Liver & Spleen

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Liver

- The **largest gland** in the body.
- Weighs approximately 1500 g (approximately 2.5% of adult body weight).
- **Lies mainly** in the **right hypochondrium** and **epigastrium** and extends into the **left hypochondrium**.
- **Protected by** the thoracic cage and diaphragm, its greater part **lies deep** to ribs 7-11 on the right side and crosses the midline toward the left below the nipple.

Relations of Liver

Anterior	Posterior
Diaphragm, right and left pleura and lower margins of both lungs, Right and left costal margins, xiphoid process, and anterior abdominal wall in the subcostal angle	Diaphragm, right kidney, hepatic flexure of the colon, /duodenum, gallbladder, inferior vena cava, esophagus and fundus of the stomach

Peritoneal Reflection

- **The liver is** surrounded by a fibrous capsule and **completely covered by peritoneum (except the bare areas).**
- **The bare area** of the liver is triangular area **on the posterior surface of right lobe** where there is **no** intervening **peritoneum** between the **liver** and the **diaphragm.**

Boundaries of bare area

- **Anterior:** superior layer of coronary ligament.
- **Posterior:** inferior layer of coronary ligament.
- **Laterally:** right and left triangular ligaments.

Other bare areas include: porta hepatis, fossa for gall bladder & grooves for IVC

Surfaces of Liver

The liver has two surfaces:
•A **convex diaphragmatic** surface (superior).
•A relatively flat or even **concave visceral** surface (posteroinferior).

	Diaphragmatic (Superior)	Visceral (Posteroinferior)
Features	**The convex upper surface** is smooth and molded to the undersurface of the domes of the diaphragm which separates it from the pleurae, lungs, pericardium, and heart.	**It is the posteroinferior surface**, related to abdominal viscera.
Covering	Covered with visceral peritoneum, **except posteriorly** in **the bare area of the liver**, where it lies in direct contact with the diaphragm.	It is covered with peritoneum, except at **the fossa for the gallbladder, the porta hepatis and IVC groove.** - It bears multiple **fissures** and **impressions** for contact with other organs.

Fissures of the Liver

Two sagittally oriented fissures, **linked** centrally by the transverse porta hepatis, **form** the letter H on the visceral surface.

The left fissure is the continuous groove formed:	The right fissure is the continuous groove formed:
Anteriorly by the **fissure for the round ligament (lig.teres).**	**Anteriorly** by the **fossa for the gallbladder**
Posteriorly by the **fissure for the ligamentum venosum.**	**Posteriorly** by the **groove** for the **inferior vena cava.**

Relations of Visceral Surface of the Liver

1. stomach and duodenum
2. Esophagus
3. lesser omentum
4. gallbladder
5. right colic flexure
6. right kidney and right suprarenal gland

Porta Hepatis (Hilum of the Liver)

- A transverse fissure **found on** the **posteroinferior surface** and **lies between** the **caudate** and **quadrate** lobes.
- The upper part of the **lesser omentum** is attached to its margins.

Structures passing through the porta hepatis include:

- Right and left **hepatic ducts.**
- Right and left branches of the **hepatic artery**
- Right and left branches of the **portal vein**
- Sympathetic and parasympathetic **nerve fibers**
- A few **hepatic lymph nodes** lie here; they drain the liver and gallbladder and **send their efferent vessels** to the **celiac lymph nodes.**

Ligaments of the Liver

Falciform ligament

- It is a two-layered fold of the peritoneum.

- It connects the liver with the diaphragm and anterior abdominal wall &umblicus..

- Its sickle-shaped free margin contains the **ligamentum teres (round Ligament) of liver**, the remains of the **umbilical vein (oblitrated umbilical vein) ,** which carried oxygenated blood from the placenta to the fetus.

Ligamentum venosum

It is the fibrous remnant of the fetal **ductus venosus (oblitrated ductus venosus)** , which shunted blood from the umbilical vein to the IVC.

Lobes of The Liver

- The liver is divided into a large right lobe and a small left lobe by the attachment of the falciform ligament.
- The right lobe is further divided into a quadrate lobe and a caudate lobe by the presence of the gallbladder, the fissure for the ligamentum teres, the inferior vena cava, and the fissure for the ligamentum venosum.
- The caudate lobe is connected to the right lobe by the caudate process.
- The quadrate and caudate lobes are a functional part of the left lobe of the liver.

The functional anatomy divides the liver into left and right lobes based on their relation to the division of common hepatic duct, hepatic portal vein, and hepatic artery proper into right & left branches.

(Just For Reading)

Blood Circulation through the Liver

- The blood vessels **conveying** blood to the liver are the **hepatic artery (30%)** a branch of celiac trunk, and portal vein (70%).
- The hepatic artery brings oxygenated blood to the liver
- The portal vein brings venous blood rich in the products of digestion, which have been absorbed from the gastrointestinal tract to the liver.
- The venous blood is drained by right & left hepatic veins into the inferior vena cava
- At or close to the porta hepatis, the hepatic artery and portal vein terminate by dividing into right and left primary branches which supply the right and left parts of liver, respectively.
- Within the liver, the primary branches divide to give secondary and tertiary to supply the hepatic segments independently.
- The hepatic veins, are intersegmental in their distribution and function, draining parts of adjacent segments.
- The attachment of these veins to the IVC helps hold the liver in position. (The peritoneal ligaments and the tone of the abdominal muscles play a minor role in the support of liver).

Lymph Drainage

- The **liver produces** a large amount of **lymph**—about one third to one half of all body lymph.
- The **lymph vessels** leave the liver and enter several **lymph nodes in** the **porta hepatis.**
- The **efferent vessels** pass to the **celiac nodes.**
- **A few vessels pass** from the **bare area of the liver** through the diaphragm to the **posterior mediastinal lymph nodes.**

Nerve Supply

- **Sympathetic** and **parasympathetic nerves.**
- **Sympathetic** from the **celiac plexus.**
- **Parasympathetic nerves** The **anterior vagal trunk** gives rise to a **large hepatic branch**, which passes **directly to the liver.**

Portal-Systemic (Portacaval) Anastomoses

- It is a specific type of anastomosis that occurs between the veins of portal circulation and those of systemic circulation
- In portal hypertion, these anastomosis open and form venous dilatation called varices.

Site	Clinical picture
Esophagus (lower part).	Esophageal varices دوالي المريء
Upper Anal canal.	Hemorrhoids البواسير
Paraumbilical region.	Caput medosea
Retroperitoneal.	No clinical Picture
Intrahepatic	(Patent ductus venosus)

Spleen

- Largest single mass of **lymphoid tissue**
- **Located in** the left hypochondrium, deep to 9, 10 & 11 ribs
- **Long axis** lies along the shaft of the 10th rib and **separated from them** by the **diaphragm** and the **costodiaphragmatic recess**(space in pleural cavity).
- Ovoid in shape with notched anterior border
- **Lower pole** extends forward as far as the **midaxillary line.**
- **Normal size spleen can not be palpated** on clinical examination.

Surfaces

- Diaphragmatic surface: is convexly curved to fit the concavity of the diaphragm and curved bodies of the adjacent ribs
- Visceral surface: related to viscera.

Borders

- The superior and anterior borders are sharp. Anterior border is notched.
- The posterior (medial) and inferior borders are rounded.

Relations

- Anteriorly: Stomach, tail of pancreas, left colic flexure & left kidney
- Posteriorly: **Diaphragm**, that separates it from the **left pleura** (left costo-diaphragmatic recess), **left lung** & **9, 10 & 11 ribs**
- Inferiorly: Left colic flexure.
- Medially: Left kidney

Peritoneal Reflections/Ligaments

Spleen is **completely** surrounded by **peritoneum** **EXCEPT** at the **hilum where its margins give attachments to** :

Gastrosplenic ligament	Lienorenal (splenorenal) ligament
to the **greater curvature** of **stomach** (carrying the short gastric and left gastroepiploic vessels)	to the **left kidney** (carrying the splenic vessels and the tail of pancreas)

Arterial Supply	**Splenic artery** - Largest branch of the celiac artery - Runs a tortuous course along the upper border of the pancreas - Passes within the lienorenal ligament - Divides into 4-5 terminal branches, which enter the spleen at the hilus - The lack of anastomosis of these arterial vessels within the spleen results in the formation of vascular segments of the spleen with relatively avascular planes between them, enabling subtotal splenectomy.
Venous Drainage	**Splenic vein** - **Leaves** the hilus - **Runs behind** the **tail** & **body** of the pancreas - Reaches **behind the neck** of **pancreas**, where **it joins** the **superior mesenteric vein** to form the **portal vein** **Tributaries:** •Short gastric vein •left gastroepiploic vein •Pancreatic veins •Inferior mesenteric vein
Lymph Drainage	•**Lymphatics** emerge from the hilus and **drain into several nodes** lying at the **hilum** •**Efferents** from the hilar nodes **pass along** the course of **splenic artery**, and **drain into** the **celiac lymph nodes**
Nerve Supply	- Derived **from** the **celiac plexus.** - Are **distributed mainly along** branches of the **splenic artery**, and are **vasomotor in function**.

MCQs

1- Which one of the following NOT anterior relation of the liver:

A- Diaphragm

B- Anterior Abdominal Wall

C- Right Kidney

D- Xiphoid Process

2- Which on of the following NOT posterior relation of the liver:

A- Diaphragm

B- Xiphoid Process

C- Doudenum

D- Esophagus

3- The liver is completely covered by peritoneum except in the:

A- Posterior Surface of The Right Lobe

B- Posterior Surface of The Left Lobe

C- Anterior Surface of The Right Lobe

D- Anterior Surface of The Left Lobe

4- The liver mainly lies in which one of following abdominal regions:

A- Hypogastric

B- Right Hypochondriac

C- Umbilical

D- Right Inguinal

5- Which one of the following pass through the porta hepatis:

A- Right & Left Hepatic Ducts

B- Right & Left Branches of The Hepatic Artery

C- Right & Left Branches of The Portal Vein

D- All The Above

6- The caudate and quadrate lobes are functionally related to the right lobe:

A-True

B-False

7- The spleen located in:

A- Left Hypochondriac Region

B- Umbilical Region

C- Epigastric Region

8- Spleen related medially with:

A- Stomach

B- Left Colic Flexure

C- Pancreas

D- Left Kidney

9- Spleen is:

A- Retroperitoneal

B- Completely Surrounded with Peritoneum EXCEPT the Helium

10- Lienorenal ligament contain:

A- Splenic Artery

B- Short Gastric Artery

C- Left Gastroepiploic Artery

11- Which vein will join the splenic vein to form the portal vein:

A- Inferior Mesenteric Vein

B- Gastric Vein

C- Hepatic Vein

D- Superior Mesenteric Vein

12- Which one of the following ligaments is fibrous remnant of the fetal ductus venosus:

A- Falciform Ligament

B- Ligamentum Venosum

C- Ligamentum Teres

13. Spleen lies deep to:

A- 8 , 9 , 10 Ribs

B- 9 , 10 , 11 Ribs

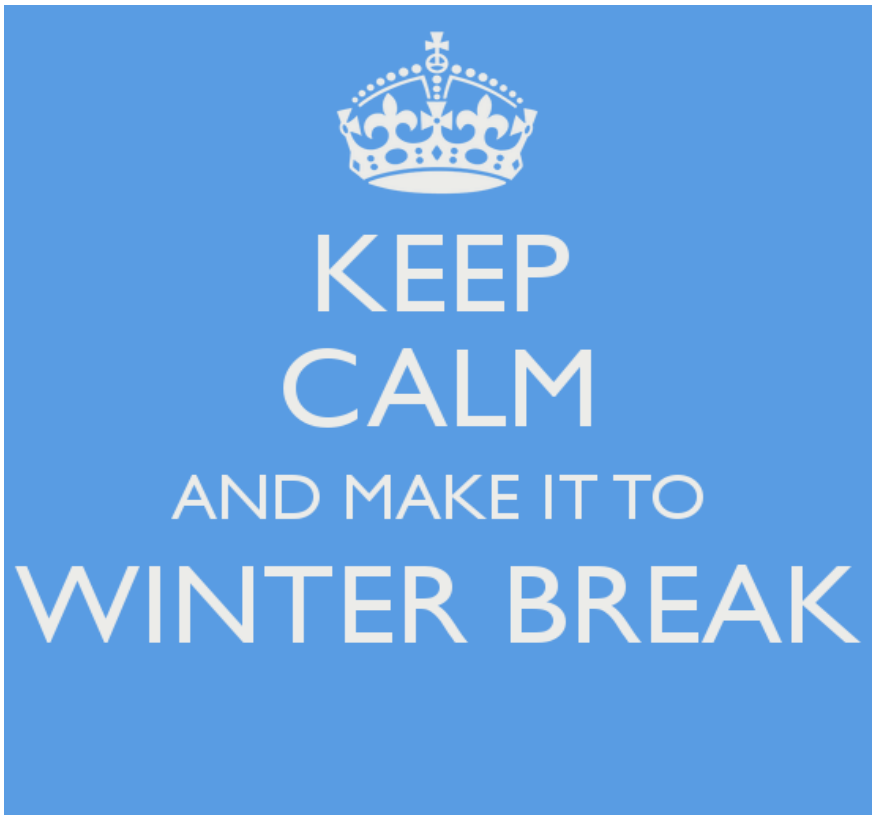
C- 10 , 11, 12 Ribs

GOOD LUCK DOCTORS

هانت يا دخاترة☺

Key answer

1.C
2.B
3.A
4.B
5.D
6.B
7.A
8.D
9.B
10.A
11.D
12.B
13.B



Done By:

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433 Anatomy Team Work.