TUTORIAL 9

THE EXAMINATION OF ABDOMEN

OVERALL OBJECTIVE

At the end of this module, the student should be able to:

1. Do a full clinical examination of abdomen and able to make a reasonable provisional and differential diagnosis of vomiting, gastroenteritis, failure to thrive, hepatomegaly, splenomegaly and jaundice in infants and children.
2. To list the complications and principles of management of chronic diarrhoea, malnutrition, chronic liver disease and portal hypertension.

EXTRA GENERAL FEATURES INCLUDE

Signs of Chronic Liver Disease	Signs of Chronic Liver Failure
• Jaundice • Ascites • Spider telangiectasia • Spider navi • Palmer erythema • Finger clubbing • Pigmentation • Itching	• Foetor hepaticus, scratch marks, pruritus • Malabsorption of vitamin D: Rickets • Malabsorption of Vit K: Bleeding/bruising/ haemorrhage/ epitasis/ purpura • Splenomegaly - Portal hypertension • Hepatic encephalopathy • Vit A deficiency: Xerophthalmia, corneal xerosis, follicular hyperkeratosis

Spider telangiectasia

It is a branched group of dilated capillary blood vessels forming a spiderlike image on the skin. It is compressible and blanchable with adequate pressure (glass slide). Generally, as the pressure is released the central feeding vessel can be seen and which often pulsates.

Spider navi

These are spider shaped small reddish marks formed by the dilatation of central arterioles from which small vessels radiate. They are found on the chest above the nipples, face forearm, and sometimes dorsum of the hands. These are present in case of liver cirrhosis.

Complications of cirrhosis (HEPATIC)

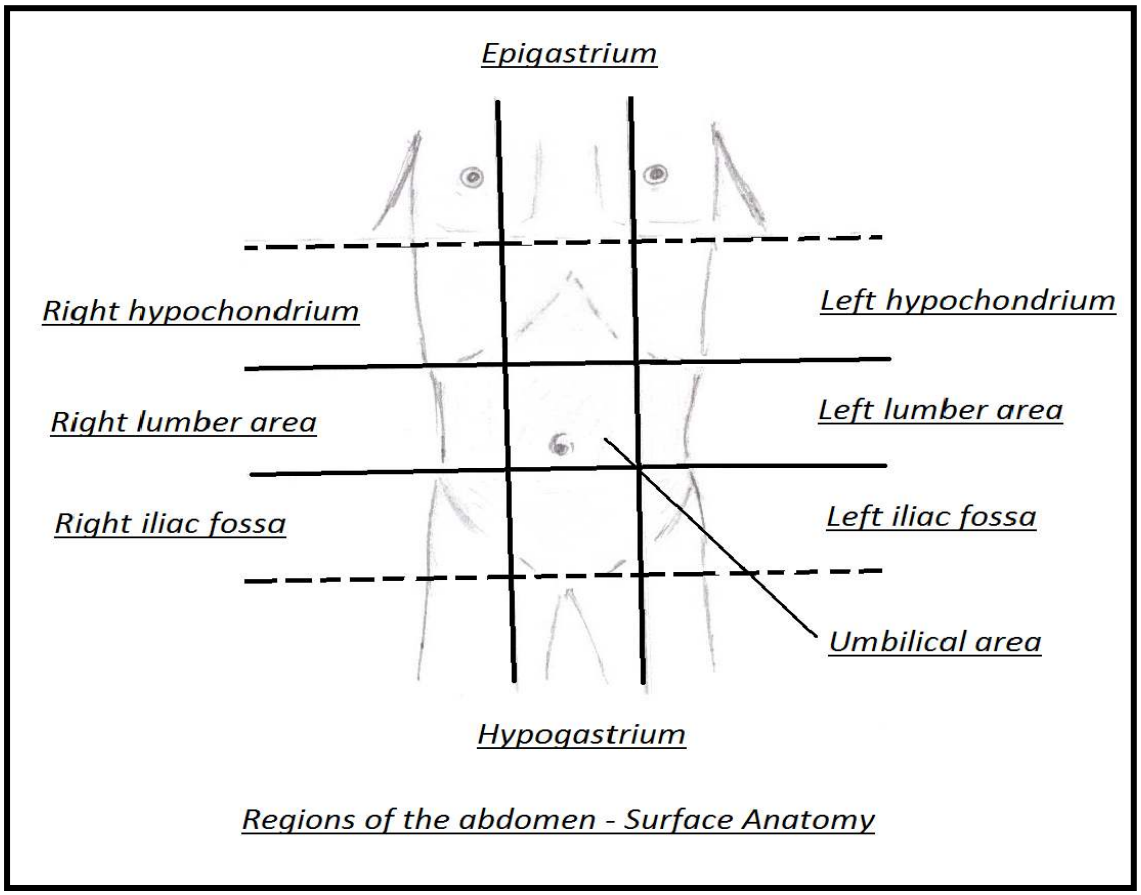
- Hepatic encephalopathy: hepatorenal syndrome, hepatopulmonary syndrome
- Esophageal varices
- Portal hypertension
- Protein energy malnutrition(PEM)
- Ascites
- Thrombosis of portal vein
- Infection/peritonitis
- Coagulopathy

EXAMINATION OF ABDOMEN

After taking permission from the parents, talk to the child and explain what you are going to do. Expose the abdomen and lower chest with child laying on his her back.

In small children, examination is done on the mother's lap if they are anxious, otherwise mother can stand at the upper end next to you, holding the hand of child to make him her more comfortable and relaxed. Leave the genitalia to examine at the end.

The abdomen is divided into 9 areas as described in the following diagram.



Regions of the abdomen - Surface Anatomy

The examination of abdomen will include inspection, palpation, percussion, auscultation, measurement of abdomen and rectal examination.

1. INSPECTION

Bladder should be emptied and nappy changed before the abdominal examination
Child should lie flat, comfortable and fully relaxed, hands by his/her side
No pillow under the head, good light and good exposure: from below nipples to include inguinal area.

Do inspection and note the followings:

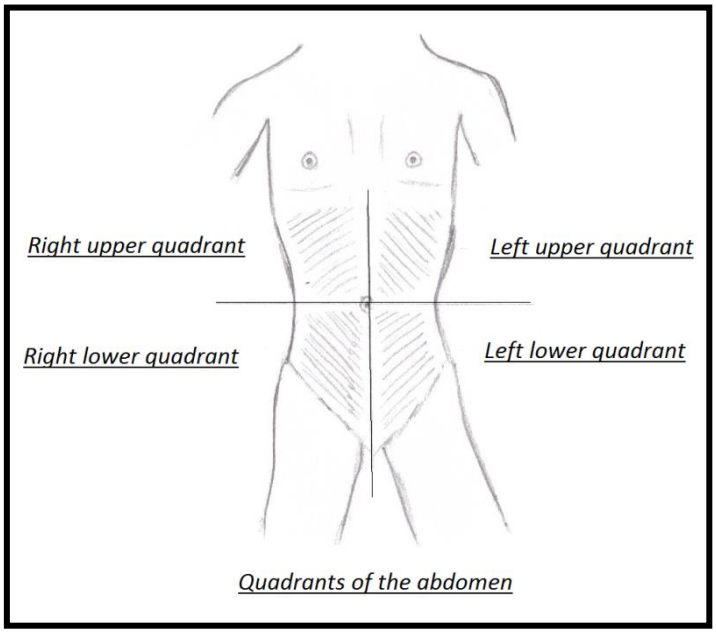
- In new born baby abdomen is symmetric, slightly rounded and moves simultaneously with the chest during respiration
- In older infants, abdomen is more prominent
- In babies, infants and small children, respiratory movements are mostly abdominal

- In older children, adolescents and adults, respiration is mainly thoracic in character
- Absence of abdominal movements may be due to peritonitis
- Paradoxical movements i.e., recession with inspiration on the paralysed side of abdomen can be seen with phrenic nerve palsy.
- Scaphoid abdomen (depressed in the centre or flat) is normal in older children but indicates a diaphragmatic hernia in the newborns
- Abdominal distension may be due to:
    1) Intraperitoneal air or fluid i.e. ascites, blood, lymph, pus, tumours (Wilm's), distended bladder or organomegaly.
    2) Flatus (gas), faeces (constipation), intestinal obstruction, ileus or Hurschsprung's disease
    3) Hypothyroidism and hypotonic musculature i.e., rickets, Downs syndrome etc.
    4) Enlarged abdominal organs or any other masses usually give rise to a localised swelling.
    5) Oedema is noted in nephrotic syndrome etc.
- Prominent veins: Dilated superficial veins also called as caput medusae may be present in the following conditions.
    1) **Portal hypertension:** obstruction in the portal circulation. Blood will be shunted in to the para umbilical veins, umbilical veins, superior and inferior umbilical veins – so these veins will become prominent called as "caput medusae". The flow in these veins is away from the umbilicus to the surroundings.
    2) **Obstruction to the inferior vena cava:** there is venous anastomosis of inferior epigastric vein tributary of femoral vein with the axillary vein. Due to the obstruction of inferior vena cava the connecting veins of the two will become prominent in the antero-lateral part of the trunk – blood flow is from below upward
- Scars of previous surgery or biopsies: stomas
- Pinkish stria may be seen in Cushing's syndrome
- Peristaltic waves may at times be seen in preterm babies but in term babies if present may indicate pyloric stenosis or obstruction to ileocaecal valve
- If secondary hair absent, consider hypopituitarism or hypogonadism
- Examine hernial orifices and look for hernias like: epigastric, inguinal, umbilical, femoral and assess if it's reducible or irreducible hernia
- Suprapubic bulge may be due to full urinary bladder
- Examine the genitalia
    - Males: look for Disorder of Sexual Differentiation (DSD), micropenis, hypospadias, undescended testes or urine voiding stream
    - Females: **Clitoris:** shape and size. Is it unusually enlarged, consider masculinisation, **Labia:** fused, check for DSD, **Vagina:** check for discharge
    - Anus: normal, patent or patulous

2. PALPATION

Child should lie flat on the bed without pillow and should be relaxed if possible. Lower limbs should be flexed at the hips and the knees. Now you should stand on the right hand side of

the patient and rub your hands to warm them up. Start palpation with your right hand; first superficial then deep palpation.



Quadrants of the abdomen

Superficial palpation

First do light supperficial palpation. If ther e is a possible tender or painful area, this should be palpated last. Child need to be made comfortable either by giving a soft toy or asking the mom to stand next to you at the upper end, holding the childs hand. Even if the child is crying, his abdomen can be examined by dipping your fingders during inspirtaion.

In calm and co-operative children start examination from left iliac fossa, moving in anticlockwise direction to find out any tenderness, rigidity or mass.

- Guarding: it is voluntary protective contraction of abdominal wall muscles
- Rigidity: it is involuntary, check if its generalised or localised

Young children cannot precisely indicate painful area and often just point to the umbilicus. The facial impression of the child often helps to determine the degree of tenderness. Babies seldom manifest abdominal rigidity even in the presence of peritonitis.

In case there is tenderness it should be graded as follows:

- Grade 1: when patient complains there is pain on touching
- Grade 2: when patient shows facial expressions for feeling pain
- Grade 3: when patient moves away his part being touched
- Grade 4: when patient does not allow the examiner to touch the affected part

In case there is inflammatory process in abdomen, there may be rebound tenderness (appendicitis) or rigidity (peritonitis). Rebound tenderness is a painful procedure with limited validity in young children.

Other signs of acute abdomen:

Rovsing's sign: is elicited by palpating the left lower quadrant of a patient's abdomen. If it increases the pain felt in the right quadrant, the patients is said to have a Rovsing's sign and may have appendicitis.

Psoas sign: is elicited by asking the patient to lie down on his or her left side while the right thigh if flexed backward. Pain may indicate an in inflamed appendix overlying the psoas muscle.

Obturator sign: is elicited by asking the patient to lie down supine. Now flex the right hip and knee at 90 degrees and rotate it internally and externally. Pain felt by patient may indicate inflamed appendix.

Murphy's sign: is elicited by asking the patient to take in and hold a deep breath while palpating the right subcostal area. If pain occurs on inspiration, when inflamed gallbladder comes into contact with examiner's hand, Murphy's sign is positive. Discomfort is more likely to be nonspecific in paediatric cholecystitis and patients of this age often present with irritability, jaundice and acholic stools.

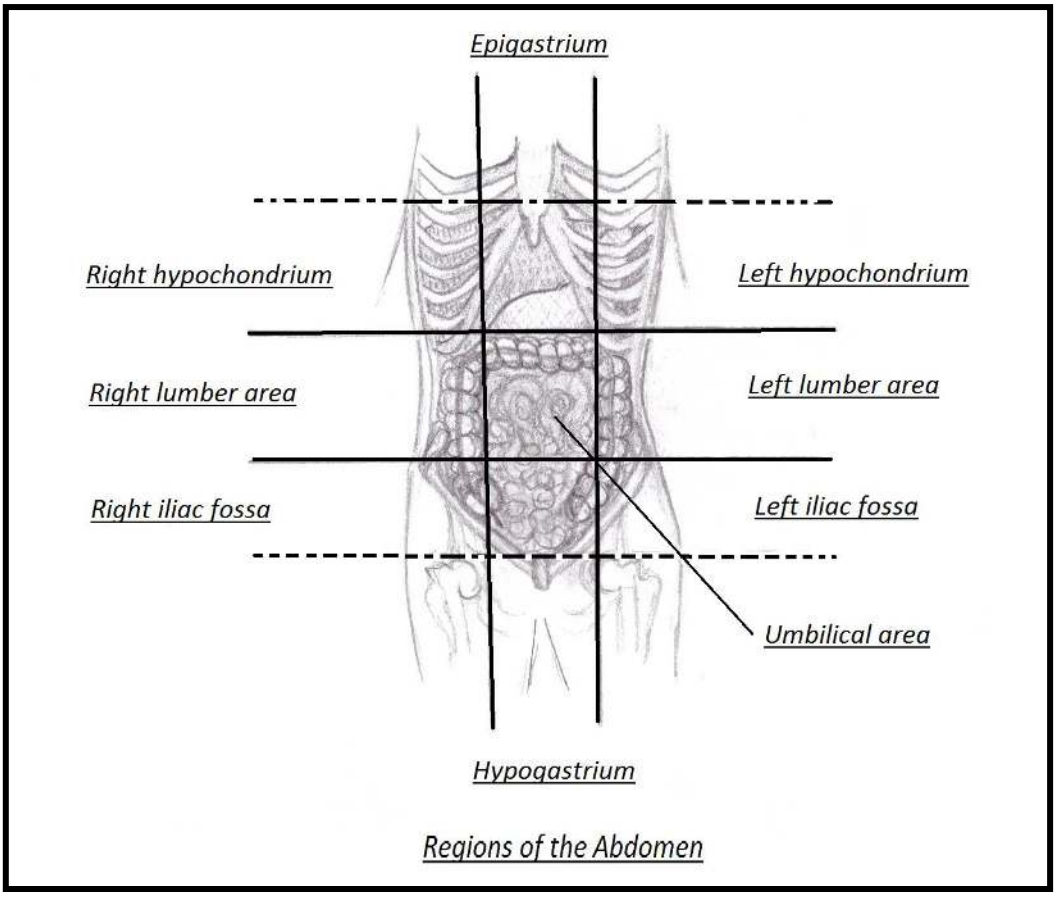
Deep palpation

Deep palpation is done by placing the whole right hand on the abdominal wall in a way that whole hand should touch the abdomen in a relaxed form. Keeping the fingers straight and flexing them slightly at the metacarpophalangeal joints. The abdomen is pressed firmly but gently. The forearm should be in horizontal position in line with the wrist joint. Following scheme can be followed while palpation is done:

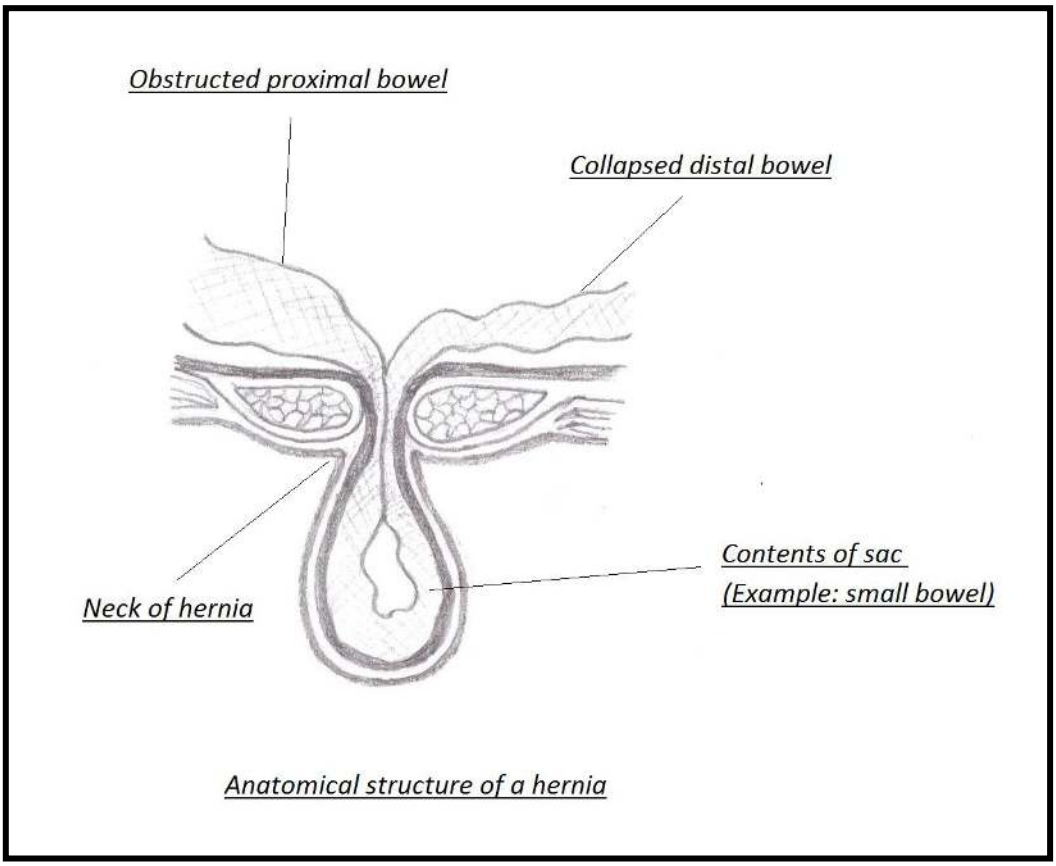
1) Left iliac fossa
2) Left lumber area (for left kidney)
3) Left hypochondrium (for spleen)
4) Right lumber area (for right kidney)
5) Right hypochondrium (for liver & gall bladder) and epigastrium
6) Right iliac fossa and hypochondrium (for urinary bladder and uterus in females)
7) Umbilical area for aortic, para-aortic, and mesentric lymph nodes
8) Palpate both groin areas for lymph nodes and femoral arteries
9) Palpate the hernial orfices: size, contents, reducibility, tenderness etc.
10) Palpate the external genitalia (see next section p 131).
11) Do rectal examination (see the next section p 130)

If mass is palpable, note the following points:

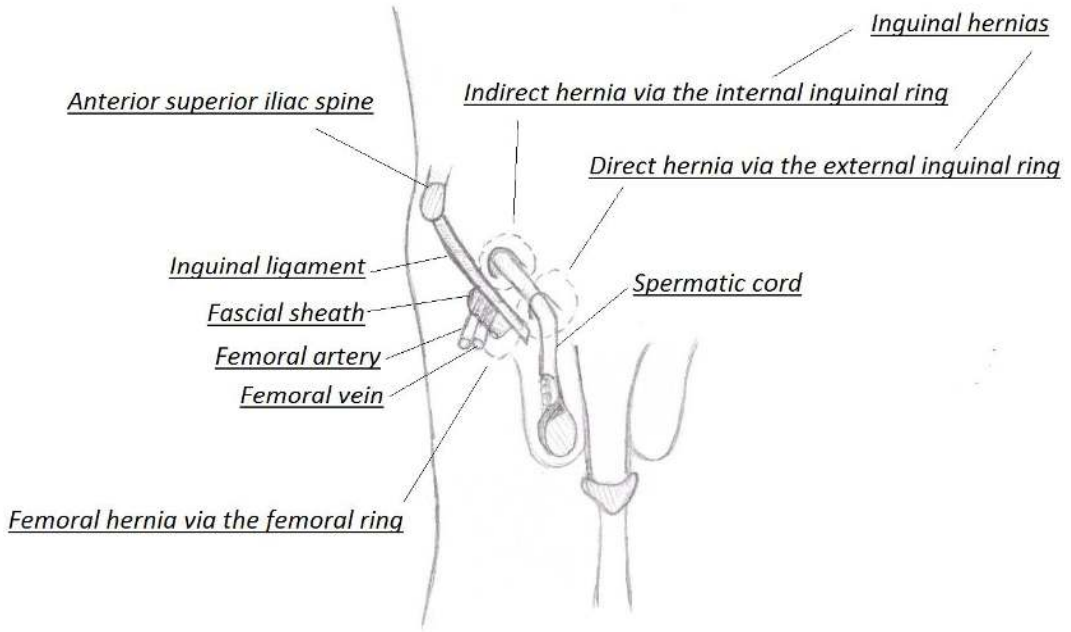
1) Area in which mass is palpable
2) Number of masses
3) Size, shape, consistency, pulsatile, tenderness
4) Mobility during respiration and examination
5) Whether the mass is intra or extra abdominal



Regions of the Abdomen



Anatomical structure of a hernia



Antomy of the inguinal and femoral hernias

METHOD OF PALPATION OF SPLEEN

Spleen is a flat disc which lies in the left upper part of the abdomen between 9th, 10th and 11th ribs. Patient should lie supine with legs flexed and abdomen exposed as stated above. For palpation of spleen with right hand, start palpating from right iliac fossa and go up obliquely to the left hypochondrium as spleen usually enlarges in this direction – infero-medially. In infants, spleen enlarges inferiorly so palpate from left iliac fossa to left hypochondrium.

Older children can be asked to take a deep inspiration. With this, the diaphragm moves downwards so the spleen is pushed down. In order to become palpable, spleen has to be enlarged by 2-3 times of its normal size.

While palpating the spleen in older children, it is sometimes helpful to let them turn slightly on the right side, with legs a little flexed. By putting your left hand in the left loin of the patient and pressing the spleen forward can be helpful at times.

When spleen is palpable describe its:

1) Size: take longest measurement. Spleen usually enlarges downward and to the right but can enlarge in any direction – measure it from the costal margin to the longest direction
2) Tenderness
3) Texture
4) Notch

Common causes of splenomegaly

1) **Cardiac:** Subacute bacterial endocarditis**,** constrictive pericarditis, CCF (Rt)
2) **Connective tissue disease:** Systemic onset juvenile chronic arthritis , serum sickness
3) **Haematological:** Polycythemia, Sickle cell disease, hereditary spherocytosis**,** G6PD deficiency,thalassaemias, haemolytic anaemia, purpura
4) **Infections/infestations:** Infectious mononeucliosis, sub acute bacterial endocarditis, malaria, CMV, kalazar, hydated cyst, typhoid fever
5) **Malignancy:** Leukaemia (myeloid), Hodgkins disease
6) **Portal hypertension:** Post UV line, Budd-Chiari sydrome
7) **Storage diseases:** Gaucher's disease
8) **Liver cirrhosis**

METHOD OF PALPATION OF LIVER

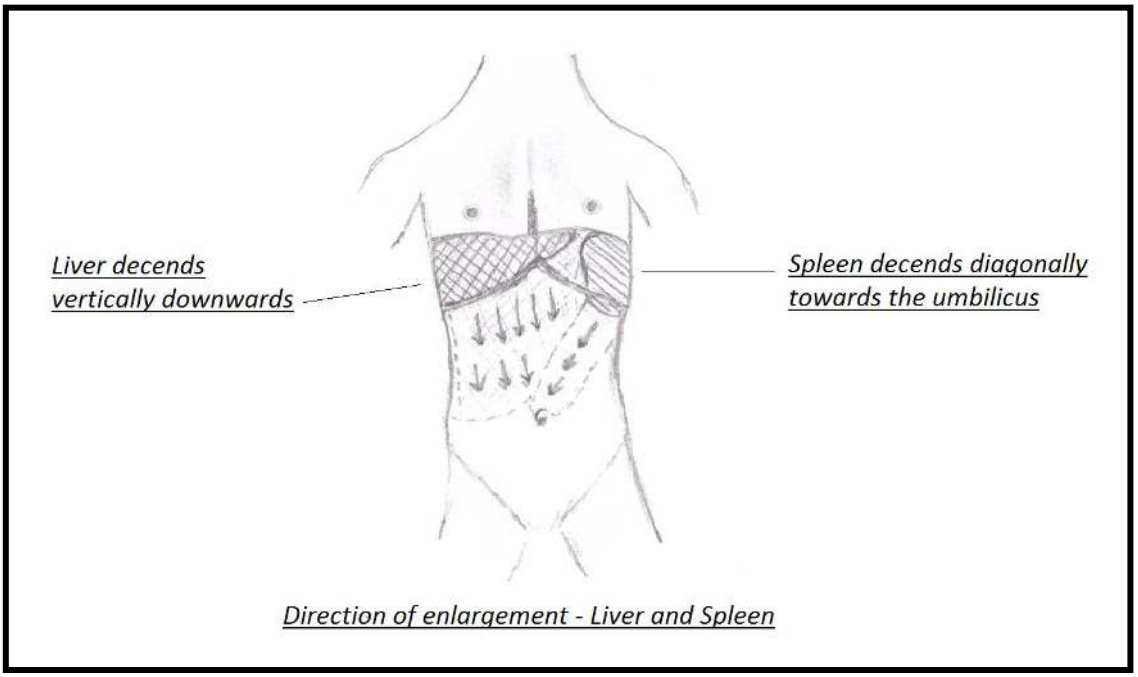
Liver lies in the right hypochondrium. Its upper border lies approximately in the 4^{th} intercostal space or behind the 5^{th} rib in mid clavicular line. Patient lies flat on the bed (pillow removed) with knees flexed. You stand on right hand side. Place your right hand over the right iliac fossa to the outer side of rectus muscle with index finger's edge towards the costal margin. Now palpate the liver by going vertically upward. If liver is palpable, note the following points.

- Feel of edge: is it smooth, sharp, rounded, irregular or thickenend
- Texture: check if it is soft, firm or hard:
    - **Soft** – non pathological
    - **Firm** – pathological
    - **Hard** – more pathological
- Surface of liver: whether smooth or nodular
- Size: measure in cm below costal margin in the midclavicular line
    - Upto 3cm Hepa is normally palpable till 5 yrs of age and 1-2cm till 10 yrs. So if its 1-2cm palpable, say its 1-2cm palpable hepa and not to say hepatomegally.
    - Percuss the upper border, it should be in 4^{th} to 5^{th} ICS
    - Mark the upper border and measure the liver span
- Tenderness: common in liver congestion (CCF) or infective hepatitis
- Pulsation: this is felt by pressing in the right hypochondrium with right hand, while supporting the right lower chest posteriorly by left hand. Pulsatile liver can be seen in tricuspid incompitance.
- Look for the presence of bruit
- Look for sub hepatic masses

Common causes of hepatomagaly

1) **Structural:** extrahepatic billiary atresia, choledochal cyst
2) **Storage and metabolic:** glycogen storage diseases, sever malnutrition
3) **Haematological:** Leukaemia, thalassaemia, sickle cell disease
4) **Heart:** Congestive cardiac failure, Constrictive pericarditis

5) **Infections/parasites:** TORCH infections, neonatal septicaemia, malaria, tuberculosis
6) **Inflamatory:** Chronic active hepatitis, chronic perisistant hepatitis
7) **Reticuloendothelial:** Non-Hodgkin's lymphoma, Hodgkin's disease
8) **Rheumatological:** Systemic onset juvenile idiopathic arthritis, Systemic Lupus Erythematosis
9) **Tumours:** Neuroblastoma/Willim's tumour



Direction of enlargement - Liver and Spleen

METHOD OF PALPATING THE KIDNEYS

Kidneys lie in the lumbar region. The left being 2 inches higher than the right kidney. Both kidneys are palpated bimanually. In newborn and premature babies, they are usually palpable, but as a rule not so in older children.

The patient lies on his or her back without pillow with knees flexed. Place the left hand in the lumber region posteriorly and the right hand anteriorly on respective sides.

First palpate the left kidney and then right. The left hand presses the loin forwards while the right hand pushes the anterior abdominal wall backwards, upwards and inwards. Older children can be asked to take a deep breath and relax abdominal muscles while trying to palpate the kidney between the two hands. NB! Kidneys don't move with respiration.

If kidney enlarged it will be felt between the two hands. In very lean lower pole of right kidney may be felt normally.

Common causes of renal enlargement

1) Hydronephrosis
2) Multicystic kidney (unilateral)
3) Posterior uretheral valve
4) Perinephric abscess

5) Obstructive uropathy
6) Polycystic kidney disase
7) Urolethiasis
8) Wilm's tumour
9) Neuroblastoma
10) Hydronephrosis
11) Renal cysts
12) Renal vein thrombosis
13) Tuberous sclerosis

Differentiating between enlarged left kidney and enlarged spleen

Enlarged kidney	Enlarged spleen
Bean shaped with round edge	Flat disc with sharp edge
Notch is not present	Nocth is present
Kidney enlarges downwards only	Spleen enlarges downward and medially
Moves very little if at all with respiration	Moves down with respiration
Bimanually palpable	Cab be palpable with one hand
Can get above the mass/margin	Cannot get above the mass
Resonant note is present in front of the kidney	Dull note is present in front of spleen

Picture: Examination of Organomegaly - Liver, Spleen, Kidney respectively

PALPATION OF ABDOMINAL LYMPH NODES AND TUMOURS

Method of palpating aortic and para-aortic lymph nodes

In majority of children, aorta can be felt readily. For its palpation finger tips of both hands (in a line from above downward) are pressed deeply in the abdomen at a site which is little above on the left side of umbilicus. After feeling the aortic pulsation, the fingers are displaced to the right so to have an idea about the width of aorta.

When enlarged, aortic and para-aortic lymph nodes can be palpated in the umbilical and epigastric regions, along the left aortic wall as firm and rounded masses. They may be separate or matted together. In most of the cases they are fixed to the posterior abdominal wall.

Mesenteric lymph nodes can be palpated along the medial 2/3rd of a line which joins right iliac spine to the umbilicus and extends about 2-3 cm to the left.

Common causes of abdominal lymph node enlargement

1) Abdominal TB
2) Bacterial infections: E-Coli, Yersinia and Staph species
3) Giardia lamblia and non Slamonella typhoid
4) Viruses like Adeno, Coxsackie, Rubiola, EBV, HIV and Catchscratch disease
5) Lymphoma

Following palpable lymph nodes of any size may indicate significant pathology

1) Femoral
2) Mediastinal
3) Abdominal
4) Epitrochlear
5) Supraclavicular

Hepatospleenomegaly with lymphadenopathy in HIV positive may indicate presence of Kaposi's sarcoma even if there are no skin lesions

PALPATION OF URINARY BLADDER

Normal urinary bladder cannot be palpated. If there is urinary retention and the patient is unable to empty the bladder, it is felt in the supra pubic area as a symetrical oval shaped swelling, firm in consistancy, with smooth surface and regular margins.

Method of palpation: stand on the right hand side of patient and with left hand horizontley from ziphisternum towards the pubic symphysis. By gentle palpation its upper border (which may be as high as umbilicus) and lateral margins can be felt but not the lower border. Now percuss the distended bladder and see if the dullness is present or absent. Pressure over it makes the patient desire to pass urine.

3. PERCUSSION

Percussion is done to confirm the visceral enlargement, fluid accumulation or gas in the gut. Normal percussion note in abdomen is tympanic (like a drum). If the fluid is present in the peritoneal cavity, the percussion note will be stony dull and fluid thrill will be present. When fluid is comparatively less in amount, shifting dullness may be present.

The ability to demonstrate ascites is usually assessed by examiners in clinical exams therefore students should acquire this skill correctly. You should expect gross ascites when abdomen is distended, umbilicus is everted, flanks are full, skin looks oedematous, pressure marks on the skin are obvious and vulva or scrotum are full. Presence of following three signs usually confirms presence of ascites.

Fluid thrill

A fluid thrill is an unreliable sign and can easily be elicited as false positive in very obese children. To find out whether fluid thrill is present or not, patient should lie flat on the bed with knees flexed (to relax abdominal muscles). Two hands method is used i.e. palmer surface of one hand is placed on the flank which is away from examiner and with the finger of the other hand flick the proximal flank. A sensation will be felt by the palpating hand. Thrill can also be conducted through the fat along the skin surface so to rule this out, another person is asked to place the ulnar side of his hand in the middle of the abdomen vertically and same procedure is repeated. If thrill is felt this is due to the fluid, as conduction by fat is checked by the third hand.

Shifting dullness

This is more reliable sign than fluid thrill. This is done to detect a small amount of fluid which is not enough to produce fluid thrill. The child is instructed to lie flat on his/her back and percussion is done from the centre of the abdomen toward the flank till the percussion note becomes dull. Keep the finger there at the point of dullness and ask the child to turn on the other side for 30 seconds and then percuss again. Now the percussion note will be resonant as under the effect of gravity the fluid has moved to the lower flank. Positive shifting dullness indicates free fluid in the peritoneal cavity. If it remains dull, there is no shifting dullness.

Distribution of ascites dullness may be noted as horseshoe shaped especially if small amount of fluid is present. In this case child is asked to stand dullness can be felt in the flanks. Free mobile fluid in the abdomen can be felt in children which is called as 'jelly belly'.

Puddle sign

This can be elicited in older and co-operative children, which may indicate presence of as little fluid as 120 ml. The child is instructed to lie down on his/her abdomen for few minutes and then is asked to be on the hands and knees. Chest piece of stethoscope is applied over the lower part of the suspended abdomen. Now flick the proximal flank repeatedly with the finger and listen with stethoscope. The sound will be dull and soft. As you move the stethoscope away from the examiner toward the opposite flank, the sound will get louder.

For further confirmation place the chest piece of stethoscope back to the lower most suspended part of abdomen, flick the finger in the flank and keeping the stethoscope there, ask the patient to sit up. Flicking is done again. Now the sound will be louder and clearer as compared to the first.

Now make your assessment:

1) Is abdomen resonant or dull
2) Fluid thrill present of absent
3) Shifting dullness present or absent
4) Dullness over distended urinary bladder, present or absent

If signs of ascites are present or the abdomen is distended, do horizontal abdominal measurement at the level of the umbilicus and below it. Circumference of abdomen is taken by measuring tape and is recorded. This can be used for prognostic purpose.

Ascitic fluid in newborn may be:

- A transudate as in hydrops and heart failure
- An exudate in peritonitis
- Biliary – rupture of common bile duct
- Chylous – rupture of lymphatic duct

Picture: Examination to elicit ascites
(Top: fluid thrill / Bottom: shifting dullness)

Common causes of ascities

1) **Hepatic:** Cirrhosis, portal hypertension
2) **Renal:** Nephrotic syndrome
3) **Gastro-intestinal**
   - Protein loosing enteropathy
   - Caeliac disease
   - Inflammatory bowel disease
   - Neutritional: Beri Beri , PEM
4) **Lymphatic:** Acquired chylous ascities (thoracic duct obstruction)
5) **Infection:** Chronic tuberculous peritonitis
6) **Cardiovascular**
   - Right ventricular failure

- Constrictive pericarditis
- Inferior vena cava obstruction
- Hepatic vein obstruction (Budd-Chiari syndrome)

4. AUSCULTATION

Place the chest piece over the abdominal wall and auscultate for peristaltic sounds, called borborygmi. The sounds may increase in case of intestinal obstruction and intestinal hurry i.e. diarrhoea or may be absent in later stages. If the sound is absent even after auscultation for 2-3 minutes at various points, this may indicate paralytic ileus (silent abdomen).

Also listen for bruits

- over the liver – hepatoma
- over the aorta – aneurysm
- over the kidneys – renal artery stenosis (bruit is present in cases of incomplete stenosis but no bruit if complete stenosis)

Picture: Auscaltation for a bruit

Succussion splash

Make the patient to lie down supine on the bed. Now place hands on both sides of the abdomen and shake it/move vigorously horizontally. Splash usually is present in stomach but sound may indicate presence of intestinal obstruction.

Groin

Examine the groins and genitalia for inguinal hernia, strangulated hernia, undescended testes, sexual abuse etc.

Anus and rectum

Examine the anus and if possible, stool in the nappy. Imperforate anus is usually missed. Note volume, colour and consistency of stools as well as the presence of blood – bright red, dark red or black – each one has a particular significance. Stool mcs can be sent for bilharzia, amoebiasis or worm infestation.

Rectal examination is usually not done as a routine in children but in case of acute abdomen, chronic constipation and rectal bleeding. Ask permission from parents and older children and explain the procedure and the reason why you are doing it. Ask the mothers or the nurse to be present during this procedure.

Ask the child to lie down on his left lateral position with left leg straight and right flexed. Use the little finger in small children and index finger for older children and lubricate properly with K-Y Jelly. Relax the child as best as you can and approach the rectum from behind by inspecting the perianal area.

When finger is inserted assess for anal tone. A tight anus resisting your finger is suggestive of anal stenosis. A loose patulous anus usually is usually present in myelomeningocele or other lower spinal lesions.

Common abnormalities found are:

1) Tenderness in retrocaecal appendix
2) Rectal prolapse and rectal polyps
3) Fissure-in-ano at 6 and 12 O' clock or sentinel tags
4) Rectal foreign bodies
5) Roundworms and tapeworms (usually noted by mothers)
6) Condyloma acuminata or genital warts – exclude sexual abuse
7) Constipation with overflow incontinance
8) Explosive release of flatus may indicate Hirschprung's disease

Back

Evaluate the back as well as the dorsal, lumber and saceral areas to rule out intraspinal abnormalities like:

- Myelomeningocele
- Pilonidal tract or sinus
- Hair tufts
- Dimples

Anal wink: Also called as anal reflex, perineal reflex or anocutaneous reflex and is usually done in infants with spina bifida. In order to elicit apply a tactile stimulus around the anus and note a wink contraction of anal sphincter muscles and also flexion. This stimulus is detected by pudendal nerve and response is integrated by the spinal cord sacral segments S2-S4. Absence of this reflex indicates interruption of reflux arc or damage to the lowest sacral segments of the spinal cord.

Genitalia

Familiarise yourself with normal genital appearance and age appropriate size and shape of its parts so that when you examine the child you can differentiate between normal and abnormal genitalia in male and female infants, toddlers and school children. Keep in mind the disorders of sexual differentiation.

Inspection and examination of perineum in girls and penis and testes in boys is part of routine examination but should always be performed in the presence of mother or a nurse.

Female genitalia

Vaginal palpation is not usually performed unless it is clinically indicated for example foreign body, suspected sexual abuse or vaginal discharge.

In premature baby girl's clitoris and labia minora is usually prominent, dark coloured, and swollen soon after birth. It is sometimes fused by a transparent membrane. The clitoris may also appear prominent. If it is abnormally large, virilisation should be considered.

During first week after birth, a vaginal discharge often occurs due to transplacental maternal hormones. The colour could be white, grey or blood stained.

A discharge is abnormal in older children and could be due to bacterial infection, irritating clothing, lack of hygiene, bubble baths, threadworms and foreign body. In children with diabetes mellitus, candidiasis may be a common cause of vaginal discharge.

In some children, hymen is imperforated and there may be accumulation of secretions causing development of hydrocolpos. At puberty haematocolpos may develop. Around the genitalia, also note presence of blisters, or ulceration due to herpes, condylomata due to syphilis tumours like sarcoma botryoides.

Epispadias may also occur in females. There is midline split in the clitoris and mons.
If baby urinates during examination take note of the volume and stream. A weak dribbling stream is abnormal. Uterus and ovaries are not usually palpable in infants and children.

Male genitalia

Examine the size of penis. Enlarged penis may be seen in certain endocrine and neurological conditions. For example, in congenital adrenal hyperplasia the penis is large but the testicular volume is normal. The explanation of usually reported small penis is a normal penis buried in fat. True micropenis is rare.

In small children, prepuce is usually adherent to the glans. Sometime you may see small harmless white spots on distal prepuce which usually disappear in few days. Also, some children have small foreskin opening which does not obstruct the urine flow. We don't need to separate the foreskin from the glans as it occurs naturally with time.

On inspection of scrotum, a normal rugosity and testes should be visible.

Enlargement of scrotum can be seen due to:

1) Enlarged testes
2) A hydrocele
3) An inguinal hernia

If there is any apparent abnormality in the size of testes, an orchidometer can be used to measure the testicular volume. The examination of testes is done in three positions:

- Standing position: toddlers and small children

- Lying flat on the couch
- Squatting position

Following are the common abnormalities seen in children:

Epispadias: the meatus is situated dorsally on the penile shaft or the glans.

Hypospadias: the penis is abnormally shaped and the meatus is on the ventral side accompanies by ventral curving called as chordee.

Undescended testes: examine the scrotum cautiously and you may find one or both testes missing from the scrotum. In order to confirm the presence of testes, put a slight pressure on the superficial inguinal ring and feel the testes in the scrotum.

In normal full-term neonate the testes are usually hiding in the inguinal canal, but can be brought into scrotum. In preterm babies the testes are in the inguinal canals and cannot be moved into scrotum soon after birth.

Torsion of testes: suspect if the testes are swollen, tender and painful. This is an emergency situation since necrosis of testes may ensue. This needs to be differentiated from orchitis and epididymitis, as both have the similar features. Check for cremasteric reflex which is absent in case of torsion but present in epididymitis. Pain relief with lifting the affected testicle points towards epididymitis also called as Prehn's sign.

Inguinal hernia: look for the bulge in the groin. This may only become visible when the child is crying, coughing, or staining during a bowel movement or it may appear larger during these times.

Hydrocele: a soft and non-tender swelling where the testes cannot usually be felt. Presence of fluid is demonstrated by trans-illumination test.