
UNIT 2 GASTROINTESTINAL HISTORY AND ABDOMINAL EXAMINATION

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2.0 OBJECTIVES

After undertaking the activities in this unit, you should be able to:

- Analyze the symptomatology of gastrointestinal problems
- Acquire clinical skills to diagnose gastrointestinal disorders;
- Decide appropriate investigations needed to confirm the diagnosis

2.1 INTRODUCTION

The gastrointestinal system extending from the mouth to the anus, which together with its connected secretory glands, controls the passage, processing, absorption and elimination of food. Symptoms of GI disorders are often non-specific, and signs of abnormality are few, unless the disease is advanced. The symptoms of disease in these organs are non-specific and hence systematic history taking and clinical examination is mandatory in the diagnosis of diseases of gastrointestinal system.

2.2 HISTORY TAKING

Let us learn more about the history that needs to be taken for the common symptoms experienced by patients of gastrointestinal disease.

Abdominal pain

Abdominal pain is a common symptom. As with any pain, it is important to characterize its **site, intensity, character, radiation, duration and frequency with aggravating and relieving factors and associated features**. The particular characteristics of pain from certain frequent and important causes are given in **Box 2.1**. Abdominal pain may also be due to causes that are not related to abdomen such as metabolic disorders like porphyria or lead poisoning and depression.

| Particular characteristics of pain from frequent and important causes |
|--|
| <ul style="list-style-type: none"> ▪ Peptic ulcer: epigastric, burning or gnawing, radiates through to back, meal related, wakes the patient, relieved by antacid. |
| <ul style="list-style-type: none"> ▪ Gastric cancer: epigastric, severe, partly meal related, not relieved by antacid. |
| <ul style="list-style-type: none"> ▪ Pancreatic: high epigastric, severe, felt front-to-back, immediately after eating, relieved by sitting forward |
| <ul style="list-style-type: none"> ▪ Midgut: periumbilical, colicky, some relation to meals |
| <ul style="list-style-type: none"> ▪ Lower gut: periumbilical or suprapubic, colicky, some relief from bowel action |
| <ul style="list-style-type: none"> ▪ Biliary: right upper quadrant, severe, colicky (but over a long time period), radiates to right shoulder, accompanied by nausea |
| <ul style="list-style-type: none"> ▪ Renal colic: loin-to-groin, colicky, very severe, accompanied by nausea |
| <ul style="list-style-type: none"> ▪ Functional: anywhere in the abdomen, colicky, accompanied by bloating, relieved by bowel action |

Box 2.1: Characteristic pain as per cause

Abdominal distension

Abdominal distension may be due to five F's Flatus, Fluid, Fetus, Feces, Fat. Marked enlargement of the major organs or the presence of a large mass lesion can also present as abdominal distension. The distension may be symmetrical (ascites) or asymmetrical (marked organomegaly).

Flatulence

Flatulence is a frequent symptomatology in elderly patients usually not associated with organic disease of GI tract. Flatulence is normally associated with belching, abdominal distension and the passage of flatus per rectum. It is only infrequently associated with organic disease of the GI tract but usually represents a functional disturbance, some of which is due to excessively swallowed air.

Anorexia

Loss of appetite refers to anorexia, although some patients with GI disease have an appetite for food but feel full after just a few mouthfuls (early satiety). It is an important symptom for pathology particularly in the upper GI tract.

Weight loss

Weight loss may be due to lack of food intake like anorexia, dysphagia or vomiting, malabsorption of nutrients or a systemic effect of important diseases. There are diseases that directly cause malabsorption such as coeliac disease, inflammatory bowel disease or pancreatic exocrine insufficiency. Weight loss is also commonly associated with conditions such as malignancy or chronic infections such as tuberculosis both within and outside the GI tract.

Heartburn and Reflux

Heartburn is due to acid reflux from the stomach into the esophagus. It causes pain in the epigastrium, retrosternal region and in the neck. It is occasionally difficult to distinguish from angina pectoris and may cause atypical chest pain in various sites. It occurs particularly at night when the patient lies flat in bed or after bending or stooping when abdominal pressure is increased. Heartburn may be exacerbated by dietary intake (such as alcohol or very spicy foods) and certain medications (such as bisphosphonates).

Reflux of Gastric content causes a disagreeable sensation in the retrosternal region. Reflux is a symptom which occurs without heartburn, when non-acidic fluid or bile regurgitates into the mouth, causing a bitter taste.

Dysphagia (and odynophagia)

Dysphagia as difficulty in swallowing for both liquids and solids and odynophagia as pain during swallowing. Dysphagia can be benign or malignant lesion. An esophageal or upper gastric carcinoma usually presents with dysphagia for solids initially, progressing quickly to liquids and with accompanying weight loss. A benign stricture may follow the same pattern but much less rapidly. Neurogenic dysphagia may present with greater difficulty in swallowing liquids than solids, sometimes associated with aspiration or coughing. Odynophagia may be due to candidal esophagitis associated with immuno-compromised states.

Indigestion (Dyspepsia)

Dyspepsia is very common symptom in elderly which include epigastric pain, heartburn, distension, nausea or 'an acid feeling' occurring after eating or drinking. The symptom is subjective and frequently may be associated with Helicobacter infection, peptic ulceration, and acid reflux. Upper GI malignancy should be excluded in older patients who present with new onset dyspepsia.

Vomiting

Vomiting is a neurogenic response triggered by chemoreceptors in the brainstem or reflexly through irritation of the stomach. Vomiting of GI origin are associated with local discomfort in the abdomen. Non-GI disease, such as raised intracranial pressure or metabolic disturbance, should be suspected if there is painless vomiting not associated after food intake.

Hematemesis and Melena

Hematemesis is the vomiting of blood and results from bleeding in the upper GI tract, above the duodenojejunal flexure. Blood that lies in gastric juice for a while turns black and may be vomited looking like ground coffee. Hematemesis often can be confused with hemoptysis (coughing up blood) or blood coming from the oral cavity. Hematemesis is associated with nausea and other GI symptoms (acidic in nature). Hemoptysis is associated with cough (alkaline in nature).

Melaena is passing of jet-black, tarry stools with a characteristic smell. It usually indicates bleeding proximal to the ileo-caecal valve but occasionally may originate from a source in the right colon.

Jaundice

Jaundice (or icterus) is a yellowish pigmentation of the skin and conjunctival membranes due to high levels of bilirubin in the blood. In addition to the characteristic color of the skin and conjunctiva, there may be other associated cutaneous and systemic features of liver disease, often with dark urine. Its presence implies disease of the liver or the biliary tract although it may also be the result of excessive haemolysis.

Diarrhoea

Diarrhoea is a subjective symptom with passage of more than three stools per day or a large amount of stool (more than 300 g/day). It results from dietary indiscretion or from viral or bacterial infection. Causes of chronic diarrhoea include inflammatory bowel disease, in which there may be associated passage of blood or mucus per rectum, or malabsorptive states. Steatorrhoea refers to the passage of pale, bulky stools containing excess fats that commonly float in water and are difficult to flush away. Elderly patients with history of chronic diarrhea are to be investigated.

Constipation

Constipation is a common symptoms encountered in elderly patient. It is often described as infrequent motion or passage of hard stools. Other relevant history to be elicited in these patients is usual bowel habits of the individual, detailed history dietary habits and fluid intake. History of physical mobility and medications like antihypertensive, diuretics, cough suppressants and sedatives.

Altered Bowel Habits

Elderly Patients with history of altered bowel habits like alternating Diarrhea and constipation should be investigated.

Itching

Generalized itching is seen in patients with obstructive jaundice, primary biliary cirrhosis, Uremia, Lymphoproliferative disorders

Check Your Progress 1

1) Name some common symptoms of GI system?

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2.3 EXAMINATION OF GASTROINTESTINAL SYSTEM

Gastro Intestinal system examination includes general physical examination pertaining to gastrointestinal disorders and examination of abdomen. Examination of the back, hernia sites and per rectal examination are important aspects to be noted.

General physical examination

General Physical examination are given in **Box 2.2**

| |
|--|
| 1. Cachexia |
| 2. Anemia |
| 3. Icterus |
| 4. Clubbing: Due to malabsorption, Inflammatory bowel disease, chronic liver disease, hepatoma |
| 5. Leuconychia(white nails): occurs in hypoalbuminemia |
| 6. Koilonychia(spoon shaped nails): chronic iron deficiency |
| 7. Lymphadenopathy – generalized - leukemia, lymphoma |
| 8. Localized: left supraclavicular node enlargement (Virchow's node), suggestive of GI and pelvic malignancy |
| 9. Scratch marks/ Pruritus: obstructive Jaundice, leukemia, Uremia Tylosis: esophageal carcinoma |

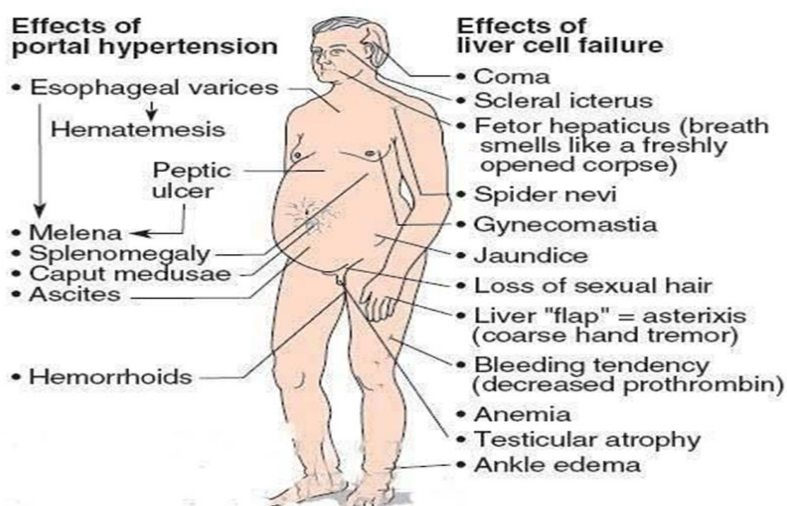
Box 2.2: General Physical Examination

Signs of liver cell failure are given in **Box 2.3**

- Alopecia
- Fetor hepaticus: sweetish, fecal smell of breath due to methyl mercaptan
- Jaundice
- Parotid swelling
- Gynaecomastia,
- Spider nevi: central arteriole with radiating vessels resembling legs of spider, >5 is significant
- Loss of axillary hair
- Palmar erythema
- Dupuytren's contracture
- Asterixis
- Xanthelasma

Box 2.3: Signs of liver cell failure

Signs of liver failure are shown in **Fig. 2.1**



Presentation of cirrhosis/portal hypertension.

Fig. 2.1: Signs of liver failure

Palmar erythema, spider naevi and gynaecomastia are shown in **Fig. 2.2**, **Fig.2.3** and **Fig. 2.4** respectively.



Fig.2.2: Palmar erythema Fig.2.3: Spider naevi



Fig.2.4: Gynaecomastia

2.4 EXAMINATION OF THE ABDOMEN

For the purpose of clinical description abdomen can be arbitrarily divided into 9 compartments by two imaginary horizontal and vertical lines. Draw two vertical lines from the midpoint of the clavicle on either sides. Draw the horizontal lines- one at the lower border of L1 vertebra and the other at the level of tubercles of iliac crest.

The regions are

Quadrants of Abdominal Examination are shown in **Fig. 2.5**

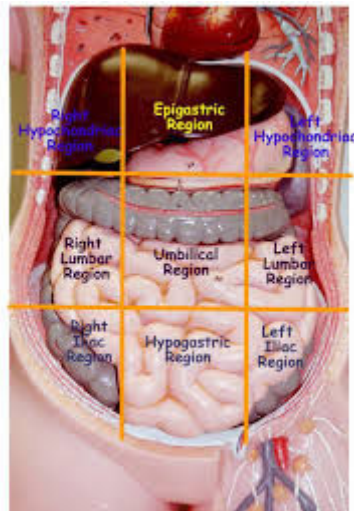


Fig 2.5: Quadrants of Abdominal Examination

Examination of the abdomen should follow the same practice like inspection, palpation, percussion and auscultation

2.4.1 Inspection

Patient should be examined both in recumbent and erect posture. There must be adequate light in the room and the patient should be in a relaxed posture. Examination should be carried out in both knee flexed and extended position while the patient is still supine. Always stand to the right side of the patient. Abdomen should be exposed, maintaining the dignity of the patient. Inspection of the groin and hernial sites should not be neglected.

Following features are noted on examination:

- Shape: is it of normal contour, distended or scaphoid??

Generalized fullness or distension is due to fat, fluid, flatus, feces, foetus

Localized distension: symmetrical and centered around umbilicus- small bowel Obstruction, asymmetrical- liver/spleen Scaphoid/ sunken abdomen: advanced starvation or malignancy

- Umbilicus

Normally: retracted and inverted

Everted: umbilical hernia

Horizontal slit: cirrhosis of liver,

Vertical slit: pelvic or ovarian tumors

Omphalolith: inspissated desquamated epithelium and other debris, seen in elderly

- Movements

Movements of the abdominal wall should be carefully watched.

Normally there is a gentle rise in the abdominal wall during inspiration and a fall during expiration.

- In generalized peritonitis, movements are diminished or absent: silent abdomen

- Visible pulsations

Seen in aortic aneurysm, in thin patients

- Visible peristalsis (gastric or intestinal)

- Visible gastric peristalsis: seen in gastric outlet obstruction. We can see a wave of peristalsis progressing from left hypochondrium and epigastric region to right lumbar
- Visible intestinal peristalsis: seen in small bowel obstruction, as a stepladder form of peristaltic wave produced by the hypomotile small intestine
- VGP and VIP can sometimes be seen in absence of obstruction in elderly patients with a lax abdominal wall

- Skin or surface of abdomen

- Striae atrophica or gravidarum: white or pink linear marks seen over skin of abdomen produced by gross stretching of the skin with rupture of elastic fibres and it indicates recent change in size of abdomen
- Purple striae: seen in Cushing's syndrome
- Prominent superficial veins: distended veins radiating from the umbilicus(caput medusa)-signifies portal hypertension
- SVC obstruction: blood flows caudally

- IVC obstruction: blood flows cranially or toward umbilicus
Veins are seen in paraspinal region or lateral wall of abdomen

- Scars

- Incisional hernia, puncture marks, scratch marks should be seen.

- External genitalia

- Look for scrotal swelling, testicular atrophy or hernias (femoral or inguinal)
- Look for herinal orifices in standing position.

Measurements

- Abdominal girth should be measured at the umbilical level. Periodic measurement is done to assess prognosis in peritonitis, paralytic ileus and bowel obstruction
- Measure the distance between lower end of xiphisternum to umbilicus and from umbilicus to symphysis pubis. Normally umbilicus is at mid position. Umbilicus is displaced downwards in cirrhosis with ascites and upwards in pelvic or ovarian tumors.
- Spinoumbilical distance: it is the distance between umbilicus and anterior superior iliac spine. Normally they are equidistant. It should be measured on both sides to find out the shift of umbilicus to one side in case of tumours originating from other side of pelvis.

Check Your Progress 2

1. Name the five F's for the causes of abdominal distension?

.....
.....
.....

2. In portal hypertension, the direction of flow of blood in the veins is from below upwards- TRUE/FALSE?

2.4.2 Palpation

Before examining ensure patient's knees are flexed and the abdominal wall is relaxed. Examiner's hands should be warm before palpating the abdomen to avoid involuntary contraction of the abdomen muscles. Start palpating with palmar aspect of the fingers placed parallel to the abdomen Palpation should be started from the left iliac fossa and proceeded in an anticlockwise direction to end in the suprapubic region. Both superficial and deep palpation should be carried out. Dipping palpation may be required in some conditions

Superficial palpation

Look for warmth and tenderness over all the regions. Palpate for any abnormal pulsation or palpable masses.

Deep palpation

Guarding and Rigidity may be experienced. Abdominal guarding is due to muscular contraction which often occurs reflexly as a part of a defense mechanism over an inflamed organ. The whole abdomen is rigid and diffuse guarding is present, in case of generalized peritonitis,

Palpation by dipping method

This method is used in tense ascites to detect the presence of hepatic or splenic enlargement. The technique may help to detect and map the outlines of enlarged organs or tumors. Sudden displacement of liquid gives a tapping sensation over the surface of liver or spleen similar to patellar tap. For eliciting this, place the hand flat on abdomen and make quick dipping movements

Palpation by dipping method shown in **Fig. 2.6**



Fig. 2.6: Palpation by dipping method

Structures normally palpable are:

1. Aorta
2. Edge of the liver
3. Lower pole of either kidney
4. Hard faeces
5. Rectus abdominis
6. Normal colon
7. Small inguinal lymph nodes
8. Distended bladder.

When an organ is enlarged, assess the following:

- a. Edge or border (sharp or rounded)
- b. Surface (smooth or nodular)
- c. Consistency (soft, firm or hard)
- d. Presence of tenderness
- e. Movement with respiration.

Let us learn the methods of palpation of the different abdominal organs and the conditions which could be picked up by palpation.

A. Palpation of Liver

Place the hand flat on abdomen with fingers pointing upwards and position the sensing fingers (index and middle) lateral to rectus muscle so that finger tips lie on a line parallel to expected liver edge. Press hand firmly inwards and upwards and keep it steady while patient takes a deep breath through mouth. Wait for one full phase of respiration and continue to workup laterally.

With this method, tip of fingers should slip over the edge of palpable liver.

You can palpate the liver with an alternate method. Keep right hand below and parallel to right subcostal margin. The liver edge will then be felt against the radial border of index finger, confirm with percussion. Avoid placing hand over rectus abdominis. Do not begin palpation too close to costal margin.

The findings on palpation of liver and their significance are -

1. Soft, smooth, tender: Congestive cardiac failure liver, acute viral hepatitis
2. Firm and regular: Obstructive jaundice and cirrhosis of liver, chronic congestive cardiac failure (nutmeg liver).
3. Nodular liver: In advanced secondary carcinoma, hepatoma
4. Pulsatile liver: Systolic pulsations-tricuspid regurgitation. Diastolic pulsations-tricuspid stenosis
5. Riedel's lobe (a tongue- may also be palpable like projection of right lobe of liver)

B. Palpation of Gallbladder

Gall Bladder is felt as a firm, smooth, rough or globular swelling with distinct borders, just lateral to the edge of the rectus abdominis near the tip of ninth costal cartilage. It moves with respiration.

Gall Bladder is palpable in:

- Carcinoma head of the pancreas
- Mucocele or impacted gallstone in the neck of a collapsed empty and uninfected gallbladder. Mucus is secreted into the lumen and in later stages gallbladder becomes palpable.
- Carcinoma of gallbladder: Gallbladder is felt as a stony hard, irregular swelling. Gallbladder is distended and palpable in carcinoma of pancreas; in cholelithiasis, the gallbladder wall is diseased, thickened, contracted and not palpable due to repeated cholecystitis. This is referred to as **Courvoisier's Law**.
- Look for **Murphy's Sign**. Ask the patient to breathe in deeply and palpate for gallbladder in the normal way. At the height of inspiration, the breath is arrested with a gasp as the mass is felt. This is the sign of acute cholecystitis.

C. Palpation of Spleen

- To become palpable, spleen should have enlarged 2-3 times. Direction of enlargement is towards right iliac fossa.
- Palpate from right iliac fossa to left hypochondrium
- Wait for one full phase of respiration
- At the height of inspiration, release the pressure on the examining hand so that the finger tips slip over the lower pole of spleen, confirming its presence and surface characteristics.
- If spleen is not palpable, move the examining hand upwards after each inspiration until the finger tips are under the costal margin.
- Repeat this process along the entire rib margin as the position of the enlarging splenic tip is variable.
- If still not palpable, position the patient in the right lateral position with the left hip and knee flexed.
- Place the other hand posteriorly to support the lower rib cage and repeat the examination.
- Alternatively, examine for spleen from patient's left side, curling the fingers of left hand beneath the costal margin as the patient breathes deeply.(Hooking method)

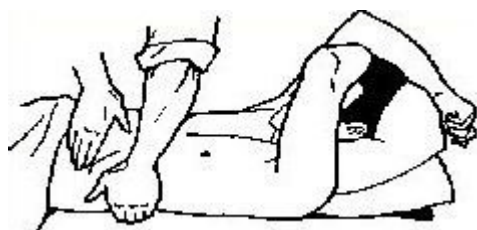


Fig. 2.7: Palpation of Spleen – Middleton's Maneuver

Middleton's maneuver of Palpation of the spleen

In this method, the examiner stands on the left side of the patient facing the foot of the bed. The hooked fingers of the left hand are placed under the costal margin and with right hand pressure is exerted over the posterolateral aspect of the lower thorax. The patient is then asked to take a deep breath and spleen is felt at the end of deep inspiration.

Hooking method is shown in **Fig. 2.8**



Fig. 2.8: Hooking method

D. Palpation of Kidneys

1. Use bimanual technique to palpate the kidneys.
2. Place one hand posteriorly below lower rib cage and the other over upper quadrant.
3. Push the two hands together firmly, but gently as the patient breathes out.
4. Feel for the lower pole as the patient breathes in deeply.
5. Try to trap the palpable kidney between the two hands by delaying application pressure until the end of inspiration. This helps in palpation, as the kidney slides up on expiration
6. Confirm the structure of the kidney, by pushing the kidney between the two hands (ballotting) and by assessing its degree of movement during respiration.
7. Assess the size, surface and consistency of a palpable kidney.
8. Examine the left kidney from either side

Method of Palpation of Kidney is shown in **Fig.2.9**



Fig.2.9: Palpation of Kidney

Differences between splenic and renal enlargement on palpation are shown in **Box 2.4**

| Spleen | Left Kidney |
|--|--|
| ● Enlarges downwards | ● Enlarges towards left iliac fossa |
| ● Look for splenic notch | ● No notch |
| ● Sharp margin | ● Rounded margin |
| ● Fingers cannot be inserted between spleen and rib border | ● Finger can be inserted between spleen and rib border |
| ● Always dull on percussion | ● Can be resonant as it lies posterior |
| ● Cannot feel the upper border | ● The upper border may be felt |

Box. 2.4: Differences between splenic and renal enlargement on palpation

E. Palpation of Urinary Bladder

Normally Urinary Bladder is not palpable. It is palpable as a smooth, firm, regular, oval shaped swelling in suprapubic region and its dome may reach as far as the umbilicus. Its lower border cannot be felt. It is symmetrically placed in suprapubic region beneath the umbilicus, which is dull on percussion.

Differential Diagnosis of the urinary bladder

- Gravid uterus: It is firmer, mobile side to side and vaginal signs are present.
- Fibroid uterus: It is felt as a bosselated, firm swelling with different vaginal signs.
- Ovarian cyst: It is eccentrically placed (left or right side)

F. Examination of Groins, Para-aortic Nodes and Vessels

- Examine groins for hernia
- Palpate aorta and common iliac vessels
- Para-aortic nodes are palpable when considerably enlarged and they are felt as round, firm, confluent masses in the umbilical region and epigastrium along the left border of aorta

Check Your Progress 3

Following are true about kidney swelling except

- Ballotable
- Bimanually palpable
- Moves with respiration
- Band of resonance present

2.4.3 Percussion

Let us learn how we can detect the various organs on percussion

A. Liver

Upper and lower border of right lobe of liver can be mapped out. Start anteriorly at the 4th inter costal space where the note will be resonant over lungs and work downwards vertically. In normal liver, upper border is at 5th inter costal space where note is dull; This extends down to the lower border found at or just below right subcostal margin.

The normal dullness over the upper part of liver is reduced in:

1. Severe emphysema
2. Large right pneumothorax
3. Gas or air in peritoneal cavity (perforation of a viscus).

Percussion below the right costal margin is useful in hepatomegaly. Ask the patient to breathe in deeply as you percuss, lightly keeping the fingers parallel to the rib margin. As the liver descends during inspiration, a change in note from resonance to dull signifies liver edge.

You can also measure the Liver span: Direct measure of liver size is 12-15 cm in height extending from 5th rib or (below right nipple in men) to the palpable border or right costal margin. Serial measurement is done to find out shrinkage or enlargement. Palpable liver size is expressed as so many cm below the right costal margin at the mid clavicular line.

B. Spleen

Dullness extends from left lower ribs to the left hypochondrium and left lumbar region. Splenic dullness gives way to the resonance of surrounding bowel.

Newer methods of percussion of spleen

1. **Nixon's method:** The patient is placed on the right side so that the spleen lies above the colon and stomach. Percussion begins at the lower level of pulmonary resonance in the posterior axillary line and proceeds diagonally along a perpendicular line toward the lower mid anterior costal margin. The upper border of dullness is normally 6-8 cm above the costal margin. Dullness greater than 8 cm in an adult is presumed to indicate splenic enlargement.
2. **Castell's method:** With patient supine, percussion in the lowest intercostal space in the anterior axillary (8th or 9th) produces a resonant note if the spleen is normal in size. This is true during expiration or full inspiration. A dull percussion note on full inspiration suggests splenomegaly.

C. Bladder

Superior and lateral borders can be defined from the adjacent bowel

D. Methods of Percussion Used for Detecting Fluid in the Abdomen

There are many methods of detecting fluid in the abdomen

a) *Shifting Dullness*

One of the methods of detecting fluid in the abdomen is by detecting Shifting Dullness.

With the patient lying supine, percuss laterally from the midline keeping the fingers in the longitudinal axis until dullness is detected. In normal individuals, flanks are resonant. In patients with moderate ascites, flanks are dull (except in loculated ascites or when there are adherent loops of bowel). On shifting the patient to one side, either to the right or left lateral decubitus position, the previous dull area over the flank becomes resonant. This is due to the shift of fluid in the peritoneal cavity. This shift of fluid can be doubly confirmed by a rise in the level of dullness in the opposite flank. About 1000 ml of fluid should be present to elicit this sign.

Levels of Shiftingdullness during percussion is shown **Fig.2.10**.

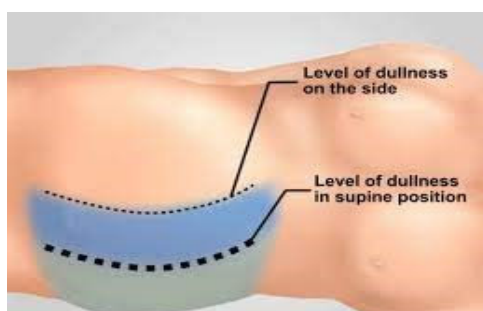


Fig. 2.10: Shifting Dullness

b) *Fluid Thrill*

Patients lies on his back. Place one hand over the lumbar region of one side, get an assistant or the patient himself to put the side of his hand firmly in the midline of the abdomen and then flick or tap gently the lumbar region. A fluid thrill or wave is felt as a definite and unmistakable impulse by the detecting hand held flat in the opposite lumbar region. The purpose of keeping the assistant's hand is to dampen any impulse that may be transmitted through the fat of the abdominal wall. This is felt when there is a large amount of fluid under tension, i.e.> 2000 ml.

The method of fluid thrill during percussion is shown in **Fig. 2.11**

Absence of fluid thrill and shifting dullness or any of them, does not exclude diagnosis of ascites.



Fig.2.11: Fluid Thrill

c) Puddle's Sign

This sign is elicited to detect the presence of minimal fluid when flanks are resonant. This can be elicited either by percussion or by ausculto-percussion. It can detect as little as 120 ml of ascitic fluid. Patient is to lie in the prone position for 5 minutes and goes on all 4 limbs (arm-knee position) so that the middle portion of abdomen is dependent and his back is horizontal. New percuss around umbilicus and elicit dullness. Previously resonant area becomes dull if minimal fluid is present. Place a stethoscope over umbilical region and scratch the abdominal wall from periphery towards umbilicus. A change in the quality of sound is perceived while crossing the fluid column. This sign is false positive in massive splenomegaly and distended bladder.

In ascites, usually flanks are dull and the centre of abdomen is resonant and in ovarian or pelvic tumours, the centre of abdomen is dull and the flanks may be resonant. However, in gross ascites and in large ovarian tumours, both the flanks and the centre of abdomen may be dull on percussion.

Arm knee position during percussion (Puddle sign) is shown in **Fig.2.12**



Fig. 2.12: Puddle's Sign

Check Your Progress 4

Shifting dullness is present when the fluid in the peritoneal cavity is more than _____?

2.4.4 Auscultation

Auscultation of abdomen is done to detect sounds in the abdomen. Let us learn about the different kinds of sounds that can be detected on auscultation.

A. Bowel Sounds

Normal motility of the gut creates a characteristic gurgling sound every 5-10 seconds which can be heard by auscultation.

Bowel sounds are increased (Borborygmi) in:

- Simple, acute, mechanical, small bowel obstruction. Increased bowel sounds with colicky pain is pathognomonic of small bowel obstruction. In between colicky pain, bowel is quiet and no sounds are audible

Bowel sounds are absent in

- Paralytic ileus
- Peritonitis.

In later stages of paralytic ileus, high pitched, tinkling sounds due to fluid spill over from one distended gas and fluid filled loop to the other can be heard.

B. Succussion Splash

It is a sound resembling shaking a half filled bottle. It is heard in:

1. Pyloric stenosis
2. Advanced intestinal obstruction
3. Paralytic ileus (with grossly distended loops of bowel)
4. Normal stomach within 2 hours after a meal.

C. Bruit

- Bruit over aorta can be heard above and to the left of umbilicus in cases of aortic aneurysm. Aortic bruit can also be heard over femoral artery.
- Bruit over mid abdomen is heard in renal artery stenosis.
- Bruit over common iliac artery can be heard in stenosis or aneurysm.
- Bruit over liver may be heard in:
 - a. Hemangioma
 - b. Hepatocellular carcinoma
 - c. Acute alcoholic hepatitis
 - d. Hepatic artery aneurysm.
- Bruit can also be heard in coeliac artery stenosis and carcinoma pancreas (due to compression of vessels).

- Venous Hum It is heard between xiphisternum and umbilicus due to turbulence of blood flow in well-developed collaterals as a result of portal hypertension (Cruveilhier-Baumgarten syndrome). It signifies a congenital patent umbilical vein draining into the portal vein.

D. Friction Rub

It is heard in perisplenitis or perihepatitis due to microinfarction and inflammation. Splenic rub is heard in the following conditions:

- Chronic myeloid leukaemia
- Infective endocarditis
- Sickle cell anaemia
- After biopsy.

Check Your Progress 5

What is borborygmi?

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.....

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2.5 INVESTIGATIONS

Let us read about the different investigations that can be carried out in a gastrointestinal case and the importance of each in reaching a differential diagnosis

2.5.1 Examination of stools

Classification of stool examination is shown in **Box 2.5**

| | | |
|------------------------|--|---|
| Amount | | copious/ scanty/ hard formed/ semi-formed |
| Colour | Black Dark tarry Pale stool | Altered Blood, iron/ bismuth ingestion UGI bleed Obstructive jaundice/diarrhoea/malabsorption |
| Odour | Offensive Odorless Fishy Foul smell | Obstructive Jaundice Cholera, Acute bacillary dysentery Amoebic dysentery Malena |
| Abnormal stools | Watery Purulent Slimy stools Bloody | Cholera - rice water stool, After purgatives Ulcerative colitis, Severe dysentery Presence of excess of mucus –disorders of large bowel <ul style="list-style-type: none"> • Upper GI bleed - black tarry • Intussuption - Red currant Jelly • Rectal bleed , Hemorrhoids - Bright red |

| | | | |
|-------------------------|--------------------------|--|---|
| Occult blood | | Test for occult blood can be used for screening purpose to rule out UGI bleed secondary to gastric and duodenal ulcers, severe gastritis or UGI Malignancy. The test may be negative in lesions which bleed intermittently. | Gastrointestinal History and Abdominal Examination |
| Fatty Stools | | Pancreatic exocrine deficiency | |
| Faecal elastase | | Pancreatic exocrine deficiency | |
| Stool Microscopy | Decreased level ova/cyst | Parasitic infections. | |

Box 2.5: Examination of the stool

2.5.2 Peritoneal fluid analysis

Peritoneal fluid analysis can be done for diagnostic and therapeutic purpose.

Therapeutic aspiration done in massive ascitis with respiratory discomfort.

Diagnostic –Following analysis can be done in diagnostic aspects

Diagnostic analysis of peritoneal fluid is shown in **Box 2.6**

| Clinical Condition | Physical | | Biochemical (Protiens) – gm/L | Cytology | | Others |
|---------------------------------|---------------------------------------|---------------------|-------------------------------|-------------------------|---------------------------------------|--|
| | Colour | Specific gravity | | RBC | WBC | |
| Cirrhosis of Liver | Straw coloured/ bile stained | < 1.016 (95%) | < 25 | 1% | < 250 (mesothelial) | Cytology Cells block. Peritoneal biopsy Peritoneal biopsy stain culture for AFB Positive gram stain or culture If chylous ether extraction/ Sudan stain — amylase in ascitic fluid/serum. |
| Neoplasm | Straw coloured/Hgic, mucinous chylous | Variable > 1.016 | > 25 | 20% | > 1000 variable cells | |
| Tuberculosis hgic, chylous | Clear, turbid, > 1.016 | Variable | > 25 | 7% | > 1000 (70%) | |
| Pyogenic peritonitis | Turbid purulent | If purulent > 1.016 | If purulent > 25 | Unusual | lymphocytes Predominantly polymorphs | |
| CCF | Straw colored | Variable < 1.016 | Variable 15–53 | 10% | < 1000 (90%) mesothelial/ mononuclear | |
| Nephrosis | straw coloured/ chylous | < 1.016 | < 25 (100%) | Unusual | < 250, mesothelial mononuclear | |
| Pancreatic ascites (Pseudocyst) | Turbid/Hgic/ chylous | Variable > 1.016 | Variable > 25 | Variable/ blood stained | Variable | |

Box 2.6: Diagnostic analysis of peritoneal fluid

Various conditions of Transudate and Exudate are shown in **Box 2.7**

| <i>Transudate</i> | <i>Exudate</i> |
|--|---|
| <ol style="list-style-type: none"> 1. Cirrhosis of liver 2. Right sided venous hypertension 3. Hypoalbuminaemia (nephrosis, protein losing enteropathy) 4. Constrictive pericarditis 5. Hepatic venous thrombosis 6. Meig's syndrome | <ol style="list-style-type: none"> 1. Bacterial infections 2. Tuberculosis 3. Tumour |

Box 2.7: Conditions of Transudate and Exudate

Features differentiating transudate and exudate are shown in **Box 2.8**

| Features | Transudate | Exudate |
|-----------------------|------------|-----------|
| Ascitic fluid protein | < 25 gm/L | > 25 gm/L |
| Serum-ascitic fluid | > 1.1/dL | < 1.1/dL |
| Albumin gradient | | |
| Specific gravity | < 1.018 | > 1.018 |

Box 2.8: Features differentiating transudate and exudate

2.5.3 Radiology

A number of radiological investigations can be carried out

A. Plain X ray abdomen

- Erect posture gas /air under the diaphragm usually on the right side seen in perforated viscous with peritonitis;
- Dilated bowel loop seen as multiple fluid levels in intestinal obstruction and Ileus.

Points to Ponder

Air under the diaphragm indicates perforated bowel viscus in plain X ray erect posture.

B. Barium swallow

- Important investigation in dysphagia
- Useful to diagnose structural abnormalities like stricture, neoplasm, disorders of motility like achalasia cardia.
- With the usage of endoscopy and manometric studies barium swallow asbecome a secondary investigation.

Barium swallow study shown in **Fig. 2.13**



Fig. 2.13: Barium swallow study

Barium follow through X ray

- The small intestine may be studied by taking films of the abdomen at intervals after swallowing barium contrast.
- It is useful to diagnose malabsorption, chrons disease, small bowel diverticulum and neoplasms.

Small bowel enema

- Alternative to barium meal follow through.
- Useful for detecting both focal lesions and strictures of small bowel.

Barium enema

- Plain x ray abdomen should always be taken in suspected perforation or obstruction, before any contrast study.
- obstruction to colon, diverticular disease, tumor, fistula can be diagnosed by Barium enema.
- Air introduced into the colon after evacuation delineates the mucosa which is useful for detecting small polyps and early tumors.

Barium enema study shown in **Fig.2.14**

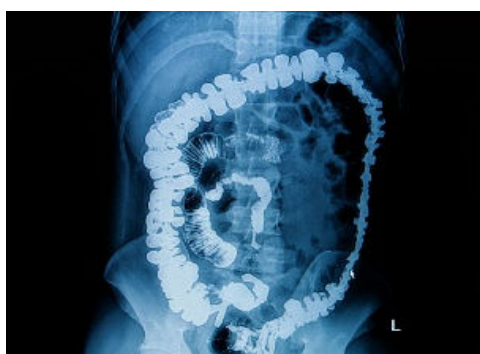


Fig. 2.14: Barium enema study

C. Radio isotope studies-

In Inflammatory bowel disease, the location of disease and a measure of its activity can be obtained by radioisotope studies using the patient's own WBCs that have been radiolabelled.

D. Upper GI endoscopy

- Direct inspection of Upper Gastrointestinal Tract upto the Duodenal loop is possible by UGI endoscopy with or without light sedation,
- It has the advantage of direct visualization, photography and biopsy.
- Therapeutic scopy is treatment choice for bleedingoesophageal varices, benign esophageal obstruction and bleeding peptic ulcer.
- Palliative prosthesis (stents)can be endoscopically in Carcinoma of esophagus.

Did You Know?

UGI scopy is an important investigation for diagnostic and therapeutic purpose in UGI Bleed.

Upper GI scopy figure shown in **Fig. 2.15**

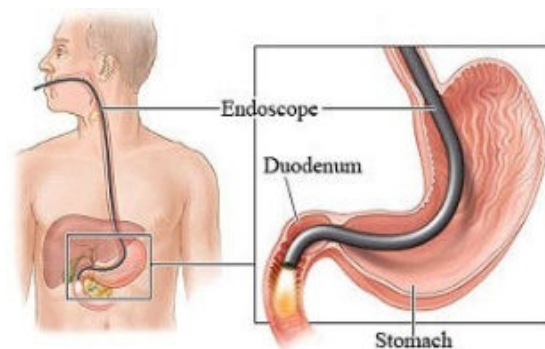


Fig. 2.15: Upper GI scopy

E. Small intestinal endoscopyand biopsy

- Small intestinal mucosa is valuable for histological diagnosis of various types of Malabsorption disease.
- Endoscopic image of whole small bowel can be obtained by wireless capsule endoscopy (biopsy not possible).

F. Colonoscopy and flexible sigmoidoscopy

- Flexible fiberoptic instrument in videos revolutionized in the investigation of colon, they can be done as a outpatient procedure.
- Useful for biopsy of inflammatory and neoplastic disease, removalof neoplastic polyps, dilatation of strictures and stenting
- Laser therapy and thermal therapy can be done during endoscopy.

Colonoscopy and flexible sigmoidoscopy procedure shown in **Fig.2.16**



Fig. 2.16: Colonoscopy and flexible sigmoidoscopy procedure

Rigid sigmoidoscopy

- Proctitis, Polyps and Carcinoma can be visualized and biopsy can be taken
- It is useful in the diagnosis of diarrhoea of colonic origin like ulcerative colitis, pseudomembranous colitis, amoebic colitis,
- This procedure needs skill and experience.

G. Proctoscopy

- Anal canal and rectum can be easily examined by rigid proctoscopy
- It is useful to diagnose hemorrhoids anal fistula anal polyp.

H. Ultrasound -

- Ultrasound is the most commonly used method of non-invasive investigation of GIT.
- Helps to diagnose cirrhosis of liver, cyst, abscess, small metastasis, tumors of liver – both benign and malignant.
- Gall bladder disease are easily diagnosed like GB stones, stones in CBD.
- Useful in diagnosis of true/pseudopancreatic cyst.
- Extensively used for diagnosis of intra abdominal, pelvic and retro peritoneal organs.
- Portal vein size and blood flow can be assessed.
- Useful in detect fluid collection in peritoneal cavity.

Endoscopic Ultrasound is another investigation that can be useful in some conditions -

- More sensitive in staging the mucosal depth of penetration of carcinoma of stomach and esophagus.
- Useful in assessing biliary and pancreatic abnormalities and can be used for guided biopsy.

I. CT Abdomen

- CT is used to produce Cross sectional imaging of liver and other intraabdominal organs.
- Useful in assessing retro peritoneal organs and bowel also.

J. MRI

- MRI has replaced barium radiology for screening of stricture and inflammation in the small bowel.

K. PET Scan -

- Sensitive technique for staging of cancer

L. Endoscopic retrograde cholangiopancreatography-

- ERCP are therapeutic procedures now, for cause of jaundice due to obstruction of main bile duct.
- Needle or forceps biopsy and brush cytology gives specific diagnosis of stricture of biliary tree.
- It is also useful for removal of bile duct stones, placement of stents past obstructive lesions of pancreas and bile duct.

Endoscopic retrograde cholangiopancreatography shown in **Fig. 2.17**

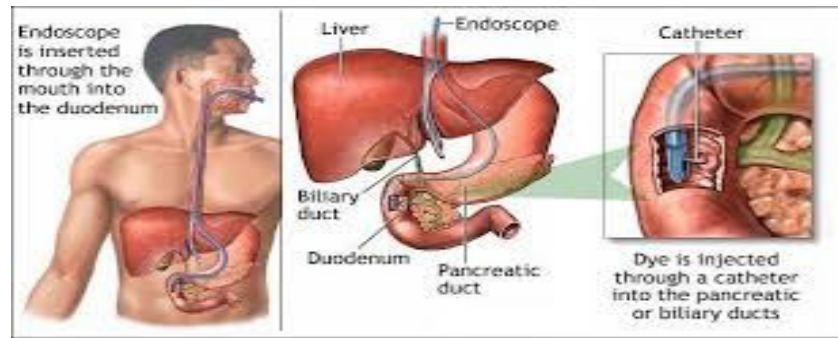


Fig. 2.17: Endoscopic retrograde cholangiopancreatography

M. MRI (MRCP)

- Magnetic resonance cholangio pancreatography gives good imaging of bile and pancreatic duct and small bowel.

N. Percutaneous Transhepatic cholangiography (PTHC)

- Useful in intrahepatic bile duct dilatation seen in USG.
- Site of obstruction due to tumors of head of pancreas.
- Benign and malignant bile duct strictures can be accurately localized and differentiated.
- It has therapeutic use also.
- Transhepatic drain can be placed to treat cholangitis and sepsis.
- Stent can also be used to release obstruction.
- GB stones can also be removed.

O. Percutaneous Transhepatic cholangiography (PTHC) method shown in **Fig. 2.18**

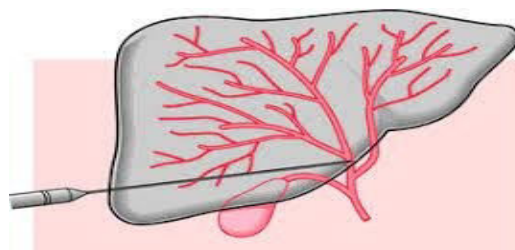


Fig.2.18: Percutaneous Transhepatic cholangiography (PTHC) method

2.5.4 Blood tests in liver disorders

Common blood tests that have been found to be useful are

- Sr. Bilirubin (ID /D), OT, PT, ALP, GGT,
- Protein, albumin, AG ratio,
- Smooth muscle antibodies in chronic active hepatitis,
- Anti-mitochondrial antibodies in primary biliary cirrhosis.
- Viral markers - HbsAg, anti HCV

2.5.5 Liver biopsy (USG guided)

- Cirrhosis, tumor (benign & malignant)

2.5.6 Pancreatic function tests

- Serum amylase & lipase
- Fecal elastase decreased in exocrine insufficiency due to chronic
- pancreatitis.

Check Your Progress 6

1. How will you differentiate between transudate and exudate in ascitic fluid analysis?

.....
.....
.....

2. Gold standard investigation in UGI bleed is _____?

2.6 LET US SUM UP

- Gastro Intestinal disorders are very common problem in elderly. As enumerated earlier, the symptomatology are numerous, and hence you should take a through and detailed history with regard to each symptom. It may be difficult to obtain history from patients with hearing impairment and cognitive issues. In such situations detailed history should be elicited from the reliable care givers.
- Through clinical examination under good light and exposure without compromising the patients dignity should be done. Examination should be done methodically from general examination, inspection, palpation, auscultation and percussion. Abdominal examination is not complete without examining the external genitalia, back and per vaginal and per rectal examination. Organ specific examination is given in detail above, which should be correlated with history to arrive at correct provisional diagnosis.

- Necessary simple investigation should be done first before going for invasive/interventional. Investigations you should know about the renal function status before subjecting the patient for contrast based studies. Investigation in elderly should be done only for the benefits of the patient and not for academic /documentation purpose.
- Appropriate treatment may be planned after thorough history, clinical examination and relevant investigations.

2.7 ANSWERS TO CHECK YOUR PROGRESS

1. Abdominal pain, vomiting, dysphagia, abdominal distension, constipation, diarrhea, etc
2. Causes of abdominal distension include Fat, Flatus, Feces, Fluid, Fetus
False
3. Moves with respiration
4. More than one litre
5. Borborygmi are frequent loud, low pitched gurgles rising to a crescendo of high pitched tinkles, occurring in rhythmic pattern with peristaltic activity. It is seen in small bowel obstruction.
6. It is differentiated based on SAAG values. Value <1.1 indicates exudate and values >1.1 indicate transudate Upper GI endoscopy

2.8 REFERENCES AND FURTHER READINGS

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- Michael Glynn & William M. Drake (2018), *HUTCHISON'S CLINICAL METHODS*, Edition 24, Available at: www.elsevier.com, Chapter 14, page no: 241-272