



PIPADOR REVISION

MRCOG Part 1 Revision Notes

The Pelvic Vessels

ANATOMY • LECTURE 3

VISUAL EXAMINATION REVISION NOTES

2026 Edition

MRCOG Part 1 Revision Notes

Lecture 3: The Pelvic Vessels

Anatomy • Visual revision edition

COLOUR CODE USED THROUGHOUT THESE NOTES

AORTA / COMMON	EXTERNAL ILIAC	ANTERIOR DIV.	POSTERIOR DIV.	GONADAL	IMA / RECTAL	URETER
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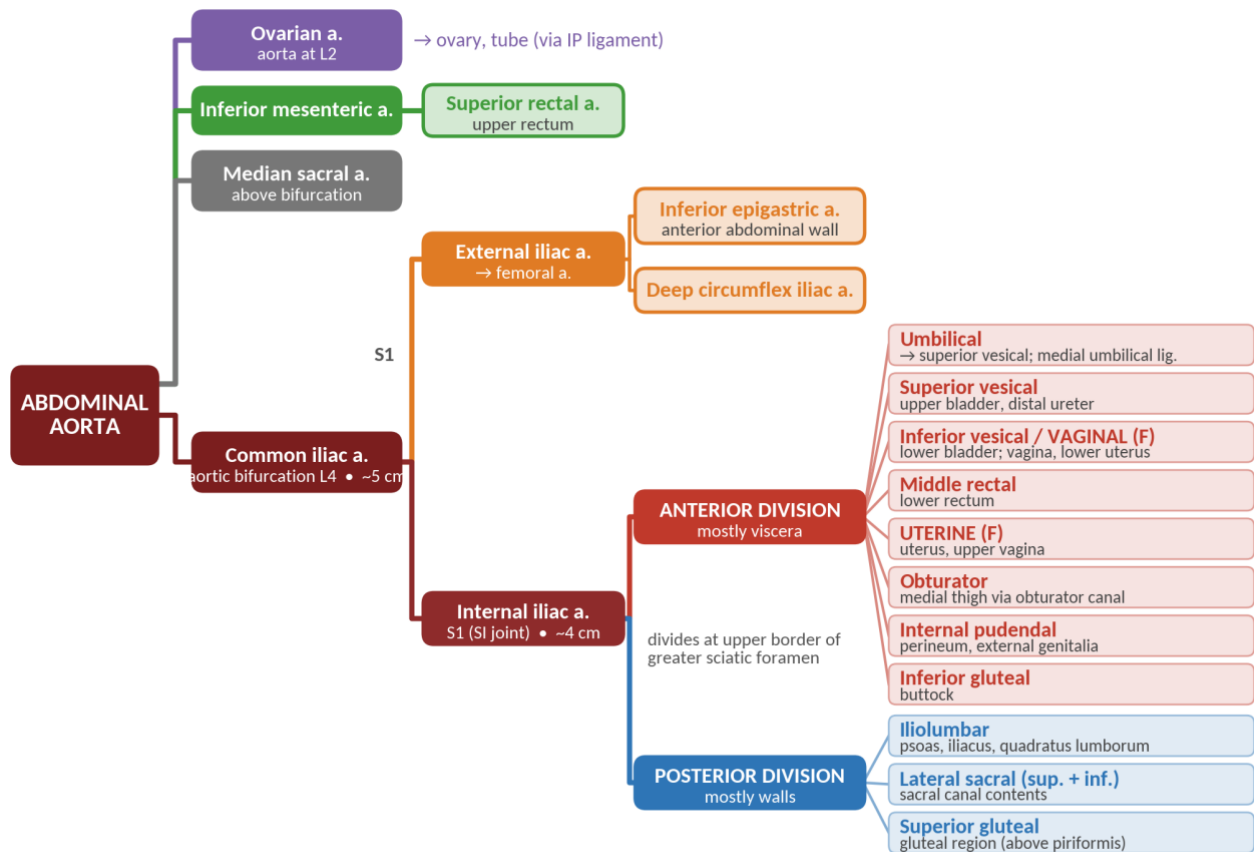
LEARNING OBJECTIVES — tick off as you go

- ☐ Describe the common iliac arteries and their bifurcation.
- ☐ List the branches of the anterior and posterior divisions of the internal iliac artery.
- ☐ Identify gonadal (ovarian/testicular) artery origin and course.
- ☐ Recognise venous drainage of the pelvis.
- ☐ Apply knowledge to pelvic surgery, PPH (internal iliac ligation), uterine artery embolisation and pelvic congestion.

1 Overview

IN ONE LINE: *Two main suppliers — the internal iliac artery and the gonadal arteries — with help from the superior rectal and median sacral arteries.*

- Venous drainage **parallels** the arterial supply, with extensive venous **plexuses**.



Branch order of the anterior division is variable.

Figure 1. The whole arterial tree on one page. Anterior division (red) = viscera; posterior division (blue) = walls.

2 Common and External Iliac Arteries

COMMON ILIAC ARTERY	EXTERNAL ILIAC ARTERY
- Aorta bifurcates at L4 into right and left common iliacs - Each descends laterally ~5 cm to the sacroiliac joint - At the SI joint (S1) it divides into external and internal iliac - The ureter crosses the bifurcation — key surgical landmark	- Larger branch; runs along medial border of psoas major to the mid-inguinal point - Becomes the femoral artery deep to the inguinal ligament - Branches just above the ligament: inferior epigastric (laparoscopic port landmark) and deep circumflex iliac - Does NOT supply pelvic organs directly

3 Internal Iliac (Hypogastric) Artery

IN ONE LINE: Main pelvic supply: ~4 cm long, begins at the SI joint, divides at the upper border of the greater sciatic foramen.

3.1 Anterior division — mostly viscera

Branch	Supply
Umbilical	Patent proximal part gives superior vesical; distal part becomes medial umbilical ligament
Superior vesical	Upper bladder, distal ureter, ductus deferens (M)
Inferior vesical (M) / Vaginal (F)	Lower bladder, urethra, seminal vesicle, prostate (M); vagina, lower uterus (F)
Middle rectal	Lower rectum (anastomoses with superior and inferior rectal)
Uterine (F)	Uterus, upper vagina; crosses over the ureter; anastomoses with ovarian artery
Obturator	Through obturator canal to medial thigh
Internal pudendal	Leaves via greater sciatic foramen below piriformis, re-enters via lesser foramen into pudendal (Alcock's) canal → perineum, external genitalia
Inferior gluteal	Leaves via greater sciatic foramen below piriformis → buttock

3.2 Posterior division — mostly walls

Branch	Supply
Iliolumbar	Psoas major, iliacus, quadratus lumborum, cauda equina
Lateral sacral (sup. + inf.)	Sacral canal contents, structures around sacrum
Superior gluteal	Leaves via greater sciatic foramen above piriformis → gluteal region

MNEMONIC / MEMORY HOOK

Posterior division = 'I Like Sweets': Iliolumbar • Lateral sacral • Superior gluteal

Everything else comes off the **anterior** division. Only the superior gluteal leaves **above** piriformis (link to Lecture 2).

4 The Uterine Artery

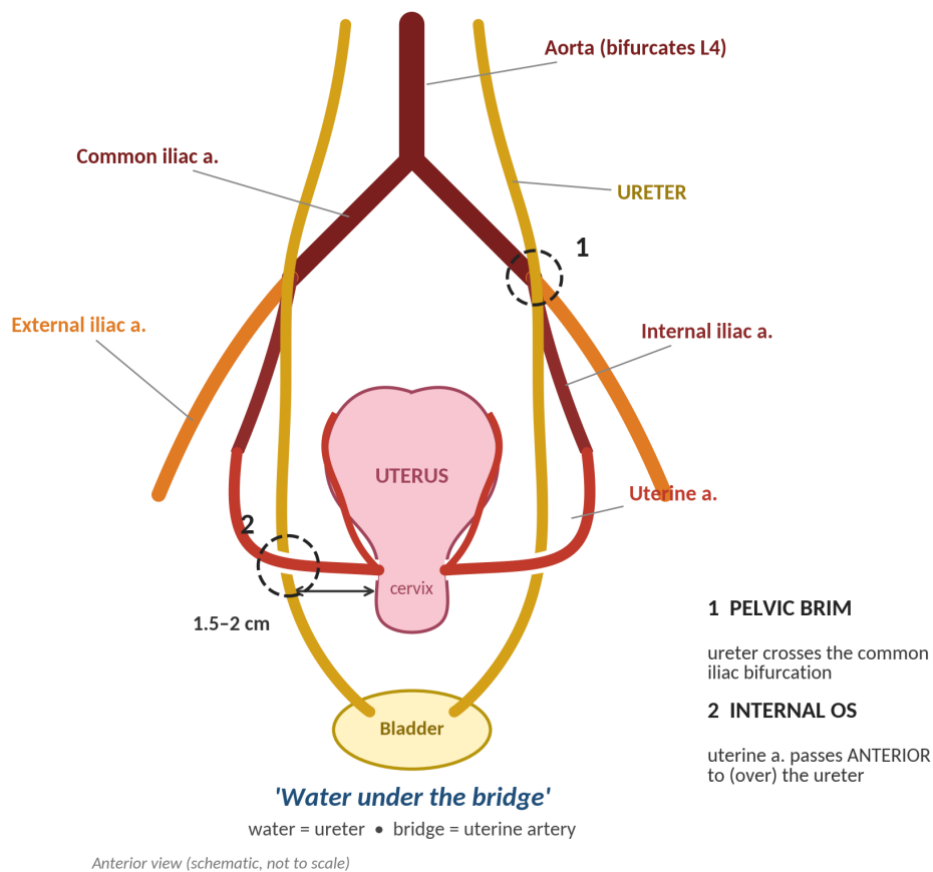


Figure 2. The two places the ureter is most at risk.

Course in six steps

1	2	3	4	5	6
Arises on lateral pelvic wall	Runs medially in base of broad ligament	Crosses ANTERIOR to ureter at internal os, 1.5–2 cm from cervix	Reaches lateral uterus at the cervix	Ascends lateral border — tortuous	Anastomoses with ovarian a. in broad ligament

BRANCHES

- Vaginal (descending — anastomose with vaginal a.)
- Cervical
- Tubal
- Ovarian (anastomose with ovarian a.)

SURGICAL IMPORTANCE

- Must be identified and ligated at hysterectomy
- **Ureter at risk** during ligation
- **Uterine artery embolisation** for fibroids and PPH

MNEMONIC / MEMORY HOOK

'Water under the bridge' — the ureter (water) runs **under** the uterine artery (bridge).

5 Gonadal Arteries

IN ONE LINE: Direct branches of the abdominal aorta at L2, just below the renal arteries, with a long retroperitoneal course.

OVARIAN ARTERY (F)	TESTICULAR ARTERY (M)
• Crosses anterior to the ureter, then the external iliac vessels at the pelvic brim • Enters the infundibulopelvic (suspensory) ligament • Supplies ovary and fallopian tube • Anastomoses with uterine artery in broad ligament	• Deep ring → inguinal canal → superficial ring • Enters the spermatic cord • Supplies testis and epididymis

CLINICAL LINK

At oophorectomy: **clamp the infundibulopelvic ligament and identify the ureter** — they lie close together at the pelvic brim.

6 Other Pelvic Arteries

SUPERIOR RECTAL ARTERY

- Terminal branch of the **inferior mesenteric** artery
- Supplies upper rectum
- Watershed at upper anal canal — anastomoses with middle and inferior rectal

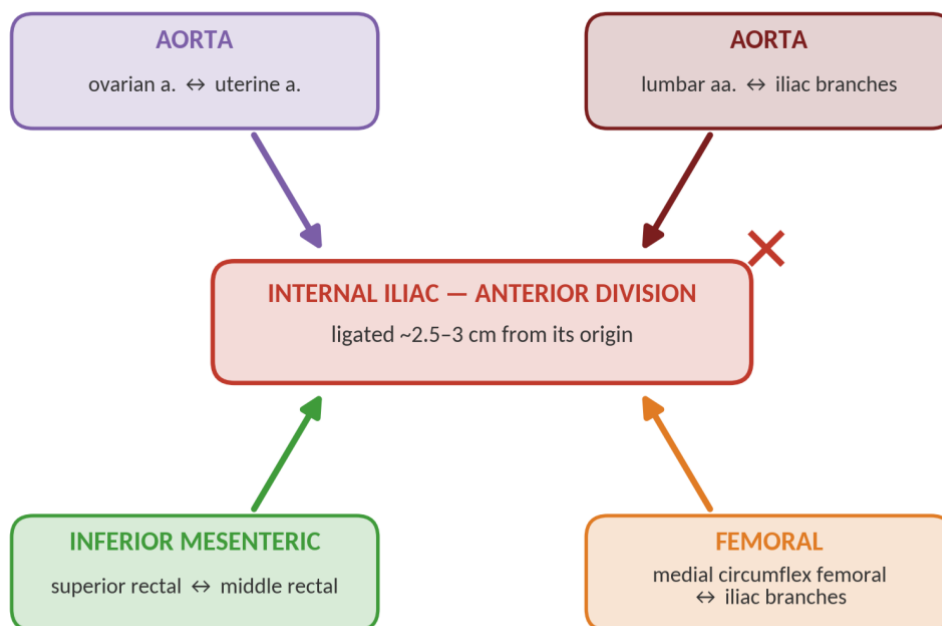
MEDIAN SACRAL ARTERY

- From **posterior aorta** just above the bifurcation
- Descends in the midline along the sacrum
- Small contribution to pelvic supply

7 Anastomoses

IN ONE LINE: Extensive collaterals allow major pelvic vessels to be ligated without ischaemia.

Why internal iliac ligation works: collateral flow



Pulse pressure falls → clotting • pelvis stays perfused • fertility preserved

Figure 3. Where blood comes from after internal iliac ligation.

Anastomosis	Where
Uterine ↔ ovarian	Broad ligament
Uterine ↔ vaginal	Lateral vagina
Middle rectal ↔ superior and inferior rectal	Rectum / anal canal
Internal iliac branches ↔ femoral (medial circumflex), IMA (superior rectal), aorta (ovarian, lumbar)	Important after internal iliac ligation

8 Venous Drainage

8.1 Pelvic venous plexuses

VESICAL	PROSTATIC (M)	UTERINE (F)	VAGINAL	RECTAL
bladder neck and base	around prostate	broad ligament, with uterine a.	around vagina	rectum and anal canal (haemorrhoidal)

They **communicate freely** and drain mainly into the **internal iliac vein**.

8.2 The venous route back to the heart

Vein	Key facts
Internal iliac v.	Tributaries from anterior and posterior territories; joins external iliac v. at the SI joint → common iliac v.
External iliac v.	Continuation of femoral v. above inguinal ligament; receives inferior epigastric and deep circumflex iliac vv.
Common iliac vv.	Unite at L5 to form the IVC — right of midline
Superior rectal v.	Upper rectum and anal canal above pectinate line → inferior mesenteric v. → portal circulation; portosystemic site (internal haemorrhoids in portal hypertension)

8.3 Ovarian veins — the asymmetry

LEVELS TO KNOW

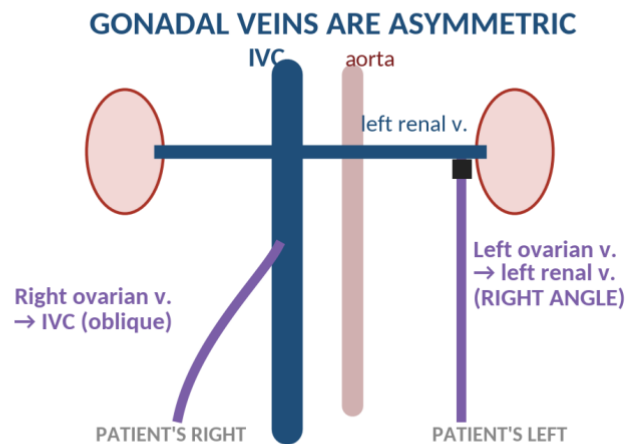
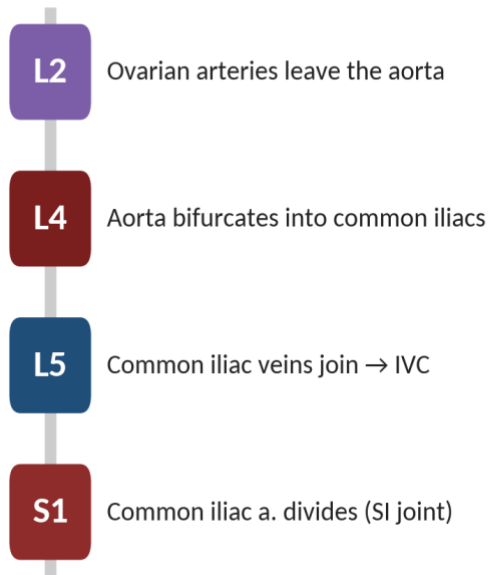


Figure 4. Vertebral levels to know, and why left and right gonadal veins behave differently.

- Arise from the **pampiniform plexus** in the suspensory ligament of the ovary.
- **Right** → IVC directly. **Left** → **left renal vein** at a right angle — prone to congestion; thrombosis can extend into the renal vein.
- **Ovarian vein thrombosis** in the puerperium: **right > left**.

9 Lymphatics (Brief — see Lecture 5)

- Largely follow venous drainage → **internal, external and common iliac** nodes.
- **Ovaries** → **para-aortic nodes** (along the ovarian vessels).

10 Clinical Correlations

10.1 Internal iliac artery ligation (life-threatening PPH)

Key point	
WHAT	The ANTERIOR division
WHERE	~2.5–3 cm from its origin — spares the posterior division (superior gluteal)
HOW MANY	Bilateral — reduces pulse pressure so clots can form
WATCH	Identify and protect the ureter
AFTER	Pregnancy rates preserved — collateral circulation

10.2 Uterine artery embolisation (UAE)



Catheter route for uterine artery embolisation (fibroids and PPH)

Risk: post-embolisation syndrome (pain, fever) • ovarian failure 1–2% via the ovarian–uterine anastomosis

Figure 5. Catheter route and the risk you must quote.

Embolic particles cause uterine ischaemia → fibroid shrinkage. Also **fertility concerns**.

10.3 – 10.6 Other clinical links

OVARIAN VEIN THROMBOSIS

- Postpartum; **right** more often affected (drains to IVC)
- Right lower abdominal pain + fever — **mimics appendicitis**
- CT or MRI
- Anticoagulation + antibiotics

PELVIC CONGESTION SYNDROME

- Chronic pain from dilated, varicose pelvic veins
- Worse standing, end of day, after intercourse
- Linked to **left ovarian vein** insufficiency
- USS, venography, MR/CT → **ovarian vein embolisation**

SURGICAL LANDMARKS

- **Inferior epigastric a.:** port-placement landmark, lateral to medial umbilical ligament; lateral ports risk injury
- Ureter crosses iliac vessels at the brim — find it first
- Uterine a. crosses ureter 1.5–2 cm from cervix
- Obturator vessels and nerve at risk in lymphadenectomy

VASCULAR INJURY AT SURGERY

- Rare but catastrophic: aorta, IVC, common iliacs (laparoscopic trocar entry)
- Common: internal iliac, uterine, ovarian, inferior epigastric
- Prompt recognition, pressure, repair, vascular surgery input

11 MRCOG Exam Pearls — Last-Minute Page

Numbers to know

L2 Ovarian arteries	L4 Aortic bifurcation	L5 IVC formed	S1 Common iliac divides
~4 cm Internal iliac length	1.5–2 cm Uterine a. × ureter from cervix	2.5–3 cm Ligation point	1–2% Ovarian failure after UAE

HIGH-YIELD CHECKLIST

- ☐ Aorta bifurcates at L4; common iliac divides into external and internal iliac at the SI joint (S1).
- ☐ Ureter crosses the common iliac bifurcation at the pelvic brim.
- ☐ Internal iliac divides at the upper edge of the greater sciatic foramen.
- ☐ Anterior division = viscera (8 branches); posterior = walls (iliolumbar, lateral sacral, superior gluteal).
- ☐ Uterine artery passes ANTERIOR to ureter ~1.5–2 cm lateral to cervix.
- ☐ Uterine ↔ ovarian anastomosis in the broad ligament.
- ☐ Ovarian artery from aorta at L2; right ovarian v. → IVC, left → left renal v.
- ☐ Ovarian vein thrombosis: right > left; postpartum; right lower abdominal pain.
- ☐ Internal iliac ligation: anterior division, 2.5–3 cm from origin, bilateral, protect ureter.
- ☐ Inferior epigastric a. (external iliac branch): laparoscopic port landmark.
- ☐ UAE: ovarian failure 1–2% via the anastomosis.

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

Question	Answer
At what level does the aorta bifurcate?	L4
Name the three posterior division branches.	Iliolumbar, lateral sacral, superior gluteal
Which gluteal artery leaves above piriformis?	Superior gluteal
Does the uterine artery pass anterior or posterior to the ureter?	Anterior ('water under the bridge')
How far from the cervix does the uterine artery cross the ureter?	~1.5–2 cm
Where does the left ovarian vein drain?	Left renal vein
Which side is more often affected by postpartum ovarian vein thrombosis?	Right
Which division is ligated for PPH, and how far from the origin?	Anterior; ~2.5–3 cm
The superior rectal artery is the terminal branch of which artery?	Inferior mesenteric
Where do the ovaries drain lymph to?	Para-aortic nodes
Why can UAE cause ovarian failure?	Uterine–ovarian anastomosis (1–2%)

12 References

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