65.8-9

DESCRIPTION

Infection of the peritoneum, usually secondary to a surgical cause such as perforated bowel. In this setting polymicrobial infection with anaerobes, Gram-positive cocci, and Enterobacteriaceae are usually found. Primary or spontaneous bacterial peritonitis is much less common and usually complicates ascites in patients with portal hypertension. This is not usually polymicrobial but due generally to Enterobacteriaceae such as *E. coli*. Spontaneous bacterial peritonitis is often culture-negative but is diagnosed by ascitic neutrophil count >0.25 x 10^9/L (250 cells/mm^3).

GENERAL MEASURES

Secondary peritonitis

» Intravenous fluids and nasogastric suction.
» Prompt surgical intervention is essential.

MEDICINE TREATMENT

Empiric antibiotic therapy

For surgical causes of peritonitis:

- Amoxicillin/clavulanic acid, IV, 1.2 g 8 hourly.

As soon as patient can tolerate oral medication:

- Amoxicillin/clavulanic acid, oral, 875/125 mg 12 hourly.

For spontaneous bacterial peritonitis:

- Ceftriaxone, IV, 1 g daily.
  - Patients not responding to ceftriaxone after 48 hours, consult a specialist.

Switch to oral therapy when clinically appropriate according to culture or treat with:

- Ciprofloxacin, oral, 500 mg 12 hourly.
  - Total duration of therapy: 14 days.

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