



PIPADOR REVISION

MRCOG Part 1 Revision Notes

Liver, Spleen and Pancreas

ANATOMY • LECTURE 30

VISUAL EXAMINATION REVISION NOTES

2026 Edition

MRCOG Part 1 Revision Notes

Lecture 30: Liver, Spleen and Pancreas

Anatomy • Visual revision edition

COLOUR CODE USED THROUGHOUT THESE NOTES

LIVER	BILIARY TREE	SPLEEN	PANCREAS	OBSTETRIC
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LEARNING OBJECTIVES — tick off as you go

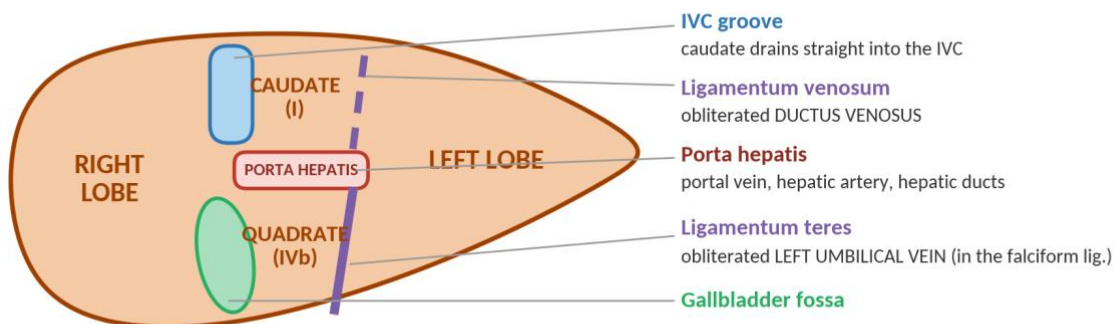
- ☐ Describe liver lobes, Couinaud segments, ligaments and dual blood supply.
- ☐ Trace the biliary tree and define Calot's triangle.
- ☐ Describe the spleen's size, relations, ligaments and functions.
- ☐ Describe the parts, relations, ducts, blood supply and embryology of the pancreas.
- ☐ Apply to HELLIP, AFLP, cholestasis, splenic artery aneurysm and pancreatitis in pregnancy.

1 The Liver

IN ONE LINE: Largest gland (1.2–1.5 kg) in the right hypochondrium and epigastrium — peritoneum covers it except the bare area, gallbladder fossa, porta and IVC groove.

- **Surface markings:** upper border ~5th rib/space in the right mid-clavicular line; lower border along the right costal margin (10th rib in the mid-axillary line), across the epigastrium to about the left 8th–9th costal cartilage.

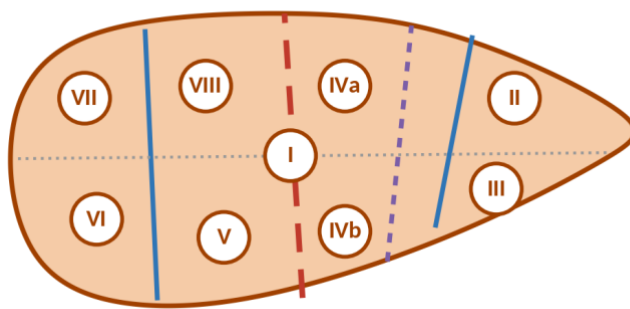
Liver — visceral (inferior) surface: the 'H'



Viewed from below and behind; patient's right on the LEFT (schematic)

Figure 1. The visceral surface — lobes, fissures and the porta.

Couinaud segments — front view, schematic (II–IV left, V–VIII right)



■ CANTLIE'S LINE

gallbladder fossa → IVC = functional right / left split (NOT the falciform)

■ FALCIFORM LIGAMENT

divides the anatomical lobes only

■ HEPATIC VEINS

run between segments → IVC at ~T8

■ SEGMENT I = CAUDATE

drains directly to the IVC — enlarges in Budd–Chiari syndrome

Figure 2. Functional segments.

PERITONEAL LIGAMENTS

- **Falciform** — anterior wall to liver; carries the **ligamentum teres** (left umbilical vein)
- **Coronary + triangular** ligaments — enclose the **bare area**
- **Lesser omentum** (hepatogastric + hepatoduodenal) — free edge holds the **portal triad**
- **Ligamentum venosum** — ductus venosus remnant between caudate and left lobe

DUAL BLOOD SUPPLY

- **Hepatic artery** (~25–30% of flow, ~50% of O₂) — right + left; **cystic** off the right
- **Portal vein** (~70–75% of flow) — splenic + SMV
- **Hepatic veins** (right, middle, left) → IVC just below the diaphragm (~T8)
- **Caudate** drains straight to the IVC → spared/enlarged in **Budd–Chiari**

MNEMONIC / MEMORY HOOK

The '**H**' on the **visceral surface**: right limb = gallbladder (below) + IVC (above); left limb = ligamentum teres (below) + ligamentum venosum (above); crossbar = porta hepatis. Quadrate below the bar, caudate above.

Biliary tree

Biliary tree and pancreatic ducts (schematic)

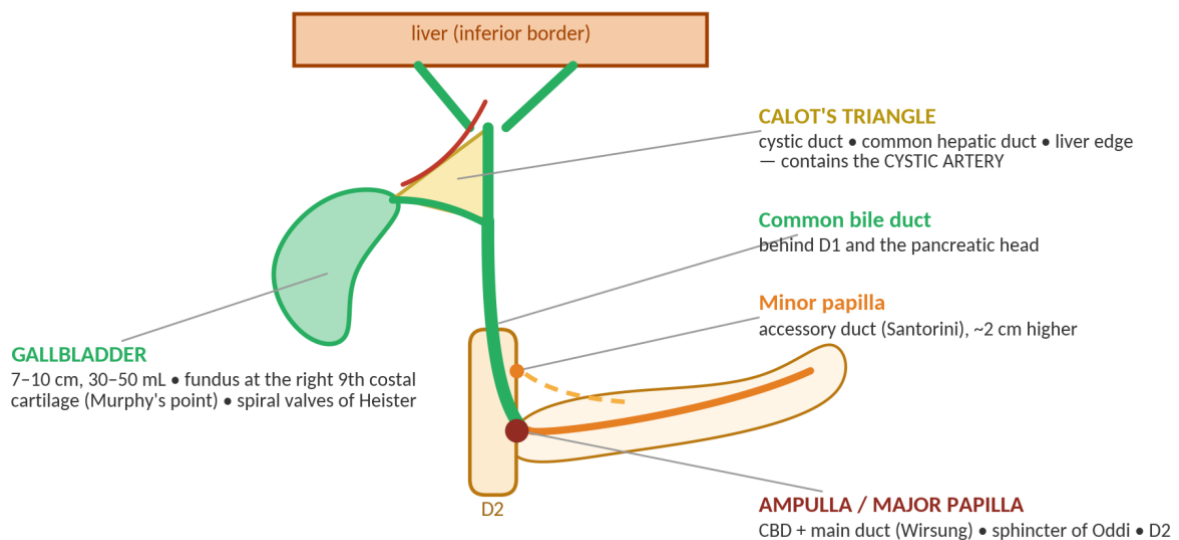


Figure 3. Bile and pancreatic ducts, and Calot's triangle.

- Canaliculi → ductules → right + left hepatic ducts → **common hepatic duct + cystic duct** → **common bile duct** → joins the main pancreatic duct → **ampulla of Vater** → **major papilla** (D2, sphincter of Oddi).

- **Calot's (cystohepatic) triangle:** cystic duct, common hepatic duct, inferior liver edge — contains the **cystic artery**; dissected at cholecystectomy.

Obstetric liver disease

HELLP + SUBCAPSULAR HAEMATOMA

- Haemolysis, Elevated Liver enzymes, Low Platelets — severe pre-eclampsia
- Subcapsular haematoma: RUQ/epigastric + **shoulder-tip pain**, shock — rupture is catastrophic

AFLP

- Third trimester, rare; microvesicular steatosis
- Some cases linked to **fetal LCHAD deficiency**
- Hypoglycaemia, coagulopathy, renal failure — deliver

INTRAHEPATIC CHOLESTASIS

- Itch (palms/soles), raised **bile acids**
- Stillbirth risk rises with very high bile acids (≥ 100 $\mu\text{mol/L}$)
- **UDCA may ease itch** but does not improve perinatal outcome (RCOG 2022)

GALLSTONES

- Progesterone $\rightarrow$ biliary stasis $\rightarrow$ more gallstones in pregnancy
- Commonest cause of pancreatitis in pregnancy

2 The Spleen

IN ONE LINE: Intraperitoneal, under ribs 9–11 on the left — the largest lymphoid organ: filters old red cells and makes antibody against encapsulated bacteria.

MNEMONIC / MEMORY HOOK

1-3-5-7-9-11: 1 inch thick, 3 wide, 5 long, 7 oz (~150 g), lies under ribs 9–11.

Axial section at T12/L1, viewed from BELOW (patient's left on the RIGHT) — schematic

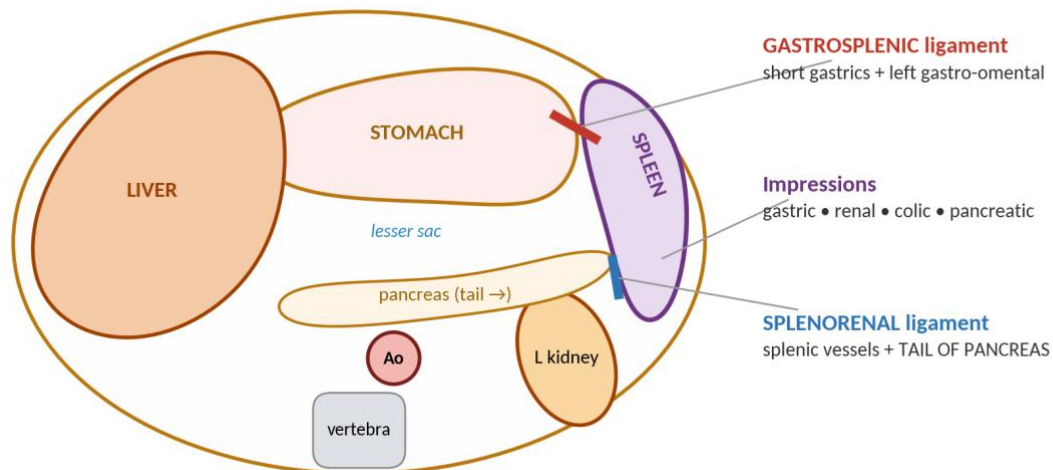


Figure 4. The spleen and its ligaments in section.

Feature	Detail
Impressions	Gastric (fundus), renal (left kidney), colic (splenic flexure), pancreatic (tail)
Gastrosplenic ligament	Greater curvature $\rightarrow$ spleen — short gastrics + left gastro-omental
Splenorenal (lienorenal) ligament	Spleen $\rightarrow$ posterior wall over the left kidney — splenic vessels + tail of pancreas

Feature	Detail
Vessels + lymph	Splenic artery (largest coeliac branch, tortuous along the pancreas); splenic vein (+ IMV) → portal vein; pancreaticosplenic → coeliac nodes
Embryology	Mesoderm of the dorsal mesogastrium (not foregut endoderm)

SPLENOMEGALY + RUPTURE

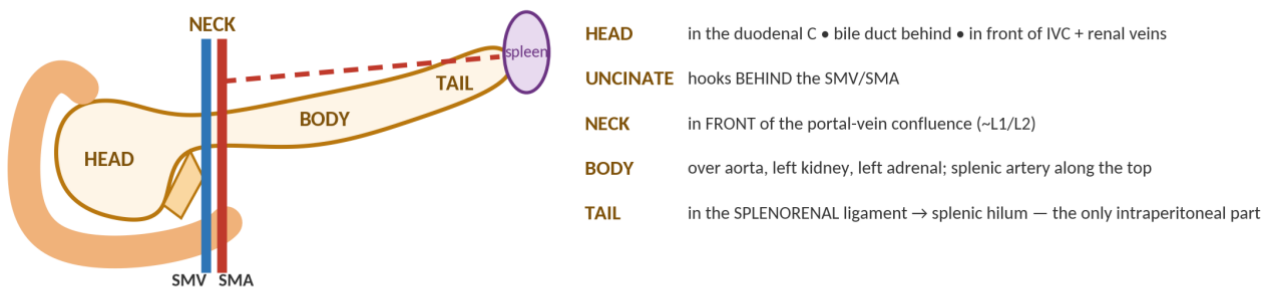
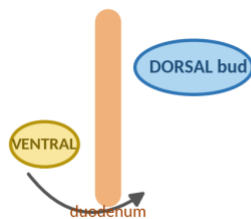
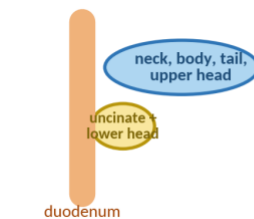
- Enlarges towards the **right iliac fossa** — the phrenicocolic ligament and splenic flexure block straight descent
- Notch on the upper border helps identify it
- Rupture after minor trauma, especially in **infectious mononucleosis**

SPLENIC ARTERY ANEURYSM + ASPLENIA

- Commonest visceral artery aneurysm**; more in women and multiparae
- Rupture in pregnancy** (often third trimester) — very high maternal and fetal mortality
- Asplenia: lifelong vaccination (pneumococcus, Hib, meningococcus) ± penicillin — **OPSI** can be fatal

3 The Pancreas

IN ONE LINE: Retroperitoneal (except the tail), across L1–L2 behind the stomach — exocrine and endocrine.

Pancreas — parts and relations (schematic)**WEEK 5 — two buds****AFTER ROTATION — fused**

Ventral bud (with the bile duct) swings behind the duodenum to fuse with the dorsal bud.

- **ANNULAR pancreas** — ring round D2 → obstruction
- **PANCREAS DIVISUM** — ducts don't fuse → pancreatitis

Figure 5. Parts, relations and development of the pancreas.

DUCTS + BLOOD

- Main duct (Wirsung)** tail → head → joins CBD at the **ampulla** → major papilla
- Accessory duct (Santorini)** → minor papilla, ~2 cm higher
- Superior (gastroduodenal) + inferior (SMA) **pancreaticoduodenal** arcades — the main coeliac–SMA link
- Splenic artery branches to neck, body, tail; veins → splenic / SMV → portal

ISLETS OF LANGERHANS

- **β (~70%)** — insulin
- **α (~20%)** — glucagon
- **δ (~5%)** — somatostatin
- PP cells — pancreatic polypeptide; ε — ghrelin
- Most numerous in the **tail**

CLINICAL LINK

Pancreatitis in pregnancy (~1 in 1000–10 000): **gallstones** commonest, then **hypertriglyceridaemia**.
Gestational diabetes: placental hormones (hPL and others) increase insulin resistance.

4 Side by Side

Feature	Liver	Spleen	Pancreas
Location	RUQ + epigastrium	LUQ, ribs 9–11	Posterior wall, L1–L2
Peritoneum	Intraperitoneal (bare area)	Intraperitoneal	Retroperitoneal (tail intra-)
Origin	Foregut endoderm	Dorsal mesogastrium (mesoderm)	Foregut endoderm (2 buds)
Arteries	Hepatic artery + portal vein	Splenic artery	Splenic + pancreaticoduodenal
Veins	Hepatic veins → IVC	Splenic vein → portal	Splenic / SMV → portal

★ **PEARL — the stomach bed**

Behind the stomach, across the **lesser sac**: pancreas, **splenic artery** (upper border), spleen, left kidney + adrenal, transverse mesocolon, left crus.

A **posterior gastric ulcer** can erode the splenic artery; the caudate lobe projects into the lesser sac from above.

5 MRCOG Exam Pearls — Last-Minute Page

Numbers to know

1.2–1.5 kg Liver	8 Couinaud segments	~75% Liver flow from portal vein	30–50 mL Gallbladder
~150 g Spleen	9–11 Ribs over the spleen	L1–L2 Pancreas	~70% Islet β cells

HIGH-YIELD CHECKLIST

- ☐ Liver: 4 anatomical lobes; 8 Couinaud segments; Cantlie's line (GB fossa → IVC) divides functional halves.
- ☐ Caudate = segment I, drains straight to the IVC (Budd–Chiari).
- ☐ Ligamentum teres = left umbilical vein; ligamentum venosum = ductus venosus.
- ☐ Portal vein ~75% of flow; hepatic artery ~25% but ~half the oxygen.
- ☐ Calot's triangle: cystic duct, CHD, liver edge — cystic artery.
- ☐ HELLP → subcapsular haematoma; ICP → bile acids; UDCA for itch only.
- ☐ Spleen: 1-3-5-7-9-11; gastrosplenic (short gastrics) and splenorenal (splenic vessels + pancreatic tail) ligaments.
- ☐ Splenomegaly heads to the RIF; splenic artery aneurysm can rupture in pregnancy.
- ☐ Pancreas: head in the C, uncinate behind SMV/SMA, neck in front of the portal confluence, tail in the splenorenal ligament.
- ☐ Wirsung → major papilla; Santorini → minor papilla.
- ☐ Ventral bud → uncinate + lower head; annular pancreas, pancreas divisum.
- ☐ Pancreatitis in pregnancy: gallstones, then hypertriglyceridaemia.

Quick-fire self-test — cover the right-hand column

Question	Answer
What divides the functional right and left liver?	Cantlie's line (GB fossa → IVC)
Which segment drains directly to the IVC?	I (caudate)
Ligamentum teres is the remnant of...?	Left umbilical vein
Share of hepatic blood flow from the portal vein?	~70–75%
Content of Calot's triangle?	Cystic artery
Which ligament carries the short gastric arteries?	Gastrosplenic
Which ligament contains the tail of the pancreas?	Splenorenal (lienorenal)
Commonest visceral artery aneurysm?	Splenic artery aneurysm
What lies behind the neck of the pancreas?	Portal vein formation (SMV + splenic)
Where does the accessory pancreatic duct open?	Minor duodenal papilla
Commonest cause of pancreatitis in pregnancy?	Gallstones

6 References

- Standring S, editor. Gray's Anatomy. 42nd ed. 2020.
- Moore KL et al. Clinically Oriented Anatomy. 8th ed. 2017.
- RCOG Green-top Guideline No. 43. Intrahepatic Cholestasis of Pregnancy. 2022.