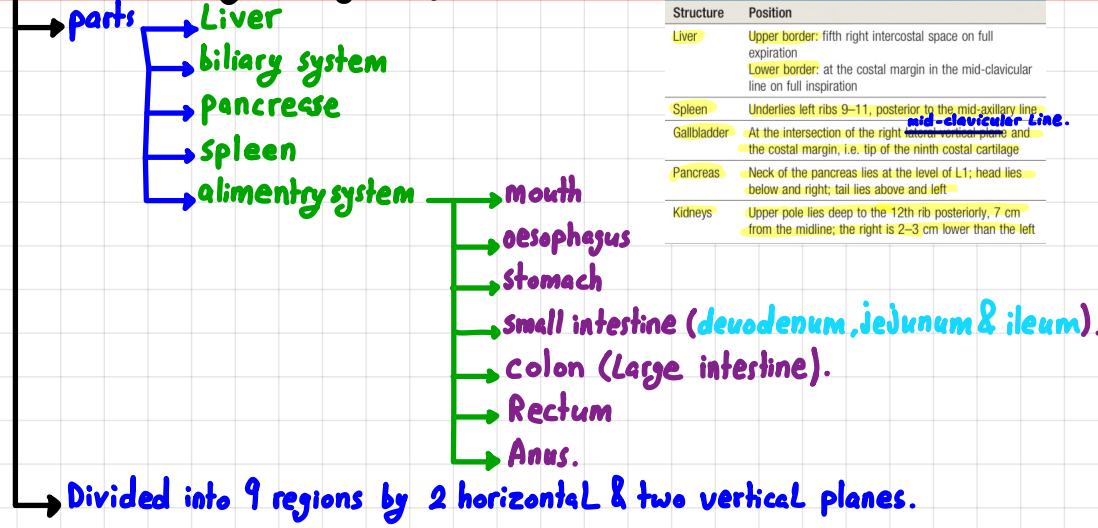


Made by : Mahmoud Alhalawani

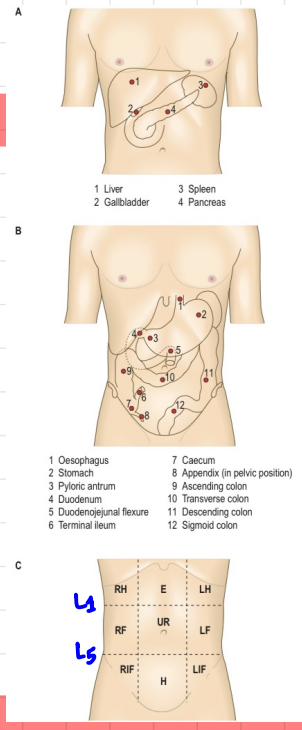
GIT

★ chapter 6 :- The gastrointestinal system.

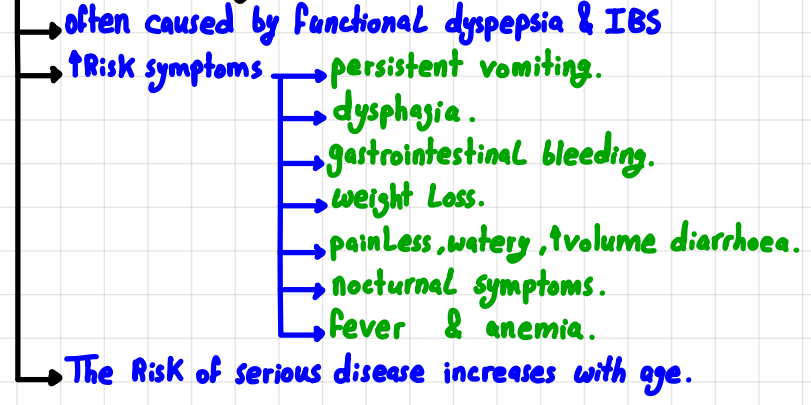
6.1:- Anatomy & physiology



6.1 Surface markings of the main non-alimentary tract abdominal organs	
Structure	Position
Liver	Upper border: fifth right intercostal space on full expiration Lower border: at the costal margin in the mid-clavicular line on full inspiration
Spleen	Underlies left ribs 9-11, posterior to the mid-axillary line.
Gallbladder	At the intersection of the right lateral vertical plane and the costal margin, i.e. tip of the ninth costal cartilage
Pancreas	Neck of the pancreas lies at the level of L1; head lies below and right; tail lies above and left
Kidneys	Upper pole lies deep to the 12th rib posteriorly, 7 cm from the midline; the right is 2-3 cm lower than the left



6.2:- The History



8.26 Gastrointestinal (GI) 'alarm features'

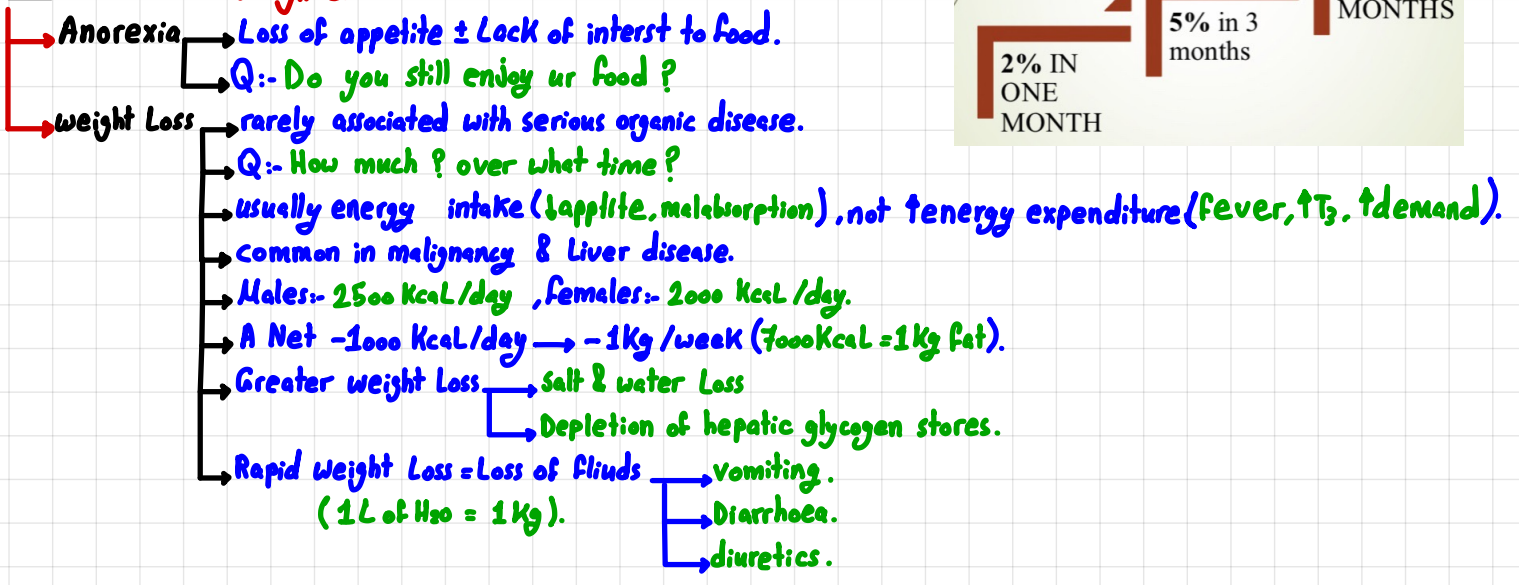
- Persistent vomiting
- Dysphagia
- Fever
- Weight loss
- GI bleeding
- Anaemia
- Painless, watery, high-volume diarrhoea
- Nocturnal symptoms disturbing sleep

6.2.1:- Common presenting symptoms.



1 Mouth symptoms

- Halitosis:- bad breath, gingival, dental or pharyngeal infection
- xerostomia:- dry mouth.
- Dysgeusia:- altered taste sensation.
- cacogeusia:- foul taste in the mouth.

2 Anorexia & weigh Loss



3 pain

- painful mouth
 - Sore Lips, tongue or buccal mucosa.
 - ↓: iron, folate, B₁₂, C.
 - Dermatological disorders: Lichen planus 
 - chemotherapy.
 - aphthous ulcers 
 - infective stomatitis.
 - mouth ulcers +: IBD, coeliac disease.

Heartburn & Reflux: Hot, burning retrosternal discomfort, GERD mostly.

- character: Burning.
- Radiation: Upwards.
- precipitating factors: Lying flat or bending forward (Food).
- Associated symptoms
 - waterbrush: fluid in mouth due reflux salivation as result of GERD or peptic ulcer.
 - acid taste in mouth: due to reflux/regurgitation.

Dyspepsia: pain or discomfort centred in upper abdomen (indigestion).

- Site
- character
- exacerbating & reliving factors: food & antacid, fatty & spicy meals.
- Associated symptoms: nausea, belching, bloating, premature satiety.
- classification
 - Reflux-Like: Heartburn.
 - ulcer-Like: epigastric pain relieved by food & antacids.
 - dysmotility Like: nausea, belching, bloating & premature satiety.
- peptic ulcer: dyspepsia worse with empty stomach & eased by eating.
- fat intolerance is common with all causes (gallbladder disease).

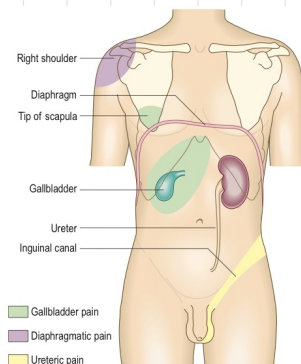
4 odynophagia

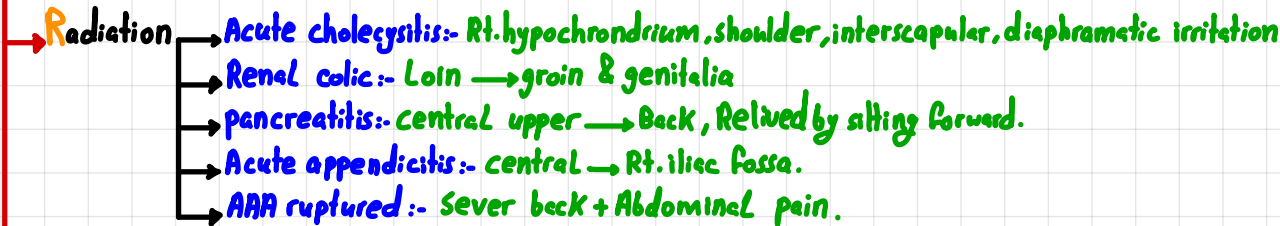
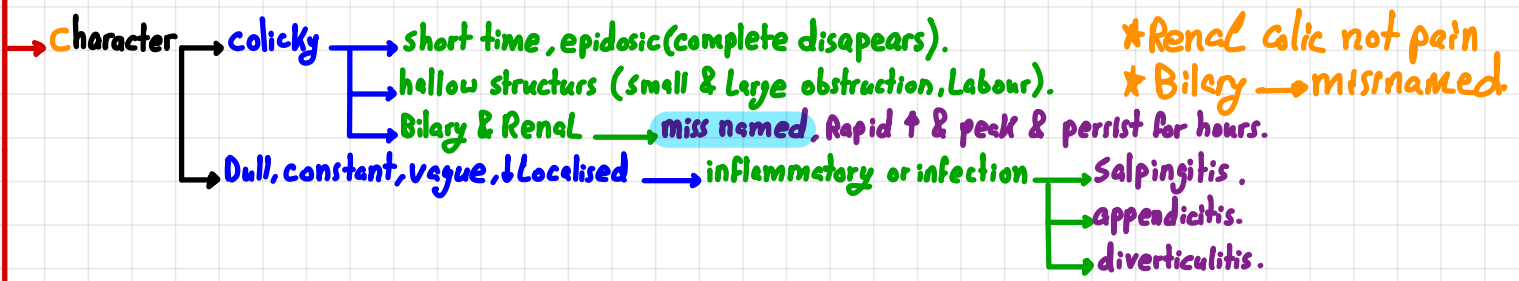
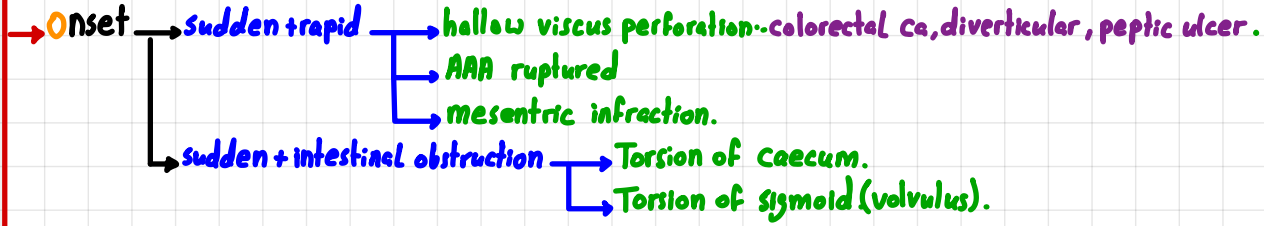
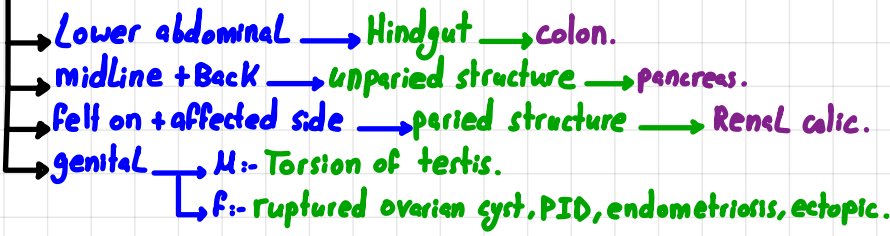
- pain on swallowing (hot liquids) ± dysphagia.
- indicate: oesophageal ulcers or esophagitis (from GERD or candidiasis).
- unlikely: oesophageal cancer (intact mucosal sensation).

5 Abdominal pain (SOCRATES)

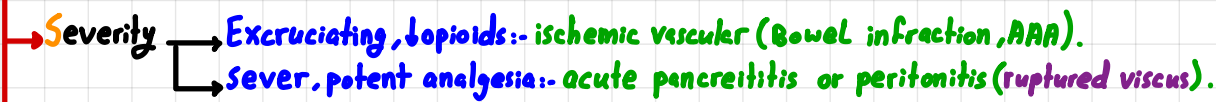
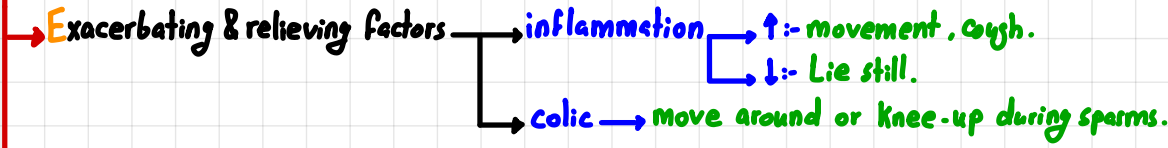
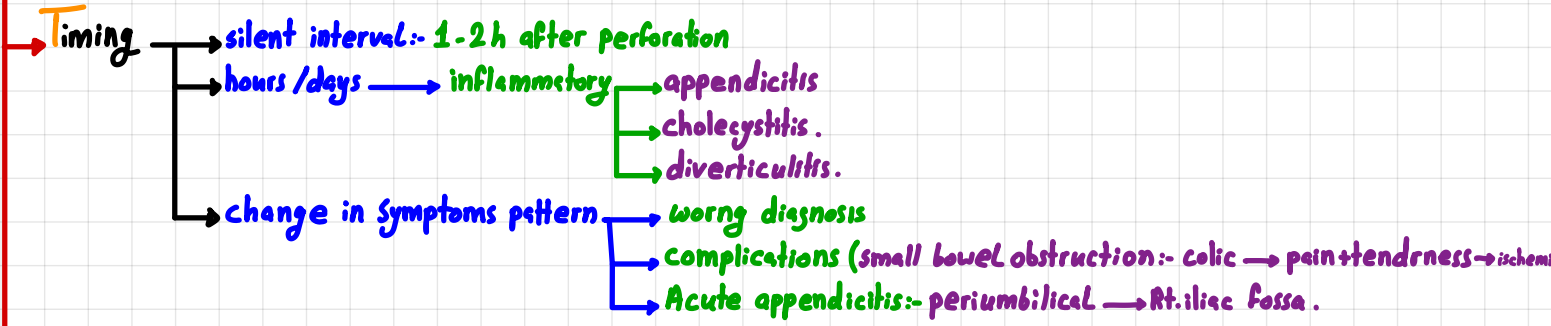
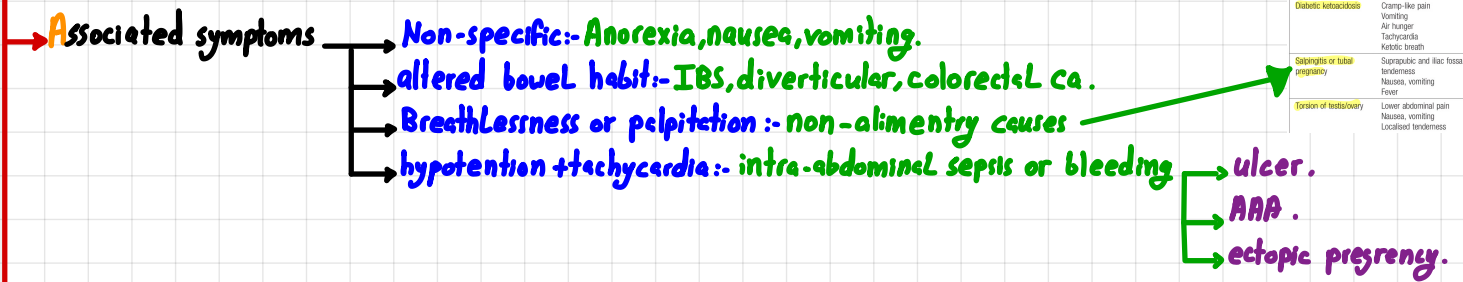
- Site
 - Visceral pain
 - Deep & poorly Localised in mid Line.
 - from
 - distention of hollow organs.
 - mesenteric traction.
 - excessive SM-contraction.
 - conducted via: symp. splanchnic nerves.
 - Somatic pain
 - Lateralised & Localised
 - from
 - parietal peritoneum.
 - Abdominal wall.
 - conducted via: intercostal nerves.
 - Above umbilicus (epigastric)
 - foregut structures
 - stomach.
 - pancreas.
 - Liver.
 - biliary system.
 - central Abdominal (periumbilical)
 - Midgut
 - small bowel.
 - appendix.

Disorder	Biliary pain	Acute pancreatitis	Renal colic
Site	Epigastrium	Epigastrium/right hypochondrium	Loin
Onset	Gradual	Rapidly increasing	Sudden
Character	Gravelling	Constant	Constant
Radiation	Into back	Below right scapula	Into back
Associated symptoms	Non-specific	Non-specific	Non-specific
Timing	Remission for weeks/months	Attacks can be enumerated	Attacks can be enumerated
Special tests	Alacal and especially when hungry	Unpredictable	After heavy drinking
Duration	1/2-2 hours	>24 hours	Usually a discrete episode following periods of dehydration 4-24 hours
Exacerbating factors	Stress, spicy foods, alcohol, non-steroidal anti-inflammatory drugs	Eating - unable to eat during bouts	Alcohol
Relieving factors	Food, antacids, vomiting	-	Eating - unable to eat during bouts
Severity	Mild to moderate	Severe	Severe





Disorder	Clinical features
Myocardial infarction	Epigastric pain without tenderness Aggravation (feeling of impending death) Hypotension Circus: arrhythmias
Dissecting aortic aneurysm	Tearing interscapular pain Agora aortic Hypotension Asymmetry of femoral pulses
Acute vertebral collapse	Lateralized pain restricting movement Tenderness overlying involved vertebra
Cord compression	Pain on percussion of thoracic spine Hypoesthesia of affected dermatome with sensory loss below Spiral cord signs
Floury	Lateralized pain on coughing Chest signs, e.g. pleural rub
Herpes zoster	Hypoesthesia in dermatomal distribution Vesicular eruption
Diabetic ketoacidosis	Crimp-like pain Numbness Air hunger Tachycardia Kussmaul breath
Salpingitis or tubal pregnancy	Suprapubic and iliac fossa pain, localized tenderness Nausea, vomiting Fever
Torsion of testis/ovary	Lower abdominal pain Nausea, vomiting Localized tenderness



Acute Abdomen → sudden severe abdominal pain

U.S. Typical clinical features in patients with an acute abdomen

Location	History	Examination
Right upper quadrant	Chills, fever, nausea, vomiting, pain that starts in the right upper quadrant	Right upper quadrant tenderness, a palpable mass in right upper quadrant
Left upper quadrant	Chills, fever, nausea, vomiting, pain that starts in the left upper quadrant	Left upper quadrant tenderness, a palpable mass in left upper quadrant
Right lower quadrant	Chills, fever, nausea, vomiting, pain that starts in the right lower quadrant	Right lower quadrant tenderness, a palpable mass in right lower quadrant
Left lower quadrant	Chills, fever, nausea, vomiting, pain that starts in the left lower quadrant	Left lower quadrant tenderness, a palpable mass in left lower quadrant
Periumbilical	Chills, fever, nausea, vomiting, pain that starts in the periumbilical region	Periumbilical tenderness, a palpable mass in periumbilical region
Suprapubic	Chills, fever, nausea, vomiting, pain that starts in the suprapubic region	Suprapubic tenderness, a palpable mass in suprapubic region
Flank	Chills, fever, nausea, vomiting, pain that starts in the flank region	Flank tenderness, a palpable mass in flank region
Epigastric	Chills, fever, nausea, vomiting, pain that starts in the epigastric region	Epigastric tenderness, a palpable mass in epigastric region
Subcostal	Chills, fever, nausea, vomiting, pain that starts in the subcostal region	Subcostal tenderness, a palpable mass in subcostal region
Lower back	Chills, fever, nausea, vomiting, pain that starts in the lower back region	Lower back tenderness, a palpable mass in lower back region
Upper back	Chills, fever, nausea, vomiting, pain that starts in the upper back region	Upper back tenderness, a palpable mass in upper back region
Neck	Chills, fever, nausea, vomiting, pain that starts in the neck region	Neck tenderness, a palpable mass in neck region
Head	Chills, fever, nausea, vomiting, pain that starts in the head region	Head tenderness, a palpable mass in head region

6 Dysphagia

Food or drinks sticks when they swallow, site of food sticking \neq site of obstruction.

- Q
- onset:- recent or longstanding.
 - nature:- intermittent or progressive.
 - difficulty in:- solid, liquids or both.
 - the LvL the patient feels food sticks at.
 - + regurgitation or reflux of food or fluids \rightarrow Zenker's diverticulum.
 - + pain (odynophagia), Heartburn or weight loss.

8.7 Causes of dysphagia	
Oral	<ul style="list-style-type: none"> Tonsillitis, glandular fever, pharyngitis, peritonsillar abscess Painful mouth ulcers
Neurological	<ul style="list-style-type: none"> Bulbar or pseudobulbar palsy Cerebrovascular accident
Neuromuscular	<ul style="list-style-type: none"> Achalasia Myasthenia gravis Pharyngeal pouch Oesophageal dysmotility
Mechanical	<ul style="list-style-type: none"> Oesophageal cancer Extrinsic compression, e.g. lung cancer Peptic oesophagitis Systemic sclerosis Other benign strictures, e.g. after prolonged nasogastric intubation

- confuse
- early satiety:- inability to complete a full meal (premature fullness)
 - Globus:- Lump in throat, not related to eating.

- Types
- Neurological:- bulbar or pseudobulbar palsy, worse in liquid + (choking, spluttering & fluid from nose).
 - Neuromuscular
 - oesophageal dysmotility:- spasms + central chest pain \rightarrow middle age, solids, \downarrow by liquid & sitting upright.
 - Achalasia:- Lower sphincter fails to relax \rightarrow dilation \rightarrow to respiration at night/Lies \rightarrow aspiration pneumonia.
 - pharyngeal pouch:- \rightarrow food stick or regurgitated \rightarrow chest infection & halitosis.
 - mechanical:- stricture, + \downarrow weight + \downarrow time + no reflux \rightarrow oesophageal ca.
 - Longstanding:- No \downarrow weight, Heartburn \rightarrow peptic stricture.

7 Nausea & vomiting

Nausea:- sensation of feeling sick

vomiting:- expulsion of gastric content via the mouth \rightarrow +pallor, sweating, Hyperventilation.

- Q
- meals/timing:- morning or evening.
 - associated symptoms:- dyspepsia, Abdominal pain, relieved by vomiting?
 - color:- bile-stained (green), blood-stained, faeculent.
 - weight loss?
 - patient's medications.

upper GI disorders \rightarrow Nausea + vomiting + Abdominal pain/discomfort.

Dyspepsia:- Nausea without vomiting.

peptic ulcer seldom:- painless vomiting.

pyloric stenosis:- projectile vomiting, \uparrow volume, not bile-stained.

- obstruction
- distal to pylorus:- bile-stained.
 - gastric outlet or proximal small bowel:- severe vomiting without pain.
 - distal small bowel or colonic:- faeculent vomiting of small bowel content.

The more distal the obstruction \rightarrow more accompanying abdominal distension & colic

peritonitis:- \downarrow volume but persistent.

gastroenteritis, cholecystitis, pancreatitis, hepatitis:- Common vomiting + Nausea.

Renal/biliary colic or MI:- severe pain \rightarrow vomiting.

Anorexia nervosa & bulimia nervosa

- eating disorders, undisclosed self-induced vomiting.
- bulimia \rightarrow \uparrow weight, anorexia nervosa \rightarrow \downarrow weight

non-GI causes

- Drugs:- Alcohol, opioids, theophyllines, digoxin, cytotoxic, Antidepressant.
- pregnancy.
- DKA.
- Renal or Liver failure.
- hypercalcaemia.
- Addison's disease.
- \uparrow intracranial pressure:- meningitis, Brain tumor.
- vestibular disorders:- Labyrinthitis & Ménière's disease

8 Wind & Flatulence.

- Belching, excessive or offensive flatus, abdominal distension & borborygmi.
- Belching
 - air swallowing (aerophagy), no medical significance.
 - anxiety, relative pain or discomfort, GERD.
- Flatus
 - Normally:- 200 - 2000mL.
 - mix of swallowed air + colonic bacterial fermentation of poorly absorbed carbs.
 - ↑:- Lactase deficiency & intestinal malabsorption.
- borborygmi
 - Audible bowel sound results from movement of fluid & gas along bowels.
 - ↑:- colicky discomfort, small bowel obstruction or dysmotility.

9 Abdominal distention

- causes (δF)
 - Fat:- obesity
 - Flatus:- pseudo-obstruction or bowel obstruction.
 - Faeces:- subacute obstruction or constipation.
 - Fluids:- Ascitis (peritoneal cavity fluid), tumors (ovarian), distended bladder.
 - Fetus
 - Functional bloating:- IBS



Fig. 6.6 Abdominal distention due to ascites.

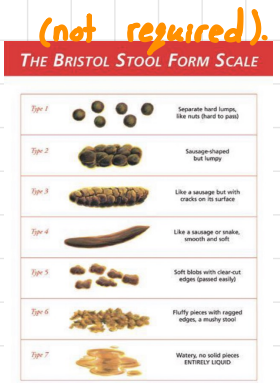
Total protein (g/dL)	SAAG (g/dL)	
	≥ 1.1	< 1.1
< 2.5	Cirrhosis	Nephrotic syndrome
≥ 2.5	CHF	Familial carcinomatosis
	Constrictive pericarditis	TB peritonitis
	Budd-Chiari syndrome	Pancreatic ascites
	Veno-occlusive disease	Chylous ascites

10 Altered bowel Habits (Diarrhoea & constipation).

- Diarrhoea
 - Normally:- 3/1 day - 1/3 days.
 - frequent passage of loose stools or more than 3 times / 1 day.
 - Q
 - onset:- Acute, chronic or intermittent.
 - frequency, volume, color, consistency (watery, unformed or semisolid), contents (RBC, mucus, pus).
 - Associated symptoms
 - urgency, incontinence, pain, vomiting, sleep disturbance.
 - tenesmus:- defecate sensstion + empty rectum.
 - recent travel? where?
 - Recent medications:- Antibiotics.
 - ↑ volume (>1L/day)
 - ↑ stool watery
 - Types
 - secretory:- inflammation (infection, IBD). Fasting → persist
 - osmotic
 - malabsorption
 - Drugs (Laxative abuse).
 - motility disorder (neuropathy DM). Fast → stops.
 - ↓ volume → IBS:- pain, bloating, dyspepsia (Rome IV criteria).
 - Types
 - Acute → Mostly infective gastroenteritis due to:- norovirus, salmonella, clostridium difficile.
 - chronic (>4w) → parasitic:- giardiasis, amoebiasis or cryptosporidiosis.
 - steatorrhoea
 - +fat malabsorption, greasy, pale, bulky & they float → Hard to flush away.
 - coeliac disease, chronic pancreatitis & cystic fibrosis.
 - Bloody → IBD, colonic ischemia or infective gastroenteritis.
 - colon cancer:- change in Bowel habit, Rt. side ≥ 50y patients.
 - Thyrotoxicosis:- secretory diarrhoea or steatorrhea + weight loss.

→ Constipation:- Less than 1 time/3 days.

- Q
 - onset:- Lifelong or recent.
 - frequency:- Bowels move/week & time straining at stool.
 - shape:- Bristol classification.
 - associated symptoms:- Abdominal pain, anal pain on defecation or rectal bleeding.
 - Drugs:- opiates, iron
- due to:- dietary fibre, impaired colonic motility, obstruction, impaired rectal sensation or anorectal dysfunction, IBS, colorectal ca, ↓T₃, ↑Ca, immobility (parkinson, stroke).



- **obstipation (Absolute constipation):** no flatus or Bowel movement → intestinal obstruction
- **Tenesmus:** rectal inflammation or tumor → +pain, vomiting & distension.
- **Fecal impaction:** overflow diarrhoea.
- **Anismus:** difficulty in emptying the rectum due to paradoxical contraction of puborectalis.

12 Bleeding

Haematemesis: vomiting of Blood.

- **Q**
 - **color:** Fresh red, dark brown, coffee grounds?
 - **onset:** intense retching or first vomit?
 - **History of:** dyspepsia, peptic ulcer, GI bleeding, Liver disease.
 - **Drugs:** Alcohol, NSAIDs, glucocorticoid ingestion.
- **first vomit blood:** gastro-oesophageal sphincter (oesophageal varices). **in Liver cirrhosis**
- **after several times:** Lower oesophageal mucosal tear → trauma → **Mallory-weiss syndrome.**

Criterion	Score
Age	
<60 years	0
60-79 years	1
>80 years	2
Shock	
None	0
Pulse >100 beats per minute and systolic blood pressure >100 mmHg	1
Systolic blood pressure <100 mmHg	2
Comorbidity	
None	0
Heart failure, ischaemic heart disease or other major illness	2
Renal failure or disseminated malignancy	3
Endoscopic findings	
Mallory-Weiss tear and no visible bleeding	0
All other diagnoses	1
Upper gastrointestinal malignancy	2
Major stigmata of recent haemorrhage	
None	0
Visible bleeding vessel/adherent clot	2
Total score	
Pre-endoscopy (maximum score = 7)	Score 4 = 14% mortality pre-endoscopy
Post-endoscopy (maximum score = 11)	Score 8+ = 25% mortality post-endoscopy

Melaena: 50mL blood, soft, tarry, shiny black stool + odour from: upper GI bleeding.

- **Distinguish from:** matt stools in oral iron or bismuth therapy.
- **causes**
 - peptic ulcer - most common.
 - ↑Alcohol: erosive gastritis.
 - **circumcised:** Mallory-weiss tear or bleeding esophago-gastric varices.
 - **ca & angiodysplasia (Dieulafoy Lesion).**
- **a profound upper GI bleed** → purple stool or fresh blood (rare).

hemocult: >20mL/day.

Rectal Bleeding: blood + stool.

- **Haematochezia** → Fresh rectal bleeding → anal canal, rectum or colon
- **sever upper GI bleeding:** blood pass unaltered.
- **Common causes**
 - haemorrhoids.
 - anal fissures: on toilet paper or pan.
 - **Complicated diverticular disease (most common).**
- **Q:** amount, mixed or fresh?

Causes of rectal bleeding

- Haemorrhoids
- Anal fissure
- Colorectal polyps
- Colorectal cancer
- Inflammatory bowel disease
- Ischaemic colitis
- Complicated diverticular disease
- Vascular malformation

13 Jaundice: yellowish discoloration of the skin, sclerae & mucus membrane caused by hyperbilirubinaemia.

bilirubin LVL: >50 μmol/L (2.92 mg/dL).

- **Q**
 - associated symptoms: abdominal pain, fever, weight loss, itching
 - **colour of stool:** normal or pale, **urine:** normal or dark.
 - alcohol intake
 - travel history & immunisations.
 - use of illicit or IV drugs.
 - sexual history.
 - previous blood transfusions.
 - recently prescribed drugs

- Appetite and weight change
- Abdominal pain, altered bowel habit
- Gastrointestinal bleeding
- Pruritus, dark urine, rigors
- Drug and alcohol history
- Past medical history (pancreatitis, biliary surgery)
- Previous jaundice or hepatitis
- Blood transfusions (hepatitis B or C)
- Family history, e.g. congenital spherocytosis, haemochromatosis
- Sexual and contact history (hepatitis B or C)
- Travel history and immunisations (hepatitis A)
- Skin tattooing (hepatitis B or C)

Increased bilirubin production	• Haemolysis (conjugated hyperbilirubinaemia)
Impaired bilirubin excretion	• Intrahepatic cholestasis: <ul style="list-style-type: none"> • Gilbert's syndrome • Drugs • Primary biliary cirrhosis
	• Extrahepatic cholestasis: <ul style="list-style-type: none"> • Gallstones • Cancer: pancreas, cholangiocarcinoma

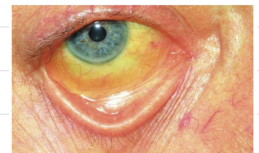


Fig. 6.2 Yellow sclera of jaundice.

→ **unconjugated bilirubin** → insoluble & binds with albumin, not filtered. → **acholuric jaundice:** urine normal color.

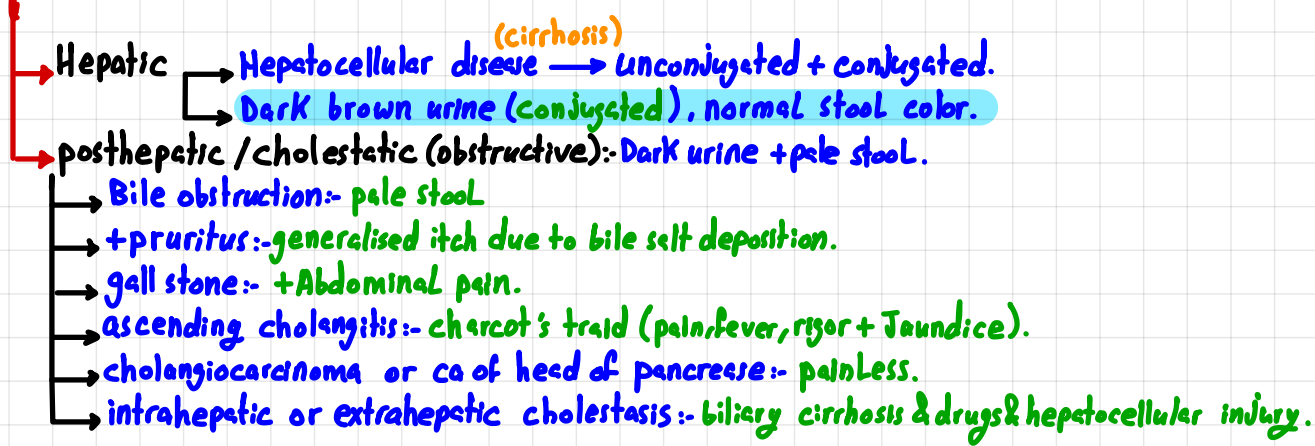
→ **conjugated bilirubin** → **bilirubin diglucuronide:** by Liver, green colour. → **urine is dark brown:** due to bilirubin diglucuronide. → **stercobilinogen:** by bacteria, brown stool, in urine → **urobilinogen:** colorless.

6.7 Urine and stool analysis in jaundice

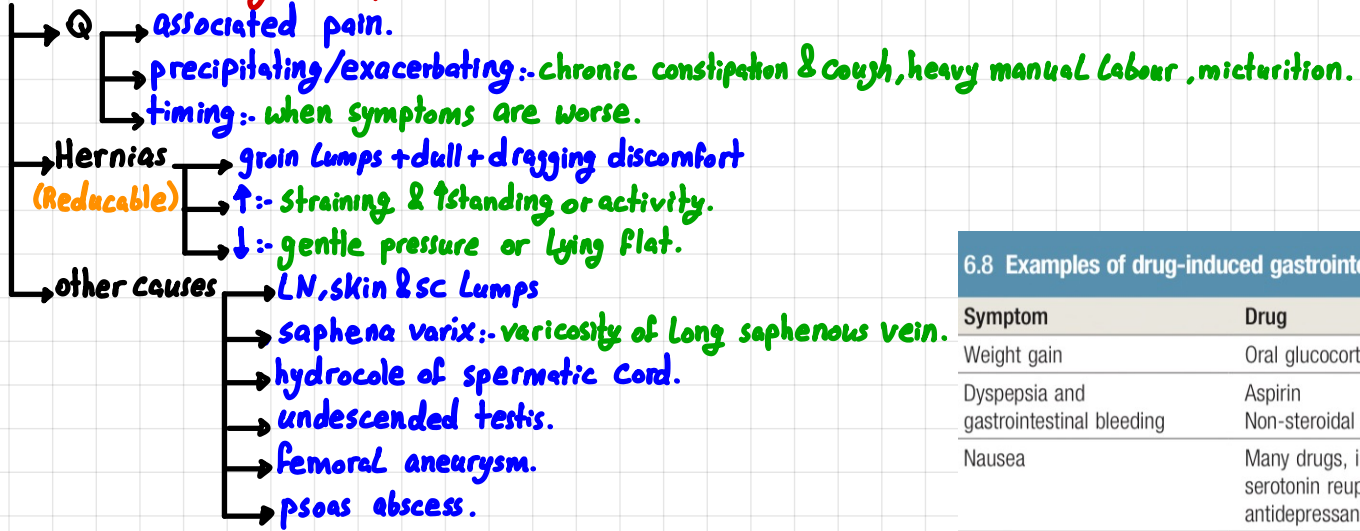
	Urine			Stools
	Colour	Bilirubin	Urobilinogen	Colour
Unconjugated	Normal	-	++++	Normal
Hepatocellular	Dark	++	++	Normal
Obstructive	Dark	++++	-	Pale

→ **prehepatic**

- **haemolytic:** anaemic pallor + jaundice → pale lemon complexion.
- normal stool & urine color.
- **Gilbert's syndrome:** unconjugated, normal liver enzymes, mild jaundice (<100 μmol/L). → ↑: prolonged fasting or intercurrent febrile illness.



14 Groin swelling & Lumps.



6.8 Examples of drug-induced gastrointestinal conditions

Symptom	Drug
Weight gain	Oral glucocorticoids
Dyspepsia and gastrointestinal bleeding	Aspirin Non-steroidal anti-inflammatory drugs
Nausea	Many drugs, including selective serotonin reuptake inhibitor antidepressants
Diarrhoea (pseudomembranous colitis)	Antibiotics Proton pump inhibitors
Constipation	Opioids
Jaundice: hepatitis	Paracetamol (overdose) Pyrazinamide Rifampicin Isoniazid
Jaundice: cholestatic	Flucloxacillin Chlorpromazine Co-amoxiclav
Liver fibrosis	Methotrexate

6.2.2 :- Past medical History

- Similar Dx:- pancreatitis, peptic ulcer, IBD.
- coexisting PVD:- HTN, HF, Afib → aneurism & mesenteric ischemia.
- thyroid disease:- primary biliary cirrhosis & Autoimmune hepatitis.
- NAFLD:- DM & obesity → cirrhosis.
- previous abdominal surgery.

6.2.3 :- Family history

- IBD:- crohn's disease or ulcerative colitis.
- colorectal cancer
- peptic ulcer:- H.pylori.
- Gilbert's syndrome:- AD.
- haemochromatosis & wilson's disease:- AR.
- Autoimmune thyroid disease:- primary biliary cirrhosis & Autoimmune hepatitis.
- DM:- NAFLD.

6.2.4 :- Social history

- Dietary history
- food intolerance:- painless diarrhoea (alcohol, lactose intolerance, coeliac disease).
- Alcohol consumption.
- Smoking:- esophageal & colorectal cancer, crohn's disease & peptic ulcer, ↓smoking in ulcerative colitis.
- stress:- IBS & dyspepsia.
- foreign travel:- Liver disease & diarrhoea.
- Risk factors for Liver disease:- IV drugs, tattoos, blood transfusion, sex habit, Hepatitis B & C.

6.3:- The physical examination

6.3.1:- General examination

- demeanour**
 - pain, orientation, cachexia (muscle wasting)
 - thin, well nourished or obese (truncal or general)
 - record height, weight, waist & BMI & vitals.
 - abdominal striae:- Asymmetric raised linear streaks:- weight, pregnancy, chushing.
 - Skin redundancy:- Loose skin folds:- Rapid weight loss



- Hands**
 - clubbing:- IBD, cirrhosis, celiac
 - Koilonychia:- IDA
 - Leukonychia:- ↓albumin:- CLD, melabsorption, proteinurea, malnutrition (Kwashiorkor)
 - muscle wasting
 - skin creases
 - Tar staining
 - flapping tremor
 - palmar erythema:- CLD
 - Dupuytren's contracture:- Alchol-Related.



- face**
 - pallor:- Anemia
 - Jaundice & pinguecula (small yellow fat pads)
 - spider nevi:- CLD, ↑Estrogen (↓Breakdown), women >5 normally.
 - sialadenitis/sialadenosis:- Bilateral, painless, Alchol. (parotid swelling).



- mouth, throat & tongue**
 - Aphthous ulcer:- celiac & IBD
 - Angular cheilitis:- painful cracks on mouth corner.
 - Atrophic glossitis:- pale smooth tongue
 - Beefy tongue:- ↓B12 & ↓folate. (Raw appearance).
 - Jaundice
 - Smell:- fetor hepaticus, uremia, melaena, Ketones.

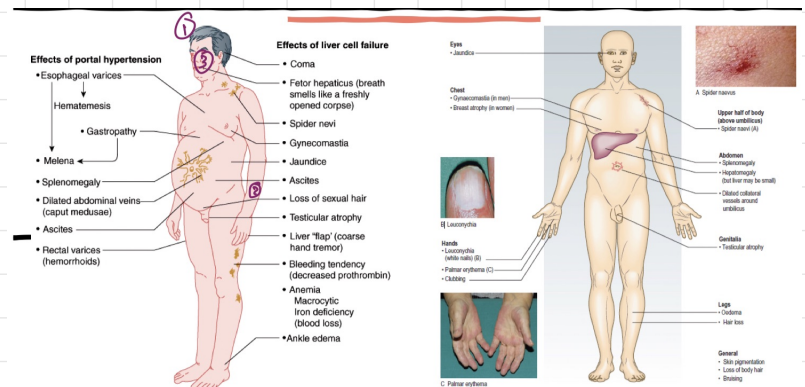


- Neck**
 - Troiser's sign:- enlargement of Lt. supraclavicular LN:- Gastric or pancreatic cancers.
 - Lymphoma:- widespread LAD + hepatosplenomegaly.



- Chest**
 - Gynecomastia (M):- ↓Breakdown of estrogen.
 - Breast atrophy (F)
 - Hair distribution:- CLD
 - Spider nvea
 - Scratch marks:- Bile acids.

- CLD**
 - palmar erythema & spider nevi
 - Gynecomastia, ↓hair, testicular atrophy.
 - Leukonychia
 - clubbing
 - Dupuytren's contracture
 - sailadenosis.



- Liver failure**
 - astrexia, fetor hepaticus (mousy odour).
 - altered mental state:- drowsiness, confusion, disorientation, coma.
 - Jaundice & acities.
 - neurological:- sparcity, extention limb, extensor planter response.

6.3.2:- Abdominal examination.

1 Inspection

General

- teeth, tongue, buccal mucosa :- mouth ulcers.
- Smell :- Alcohol, fetor hepaticus, uraemia, melaena, ketones.
- exposure :- xiphisternum → symphysis pubis (Nipples → mid thighs).
- position :- supine + 1-2 pillows (to relax abdominal muscles) + Legs & Arms stretched.

Foot of bed

- Contour
 - Flat
 - scaphoid
 - protuberant (SF).
- Symmetry → Abdominal swelling
 - Diffuse :- ascites or intestinal obstruction.
 - Localized :- urinary retention, mass, organo-mesally.
- Umbilicus
 - inverted :- normal
 - sunken :- obesity.
 - Flat or Everted :- Ascites
- Abdominal respiration :- Abs in peritonitis.

Rt. side

- Hair distribution
- Stomas . surgically opening btw skin & hollow viscus
 - Heostomy (Rt) → fluid
 - colostomy (Lt) → stool
- Scars
 - Small infraumbilical :- Laparoscopy.
 - puncture scar :- Laproscopic ports.
 - incisional hernia :- cough-impulse or Rise head.
- Skin Lesions
 - seborrheic warts :- Age, pink-brown-black
 - Haemangiomas (Campbell de Morgan) :- Age related.
 - note any :- striae, bruising or scratch marks.
- Bruising
 - Cullen's sign. → trauma, retroperitoneal bleeding.
 - Grey Turner sign. → trauma, retroperitoneal bleeding.
- Visible veins
 - prominent veins :- portal HTN, VC obstructions.
 - caput medusae :- portal HTN + umbilical varix (blue & distended)
 - tortuous vein :- IVC obstruction (Rare svc), Blood flows superiorly.
 - umbilical Hernia :- distended & everted, no vascular appearance, + cough impulse.
- Visible masses → incisional Hernia :- at scar site (Muscle defect).
- Visible pulsations.
- Visible peristalsis.

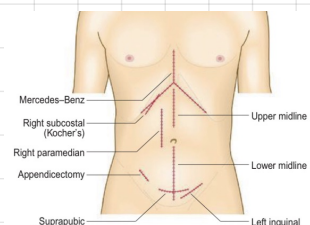


Fig. 6.10 Some abdominal incisions. The midline and oblique incisions avoid damage to innervation of the abdominal musculature and later development of incisional hernias. These incisions have been widely superseded by laparoscopic surgery, however.

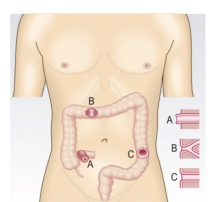
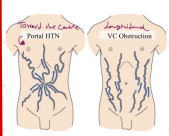


Fig. 6.11 Surgical stomas. [A] An ileostomy is usually in the right iliac fossa and is formed as a spout. [B] A loop colostomy is created to defunction the distal bowel temporarily. It is usually in the transverse colon and has afferent and efferent limbs. [C] A colostomy may be terminal: that is, resected distal bowel. It is usually flush and in the left iliac fossa.



2 monovers

- Cough-impulse
 - Hernia
 - ↑ pain in peritonitis.
 - Dunphy sign - pain elicited after coughing.
- Rise Head → Divercation of Recti (Rectus abdominis Diastasis).



2 palpation & percussion

superficial palpation

- gain patient confidence.
- superficial masses.
- superficial tenderness.
- Guarding.

Deep palpation

- Deep masses.
- Deep tenderness.
- Rebound tenderness (intra-abdominal dx). & Murphy's sign (Acute cholecystitis).

organo-mesally :- Liver, spleen & Kidneys.

palpable masses

- Describe any mass:- site, size, surface, consistency.
- Lifting head
 - palpable → abdominal wall mass.
 - not palpable → intra-abdominal mass.
- Abnormal vs normal :- by site & palpable feces.
- pulsatile mass in upper abdomen
 - thin
 - gastric or pancreatic tumor
 - Aortic Aneurysm.
- sister Mary Joseph's nodule:- hard sc nodules in metastatic Ca (gastric or Aortic).

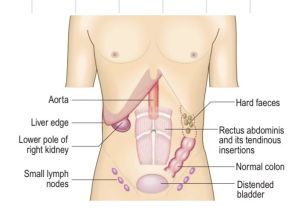
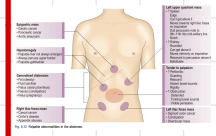


Fig. 6.13 Palpable masses that may be physiological rather than pathological.

Tenderness

- generalised peritonitis:- several area, ↓ pressure.
- anxiety:- sever pain + no tenderness in deep palpation.
- Voluntary guarding:- voluntary contraction of Abdominal muscles when palpation → pain.
- involuntary guarding:- reflex contraction in generalised peritonitis + board-like rigidity.
- Site
 - epigastrium:- peptic ulcer.
 - Rt. hypochondrium:- cholecystitis.
 - Lt. iliac fossa:- diverticulitis.
 - Rt. iliac fossa:- appendicitis or crohn's ileitis.
- Rebound tenderness:- cough or percuss → remove hand → pain → intra-abdominal disease.
- Masked by:- glucocorticoids, immunosuppressant, ant:-inflammatory, alcohol intoxication, ↓conscious



6.9 Specific signs in the 'acute abdomen'		
Sign	Disease associations	Examination
Murphy's	Acute cholecystitis: Sensitivity 50-97% Specificity 50-80%	As the patient takes a deep breath in, gently palpate in the right upper quadrant of the abdomen; the acutely inflamed gallbladder contacts the examining fingers, evoking pain with the arrest of inspiration
Rooving's	Acute appendicitis: Sensitivity 20-70% Specificity 40-96%	Palpation in the left iliac fossa produces pain in the right iliac fossa
Iliopsoas	Retroileal appendicitis, iliopsoas abscess, perinephric abscess	Ask the patient to flex their thigh against the resistance of your hand; a painful response indicates an inflammatory process involving the right psoas muscle
Grey Turner's and Cullen's	Haemorrhagic pancreatitis, aortic rupture and ruptured ectopic pregnancy (see Fig. 6.25)	Bleeding into the falciform ligament; bruising develops around the umbilicus (Cullen) or in the loins (Grey Turner)

Enlarged organs

- in Deep inspiration:- Liver, GB, spleen, Kidney
- Don't palpate close to costal margin → miss Liver & spleen edge.

Liver (Hepatomegaly)

- Rt. iliac fossa → 1 cm/inspiration → costal cartilage/Liver edge
- Comment on:- size, surface, Edge, consistency.
- Liver span - percuss from 2nd intercostal → Dullness.
- normally:- dull, Rt. 5th rib → costal margin.
- enlarged
 - Liver cirrhosis (shrunken in advanced).
 - Fatty Liver (hepatic steatosis).
 - metastatic tumor:- hard & irregular.
 - enlarged Lt. Lobe:- epigastrium or Lt. hypochondrium.
 - Rt. HF:- soft & tender.
 - Tricuspid regurgitation:- pulsatile Liver.
- Bruit
 - transmitted murmur (MC).
 - acute Alcoholic hepatitis.
 - hepatocellular cancer.
 - arteriovenous malformation
- encephalopathy → Liver failure
- displaced → hyperinflated Lungs
- interposition of transverse colon between Liver & diaphragm → chilaiditi's sign

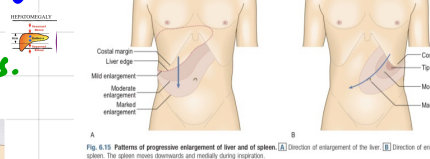


Fig. 6.10 Patterns of progressive enlargement of liver and of spleen. (A) Direction of enlargement of the liver; (B) Direction of enlargement of the spleen. The green marks demonstrate and readily during inspiration.

6.10 Causes of hepatomegaly	
Chronic parenchymal liver disease	<ul style="list-style-type: none"> Alcoholic liver disease Hepatic steatosis Autoimmune hepatitis Viral hepatitis Primary biliary cirrhosis
Malignancy	<ul style="list-style-type: none"> Primary hepatocellular cancer Secondary metastatic cancer
Right heart failure	<ul style="list-style-type: none"> Myelofibrosis Polycythaemia
Haematological disorders	<ul style="list-style-type: none"> Lymphoma Leukaemia
Rarities	<ul style="list-style-type: none"> Amyloidosis Budd-Chiari syndrome Sarcoidosis Glycogen storage disorders

6.11 Grading of hepatic encephalopathy (West Haven)	
Stage	State of consciousness
0	No change in personality or behaviour No asterix (flapping tremor)
1	Impaired concentration and attention span Sleep disturbance, slurred speech Euphoria or depression Asterix present
2	Lethargy, drowsiness, apathy or aggression Disorientation, inappropriate behaviour, slurred speech
3	Confusion and disorientation, bizarre behaviour Drowsiness or stupor Asterix equally absent
4	Comatose with no response to voice commands Minimal or absent response to painful stimuli

gall bladder

- Rt. upper pain + Murphy's sign:- acute cholecystitis.
- globular shape :- palpable distention
 - obstruction of cystic duct.
 - obstruction of common bile duct + patent cystic duct.
- +Jaundice:- palpable → extrahepatic obstruction.
- gall stones (Courvoisier sign) → pancreatic ca.
- fibrosis of gallbladder wall:- tender but impalpable.

splenomegally → x3 size → palpable, Rt. iliac fossa → Lt. Costal margin + 9th/10th/11th percussion

4.12 Differentiating a palpable spleen from the left kidney		
Characterising feature	Spleen	Kidney
Mass is smooth and regular in shape	Yes	No
Mass descends in inspiration	Yes, travels horizontally and diagonally	Yes, moves deep and vertically
Ability to feel deep to the mass	Yes	No
Flippable (rests on the costal surface)	No	Yes
Visible masses on capsule	No	Sometimes, e.g. angiomyelolipoma
Pericapsule resistant and the mass	No	Sometimes
Mass extends beyond the ribcage	Sometimes	No (except with hepatosplenomegaly)

causes → myeloproliferative disease.
 → haematological malignancy.
 → malaria.



6.13 Causes of splenomegaly	
Haematological disorders	<ul style="list-style-type: none"> Lymphoma and lymphatic leukaemias Myeloproliferative diseases, polycythaemia rubra vera and myelofibrosis
Portal hypertension	
Infections	<ul style="list-style-type: none"> Glandular fever Malaria, kala-azar (leishmaniasis) Bacterial endocarditis Brucellosis, tuberculosis, salmonellosis
Rheumatological conditions	<ul style="list-style-type: none"> Rheumatoid arthritis (Felly's syndrome) Systemic lupus erythematosus
Rarities	<ul style="list-style-type: none"> Sarcoidosis Amyloidosis Glycogen storage disorders

• Felty syndrome (SANTA)

Splenomegaly
 Anemia
 Neutropenia
 Thrombocytopenia
 Arthritis (Rheumatoid).

myeloproliferative disease.
 Lymphoma.
 cirrhosis + portal HTN.
 amyloidosis.
 Sarcoidosis.
 glycogen storage disease.

6.14 Causes of ascites	
Diagnosis	Comment
Common	
Hepatic cirrhosis with portal hypertension	Transudate
Intra-abdominal malignancy with peritoneal spread	Exudate, cytology may be positive
Uncommon	
Hepatic vein occlusion (Budd-Chiari syndrome)	Transudate in acute phase
Constrictive pericarditis and right heart failure	Check jugular venous pressure and listen for pericardial rub
Hypoproteinaemia (nephrotic syndrome, protein-losing enteropathy)	Transudate
Tuberculous peritonitis	Low glucose content
Pancreatitis, pancreatic duct disruption	Very high amylase content

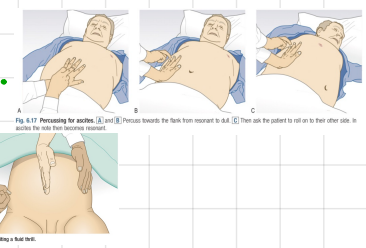
Kidneys

Bimanual exam.
 Ballotement.
 Renal angle tenderness.

Ascites:- accumulation of intraperitoneal fluid.

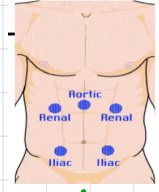
shifting dullness (mild-moderate) → midline → flanks (resonance & dull).
 → mark dull site & ask the patient to turn to opposite side.
 → pause 1 sec → percuss → resonant → ascites.

fluid thrill (massive) → Lt. palm → Lt. abdomen, flick finger Rt. hand → Rt. abdomen.
 → ripple on Lt → edge in midline → ripple → gross ascites



3 Auscultation

8 places → 5 Arteries:- Aorta, 2 Renal, 2 iliac
 → 2 organs:- Liver & spleen
 → Bowel sound:- Rt. iliac fossa.



succussion splash: half-filled water bottle + shaken, Delayed gastric emptying → pyloric stenosis.

Bowel sounds → Normal:- gurgling noises every 5-10 sec.
 → Abs:- paralytic ileus or peritonitis.
 → ↑ frequency & volume + ↑ pitched:- intestinal obstruction.

Bruit → Liver (↑).
 → for the 5 Arteries ↑:- atheromatous or aneurysmal aorta, SMA stenosis.

Friction Rubs → Liver:- perihepatitis.
 → spleen:- perisplenitis.

• The End

External genitalia.
 Hernia orifices
 Digital rectal examination
 Back (sacral edema)
 Lower Limb → edema.
 → Loss of Hair.
 → pyoderma gangrenosum:- IBD.
 → Auscultate over femoral A.



6.16 Causes of abnormal stool appearance	
Stool appearance	Cause
Abnormally pale	Biliary obstruction
Pale and greasy	Steatorrhea
Black and tarry (melaena)	Bleeding from the upper gastrointestinal tract
Grey/black	Oral iron or bismuth therapy
Silvery	Steatorrhea plus upper gastrointestinal bleeding, e.g. pancreatic cancer
Fresh blood in or on stool	Large bowel, rectal or anal bleeding
Stool mixed with pus	Infective colitis or inflammatory bowel disease
Rice-water stool (watery with mucus and cell debris)	Cholera

(Hernias & Rectal examination, not mentioned in slides).

6.3.3 :- Hernias

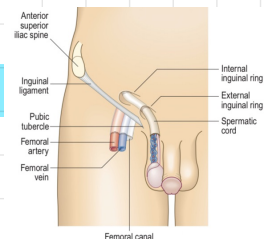


Fig. 6.19 Anatomy of the inguinal canal and femoral sheath.

- **Anatomy**
 - **inguinal canal**
 - **pubic tubercle** → Anterior superior iliac spine
 - **internal ring** :- mid-inguinal point.
 - **external ring** :- pubic tubercle.
 - **femoral canal** → Below inguinal ligament & Lateral to pubic tubercle.
- **Common sites**
 - **opening of anterior wall** :- inguinal, femoral & obturator canals, umbilicus & oesophageal hiatus.
 - **site of weakness** :- previous surgery incision.
- **External hernia**
 - abnormal protrusion of bowel ± omentum from abdominal cavity.
 - ↑ :- ↑ abdominal pressure (stand, cough, straining at stool).
- **internal hernia**
 - occurs through defects
 - mesentery.
 - retroperitoneal space.
 - not visible.
- **Cough impulse** :- impulse can be felt in hernia during coughing.
- **Examination**
 - groin with standing upright
 - inspect canals & scrotum for lumps or bulges.
 - cough → impulse
 - palpate the external inguinal ring → muscle defect
 - Lie down → ↓ hernia.
 - press 2 fingers at mid-inguinal point → cough or stand
 - reappears :- **direct**.
 - don't reappear :- **indirect**.
- **indirect inguinal**
 - internal ring → canal → external ring → scrotum.
 - 85% of all hernias, younger men.
- **direct inguinal**
 - muscle weakness in posterior wall of inguinal canal.
 - more common in age.
- **femoral**
 - femoral ring → femoral canal
 - palpable below the inguinal ligament, lateral to pubic tubercle.
- **reducible** :- content can be returned to abdominal cavity.
- **Abdominal**
 - covering sac of peritoneum
 - neck of hernia → compress contents
 - + bowels → obstruction.
- **strangulated**
 - + Blood supply to hernia contents.
 - tense, tender, no cough impulse.
 - → bowel obstruction → sepsis & shock.
 - untreated :- **Bowel infarction & peritonitis.**



palpable above & medial to pubic tubercle.

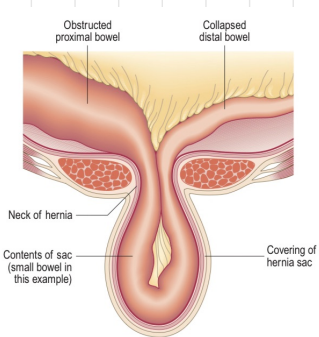


Fig. 6.21 Hernia: anatomical structure.

6.3.4: Rectal examination

- Anatomy**
- Rectum**: empty smooth walled, coccyx & sacrum lying posteriorly.
 - M**: anterior to rectum from below upwards → membranous urethra.
 - prostate**: Base of bladder, smooth & firm.
 - f**: vagina & cervix anteriorly.
 - upper end of anal canal**: puborectalis M.

anxious patient: spasms in external anal sphincter.

- anal fistula**
- Spasms + pain
 - Local anesthetic 10min before examination.

- Examination**
- position** → Lt. Lateral position + gloves + light source
 - Lesions**: haemorrhoids, fissure & fistulae.
 - Lubricate your index finger → push gently.
 - anal spasm → Breathe & relax → anaesthetic.
 - Ask to squeeze ur finger → sphincter weakness.
 - palpate around rectum, cervix & prostate.
 - feces → repeat the exam.
 - slowly withdraw → stool color, blood & mucus?

- Haemorrhoids**
- piles, congested venous plexuses around anal canal.
 - palpable if thrombosed.

chronic constipation: faeces → palpable, moveable & indented.

retroverted uterus + normal cervix: palpable, vagina tampon confusing.

Lower rectum ca: palpable as a mucosal irregularity.

obstructing ca of upper rectum: ballooning of empty rectal activity.

metastases or colonic tumors in pelvis: mistaken by faeces.

pelvic peritonitis: lateralised tenderness.

Gynaecological malignancy: frozen pelvis (hard, rigid).

Benign prostatic hyperplasia: palpable symmetrical enlargement (not Median Lobe).

prostate ca: Hard, irregular or asymmetrical, no palpable median groove.

prostatitis or prostatic abscess: Tenderness + change in gland consistency.

Hypogonadism: abnormally small.

6.15 Indications for rectal examination

Alimentary

- Suspected appendicitis, pelvic abscess, peritonitis, lower abdominal pain
- Diarrhoea, constipation, tenesmus or anorectal pain
- Rectal bleeding or iron deficiency anaemia
- Unexplained weight loss
- Bimanual examination of lower abdominal mass for diagnosis or staging
- Malignancies of unknown origin

Genitourinary

- Assessment of prostate in prostatism or suspected prostatic cancer
- Dysuria, frequency, haematuria, epididymo-orchitis
- Replacement for vaginal examination when this would be inappropriate

Miscellaneous

- Unexplained bone pain, backache or lumbosacral nerve root pain
- Pyrexia of unknown origin
- Abdominal, pelvic or spinal trauma

5.15 Causes of abnormal stool appearance	
Stool appearance	Cause
Abnormally pale	Biliary obstruction
Pain and greasy	Steatorrhea
Black and tarry (melena)	Bleeding from the upper gastrointestinal tract
Grey/black	Oral iron or bismuth therapy
Slimy	Steatorrhea also: acute gastrointestinal bleeding, e.g. pancreatic cancer
Fresh blood in or on stool	Large bowel, rectal or anal bleeding
Stool mixed with pus	Infective colitis or inflammatory bowel disease
No water stool (stercoraria)	Cholera

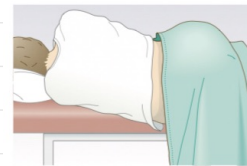


Fig. 6.22 The correct position of the patient before a rectal examination.

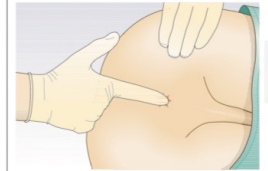


Fig. 6.23 Rectal examination. The correct method for inserting your index finger in rectal examination.

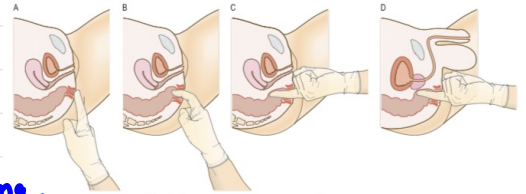


Fig. 6.24 Examination of the rectum. (A) and (B) Insert your finger, then rotate your hand. (C) The most prominent feature in the female is the cervix. (D) The most prominent feature in the male is the prostate.

6.3.5: Proctoscopy

visual examination of anal canal

- Examination**
- Lt. Lateral position, insert lubricated proctoscope + obturator
 - remove obturator → examine → fissures, pain.
 - Strain down → slowly withdraw → rectal prolapse, haemorrhoids.

Dx: haemorrhoids, anal fissures & rectal prolapse.

Rectal mucosa: Buccal mucosa + prominent submucosal veins.

haemorrhoids: distend with blood → prolapse.

rectal prolapse: degree of protrusion is > 3-4cm.

6.4: investigations

(Box 4.7, page 113 & 114).

Made by : Mahmoud Alhalawani

The Renal System

* chapter 12:-The Renal system

• 12.1:- Anatomy & physiology.

- Kidneys**
 - kidneys lie posteriorly in abdomen (T12-L3), 11-14 cm.
 - Rt kidney lower 1.5cm (**Liver**)
 - Liver & spleen lie anterior to kidneys.
 - moves downward during inspiration.
 - 25% of cardiac output.
 - 1 million nephrons
 - Glomerulus
 - PCT
 - Loop of Henle
 - DCT
 - collecting duct → calyces → pelvis.
 - functions
 - excretion of waste products :- urea & creatine.
 - maintenance of salt, water & electrolyte.
 - RAAS system → BP control.
 - endocrine :- erythropoiesis & vit D metabolism.
 - nerves for capsule & ureter:- T10-12 / L1 (slides → T8-L2).

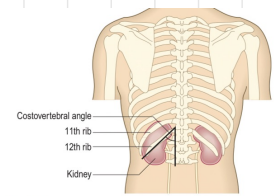


Fig. 12.1 The surface anatomy of the kidneys from the back.

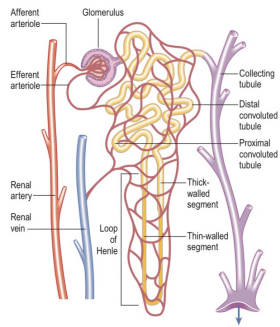


Fig. 12.2 A single nephron.

- Bladder**
 - reservoir, fills → ovoid & rise the pelvis → umbilicus
 - Detrusor = Layers of SM, parasympathetic control → micturition.
 - Micturition:- 250-350 mL in bladder.

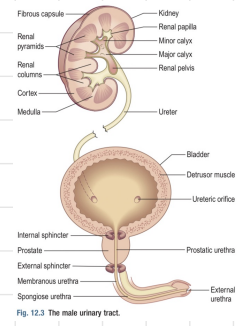
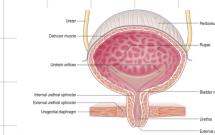


Fig. 12.3 The male urinary tract.

- urethra**
 - M: bladder → tip of penis
 - prostatic
 - membranous
 - spongy & bulbar
 - F:- shorter, external meatus anterior to vaginal orifice & behind the clitoris.
 - 2 sphincters
 - internal:- bladder neck, involuntary.
 - external:- surrounds membranous urethra, voluntary, pudendal nerves (S2-u).

• 12.2:- The history

- Renal disease may be asymptomatic + non-specific symptoms (Lethargy or Breathlessness).
- growth retardation:- child + CKD.

• 12.2.1:- Common presenting symptoms

- Dysuria**
 - pain or discomfort during urination, burning sensation
 - causes
 - UTI
 - urethritis
 - acute prostatitis = + perineal/rectal pain.
 - associated :- urinary frequency & urgency & suprapubic discomfort (cystitis).
 - Q
 - systemic fever & suprapubic discomfort → pyelonephritis > 38°C, rigors, vomiting, flank pain.
 - symptoms of obstruction:- slow flow, hesitancy, incomplete emptying, dribbling, nocturia.
 - History of sexual contacts.

- Loin pain**

- causes
 - Non-Renal
 - Mucoskeletal:- muscle spasm, trauma.
 - GI disease
 - gynecological disease:- ectopic pregnancy, ovarian torsion.
 - Vascular :- ruptured AAA

Renal or ureteric colic:

- Site - unilateral, in the renal angle and flank area
- Onset - sudden
- Character - usually very severe may vary cyclically in intensity mainly it is colicky
- Radiation - may radiate to the iliac fossa, the groin and the genitalia/ testes
- Associated features - patient is usually restless and nauseated, and often vomits
- Timing - mainly colicky.
- Exacerbating/relieving factors - analgesia
- Severity - often very severe.

Urinary track disease → Acute obstruction:- colic (stones) or Blod clot (Bleeding).
 → paranchymal:- pyelonephritis (inflammation, dull, constant).

Q → Location:- in Loin, radiates into testicle or Labium?
 → fever, rigor, dysurea → infection.
 → previous episodes of Loin pain?

3 Voiding symptoms:- Lower urinary tract symptom.

Storage Symptom

→ Frequency:- ↑pass of urine than usual, >7 times/day.
 → urgency:- sudden strong need to pass urine → overactivity of detrusor M.
 → abnormal stretch receptor activity (sensory urgency).
 → Nocturia:- waking to void between sleeping periods.
 → Causes → bladder, prostate & urethral problems → Lower UTI
 → neurological → multiple sclerosis. → tumor
 → prostatic enlargement obstruction.

9.2 Features of bladder outlet obstruction due to prostatic hyperplasia

- Slow flow
- Hesitancy
- Incomplete emptying (the need to pass urine again within a few minutes of micturition)
- Dribbling after micturition
- Frequency and nocturia (due to incomplete bladder emptying)
- A palpable bladder

Voiding symptoms.

→ Hesitancy:- difficulty or delay in initiating urine flow.
 → post void Dribbling & incomplete:- bladder neck obstruction.
 → abnormal detrusor function.
 → poor stream → M:- >40y → prostatic Enlargement obstruction.
 → f:- urethral obstruction (stenosis) or genital prolapse.

9.6 Causes of urinary incontinence

- Pelvic floor weakness following childbirth
- Pelvic surgery or radiotherapy
- Detrusor overactivity
- Bladder outlet obstruction
- Urinary tract infection
- Degenerative brain diseases and stroke
- Neurological diseases, e.g. multiple sclerosis
- Spinal cord damage

incontinence:- involuntary loss of urine.

→ Urge incontinence:- by urgency.
 → Stress incontinence:- ↑intra-abdominal pressure → physical exertion.
 → Sneezing or coughing.
 → childbirth → weak pelvic floor.
 → Mixed incontinence:- urge + stress.
 → overflow incontinence:- without warning & painless:- change in position.
 → Enuresis:- During sleep → bladder outlet obstruction.
 → abnormalities of waking mechanism.

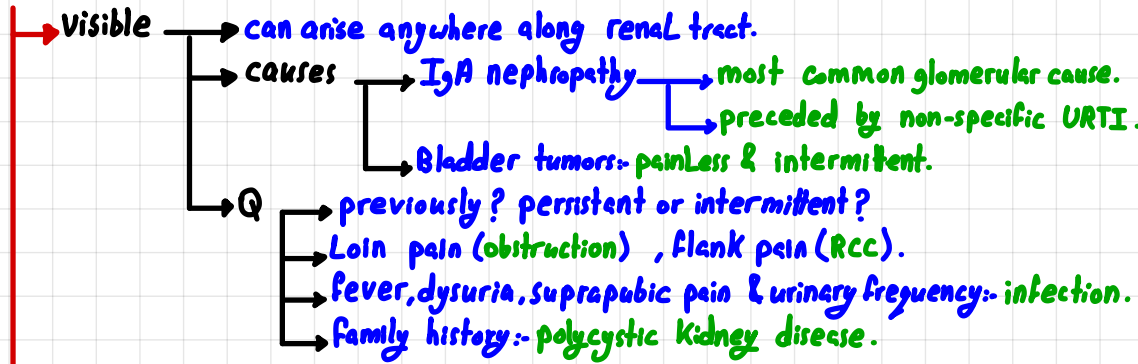
9.11 Urinary Incontinence: points to cover in the history

- Age at onset and frequency of wetting
- Occurrence during sleep (enuresis)
- Any other urinary symptoms
- Provocative factors, e.g. coughing, sneezing, exercising
- Past medical, obstetric and surgical histories
- Number of pads used. Are they damp, wet or soaked?
- Impact on daily living

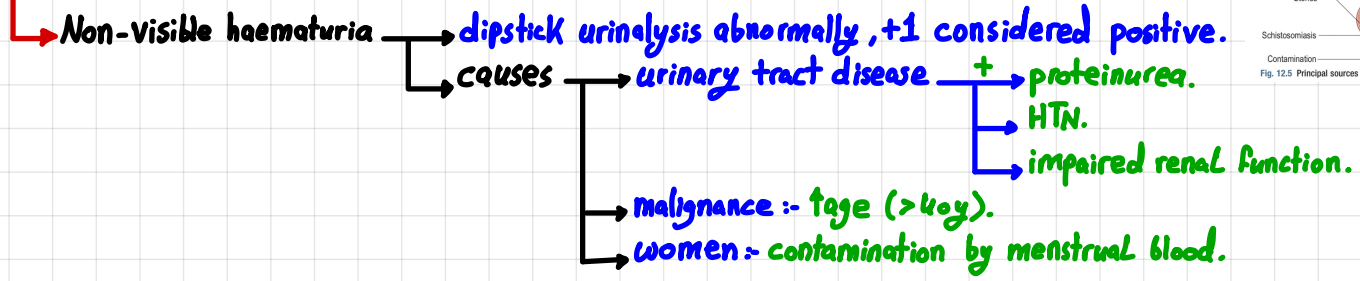
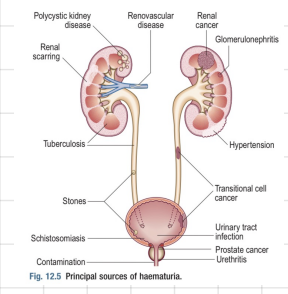
Abnormalities in urine volume & composition

→ polyuria :- ↑urine (>3L/day) → ↑fluid intake.
 → psychogenic polydipsia.
 → Kidney cannot concentrate urine → External:- diuretic, DM, DI, Addison's
 → Internal:- nephrogenic DI.
 → oliguria:- <500ml, causes → ↓fluid intake
 → mechanical obstruction.
 → ↓Kidney function:- ARF.
 → Anuria:- <50ml/day, Exclude urinary tract obstruction → upper:- ureteric stone in single function kidney.
 → Lower:- bladder neck or urethral obstruction.
 → pneumaturia:- rare, passing gas bubbles in urine
 → causes → fistula between bladder & colon (diverticular abscess) → faecuria.
 → malignancy
 → Crohn's disease.

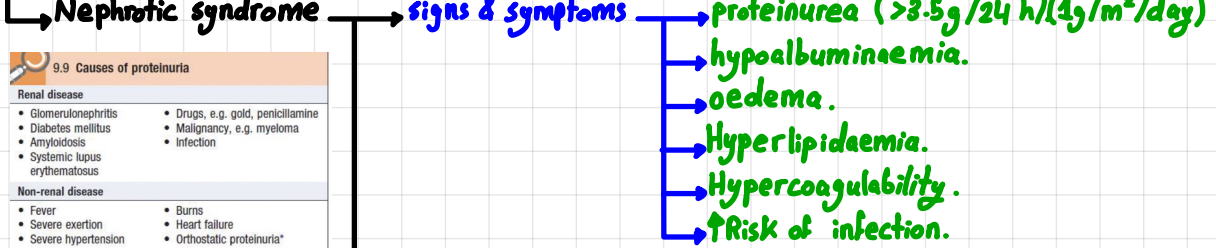
4 Haematuria :- pink, red, brown



9.7 Abnormalities of urine colour	
Orange-brown	<ul style="list-style-type: none"> Conjugated bilirubin Rhubarb, senna Concentrated normal urine, e.g. very low fluid intake Drugs: sulfasalazine
Red-brown	<ul style="list-style-type: none"> Blood, myoglobin, free haemoglobin, porphyrins Drugs: rifampicin, rifabutin, clobazime, entacapone
Brown-black	<ul style="list-style-type: none"> Conjugated bilirubin Drugs: L-dopa, metronidazole, nitrofurantoin, chloroquine, primaquine Homogenetic acid (in alkaptonuria or ochronosis)
Blue-green	<ul style="list-style-type: none"> Drugs/dyes, e.g. propofol, fluorescein, triamterene



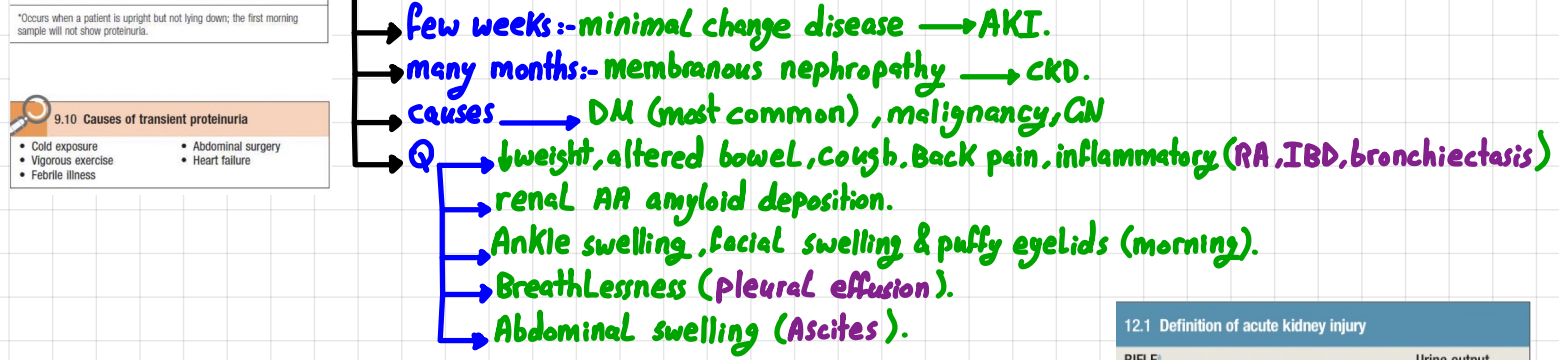
5 proteinuria & nephrotic syndrome :- 150mg/day except children & pregnancy (300mg/d) asymptomatic



9.9 Causes of proteinuria	
Renal disease	<ul style="list-style-type: none"> Glomerulonephritis Diabetes mellitus Amyloidosis Systemic lupus erythematosus Drugs, e.g. gold, penicillamine Malignancy, e.g. myeloma Infection
Non-renal disease	<ul style="list-style-type: none"> Fever Severe exertion Severe hypertension Burns Heart failure Orthostatic proteinuria*

*Occurs when a patient is upright but not lying down; the first morning sample will not show proteinuria.

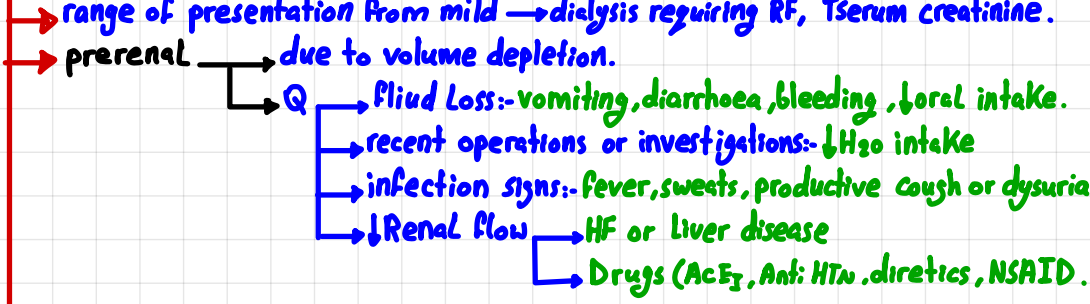
9.10 Causes of transient proteinuria	
<ul style="list-style-type: none"> Cold exposure Vigorous exercise Febrile illness 	<ul style="list-style-type: none"> Abdominal surgery Heart failure



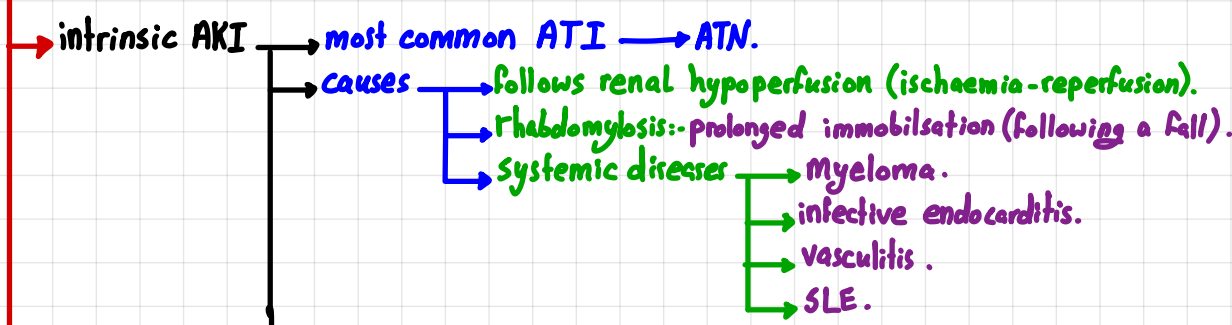
12.1 Definition of acute kidney injury		
RIFLE ^a / AKIN ^b	Serum creatinine criteria	Urine output criteria
Risk / AKIN stage 1	Increase >50%	<0.5 mL/kg/h for 6 hours
Injury / AKIN stage 2	Increase >100%	<0.5 mL/kg/h for 12 hours
Failure / AKIN stage 3	Increase >200% or serum creatinine >350 μmol/L (3.96 mg/dL)	<0.3 mL/kg/h for 24 hours or anuria for 12 hours
Loss	Renal replacement therapy for >4 weeks	—
End-stage kidney disease	Renal replacement therapy for >3 months	—

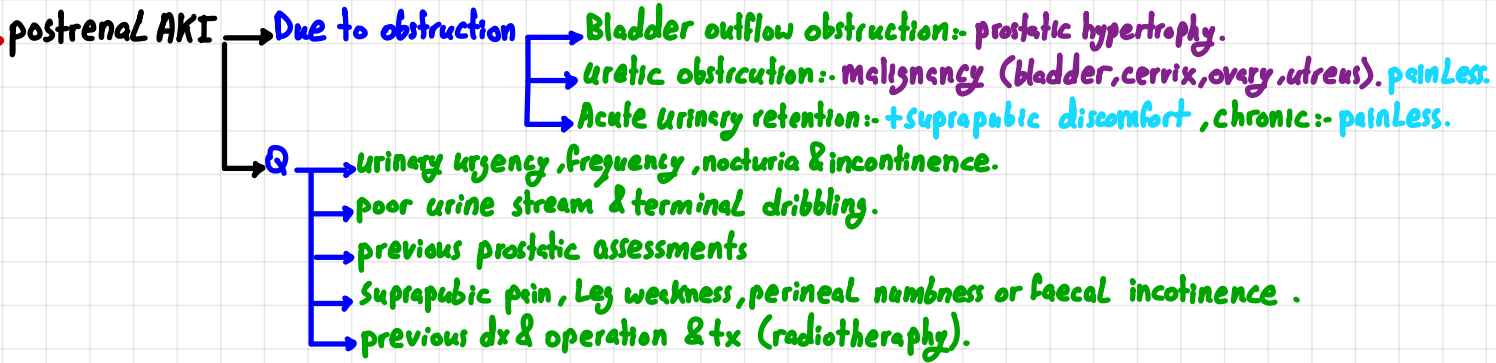
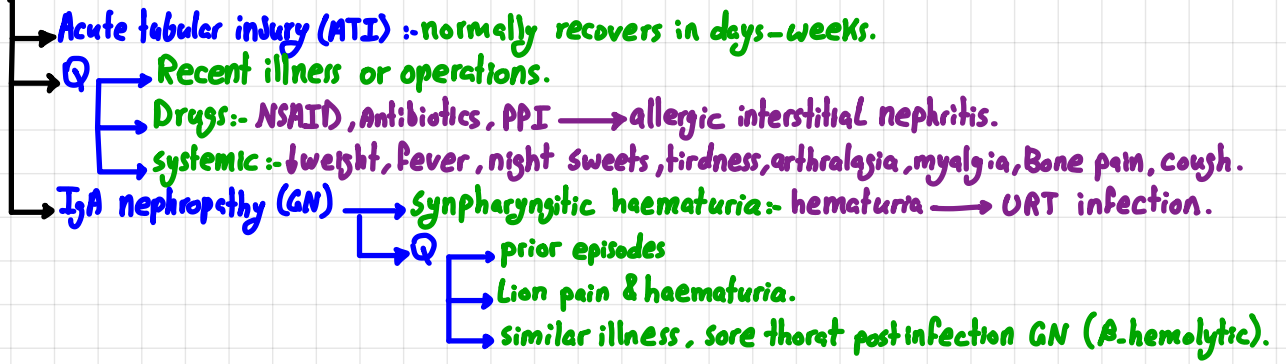
^aRisk, Injury, Failure, Loss, End-stage kidney disease.
^bAcute Kidney Injury Network.

6 Acute Kidney injury



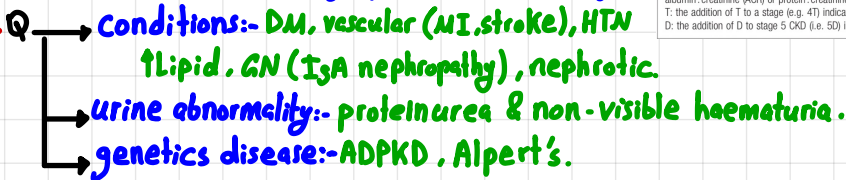
12.2 Causes of acute kidney injury	
Prerenal	<ul style="list-style-type: none"> Hypovolaemia (e.g. blood loss, diarrhoea, vomiting, diuresis, inadequate oral intake) Relative hypovolaemia (e.g. heart failure, nephrotic syndrome) Sepsis Drugs (e.g. antihypertensives, diuretics, non-steroidal anti-inflammatory drugs) Renal artery stenosis or occlusion Hepatorenal syndrome
Intrarenal	<ul style="list-style-type: none"> Glomerular disease (e.g. systemic vasculitis, systemic lupus erythematosus, immunoglobulin A nephropathy) Interstitial nephritis (drug-induced) Acute tubular necrosis/injury (may follow a prerenal cause) Multiple myeloma Rhabdomyolysis Intrarenal crystal deposition (e.g. urate nephropathy, ethylene glycol poisoning) Thrombotic microangiopathy (e.g. haemolytic uremic syndrome, scleroderma renal crisis) Accelerated-phase hypertension Cholesterol emboli
Postrenal	<ul style="list-style-type: none"> Renal stones (in papilla, ureter or bladder) Papillary necrosis Ureteric or bladder transitional cell carcinoma Intra-abdominal or pelvic malignancy (e.g. cervical carcinoma) Retropertoneal fibrosis Blood clot Bladder outflow obstruction (e.g. prostatic enlargement) Neurogenic bladder Urethral stricture Posterior urethral valves Iatrogenic (e.g. ureteric damage at surgery, blocked urethral catheter)





7 Chronic Kidney disease (CKD) :- >3m

- Degree of renal dysfunction ± proteinuria.
- most patient have few symptoms → end-stage.

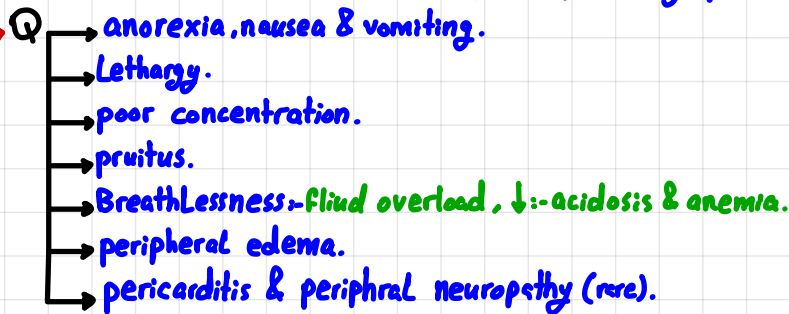


12.3 Definition of chronic kidney disease (CKD)				12.4 Quantification of proteinuria using either urine albumin:creatinine ratio (ACR) or protein:creatinine ratio (PCR)		
CKD stage	eGFR (mL/min/1.73 m ²)	Description	Management	ACR (mg/mmol)	PCR (mg/mmol)	Interpretation
1	≥90	Kidney damage with normal or ↑ GFR	Observe; control blood pressure and risk factors	≥2.5/3.5 [†]	>15	Abnormal; adequate to define CKD stages 1 and 2; start ACE inhibitor or angiotensin-receptor blocker if diabetes is present
2	60–89	Kidney damage with mild ↓ GFR				
3A	45–59	Moderate ↓ GFR		30	>50	Use ACE inhibitor or angiotensin-receptor blocker if blood pressure is elevated, suffice '2' on CKD stage
3B	30–44		70	100	Requires tight blood pressure control	
4	15–29	Severe ↓ GFR	Prepare for end-stage kidney disease	≥250	>300	Nephrotic-range proteinuria
5	<15	End-stage kidney disease	Dialysis, transplantation or conservative care	<small>†Values for males/females ACE, angiotensin converting enzyme; CKD, chronic kidney disease.</small>		

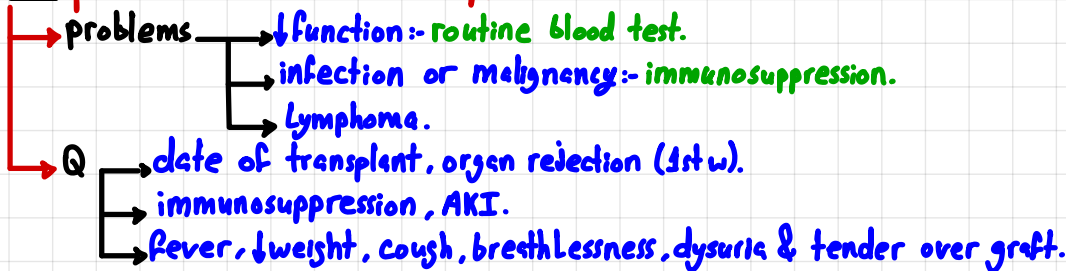
p: the addition of p to a stage (e.g. 2p, 3Bp) means that there is significant proteinuria. Proteinuria is quantified on the basis of an albumin:creatinine (ACR) or protein:creatinine (PCR), see Box 12.4.
T: the addition of T to a stage (e.g. 4T) indicates that the patient has a renal transplant.
D: the addition of D to stage 5 CKD (i.e. 5D) indicates that the patient is on dialysis.

8 End-stage renal disease & uraemia.

- uraemia, GFR < 10 mL/min/1.73 m², non-specific symptoms.



9 patient with renal transplant.



1. The dialysis patient.

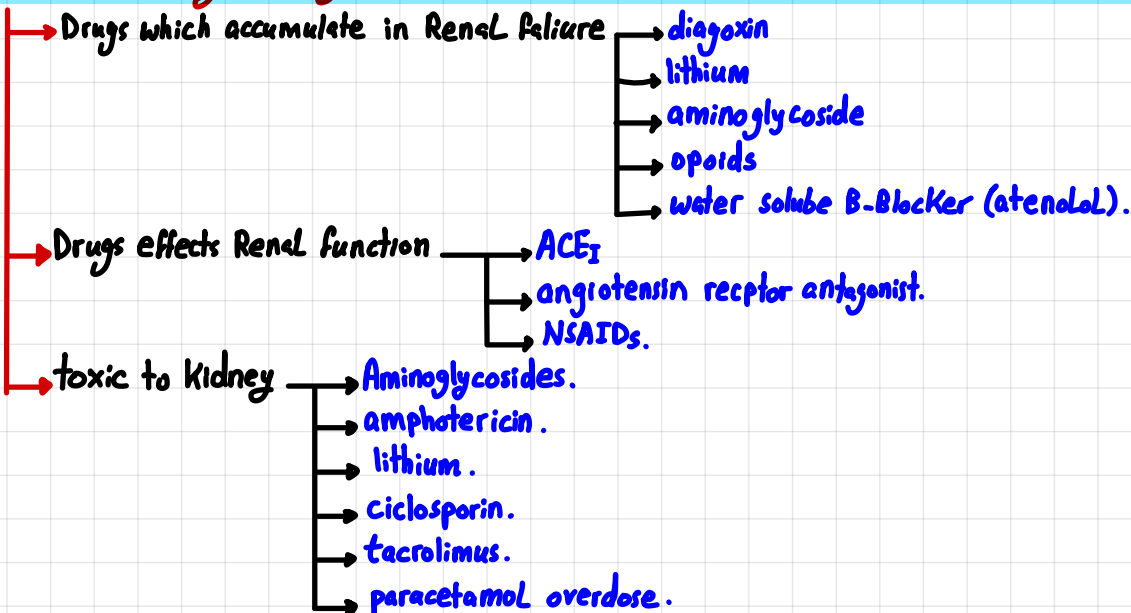
- Haemodialysis → via: AV fistula (thrills) or tunnelled vascular cath (infection).
- peritoneal dialysis → via: tunnelled catheter (infection).
- Q
 - fever & rigors
 - abdominal pain
 - peritoneal dialysate fluid appearance: cloudy.

11 other symptoms:- HTN, anemia, electrolyte disorder.

12.2.2 :- past medical history.

- HTN, vascular, DM, RA, IBD, anemia.
- urinary tract stones or surgery, Renal disease (dialysis & transplant).

12.2.3 :- Drug history.



12.2.4 :- Family history

- Renal disease, HTN, stroke, DM, deafness.
- polycystic kidney disease (ADPKD)
 - each generation, males & females.
 - + berry aneurysms:- subarachnoid haemorrhage.
- Alport syndrome
 - type IV collagen + early-onset deafness.
 - heterogenous & X-Link (most common).
 - non-visible haematuria in childhood → ↑significant in early adults.

9.12 Some hereditary and congenital conditions affecting the kidneys and urinary tract			
Name	Principal findings	Commonly associated abnormalities	Most common form of inheritance
Adult polycystic kidney disease	Bilateral enlarged kidneys, sometimes massive, with nodular surface	Liver cysts Intracranial berry aneurysms Mitral or aortic valve abnormalities	Autosomal dominant
Alport's syndrome	Haematuria, proteinuria, renal failure	Nerve deafness Lens and retinal abnormalities	X-linked dominant
Medullary sponge kidney	Tubular dilatation; renal stones	Other congenital abnormalities, e.g. hemihypertrophy, cardiac valve abnormalities, Marfan's syndrome	Congenital, rarely familial
Nail-patella syndrome	Proteinuria Renal failure (30%)	Nail dysplasia, patellar dysplasia or aplasia	Autosomal dominant
Cystinosis	Tubular dysfunction; renal failure	Rickets, growth retardation, retinal depigmentation and visual impairment	Autosomal recessive
Tuberous sclerosis complex	Renal cysts Renal angioliopomata	Seizures, mental retardation, facial angioliopomata, retinal lesions	Autosomal dominant
Prune-belly syndrome	Dilated bladder and urinary tract; urinary infection and renal failure	Absent abdominal wall musculature	Sporadic mutation

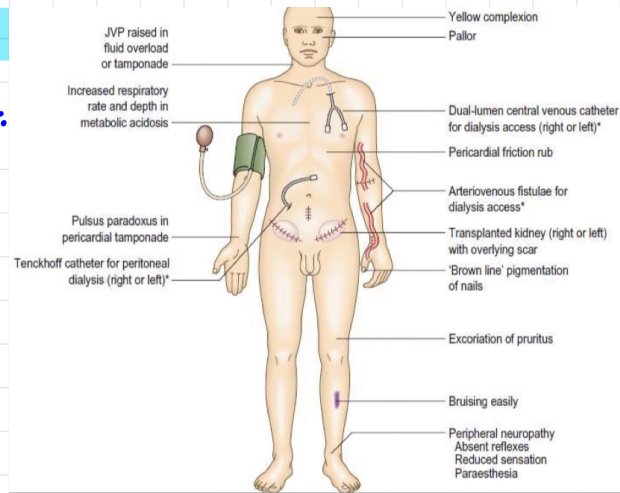
•12.2.5:-Social History.

- end-stage renal disease :- dialysis or transplantation → effect Lifestyle.
- incontinence :- implication for daily Living.
- Smoking & dietary :- CKD, Renal stones.
- Occupational
 - ↳ organic solvents → GN.
 - ↳ Aniline dye & rubber → turothelial ca.
 - ↳ Lead & cadmium → Renal damage.

•12.3:-The physical examination.

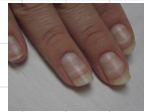
•12.3.1:-General appearance

- CKD:-mostly alter general apperance.
- unwell, pallor, cushyoid & hirsutism, Hiccapping, Flapping tremor.
- Scratch mark:-from pruitis.
- Sever:-drowsiness, myoclonic twitching or asterixis.
- uraemia :- yellow, uremic fetor.
- eye:- anemia & fundoscopy
- Breathlessness:-fluid overload.
- Hyperventilation:-metabolic acidosis.



1 Hands

- ↳ pallor:- anemia.
- ↳ Nails
 - ↳ Muehrcke's:- ↓albumin.
 - ↳ Lindsay's:- CKD.



2 Dialysis access

- ↳ AV fistula
 - ↳ prominent blood vessels on forearm or upper arm.
 - ↳ Scars from previous fistula on either arms.
 - ↳ Functioning:-readily palpable fluid thrill.
- ↳ tunnelled venous cath → in anterior chest wall.



3 Face

- ↳ Rash :- CT disease (SLE)
- ↳ conjunctival pallor:- anemia in CKD.
- ↳ inflammed eye :- scleritis ± uveitis, systemic vasculitis.
- ↳ fundoscopy
 - ↳ DM:- retinal disease
 - ↳ HTN:- chronic end-organ damage (TAP)
 - ↳ accelerated phase HTN:- flame haemorrhages & papilloedema → AKI.
- ↳ gingival hyperplasia:- calcineurin inhibitors (ciclosporin or tacrolimus).
- ↳ uremic fetor.

4 Skin

- ↳ General :- rash, bruising, scratch marks & excoriations.
- ↳ vasculitic rash:- purpura on Legs.
- ↳ Henoch-schönlein purpura & cryoglobulinemia :- AKI & CKD.
- ↳ Drug rash:- allergic interstitial nephritis.

•12.3.2 :-Assessment of fluid balance

1 General

- ↳ Dehydrated
 - ↳ sunken eye.
 - ↳ skin turgor
 - ↳ dry mucous membrane
- ↳ fluid overLoad → Breathless
 - ↳ pulmonary edema.
 - ↳ pleural effusion.
 - ↳ peripheral edema.

2 pulse & BP → HTN.
hypovolaemia: tachycardia + hypotension (↓BP when patient stand or sits).

3 JVP → ↑ fluid overload
cardiac tamponade: uraemic pericarditis.

4 chest → fluid overload → pulmonary edema & pleural effusion.
S₃: third heart sound.
HTN: S₄
anemia of CRD: flow murmur.
pericardial effusion: quiet heart sounds.
uraemia: pericardial rub.

5 peripheral oedema → Nephrotic syndrome: ankle → highest point.

6 weight → accurate assessment of fluid loss or gain over short term.

7 fluid balance charts → fluid input: oral or IV
fluid output: urine volumes & other.

12.3.3: Abdominal examination.

→ Lie flat + full abdominal exposure → anterior iliac spine.

1 inspection

→ Abdominal distention in flanks → ascities
fluid overload.
Large polycystic kidneys.
operative scars → Rt or Lt. iliac fossa: renal transplant.
Rt or Lt. flank: nephrectomy (ADPKD).
peritoneal dialysis catheter.

2 palpation

→ superficial → deep: mass, AAA.
enlarged kidney: palpable on flanks, 12th rib paramedian (ADPKD).
transplant kidney: palpated mass (12-14 cm) in iliac fossa, Rt more common.
tenderness: graft pyelonephritis or rejection.
palpable bladder: soft, midline, suprapubic mass, cannot get below
Tenderness in renal angle: pyelonephritis.

3 percussion

→ Ascites: shifting dullness → nephrotic syndrome.
peritoneal dialysis.
enlarged bladder: midline from resonant area at umbilicus → symphysis pubis.

4 Auscultation

→ Bruits in epigastrium & renal artery: renovascular or atheromatous disease.

12.3.4: Targeted examination of other systems.

→ Joints → Systemic vasculitis: swelling of joint.
chronic arthritis (rheumatoid): amyloid → nephrotic syndrome, NSAIDs → AKI.
myeloma: bony tenderness on spine.

