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GIT

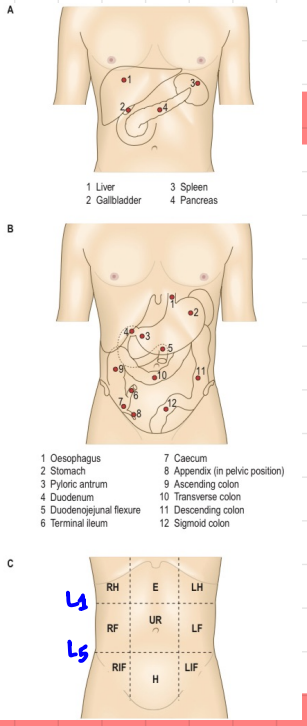
★ chapter 6 :- The gastrointestinal system.

• 6.1 :- Anatomy & physiology

- parts
  - Liver
  - biliary system
  - pancreese
  - spleen
  - alimentry system
    - mouth
    - oesophagus
    - stomach
    - small intestine (deuodenum, jejunum & ileum).
    - colon (Large intestine).
    - Rectum
    - Anus.
- Divided into 9 regions by 2 horizontal & two vertical planes.

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~~ mid-clavicular Line. 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

- often caused by functional dyspepsia & IBS
- ↑Risk symptoms
  - persistent vomiting.
  - dysphagia.
  - gastrointestinal bleeding.
  - weight Loss.
  - painLess, watery, ↑volume diarrhoea.
  - nocturnal symptoms.
  - fever & anemia.
- The Risk of serious disease increases with age.

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

- Anorexia
  - Loss of appetite ± Lack of interst to food.
  - Q :- Do you still enjoy ur food ?
- weight Loss
  - rarely associated with serious organic disease.
  - Q :- How much ? over what time ?
  - usually energy intake (↓applite, malabsorption), not ↑energy expenditure (fever, ↑T_3, ↑demand).
  - common in malignancy & Liver disease.
  - Males :- 2500 KcaL/day, females :- 2000 KcaL/day.
  - A Net -1000 KcaL/day → -1Kg/week (7000KcaL = 1Kg fat).
  - Greater weight Loss
    - salt & water Loss
    - Depletion of hepatic glycogen stores.
  - Rapid weight Loss = Loss of fliuds (1L of H_2O = 1Kg).
    - vomiting.
    - Diarrhoea.
    - diuretics.

3 Pain

- painful mouth
  - sore lips, tounge or buccal mucosa.
  - ↓:- iron, folate, B_{12}, 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:- fliud 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 & specy 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

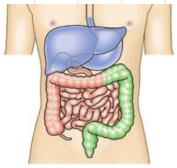
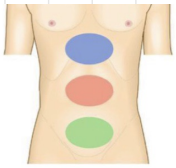
- pain on swallowing (hot Liquids) ± dysphagia.
- indicate:- oesophageal ulcers or esophagitis (from GERD or candidiasis).
- unlikely:- oesophageal cancer (intact mucosal sensation).

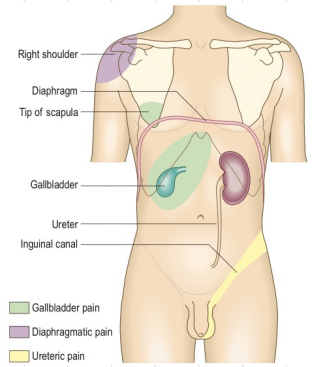
5 Abdominal pain (SOCRATES)

- Site
  - Visceral pain
    - Deep & poorly Localised in midline.
    - from
      - distention of hollow organs.
      - mesentric traction.
      - excessive SM-contraction.
    - Conducted via:- symp. splanchic nerves.
  - Somatic pain
    - Lateralised & Localised
    - from
      - parietal peritoneum.
      - Abdominal wall.
    - conducted via:- intercostal nerves.
    - cholecystitis.
    - appedicitis.
    - diverticulitis.
  - Above umbilicus (epigastric)
    - foregut structures
      - stomach.
      - pancreas.
      - Liver.
      - biliary system.
  - central Abdominal (periumblical).
    - Midgut
      - small bowel.
      - appendix.

6.2 Diagnosing abdominal pain

	Disorder			
	Peptic ulcer	Biliary colic (pain)	Acute pancreatitis	Renal colic
Site	Epigastrium	Epigastrium/right hypochondrium	Epigastrium/left hypochondrium	Loin
Onset	Gradual	Rapidly increasing	Sudden	Rapidly increasing
Character	Gnawing	Constant	Constant	~~Constant~~ Colicky
Radiation	Into back	Below right scapula	Into back	Into genitalia and inner thigh
Associated symptoms	Non-specific	Non-specific	Non-specific	Non-specific
Timing Frequency/periodicity Special times Duration	Remission for weeks/months Nocturnal and especially when hungry ½–2 hours	Attacks can be enumerated Unpredictable ~~4–24 hours~~ 4h	Attacks can be enumerated After heavy drinking >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 Eating – unable to eat during bouts	–
Relieving factors	Food, antacids, vomiting	–	Sitting upright/RIE	–
Severity	Mild to moderate	Severe	Severe	Severe



- Lower abdominal → Hindgut → colon.
- midline + Back → unpaired structure → pancreas.
- felt on + affected side → paried structure → Renal calic.
- genital → M:- Torsion of testis.
  - F:- ruptured ovarian cyst, PID, endometriosis, ectopic.

Onset
- sudden + rapid → hollow viscus perforation - colorectal ca, diverticular, peptic ulcer.
  - AAA ruptured
  - mesentric infraction.
- sudden + intestinal obstruction → Torsion of caecum.
  - Torsion of sigmoid (volvulus).

Character
- colicky → short time, epidosic (complete disapears).
  - hollow structurs (small & Large obstruction, Labour).
  - Bilary & Renal → miss named. Rapid ↑ & peak & persist for hours.
- Dull, constant, vague, ↓Localised → inflammetory or infection → Salpingitis.
  - appendicitis.
  - diverticulitis.

*Renal calic not pain
*Bilary → missnamed.

Radiation
- Acute cholecystitis:- Rt. hypochrondrium, shoulder, interscapular, diaphramatic irritation
- Renal colic:- Loin → groin & genitalia
- pancreatitis:- central upper → Back, Relived by sitting forward.
- Acute appendicitis:- central → Rt. iliac fossa.
- AAA ruptured:- sever back + Abdominal pain.

6.3 Non-alimentary causes of abdominal pain

Disorder	Clinical features
Myocardial infarction	Epigastric pain without tenderness *Angor animi* (feeling of impending death) Hypotension Cardiac arrhythmias
Dissecting aortic aneurysm	Tearing interscapular pain *Angor animi* Hypotension Asymmetry of femoral pulses
Acute vertebral collapse	Lateralised pain restricting movement Tenderness overlying involved vertebra
Cord compression	Pain on percussion of thoracic spine Hyperaesthesia at affected dermatome with sensory loss below Spinal cord signs
Pleurisy	Lateralised pain on coughing Chest signs, e.g. pleural rub
Herpes zoster	Hyperaesthesia in dermatomal distribution Vesicular eruption
Diabetic ketoacidosis	Cramp-like pain Vomiting Air hunger Tachycardia Ketotic breath
Salpingitis or tubal pregnancy	Suprapubic and iliac fossa pain, localised tenderness Nausea, vomiting Fever
Torsion of testis/ovary	Lower abdominal pain Nausea, vomiting Localised tenderness

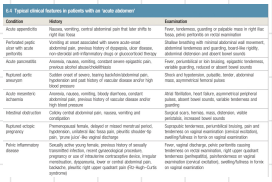
Associated symptoms
- Non-specific:- Anorexia, nausea, vomiting.
- altered bowel habit:- IBS, diverticular, colorectal ca.
- Breathlessness or palpitation:- non-alimentry causes
- hypotention + tachycardia:- intra-abdominal sepsis or bleeding → ulcer.
  - AAA.
  - ectopic pregrency.

Timing
- silent interval:- 1-2 h after perforation
- hours / days → inflammetory → appendicitis
  - cholecystitis.
  - diverticulitis.
- change in Symptoms pattern → worng diagnosis
  - complications (small bowel obstruction:- colic → pain + tendrness → ischemi
  - Acute appendicitis:- periumbilical → Rt. iliac fossa.

Exacerbating & relieving factors
- inflammation → ↑:- movement, cough.
  - ↓:- Lie still.
- colic → move around or knee-up during spasms.

Severity
- Excruciating, Opioids:- ischemic vascular (Bowel infraction, AAA).
- sever, potent analgesia:- acute pancreititis or peritonitis (ruptured viscus).

Acute Abdomen → sudden sever abdominal pain



6 Dysphagia

- food or drinks sticks when they swallow, site of food sticking ≠ 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 fliuds → Zenker's diverticulum.
  - +pain (odynophagia), Heartburn or weight Loss.
- confuse
  - early satiety:- inability to complete a full meaL (premature fullness)
  - Globus:- Lump in throat, not related to eating.
- Types
  - Neurological:- bulber or pseudobleIber palsy, worse in Liquid + (choking, spluttering & fliud from nose).
  - Neuromascular
  - esophageaL dysmotility:- spasms + centraL chest pain → middle age, solids, ↓ by Liquid & sitting upright.
  - Achalasia:- Lower sphincter fails to relax → dilation → to respiation at night/Lies → aspiration pneumonia.
  - pharyngeaL pouch:- → food stick or regurgitated → chest infection & halitosis.
  - mechanicaL :- stricture, + ↓weight + ↓time + no reflux → esophageaL ca.
  - Longstanding:- No ↓weight, Heartburn → peptic stricture.

8.7 Causes of dysphagia

Oral	
• Tonsillitis, glandular fever, pharyngitis, peritonsillar abscess	• Painful mouth ulcers
Neurological	
• Bulbar or pseudobulbar palsy	• Cerebrovascular accident
Neuromuscular	
• Achalasia • Pharyngeal pouch	• Myasthenia gravis • Oesophageal dysmotility
Mechanical	
• Oesophageal cancer • Peptic oesophagitis • Other benign strictures, e.g. after prolonged nasogastric intubation	• Extrinsic compression, e.g. lung cancer • Systemic sclerosis

7 Nausea & vomiting

- Nausea:- sensation of feeling sick
- Vomiting:- expulsion of gastric content via the mouth → +pallor, sweating, Hyperventilation.
- Q
  - meals/timing:- morning or evening.
  - associated symptoms:- dyspesia, Abdominal pain, relieved by vomiting?
  - color:- bile-stained (green), blood-stained, faeculent.
  - weight Loss?
  - patient's medications.
- upper GI disorders → Nausea + vomiting + Abdominal pain/discomfort.
- Dyspepsia:- Nausea without vomiting.
- peptic ulcer seldom:- painless vomiting.
- pyloric stenosis:- projectile vomiting, ↑volume, not bile-stained.
- obstruction
  - distal to pylorus:- bile-stained.
  - gastric outlet or proximaL small bowel:- sever vomiting without pain.
  - distal small bowel or colonic:- faeculent vomiting of small bowel content.

• The more distal the obstruction → more accompaying abdominal distension & colic

- peritonitis:- ↓volume but persistent.
- gastroenteritis, cholecystitis, pancreatitis, hepatitis:- Common vomiting + Nausea.
- RenaL/biliary colic or MI:- sever pain → vomiting.
- Anorexia nervosa & bulimia nervosa
  - eating disorders, undisclosed self-induced vomiting.
  - bulimia → ↑weight, anorexia nervosa → ↓weight
- non-GI causes
  - Drugs:- AlchoL, opioids, theophyllines, digoxin, cytotoxic, Antidepressent.
  - pregrency.
  - DKA.
  - RenaL or Liver faliure.
  - hypercalcaemia.
  - Addison's disease.
  - ↑intracranial pressure:- meningitis, Brain tumor.
  - vestibular disorders:- Labyrinthitis & méniére's disease

8 Wind & Flatulence.

- Belching, excessive or offensive flatus, abdominal distension & borborygmi.
- Belching
  - air swallowing (aerophyjy), no medical significance.
  - anxity, relaive 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 fliud & gas along bowels.
  - ↑:- colicky discomfort, small bowel obstruction or dysmotility.

9 Abdominal distention

- causes (6F)
  - Fat:- obesity
  - Flatus:- pseudo-obstruction or bowel obstruction.
  - Faeces:- subacute obstruction or constipation.
  - Fluids:- Ascitis (peritoneal cavity fliud), tumors (ovarian), distended bladder.
  - Fetus
  - Functional bloating:- IBS

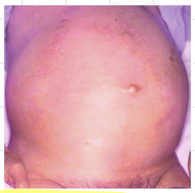
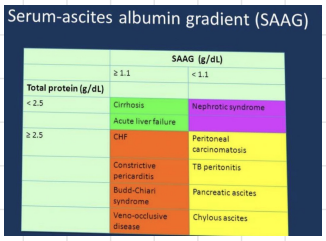


Fig. 6.6 Abdominal distension due to ascites.



10 Altered bowel Habits (Diarrhoea & constipation).

- Diarrhoea
  - Normally:- 3/1 day - 1/3 days.
  - Frequent passage of Loose stools or more than 3times/1 day.
  - Q
    - onset:- Acute, chronic or intermittent.
    - Freqeuncy, volume, color, consistency (watery, unformed or semisolid), contents (RBC, mucus, pus).
    - Associated symptoms
      - urgency, incontinence, pain, vomiting, sleep disturbance.
      - tenesmus:- defecate sensation + 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 → steps.
  - ↓volume → IBS:- pain, bloating, dyspepsia (Rome IV criteria).
  - Types
    - Acute → Mostly infective gastroenteritis due to:- norovirus, salmonella, clostridium difficlie.
    - 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 defection or rectal bleeding.
    - Drugs:- opiates, iron
  - due to:- dietary fibre, imparied colonic motility, obstruction, impared rectal sensation or anorectal dysfunction, IBS colorectal Ca, ↓T3, ↑Ca, immobility (parkinson, stroke).

(not required).

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

12 Bleeding

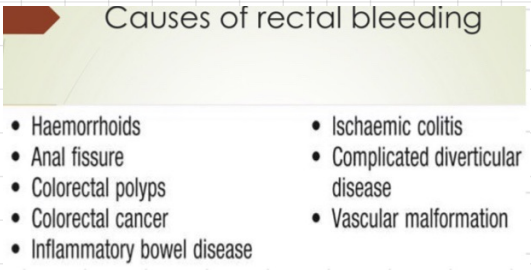
- Haematemesis :- vomiting of Blood.
  - Q
    - color :- fresh red, dark brown, coffe grounds?
    - onset :- intense retching or first vomit?
    - History of :- dyspepsia, peptic ulcer, GI bleeding, Liver disease.
    - Drugs :- Alchol, NSAIDs, glucocorticoid ingestion.
  - first vomit blood :- gastro-esophageal sphincter (oesophageal varices). .in Liver cirrhosis
  - after several times :- Lower oesophageal mucosal tear → trauma
    - Mallory-weiss syndrome.
- Melaena :- 50ml blood, soft, tarry, shiny black stool + odour from :- upper GI bleeding.
  - Distinguish from :- matt stools in oral iron or bismuth theraphy.
  - causes
    - peptic ulcer :- most common.
    - tAlchol :- erosive gastritis.
    - cirrhotic :- Mallory-weiss tear or bleeding esophagogastric varices.
    - Ca & angioectasis (Dieulafoy Lesion).
  - a profound upper GI bleed → purple stool or fresh blood (rare).

.hemoccult :- >2oml/day.

6.5 Prediction of the risk of mortality in patients with upper gastrointestinal bleeding: Rockall score

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

- Rectal Bleeding :- blood + stool.
  - Haematochezia → Freach rectal bleeding
    - anal canal, rectum or colon
  - sever upper GI bleeding :- blood pass unaltered.
  - common causes
    - haemorrhoids.
    - anal fissures :- on toielt paper or pan.
    - complicated diverticular disease (most common).
  - Q :- amount, mixed or freash?



13 Jaundice :- yellowish discolaration 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.
  - alchol intake
  - travel history & immunisations.
  - use of illicit or IV drugs.
  - sexual history.
  - prevous 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)

6.6 Common causes of jaundice

Increased bilirubin production
- Haemolysis (unconjugated hyperbilirubinaemia)

Impaired bilirubin excretion
- Congenital:
  - Gilbert's syndrome (unconjugated)
- Hepatocellular:
  - Viral hepatitis
  - Cirrhosis
  - Drugs
  - Autoimmune hepatitis
- Intrahepatic cholestasis:
  - Drugs
  - Primary biliary cirrhosis
- Extrahepatic cholestasis:
  - Gallstones
  - Cancer: pancreas, cholangiocarcinoma

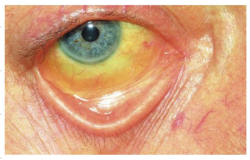


Fig. 6.8 Yellow sclera of jaundice.

6.7 Urine and stool analysis in jaundice

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

- unconjugated bilirubin → insoulble & binds with albumin, not filtered.
  - acholuric jaundice :- urine normal color.
- conjugated bilirubin → bilirubin digucuronide :- by liver, green colour.
  - urine is dark brown :- due to bilirubin diglucuroide.
  - stercobilinogen :- by bacteria, brown stool. in urine → urobilinogen :- colorless.
- prehepatic → haemolytic :- anaemic pallor + Jaundice → pale Lemon complexion.
  - normal stool & urine color.
  - Gilbert's syndrome → uncojugated, normal liver enzymes, mild Jaundice (<100 μmol/L).
    - ↑ :- prolonged fasting or intercurrent febrile illness.

- Hepatic → Hepatocellular disease (cirrhosis) → unconjugated + conjugated.
  - Dark brown urine (conjugated), normal stool color.
- posthepatic / cholestatic (obstructive):- Dark urine + pale stool.
  - Bile obstruction:- pale stool
  - + pruritus:- generalised itch due to bile salt deposition.
  - gall stone:- + Abdominal pain.
  - ascending cholangitis:- charcot's traid (pain, fever, rigor + Jaundice).
  - cholangiocarcinoma or ca of head of pancreese:- painless.
  - intrahepatic or extrahepatic cholestasis:- biliary cirrhosis & drugs & hepatocellular injury.

14 Groin swelling & Lumps.

- Q
  - associated pain.
  - precipitating/exacerbating:- chronic constipation & cough, heavy manual labour, micturition.
  - timing:- when symptoms are worse.
- Hernias (Reducable)
  - groin Lumps + dull + dragging discomfort
  - ↑:- straining & standing or activity.
  - ↓:- gentle pressure or lying flat.
- other causes
  - LN, skin & sc Lumps
  - saphena varix:- varicosity of long saphenous vein.
  - hydrocole of spermatic cord.
  - undescended testis.
  - femoral aneurysm.
  - psoas abscess.

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 → aneurysm & mesentric ischemia.
- thyroid disease:- primary bilary 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 bilary cirrhosis & Autoimmune hepatitis.
- DM:- NAFLD.

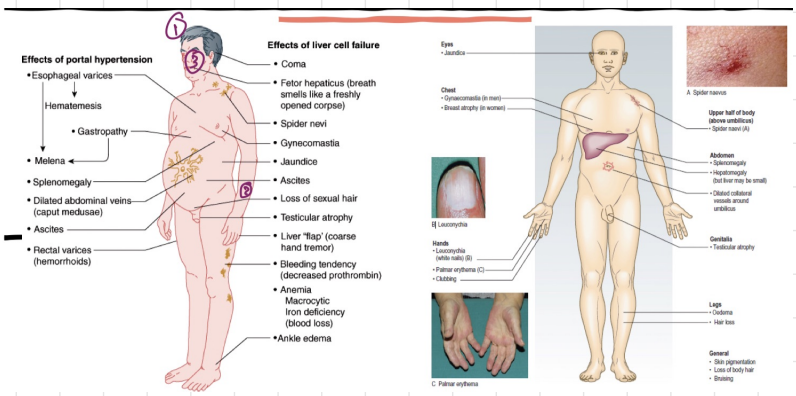
• 6.2.4 :- Social history

- Dietary history
- food intolerance:- painless diarrhoea (alchol, Lactose intolerance, coeliac disease).
- Alchol consumption.
- smoking:- esophageal & colorectal cancer, crohn's disease & peptic ulcer. ↓smoking in ulcerative colites.
- stress:- IBS & dyspepsia.
- foreign travel:- Liver disease & diarrhoea.
- Risk factors for Liver disease:- IV drugs, tattos, blood transfusion, sex hapit, 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 :- Asymetric rasied Linear streaks :- weight, pregrency, chushing.
  - skin redudancy :- Loose skin folds :- Rapid weight Loss
- Hands
  - clubbing :- IBD, cirrhosis, celiac
  - Koilonychia :- IDA
  - Leukonychia :- ↓albumin :- CLD, malabsorption, proteinurea, malnutrition (KwashiorKor)
  - muscle wasting
  - skin creases
  - Tar staining
  - flapping tremor
  - palmar erthyma :- CLD
  - Dupuyten's contracture :- Alchol-Related.
- face
  - pallor :- Anemia
  - Jaundice & pinguecula (small yellow fat pads)
  - spider neavi :- 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. → IDA
  - Atrophic Glossitis :- pale smooth tongue
  - Beefy tongue :- ↓B12 & ↓folate. (Raw apperance).
  - Jaundice
  - Smell :- Fector hepaticus, uremia, melaena, Ketones.
- Neck
  - Troiser's sign :- enlargment 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 nivea
  - Scratch marks :- Bile acids.

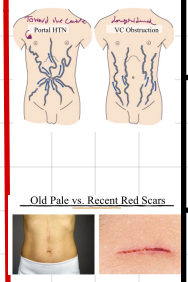


- CLD
  - palmar erthyma & spider neevi
  - Gynecomastia, ↓hair, testicular atrophy.
  - Leuconychia
  - clubbing
  - Dupuytren's contructure
  - Sailoadenosis.
- Liver failure
  - astrexis, fector hepaticus (mousy odour).
  - altered mental state :- drowsiness, confusion, disrientation, coma.
  - Jaundice & acities.
  - neurological :- spancity, extention limb, extensor planter response.

• 6.3.2 :- Abdominal examination.

1 Inspection

- General
  - teeth, tounge, buccal mucosa :- mouth ulcers.
  - Smell :- Alchol, fetor hepaticus, uraemia, melaena, Ketones.
  - Exposure :- Xiphisternum → symphysis pubis (Nipples → midthighs).
  - position :- Supine + 1-2 pillows (to relax abdominal muscles) + Legs & Arms stretched.
- foot of bed
  - Contour
    - flat
    - scaphoid
    - protuberant (5f).
  - Smmetry → Abdominal swelling
    - Diffuse :- ascites or intestinal obstruction.
    - Localised :- urinary retention, mass, organo-megally.
  - Umbilicus
    - inverted :- normal
    - sunken :- obsity.
    - 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 infraumblical :- Laproscopy.
    - puncture scar :- Laproscopic ports.
    - incisional hernia :- cough-impulse or Raise 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.
    - Grey turner sign.
    - → trauma, retroperitoneal bleeding.
  - visible veins
    - prominent veins :- portal HTN, VC obstructions.
    - caput medusa :- portal HTN + umblical varix (blue & distended)
    - tortuous vein :- IVS obstruction (Rare SVC), Blood flows superiorly.
    - umbilical Hernia :- distended & everted, no vascular apperence, + cough impulse.
  - visible masses → incisional Hernia :- at scar site (Muscle defect).
  - visible pulsations.
  - visible peristalsis.
- 2 monovers
  - Cough-impulse
    - Hernia
    - Pain in peritonitis.
    - Dunphy sign - pain elicited after coughing.
  - Rise Head → Divercation of Recti (Rectus abdominis Diastasis).



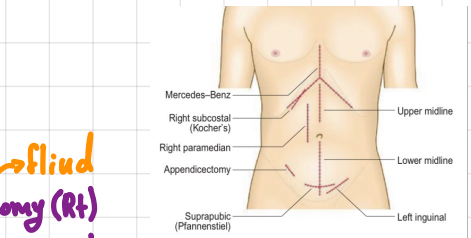


Fig. 6.10 **Some abdominal incisions.** The midline and oblique incisions avoid damage to innervation of the abdominal musculature and later development of incisional hernias. These incisions have been widely superseded by laparoscopic surgery, however.

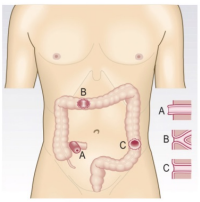
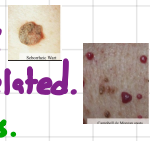
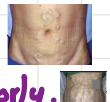
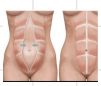


Fig. 6.11 **Surgical stomas.** A An ileostomy is usually in the right iliac fossa and is formed as a spout. B A loop colostomy is created to defunction the distal bowel temporarily. It is usually in the transverse colon and has afferent and efferent limbs. C A colostomy may be terminal: that is, resected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







2 palpation & percussion

- superficial palpation
  - gain patient confidence.
  - Superficial masses.
  - Superficial tenderness.
  - Guarding.
- Deep palpation
  - Deep masses.
  - Deep tenderness.
  - Repound tenderness (intra-abdominal dx). & murphy's sign (Acute cholecystitis).
- organo-megally :- Liver, spleen & Kidneys.

- Palpable masses
  - Discribe 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).

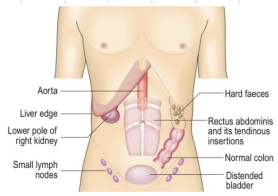
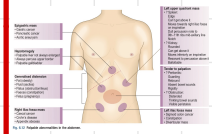


Fig. 6.13 Palpable masses that may be physiological rather than pathological.

- Tenderness
  - generalised peritonitis:- several area, ↓ pressure.
  - anxiety:- sever pain + no tendreness in deep palpation.
  - Voluntary guarding:- voluntary contraction of Abdominal muscles when palpation → pain.
  - involuntary guarding:- reflex contraction in generalised pertonitis + board-like rigidity.
  - Site
    - epigastrium:- peptic ulcer.
    - Rt. hypochondrium:- cholecystitis.
    - Lt. iliac fossa:- diverticulitis.
    - Rt. iliac fossa :- appendicitis or crohn's ileitis.
  - Rebound tendreness:- cough or percuss → remove hand → ↑pain → intra-abdominal disease.
  - Masked by:- glucocorticoids, immunesuppressant, ant:-inflammatory, alchol 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
Rovsing'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 :- purcuss from 2nd intercostal → Dullness.
  - normally :- dull, Rt. 5th rib → costal margin.
  - enlarged
    - Liver cirrhosis (shrunken in advanced).
    - Fatty Liver (hepatic stenosis).
    - metastic 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.
    - anteriovenous malformation
  - encephalopathy → Liver feliure
  - diplaced
    - hyperinflated Lungs
    - interporsition of transverse colon between Liver & diaphragm → chilaiditi's sign

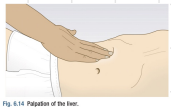


Fig. 6.14 Palpation of the liver.

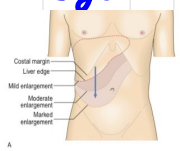


Fig. 6.15 Patterns of progressive enlargement of liver and of spleen. [A] Direction of enlargement of the liver. [B] Direction of enlargement of spleen. The spleen moves downwards and medially during inspiration.

6.10 Causes of hepatomegaly

Chronic parenchymal liver disease
- Alcoholic liver disease
- Hepatic steatosis
- Autoimmune hepatitis
- Viral hepatitis
- Primary biliary cirrhosis

Malignancy
- Primary hepatocellular cancer
- Secondary metastatic cancer

Right heart failure

Haematological disorders
- Lymphoma
- Leukaemia
- Myelofibrosis
- Polycythaemia

Rarities
- 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 asterixis (flapping tremor)
1	Impaired concentration and attention span Sleep disturbance, slurred speech Euphoria or depression Asterixis present
2	Lethargy, drowsiness, apathy or aggression Disorientation, inappropriate behaviour, slurred speech
3	Confusion and disorientation, bizarre behaviour Drowsiness or stupor Asterixis usually absent
4	Comatose with no response to voice commands Minimal or absent response to painful stimuli

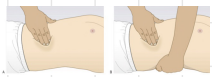
- gall bladder
  - Rt. upper pain + Murphy's sign:- acute cholecystitis.
  - globular shape :- palpable distention
    - obstruction of cystic duct.
    - obstruction of common bile duct + patent cystic duct.
  - +Jaundice :- palpable
    - extrahepatic obstruction.
    - gall stones (Courvoisier sign)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

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

6.12 Differentiating a palpable spleen from the left kidney

Distinguishing feature	Spleen	Kidney
Mass is smooth and regular in shape	More likely	Polycystic kidneys are bilateral irregular masses
Mass descends in inspiration	Yes, travels superficially and diagonally	Yes, moves deeply and vertically
Ability to feel deep to the mass	Yes	No
Palpable notch on the medial surface	Yes	No
Bilateral masses palpable	No	Sometimes, e.g. polycystic kidneys
Percussion resonant over the mass	No	Sometimes
Mass extends beyond the midline	Sometimes	No (except with horseshoe kidney)

  - causes → myeloproliferative disease.
    - haematological malignancy.
    - malaria.
  - Hepatosplenomegaly → myeloproliferative disease.
    - Lymphoma.
    - cirrhosis + portal HTN.
    - amyloidosis.
    - sarcoidosis.
    - glycogen storage disease.



- Felty syndrome (SANTA) → Splenomegaly, Anemia, Neutropenia, Thrombocytopenia, Arthritis (Rheumatoid).

6.13 Causes of splenomegaly

Haematological disorders
- Lymphoma and lymphatic leukaemias
- Myeloproliferative diseases, polycythaemia rubra vera and myelofibrosis
- Haemolytic anaemia, congenital spherocytosis

Portal hypertension

Infections
- Glandular fever
- Malaria, kala-azar (leishmaniasis)
- Bacterial endocarditis
- Brucellosis, tuberculosis, salmonellosis

Rheumatological conditions
- Rheumatoid arthritis (Felty's syndrome)
- Systemic lupus erythematosus

Rarities
- Sarcoidosis
- Amyloidosis
- Glycogen storage disorders

- Kidneys → Bimanual exam.
  - Ballotement.
  - Renal angle tenderness.

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

- Ascities :- accumulation of intraperitoneal fluid.
  - shifting dullness (mild-modrate) → midline → flanks (resonance & dull).
    - mark dull site & ask the patient to turn to opposite side.
    - pause 1 sec → percuss → resonant → ascities.
  - fluid thrill (massive) → Lt. palm → Lt. abdomen, flink finger Rt. hand → Rt. abdomen.
    - ripple on Lt → edge in midline → ripple → gross ascites

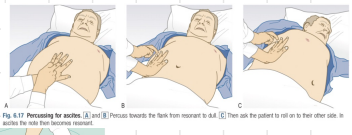


Fig. 6.17 Percussing for ascites. A and B Percuss towards the flank from resonant to dull. C Then ask the patient to roll on to their other side. In ascites the note then becomes resonant.

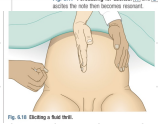
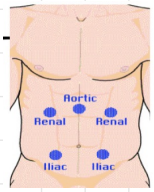


Fig. 6.18 Eliciting a fluid thrill.

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.

6.16 Causes of abnormal stool appearance

Stool appearance	Cause
Abnormally pale	Biliary obstruction
Pale and greasy	Steatorrhoea
Black and tarry (melaena)	Bleeding from the upper gastrointestinal tract
Grey/black	Oral iron or bismuth therapy
Silvery	Steatorrhoea 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

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

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

6.3.3 :- Hernias

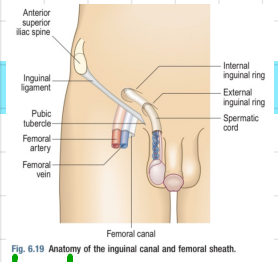
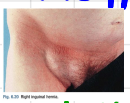


Fig. 6.19 Anatomy of the inguinal canal and femoral sheath.

- **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 → mesentry.
    - 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 bulgus.
  - Cough → impulse
  - palpate the external inginal 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.

→ palpable above & medial to pubic tubercle.

- **femoral**
  - femoral ring → femoral canal
  - palpable below the inguinal Ligament, Lateral to pubic tubercle.
- **reducible :-** content can be retured 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 infraction & peritonitis.

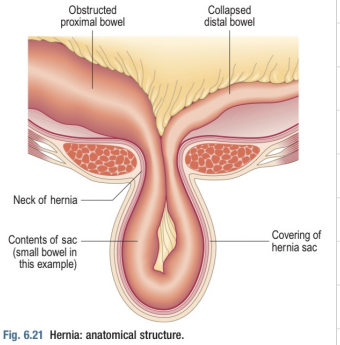


Fig. 6.21 Hernia: anatomical structure.

•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 10 min before examination.

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

- Haemorrhoids
  - piles, congested venous plexses around anal canal.
  - palpable if thrombosed.
- chronic constipation :- faeces → palpable, moveable & indented.
- retroverted uterus + normal cervix :- palable, 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.
- Gyneacological malignancy :- frozen pelvis (hard, rigid).
- Benign prostatic hyperplasia :- palpable symmetrical enlargment (not Median Lobe).
- prostate ca :- Hard, irregular or asymmetrical, no palpable median groove.
- prostatitis or prostatic abcess :- 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

6.16 Causes of abnormal stool appearance

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Abnormally pale	Biliary obstruction
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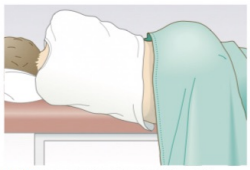


Fig. 6.22 The correct position of the patient before a rectal examination.

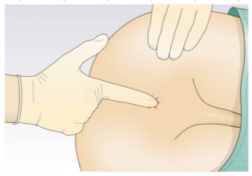


Fig. 6.23 Rectal examination. The correct method for inserting your index finger in rectal examination.

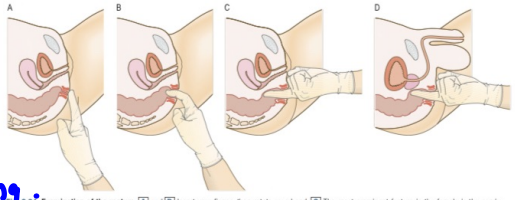


Fig. 6.24 Examination of the rectum. A and B Insert your finger, then rotate your hand. C The most prominent feature in the female is the cervix. D The most prominent feature in the male is the prostate.

•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, heamorrhoids.
- Dx :- haemorrhoids, anal fissures & rectal prolapse.
- Rectal mucosa :- Buccal mucosa + prominent submucosal veins.
- haemorrhoids :- distend with blood → prolapse.
- rectal prolapse :- dgree of protrusion is > 3-4cm.

•6.4 :- investigations

(Box 4.17, 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 ($T_{12}-L_3$), 11-14 cm.
  - Rt kidney Lower 1.5cm (Liver)
  - Liver & spleen lie anterior to kidneys.
  - moves downward during inspiration.
  - 25% of cardiac output.
  - 1 millon 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:- T_{10-12} / L_1 (slides → T_8-L_2).

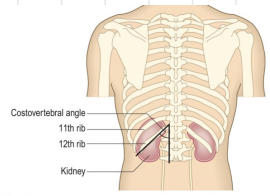


Fig. 12.1 The surface anatomy of the kidneys from the back.

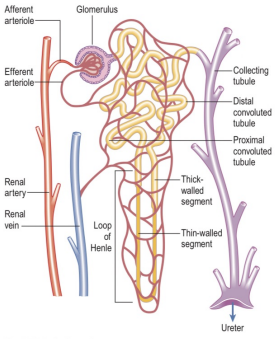
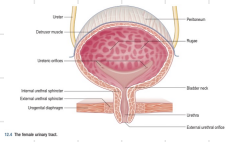


Fig. 12.2 A single nephron.

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



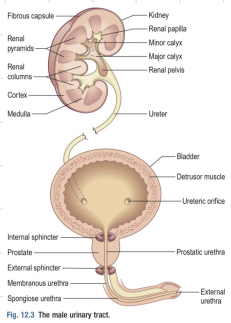


Fig. 12.3 The male urinary tract.

- urethra
  - M: bladder → tip of penis
    - prostatic
    - membranous
    - spongiose & bulbar
  - f:- shorter, external meatus anterior to vaginal orifice & behind the clitoris.
  - 2 sphicters
    - internal:- bladder neck, involuntary.
    - external:- surronds membranous urethra, voluntary, pudendal nerves (S_2-4).

•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

1 Dysuria

- pain or discomfort during urinction, 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.

2 Loin pain

- causes
  - Non-Renal
    - Mucoskeletal:- muscle sperm, trauma.
    - GI disease
    - gynecological disease:- ectopic pregrency, ovarian torison.
    - 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 strech receptor activity (sensory urgency).
  - Nocturia :- waking to void between sleeping periods.
  - causes
    - bladder, prostate & urethral problems
      - Lower UTI
      - tumor
      - urinary stones
      - prostatic enlargment obstruction.
    - neurological → multiple sclerosis.

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 initating urine flow.
  - post void Dribbing & incomplete :-
    - bladder neck obstruction.
    - abnormal detrusor function.
  - poor stream
    - M :- >40y → prostatic enlargment 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 incontience :- by urgency.
  - stress incontience :- ↑intra-abdominal pressure
    - physical exertion.
    - sneezing or coughing.
    - childbirth → weak pelvic floor.
  - Mixed incontience :- urge + stress.
  - overflow incontience :- without warning & painLess :- change in position.
  - Enuresis :- During sleep
    - bladder outlet obstruction.
    - abnormalities of wakening 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 abcess) → faecuria.
      - malignancy
      - crohn's disease.

4 Haematuria :- pink, red, brown

- Visible
  - can arise anywhere along renal tract.
  - causes
    - IgA nephropathy → most common glomerular cause.
      - preceded by non-specific URTI.
    - Bladder tumors :- painless & intermittent.
  - Q
    - previously? persistent or intermittent?
    - Loin pain (obstruction), flank pain (RCC).
    - fever, dysuria, suprapubic pain & urinary frequency :- infection.
    - family history :- polycystic kidney disease.
- Non-visible haematuria → dipstick urinalysis abnormally, +1 considered positive.
  - causes
    - urinary tract disease + → proteinurea.
      - HTN.
      - impaired renal function.
    - malignance :- age (>40y).
    - women :- contamination by menstrual blood.

9.7 Abnormalities of urine colour

Orange-brown	
• Conjugated bilirubin • Rhubarb, senna • Concentrated normal urine, e.g. very low fluid intake • Drugs: sulfasalazine	
Red-brown	
• Blood, myoglobin, free haemoglobin, porphyrins • Beetroot, blackberries	• Drugs: rifampicin, rifabutin, clofazimine, entacapone
Brown-black	
• Conjugated bilirubin • Drugs: L-dopa, metronidazole, nitrofurantoin, chloroquine, primaquine	• Homogentisic acid (in alkaptonuria or ochronosis)
Blue-green	
• Drugs/dyes, e.g. propofol, fluorescein, triamterene	

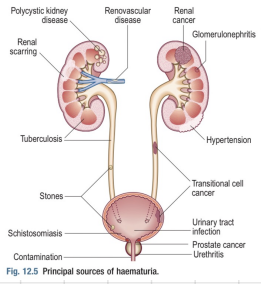


Fig. 12.5 Principal sources of haematuria.

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

- Nephrotic syndrome → signs & symptoms
  - proteinurea (>3.5g/24 h)(1g/m²/day)
  - hypoalbuminaemia.
  - oedema.
  - Hyperlipidaemia.
  - Hypercoagulability.
  - ↑Risk of infection.
- few weeks :- minimal change disease → AKI.
- many months :- membranous nephropathy → CKD.
- causes → DM (most common), malignancy, GN
- Q
  - weight, altered bowel, cough, Back pain, inflammatory (RA, IBD, bronchiectasis)
  - renal AA amyloid deposition.
  - Ankle swelling, facial swelling & puffy eyelids (morning).
  - BreathLessness (pleural effusion).
  - Abdominal swelling (Ascites).

9.9 Causes of proteinuria

Renal disease	
• Glomerulonephritis • Diabetes mellitus • Amyloidosis • Systemic lupus erythematosus	• Drugs, e.g. gold, penicillamine • Malignancy, e.g. myeloma • Infection
Non-renal disease	
• 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

• Cold exposure • Vigorous exercise • Febrile illness	• Abdominal surgery • Heart failure

6 Acute kidney injury

- range of presentation from mild → dialysis requiring RF, ↑serum creatinine.
- prerenal → due to volume depletion.
  - Q
    - fluid Loss :- vomiting, diarrhoea, bleeding, ↓oral intake.
    - recent operations or investigations :- ↓H₂O intake
    - infection signs :- fever, sweats, productive cough or dysuria
    - ↓Renal flow → HF or liver disease
      - Drugs (ACEI, Anti-HTN, diretics, NSAID.

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	–

[a]Risk, Injury, Failure, Loss, End-stage kidney disease.
[b]Acute Kidney Injury Network.

- intrinsic AKI → most common ATI → ATN.
  - causes
    - follows renal hypoperfusion (ischaemia-reperfusion).
    - rhabdomylosis :- prolonged immobilsation (following a fall).
    - systemic diseases
      - myeloma.
      - infective endocarditis.
      - vasculitis.
      - SLE.

12.2 Causes of acute kidney injury

Prerenal
- 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
- 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 uraemic syndrome, scleroderma renal crisis)
- Accelerated-phase hypertension
- Cholesterol emboli

Postrenal
- Renal stones (in papilla, ureter or bladder)
- Papillary necrosis
- Ureteric or bladder transitional cell carcinoma
- Intra-abdominal or pelvic malignancy (e.g. cervical carcinoma)
- Retroperitoneal 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)

- Acute tubular injury (ATI) :- normally recovers in days-weeks.
  - Q
    - Recent illness or operations.
    - Drugs:- NSAID, Antibiotics, PPI → allergic interstitial nephritis.
    - systemic :- ↓weight, fever, night sweets, tiredness, arthralgia, myalgia, Bone pain, cough.
- IgA nephropathy (GN) → Syncharyngitic haematuria:- hematuria → URT infection.
  - Q
    - prior episodes
    - Lion pain & haematuria.
    - similar illness, sore thorat post infection GN (β-hemolytic).

- postrenal AKI → Due to obstruction
  - Bladder outflow obstruction:- prostatic hypertrophy.
  - uretic obstrcution:- malignancy (bladder, cerrix, ovary, utreus). painLess.
  - Acute urinary retention:- +suprapubic discomfort, chronic:- painLess.
  - Q
    - urinary urgency, frequency, nocturia & incontinence.
    - poor urine stream & terminal dribbling.
    - previous prostatic assessments
    - Suprapubic pain, Leg weakness, perineal numbness or faecal incotinence .
    - previous dx & operation & tx (radiotheraphy).

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

- Degree of renal dysfunction ± proteinurea.
- most patient have few symptoms → end-stage.
- Q
  - conditions:- DM, vascular (MI, stroke), HTN ↑Lipid, GN (IgA nephropathy), nephrotic.
  - urine abnormality:- proteinurea & non-visible haematuria.
  - genetics disease:- ADPKD, Alpert's.

12.3 Definition of chronic kidney disease (CKD)

CKD stage	eGFR (mL/min/1.73 m²)	Description	Management
1	≥90	Kidney damage with normal or ↑ GFR	Observe; control blood pressure and risk factors
2	60–89	Kidney damage with mild ↓ GFR	
3A	45–59	Moderate ↓ GFR	
3B	30–44		
4	15–29	Severe ↓ GFR	Prepare for end-stage kidney disease
5	<15	End-stage kidney disease	Dialysis, transplantation or conservative care

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.

12.4 Quantification of proteinuria using either urine albumin : creatinine ratio (ACR) or protein : creatinine ratio (PCR)

ACR (mg/mmol)	PCR (mg/mmol)	Interpretation
>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
30	>50	Use ACE inhibitor or angiotensin-receptor blocker if blood pressure is elevated; suffix 'p' on CKD stage
70	100	Requires tight blood pressure control
>250	>300	Nephrotic-range proteinuria

*Values for males/females.
ACE, angiotensin-converting enzyme; CKD, chronic kidney disease.

8 End-stage renal disease & uraemia.

- uraemia, GFR <10 mL/min/1.73 m², non-specific symptoms.
- Q
  - anorexia, nausea & vomiting.
  - Lethargy.
  - poor concentration.
  - pruitus.
  - BreathLessness:- fliud overload, ↓:- acidosis & anemia.
  - peripheral edema.
  - pericarditis & peripheral neuropathy (rare).

9 patient with renal transplant.

- problems → ↓function:- routine blood test.
  - infection or malignancy:- immunosuppression.
  - Lymphoma.
- Q
  - date of transplant, organ rejection (1st w).
  - immunosuppression, AKI.
  - fever, ↓weight, cough, breathLessness, dysuria & tender over graft.

10 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 apperance :- 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.

- Drugs which accumulate in Renal failure
  - digoxin
  - lithium
  - aminoglycoside
  - opoids
  - water solube B-Blocker (atenolol).
- Drugs effects Renal function
  - ACE_I
  - angiotensin receptor antagonist.
  - NSAIDs.
- toxic to kidney
  - Aminoglycosides.
  - amphotericin.
  - lithium.
  - ciclosporin.
  - tacrolimus.
  - paracetamol overdose.

•12.2.4 :- Family history

- Renal disease, HTN, stroke, DM, deafness.
- polycystic kidney disease (ADPKD)
  - each generation, males & females.
  - +berry anyrsms:- Subarachnoid haemorrhage.
- Alport syndrome
  - type IV collagen + early-onset deafness.
  - heterogenous & X-Link (most common).
  - non-visible heamaturia in childhood → ↑signeficant 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 angiolipomata	Seizures, mental retardation, facial angiofibromata, retinal lesions	Autosomal dominant
Prune-belly syndrome	Dilated bladder and urinary tract; urinary infection and renal failure	Absent abdominal wall musculature	Sporadic mutation

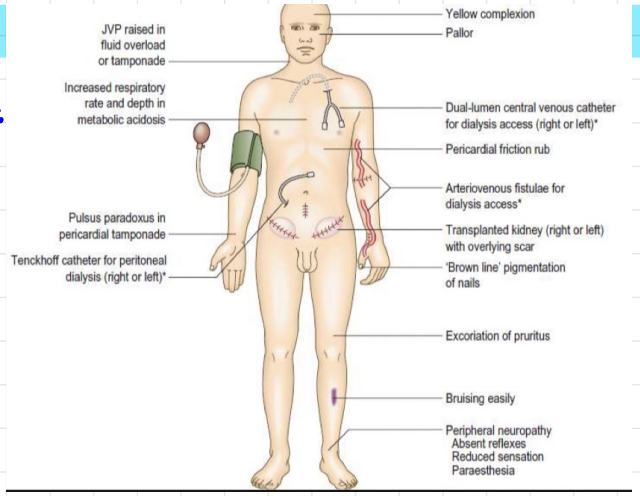
•12.2.5 :- Social History.

- 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.

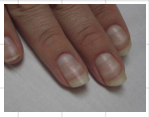
•12.3 :- The physical examination.

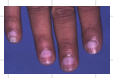
•12.3.1 :- General appearance

- CKD :- mostly alter general apperance.
- unwell, pellor, cushigoid & hirsutism, Hiccupping, flapping tremor.
- Scratch mark :- from pruitis.
- Sever :- drowsiness, myoclonic twitching or asterixis.
- uraemia :- yellow, uremic fetor.
- eye :- anemia & fundoscopy
- Breathlessness :- fliud overload.
- Hyperventilation :- metabolic acidosis.

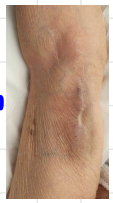


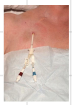
1. Hands
   - pellor :- anemia.
   - Nails
     - Muehrcke's :- Ialbumin.
     - Lindsay's :- CKD.





2. Dialysis acess
   - AV fistula
     - prominent blood vessels on forearm or upper arm
     - scars from previous fistula on either arms.
     - functioning :- readily pelpable fliud thrill.
   - tunnelled venous cath → in anterior chest wall.





3. Face
   - Rash :- CT disease (SLE)
   - conjunctival pellor :- anemia in CKD.
   - inflammed eye :- scleritis ± uveitis, systemic vasculitis.
   - fundoscopy
     - DM :- retinal disease
     - HTN :- chronic end-organ damge (TBP)
       - 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-schönlenin purpura & cryoglobunemia :- AKI & CKD.
   - Drug rash :- allergic interstiail nephritis.

•12.3.2 :- Assessment of fliud balance

1. General
   - Dehydrated
     - sunken eye.
     - ↓skin turgor
     - dry mucous membrane
   - fliud 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 oveload → pulmonary edema & pleural effusion.
→ S_3:- third heart sound.
→ HTN:- S_4
→ 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:- nephroectomy (ADPKD).
→ peritoneal dialysis catheter.

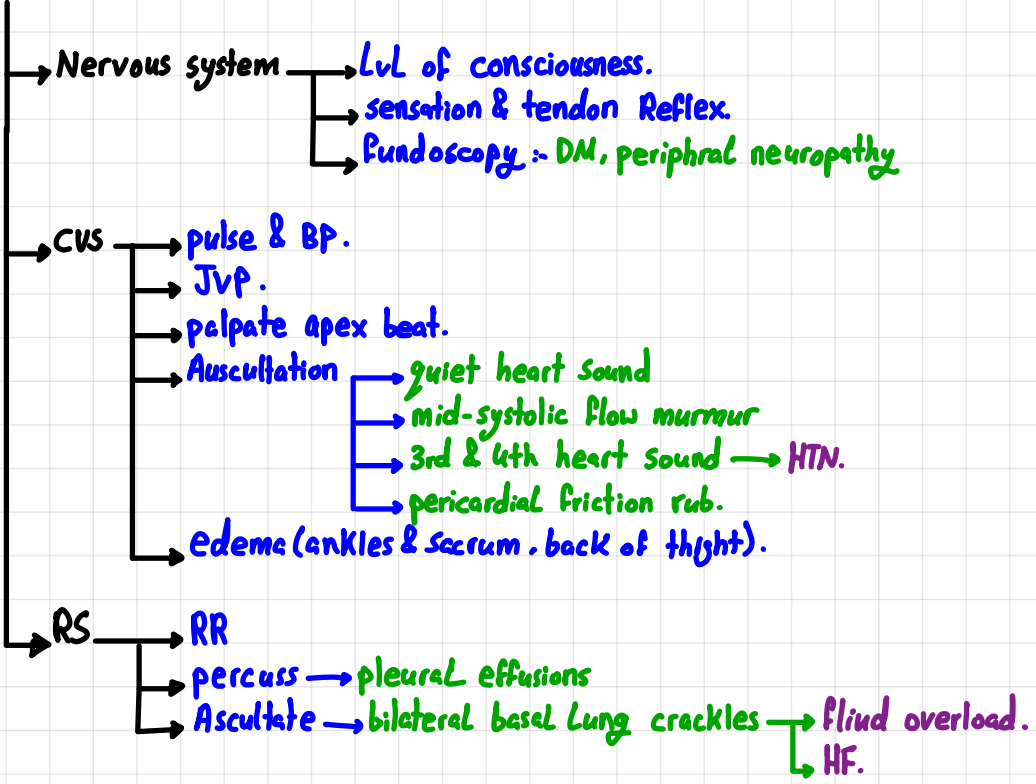
2 palpation
→ superficial → Deep:- masess, AAA.
→ enlarged kidney:- palapable on flanks, 12th rib paramedian (ADPKD).
→ transplant kidney:- palpated mass (12-14 cm) in iliac fossa, Rt more common.
→ tenderness:- graft pyelonephritis or rejection.
→ palpable bladder:- soft. midline, suprapubic mass, cannot 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:- renovescular 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.


Nervous system
LvL of consciousness.
sensation & tendon Reflex.
Fundoscopy :- DM, peripheral neuropathy
CVS
pulse & BP.
JVP.
palpate apex beat.
Auscultation
quiet heart sound
mid-systolic flow murmur
3rd & 4th heart sound → HTN.
pericardial friction rub.
edeme (ankles & sacrum . back of thight).
RS
RR
percuss → pleural effusions
Ascultate → bilateral basal Lung crackles → fliud overload.
HF.