SURFACE ANATOMY OF ABDOMINAL WALL

Regions of the Abdomen

- Right hypochondrium
- Left hypochondrium
- Subcostal plane (L2)
- Supracristal plane (L4)
- Right iliac fossa
- Left iliac fossa
- Epigastrum
- Right loin
- Umbilical region
- Left loin
- Suprapubic region

Transpyloric plane: half way between suprasternal notch & symphysis pubis
Inguinal ligament: anterior superior iliac spine to pubic tubercle
Arcuate line: 3-5cm inferior to umbilicus
Linea semilunaris: lateral edge of rectus sheath
McBurney’s point: one third along a line from ASIS to umbilicus

Scapulae
- T11
- L3

Sacral dimples (S2)
- Mid point of sacro-iliac joints
- End of dural sac
- Posterior superior iliac spine

POSTERIOR VIEW

Hila of kidneys are 5cm from midline
TRANSPYLORIC PLANE
(Horizontal line half way between suprasternal notch & pubic symphysis)

Structures approximately on this line:
1. End of spinal cord
2. L1 vertebral body
3. Origin of superior mesenteric art
4. Origin of portal vein
5. Neck of pancreas
6. Pylorus of the stomach
7. Second part of duodenum
8. Sphincter of Oddi
9. Hilum of each kidney
10. Duodenojejunal flexure
11. Fundus of gall bladder
12. Tips of ninth costal cartilages
LAYERS OF THE ABDOMINAL WALL

1. Skin
2. Fat
3. Camper’s fascia (superficial layer of superficial fascia - thin)
4. Fat
5. Scarpa’s fascia (deep layer of superficial fascia - thick)
6. Fat
7. Aponeurosis
8. Three muscles
9. Transversalis fascia
10. Peritoneum

RETROPERITONEAL
- Most of duodenum
- Ascending colon
- Descending colon
- Rectum
- Pancreas
- Kidneys

ON A MESENTERY
- Stomach
- 1st half of 1st part of duodenum
- 2nd half of 4th part of duodenum
- All small bowel
- Caecum (size dependent)
- Appendix
- Transverse colon
- Sigmoid colon
All the intestines have been removed as far posterior as possible leaving the cut edges of the peritoneum. If the area of denuded peritoneum is narrow then the piece of bowel was on a mesentery. If it is wide then it was retroperitoneal, the exception being the stomach.

M = Mesentery  
R = Retroperitoneal  
St = Stomach  
Sp = Spleen  
Lo = Lesser omentum

Note: Small bowel mesentery runs from the left L2 transverse process to the right sacro-iliac joint (S2). It is 6 inches (15cm) long and crosses left psoas, aorta, IVC, right psoas, right ureter, right common iliac bifurcation & into right iliac fossa

**PERITONEUM**

**PARIETAL**
Serous membrane  
Lines abdominal cavity  
Nerve: somatic, intercostals

**VISCERAL**
Serous membrane  
Forms all mesenteries  
Covers all retroperitoneal organs  
Nerve: Probably has general visceral afferents, carried by sympathetics detecting stretch and inflammation

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PRINCIPLES OF MESENTERY DEVELOPMENT

1. At the level of the developing foregut which includes the stomach there are two peritoneal cavities separated by a dorsal and ventral mesentery. The stomach is covered by, and suspended between, the two. Note the access for the blood supply in the dorsal mesentery only.

2. There is no ventral mesentery below the foregut and thus the primitive bowel is surrounded by the dorsal mesentery only.

3. This dorsal mesentery can do one of three things. It can regress posteriorly so that the bowel is then retroperitoneal (A), the majority of the duodenum is a good example. Or the bowel can fall on its side and the mesentery is absorbed (B), such as the ascending and descending colons. This can be called a pseudo-mesentery. The third alternative is that the mesentery persists (C), such as with the small bowel, and this is described as being "on a mesentery". The length of the mesentery varies throughout the intestine.
1. Fetus viewed from below. Ventral mesentery (VM) joins the stomach to anterior wall. Dorsal mesentery (DM) joins stomach to posterior wall.

ROTATION OF THE STOMACH AND THE FORMATION OF THE LESSER SAC

2. The stomach rotates anticlockwise. VM with developing liver in it is thrown to the right & DM with developing spleen in it to the left. Duodenum (D) is pushed retroperitoneally & pancreas is formed posterior to the developing lesser sac (LS) alongside the IVC (V) & the aorta (A). The left kidney (K) lies just posterior to the spleen.

3. As the liver enlarges the remnant of the VM between it & the stomach widens to give the lesser omentum (LO) with its free edge holding the bile duct, portal veins & hepatic artery. The anterior remnant of the VM becomes the falciform ligament (FL). The stomach completes its rotation dragging the peritoneum posteriorly to give the lining of the LS. The IVC moves anteriorly to narrow the opening of the lesser sac.

AXIAL SECTION ACROSS FAR LEFT SIDE OF LESSER SAC

Free edge of lesser omentum

The entrance to the lesser sac

Gastroplenic ligament

Pancreas

Spleen

Kidney

Lienorenal ligament

The **gastroplenic ligament** contains the short gastric & left gastro-epiploic vessels

The **lienorenal ligament** contains the tail of pancreas & splenic vessels

The two ligaments are the **remnants of the dorsal mesentery** of the stomach. The **ventral mesentery** is the lesser omentum and the falciform ligament.
The **gastrosplenic ligament** contains the short gastric & left gastro-epiploic vessels

The **lienorenal ligament** contains the tail of pancreas & splenic vessels)

The two ligments are the **remnants of the the dorsal mesentery** of the stomach. The **ventral mesentery** is the lesser omentum and the **falciform ligament**
PERITONEAL CAVITIES AND LESSER SAC

Subphrenic space
Bare area of liver
Midline sagittal view of abdomen
Falciform ligament
Lesser omentum
Inner wall of lesser sac (fuses with transverse mesocolon)
Greater omentum (4 layers)

Note: lesser sac is left subhepatic space
PERITONEAL CAVITIES AND LESSER SAC

Subphrenic space
Bare area of liver
Midline sagittal view of abdomen
Falciform ligament
Lesser omentum
Ventral
Inner wall of lesser sac (fuses with transverse mesocolon)
Greater omentum (4 layers)
Dorsal
Note: lesser sac is left subhepatic space

LESSER SAC
The arrows indicate the direction of expansion of the lesser sac -
1. Up under the left lobe of the liver
2. Across to the spleen on the left
3. Down within the 2 layers of the greater omentum inferiorly

Note: perforation of posterior wall gastric ulcers can fill the lesser sac with gastric contents

EPIPLOIC FORAMEN
(Foramen of Winslow, aditus to lesser sac)

ANTERIOR

Hepatic artery
Bile duct
Portal vein
SUPERIOR

Caudate lobe of liver
Epiploic foramen
Inferior vena cava

POSTERIOR
Simplified diagram looking left into the lesser sac from the right side of the abdomen

INFERIOR

1st part of duodenum