

Urologic Gross Anatomy Inservice Exam Review

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**COLUMBIA UNIVERSITY
MEDICAL CENTER**

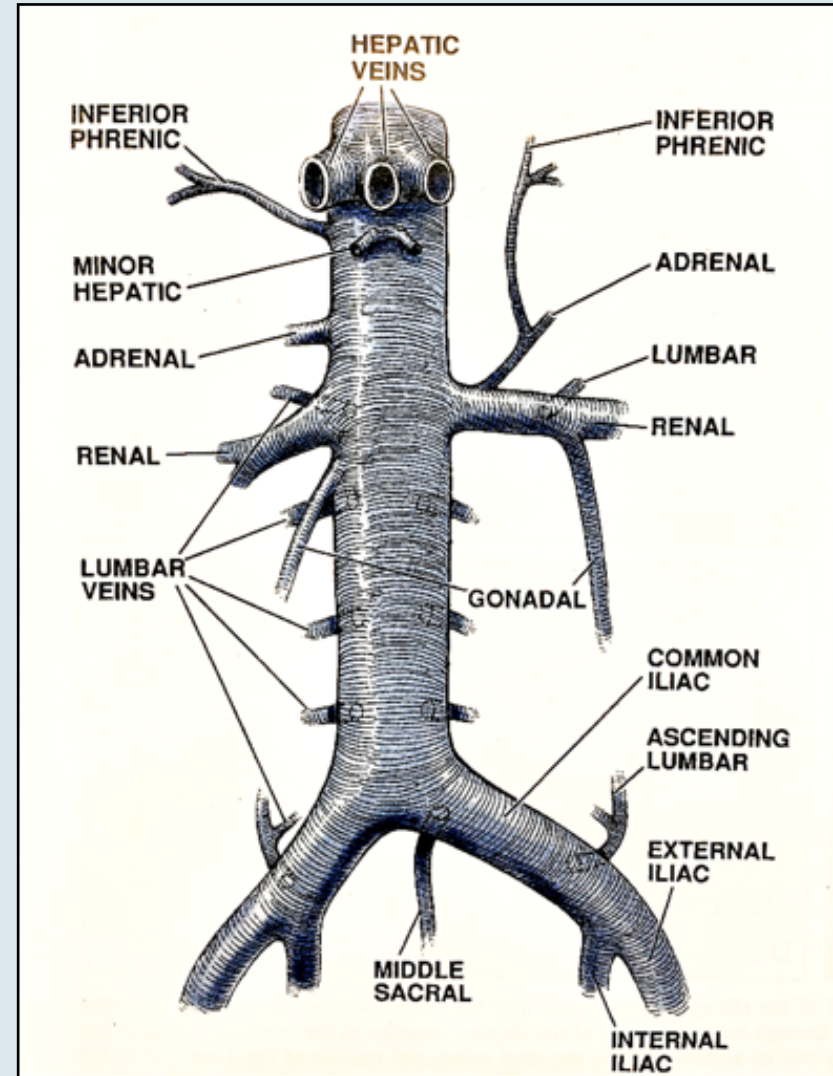
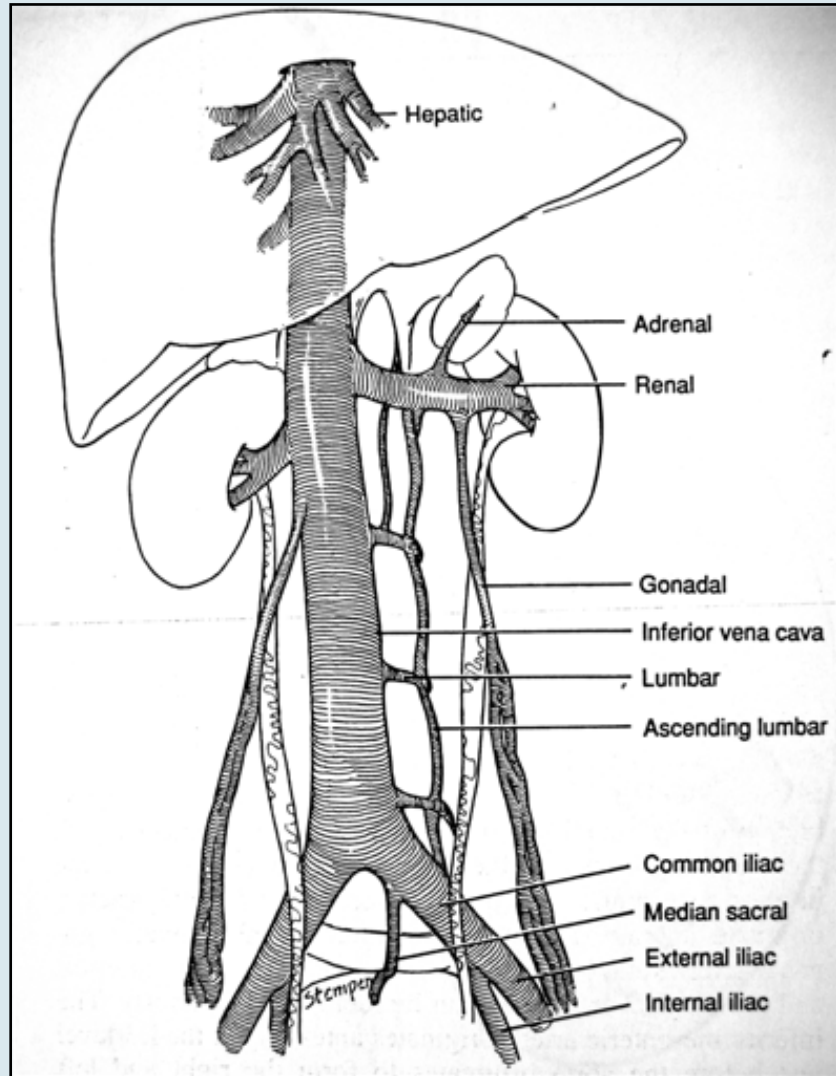


NewYork-Presbyterian

**AMAZING
THINGS
ARE
HAPPENING
HERE**

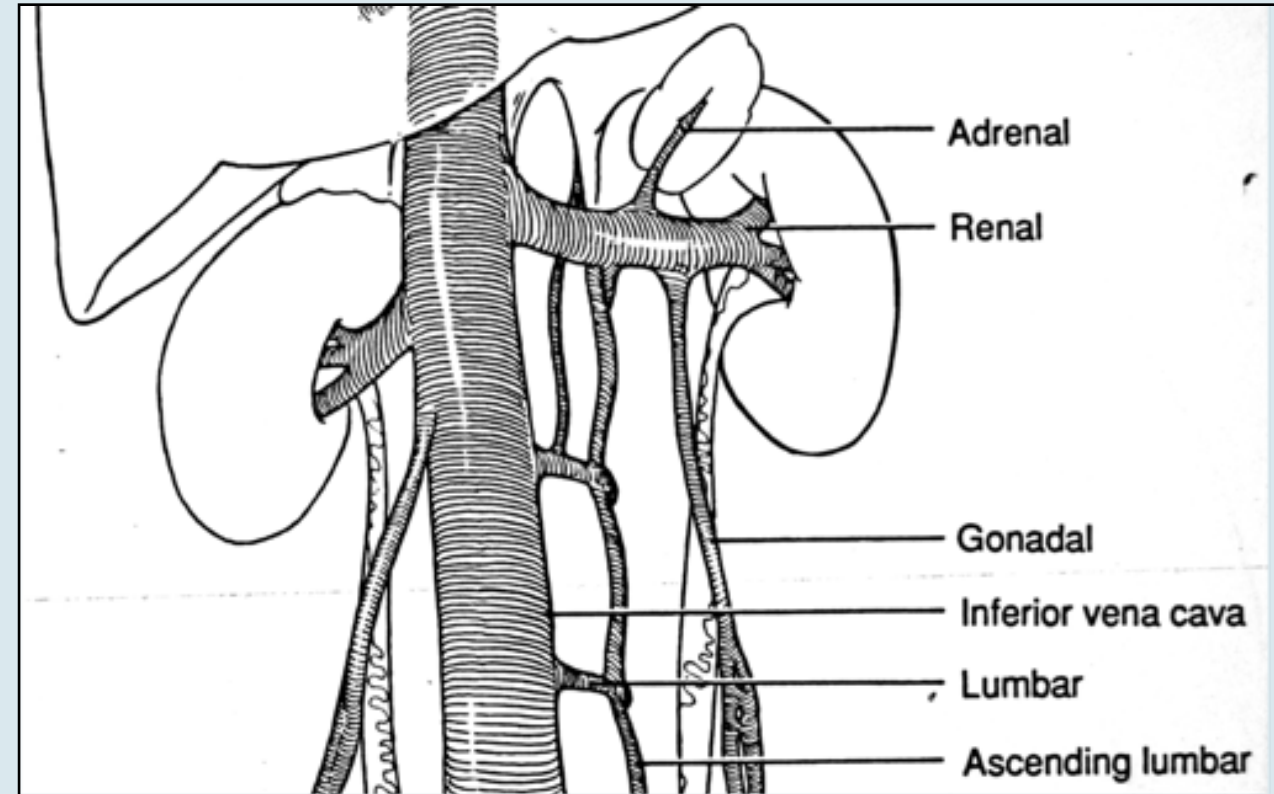
Kidney Anatomy and Abdominal Vasculature

Venous Blood Supply

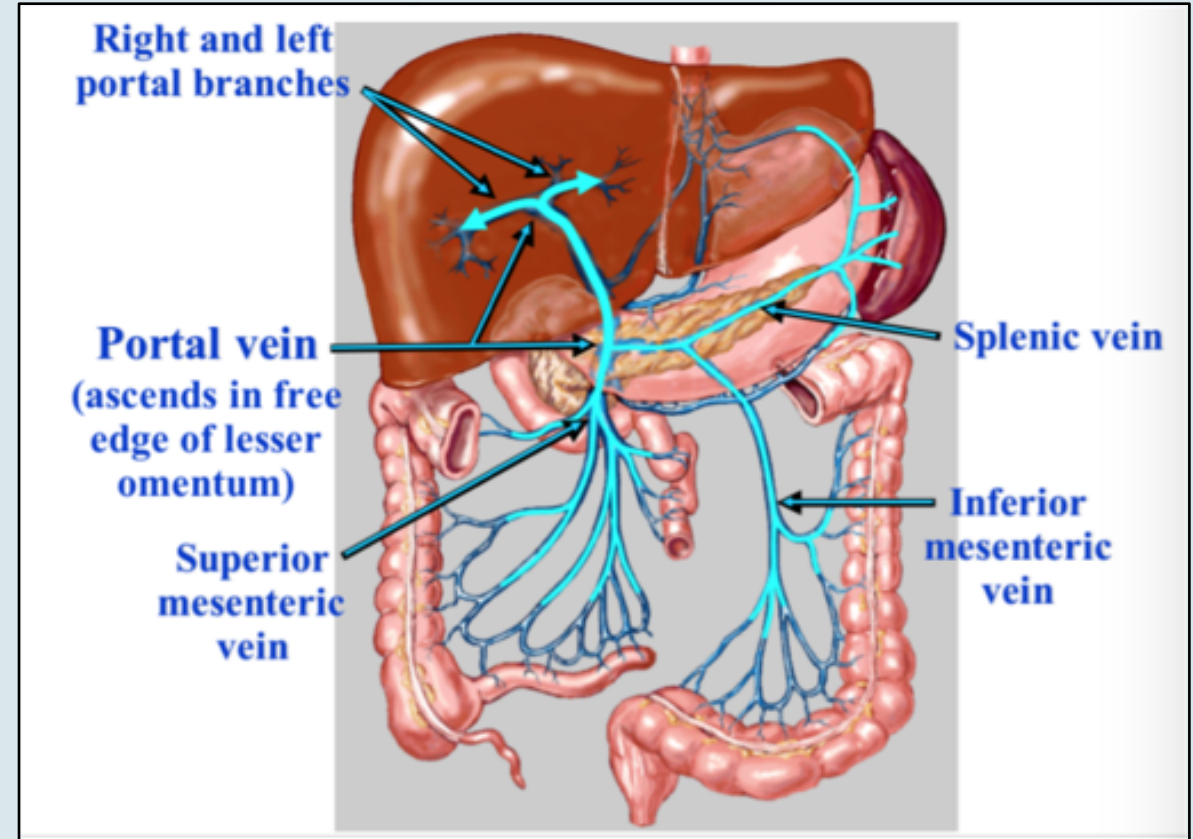
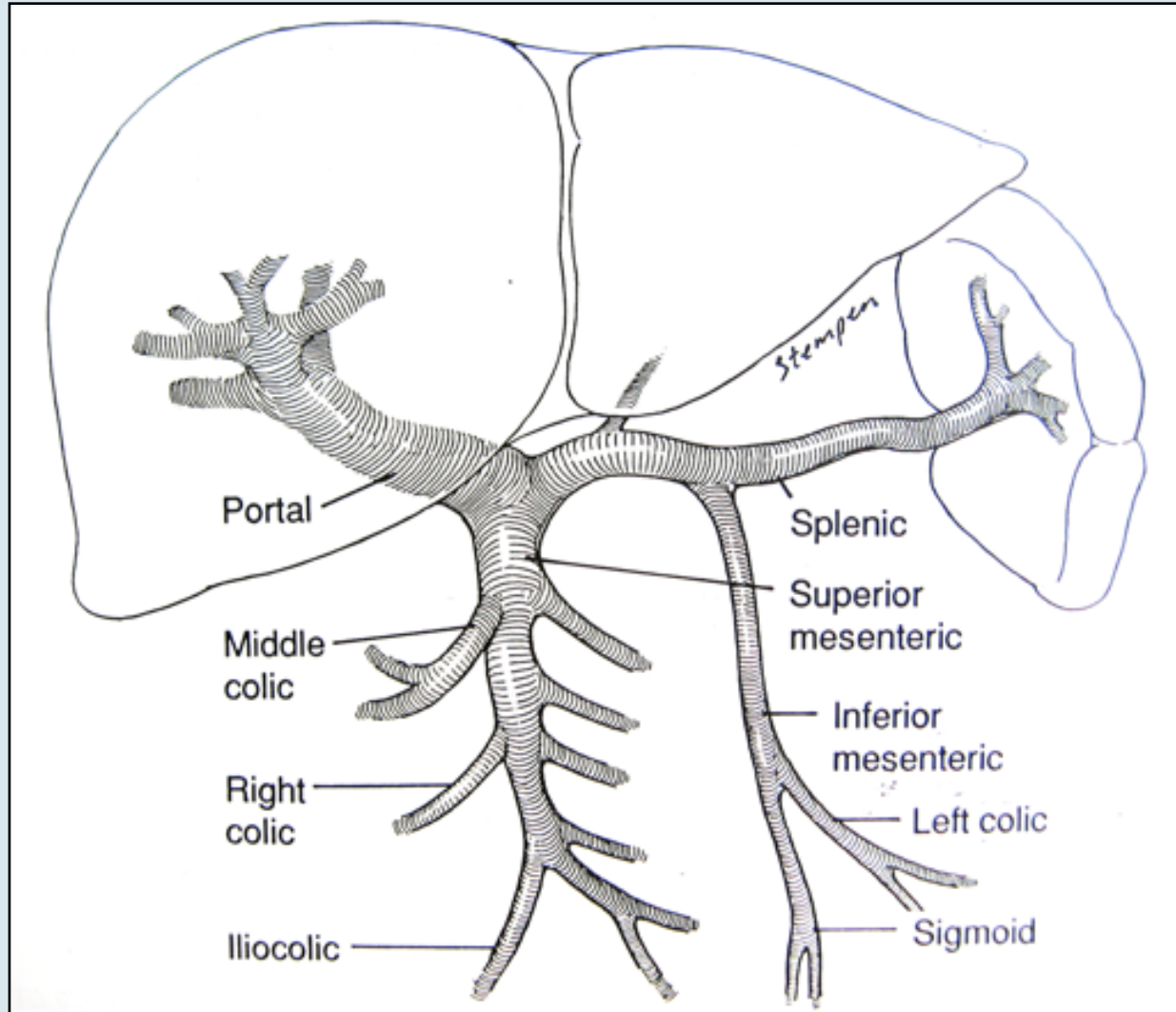


Management

- Renal Vein Lacerations
 - Left Side:
 - Proximal renal vein – Ligate
 - Mid or distal vein – Repair
 - Right Side: - Repair
 - Nephrectomy in 25%-55% of main renal vein injuries

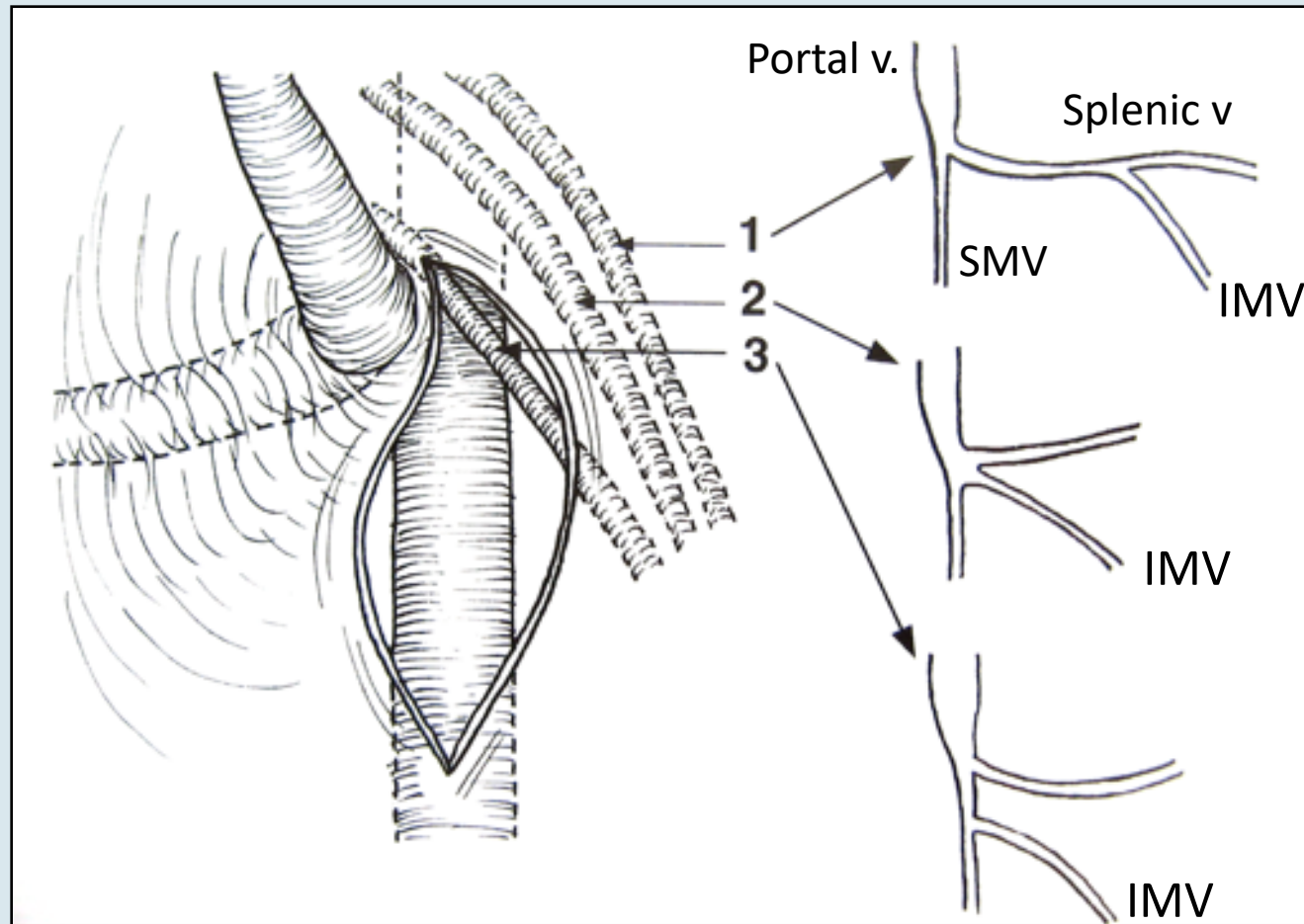


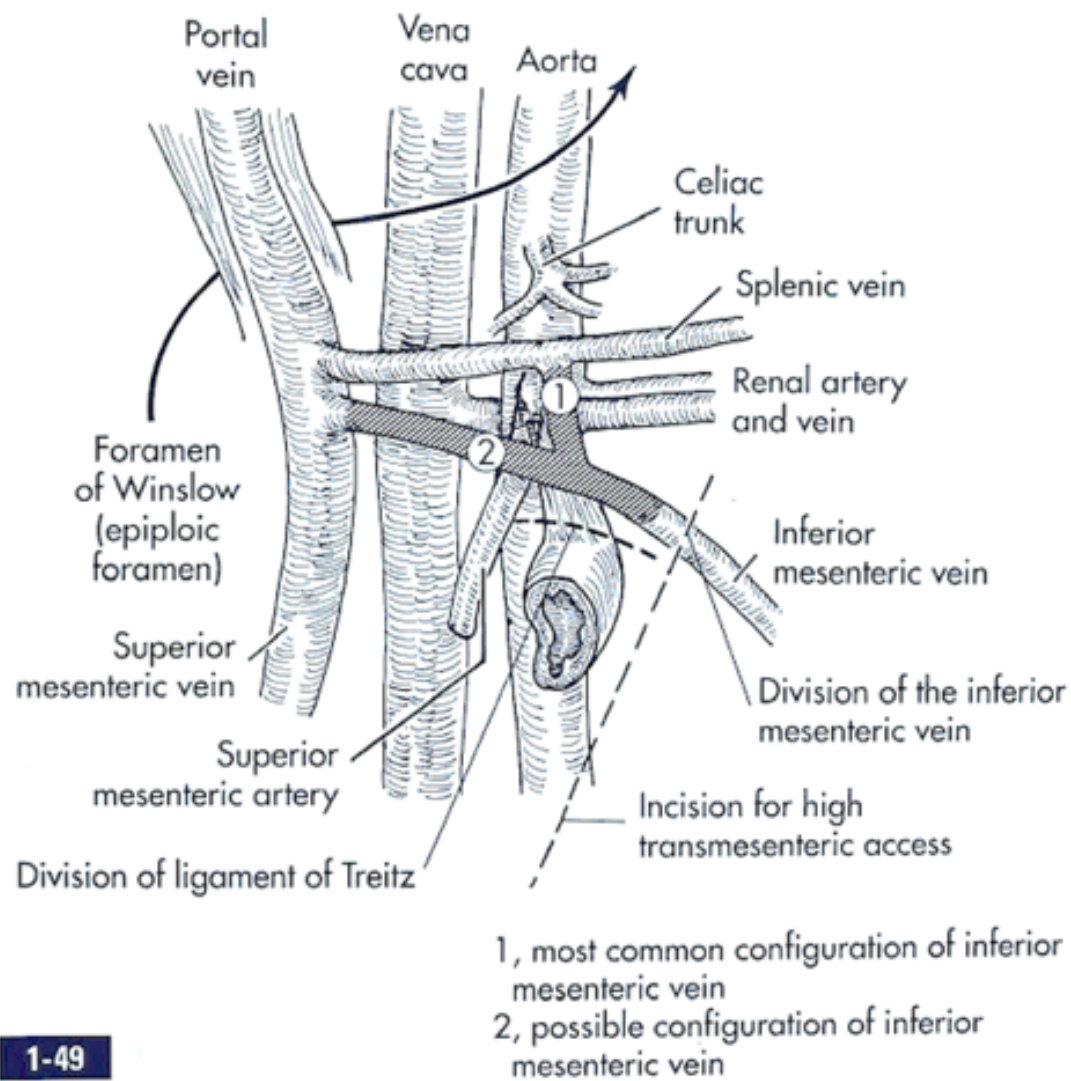
Portal Veins



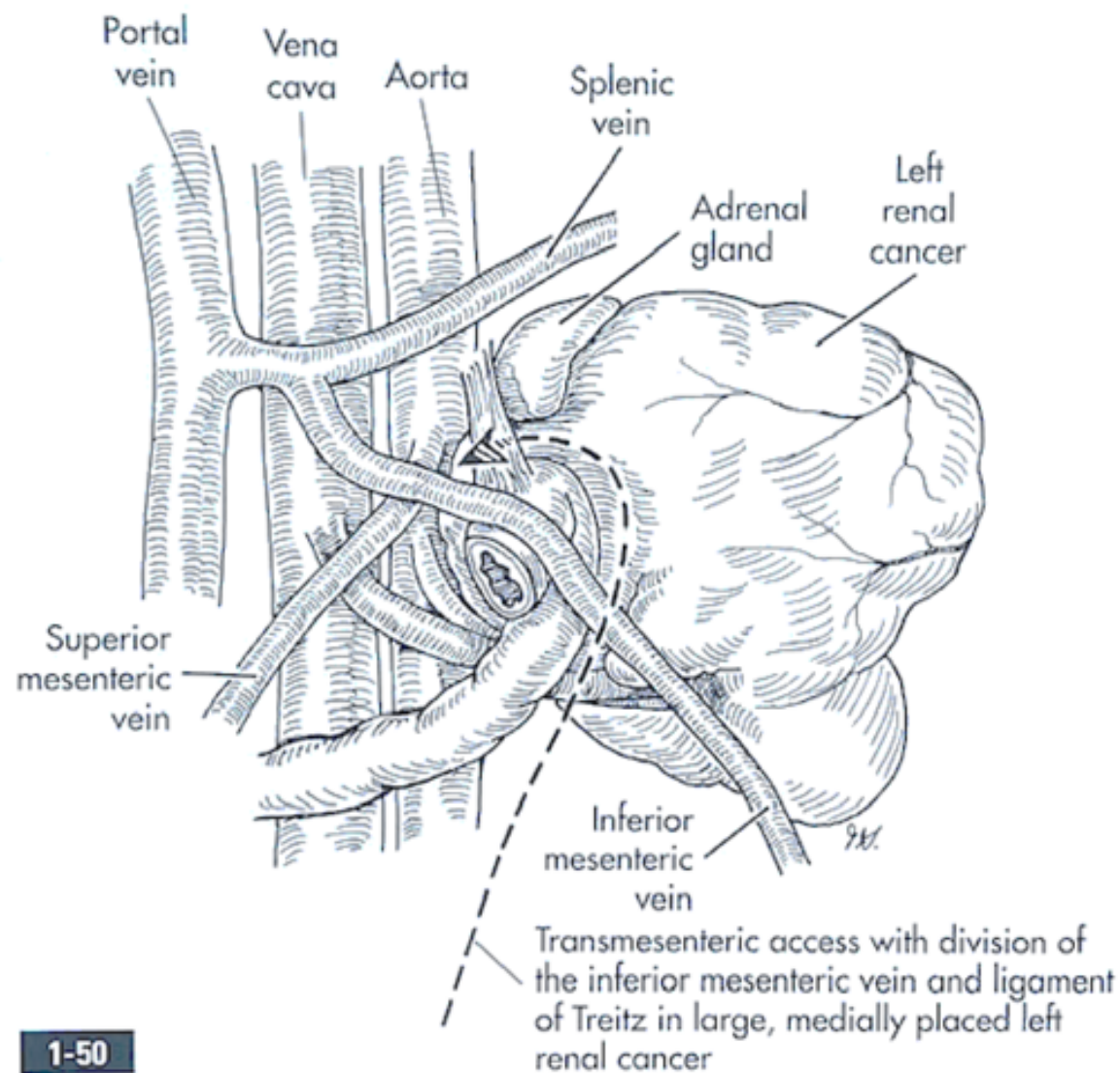
IMV Variants

A landmark for obtaining proximal vascular control



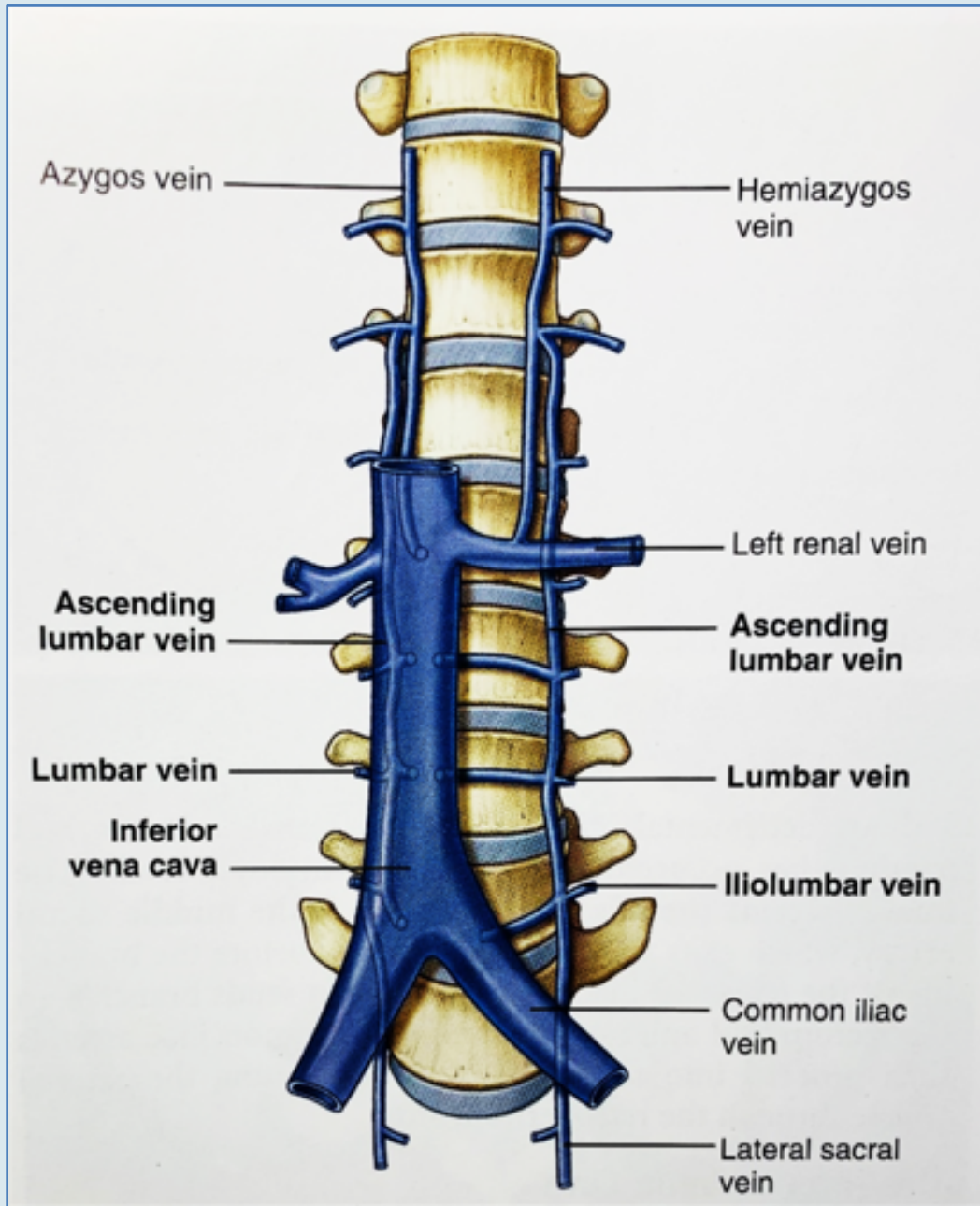


1-49

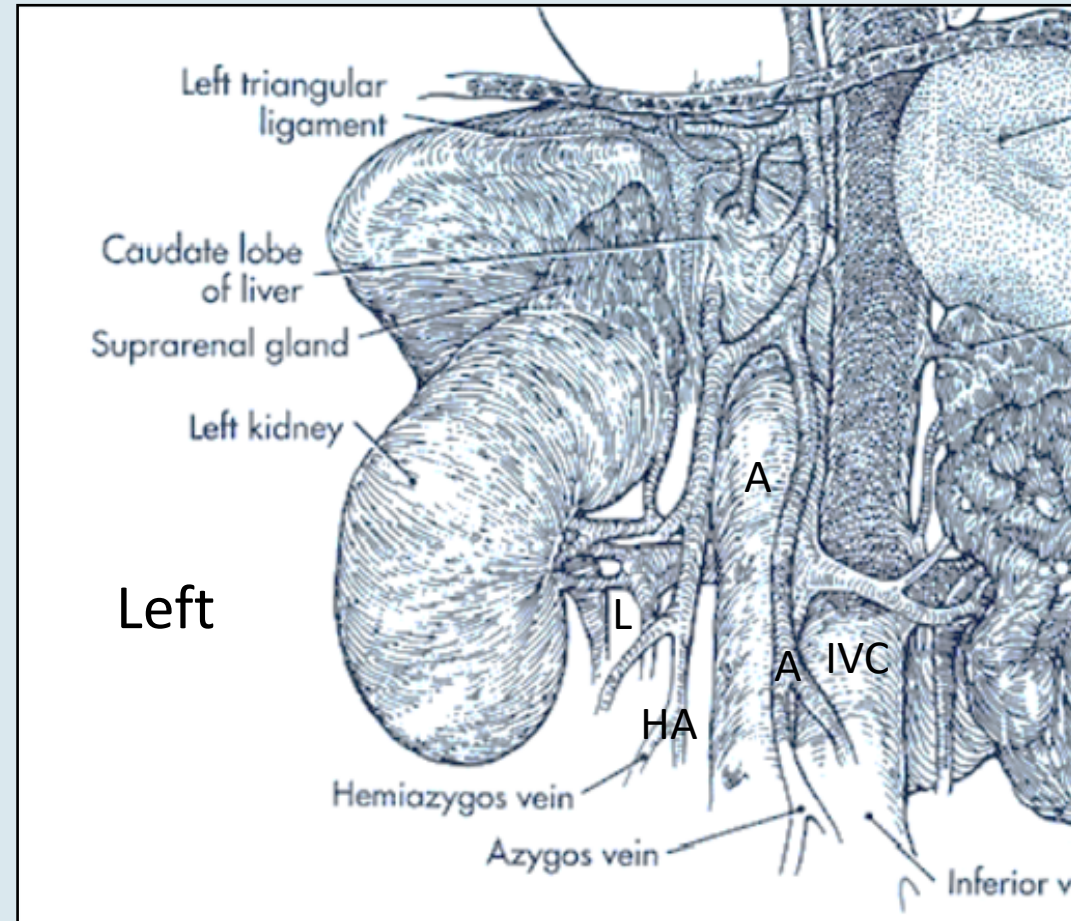


1-50

Lumbar, Azygos and Hemiazygos

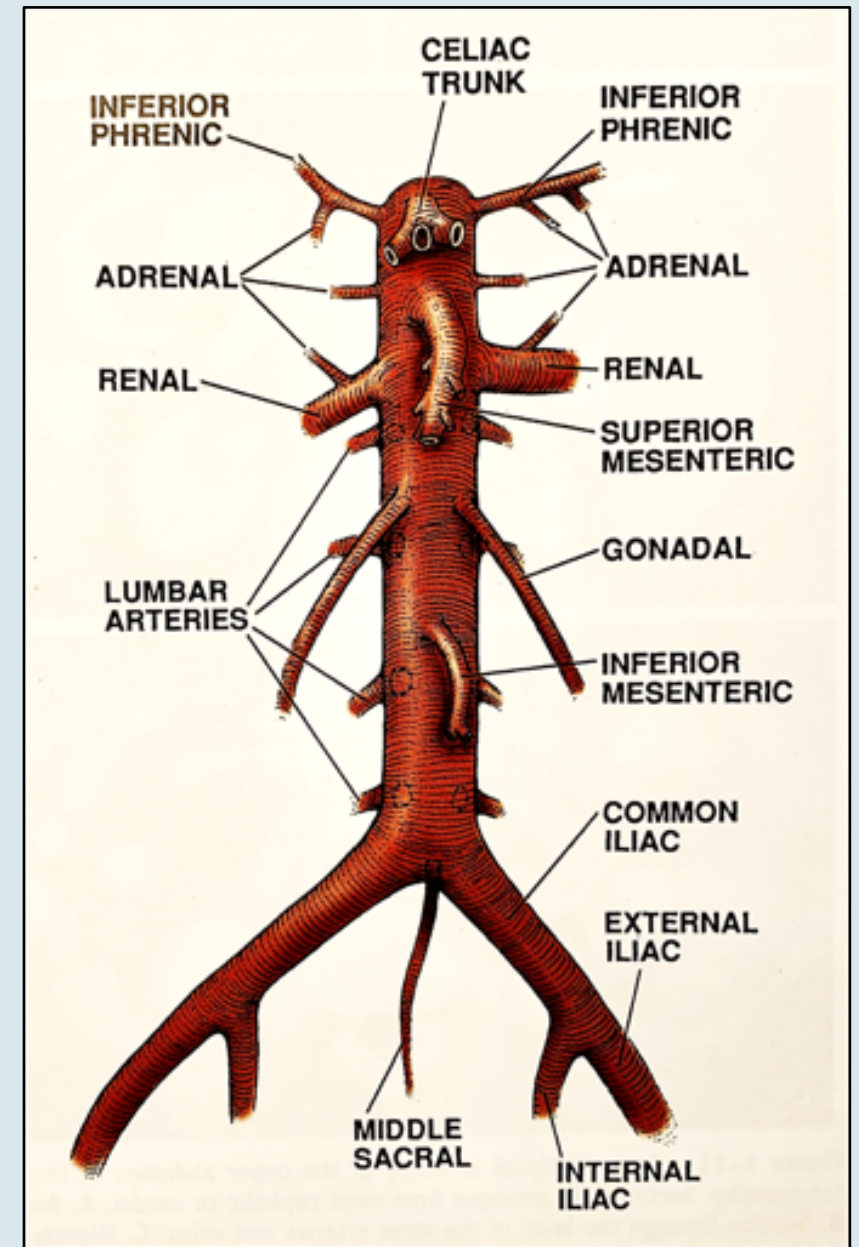
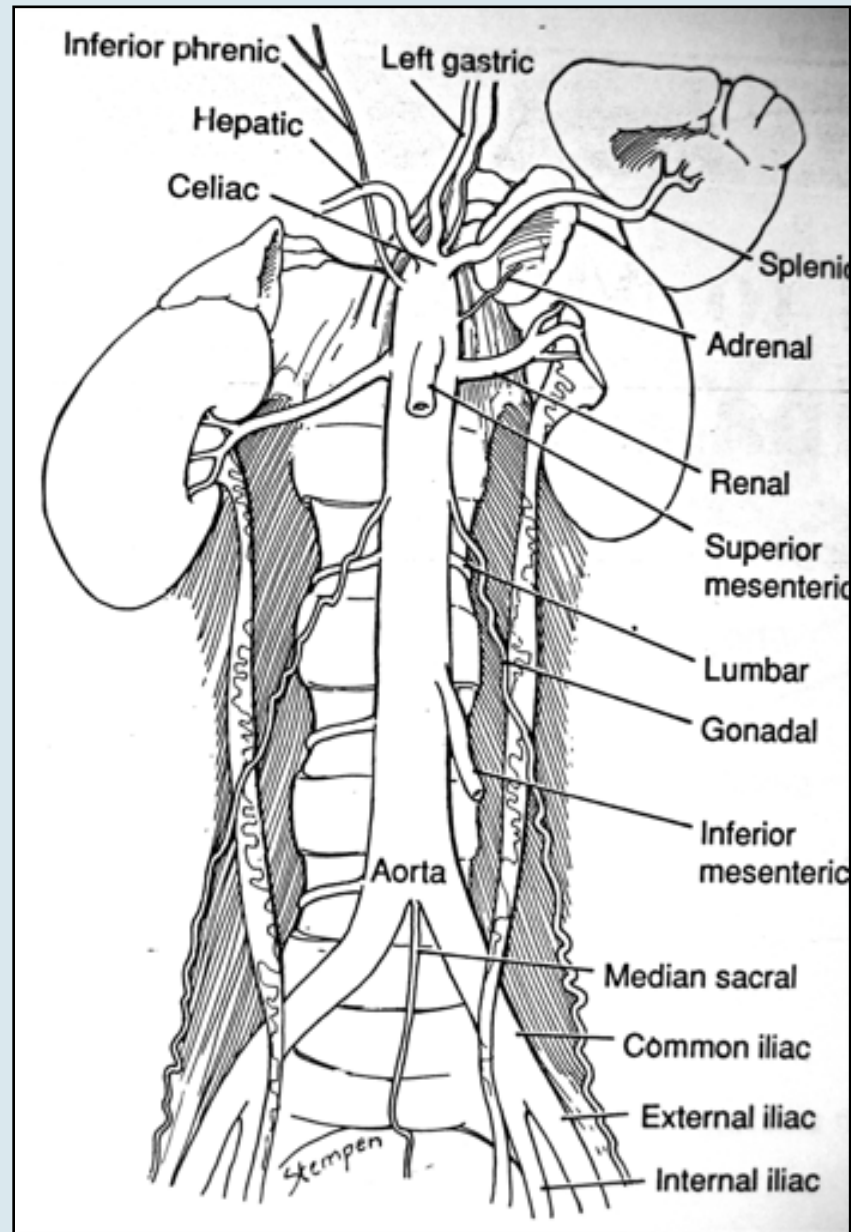


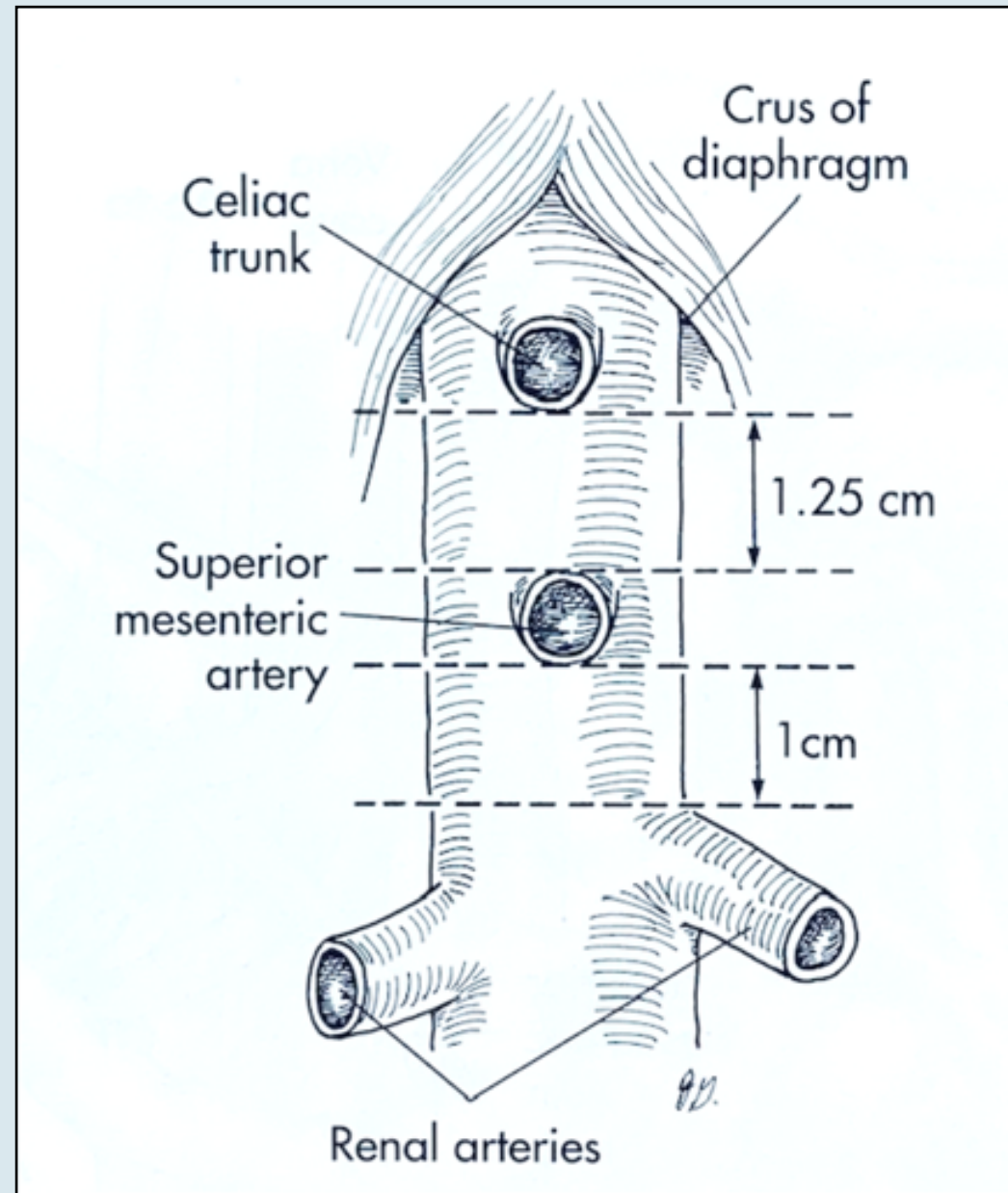
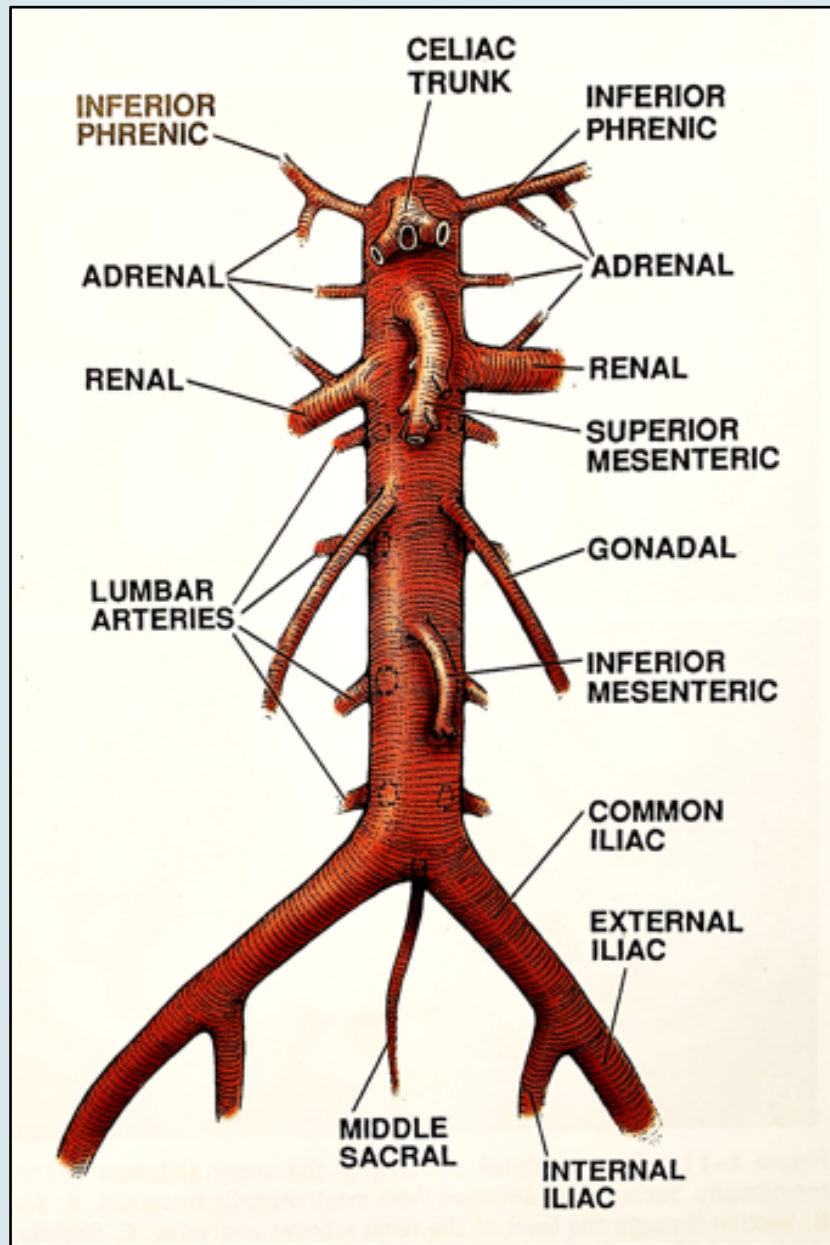
Anterior View

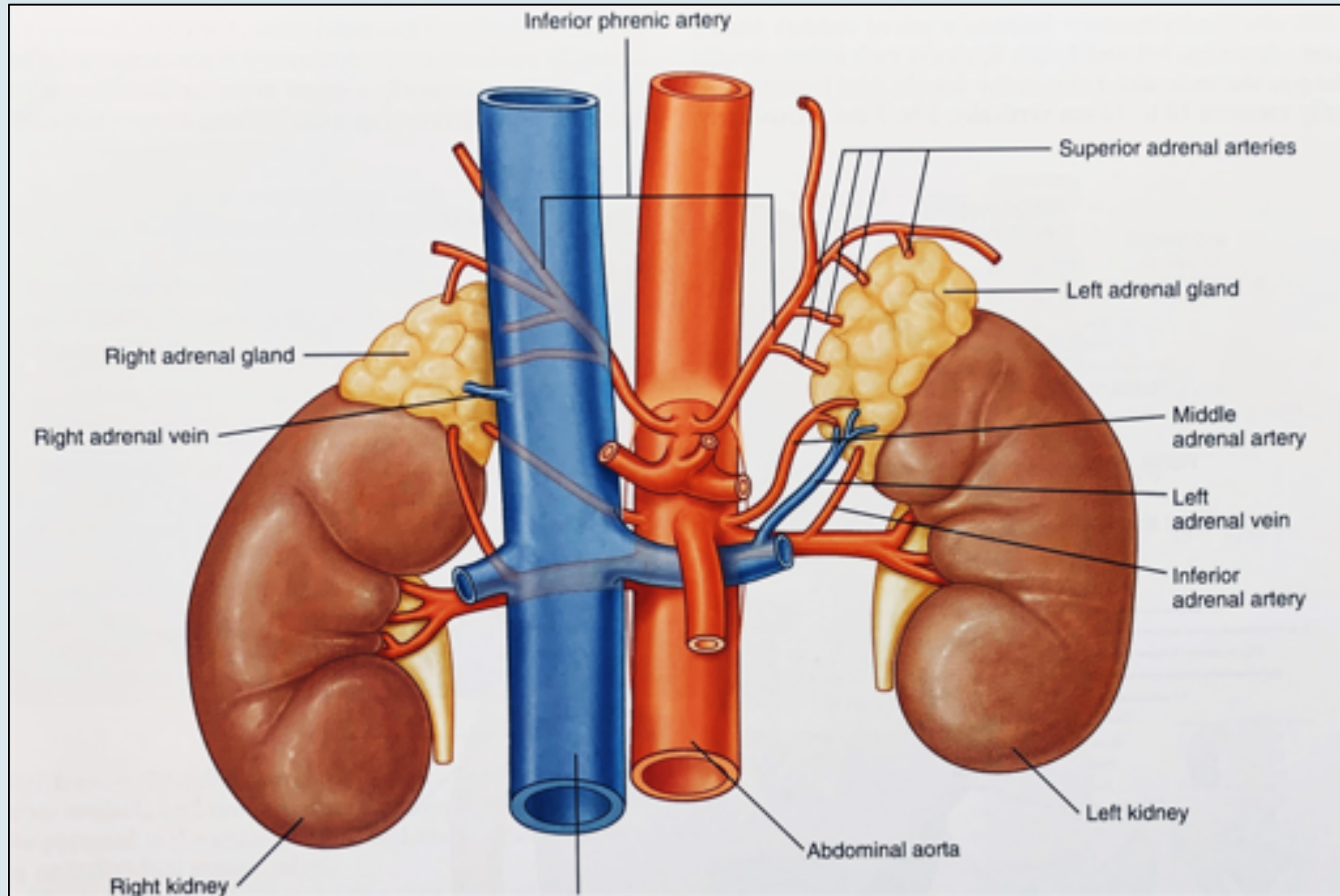


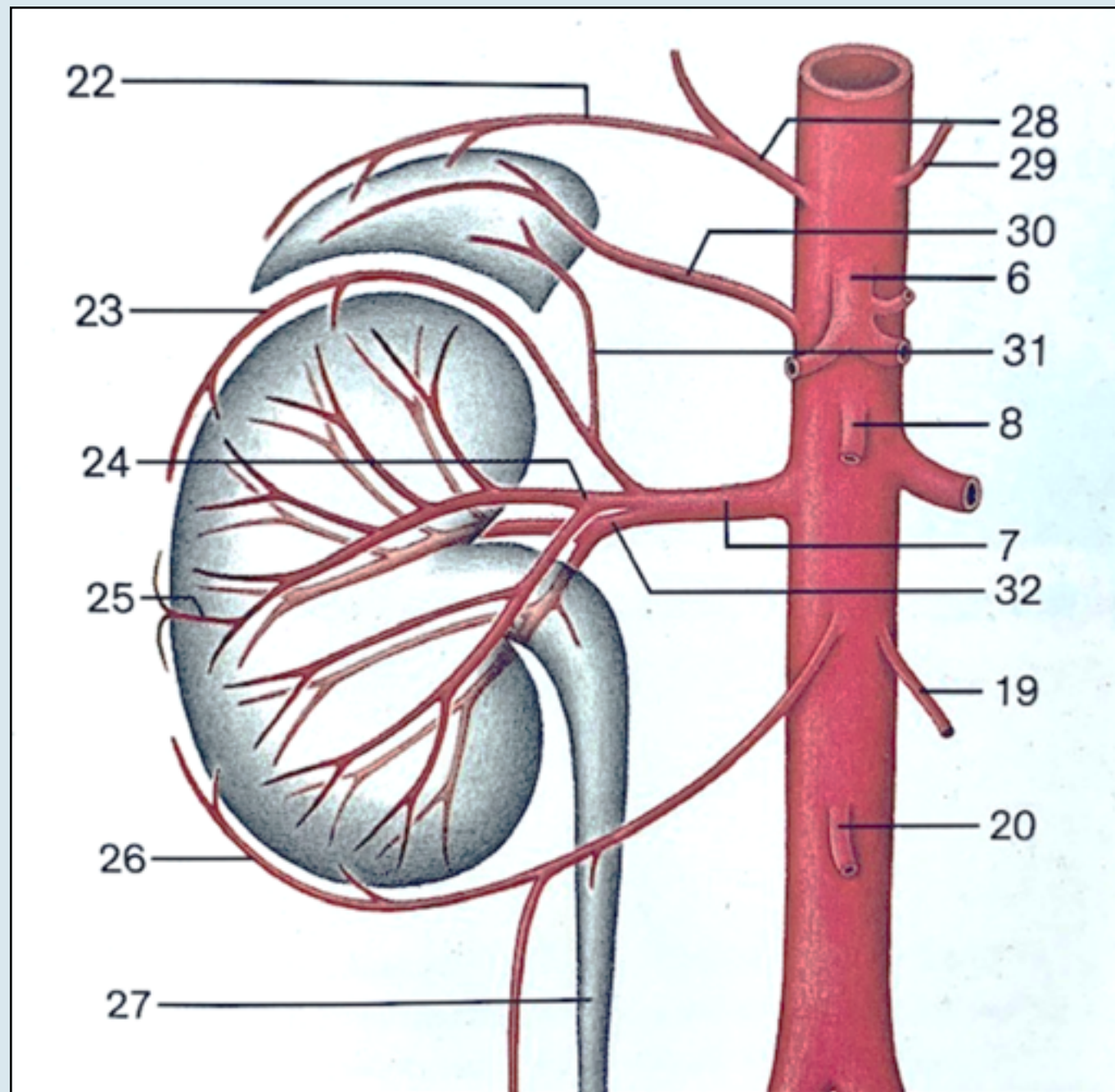
Posterior View

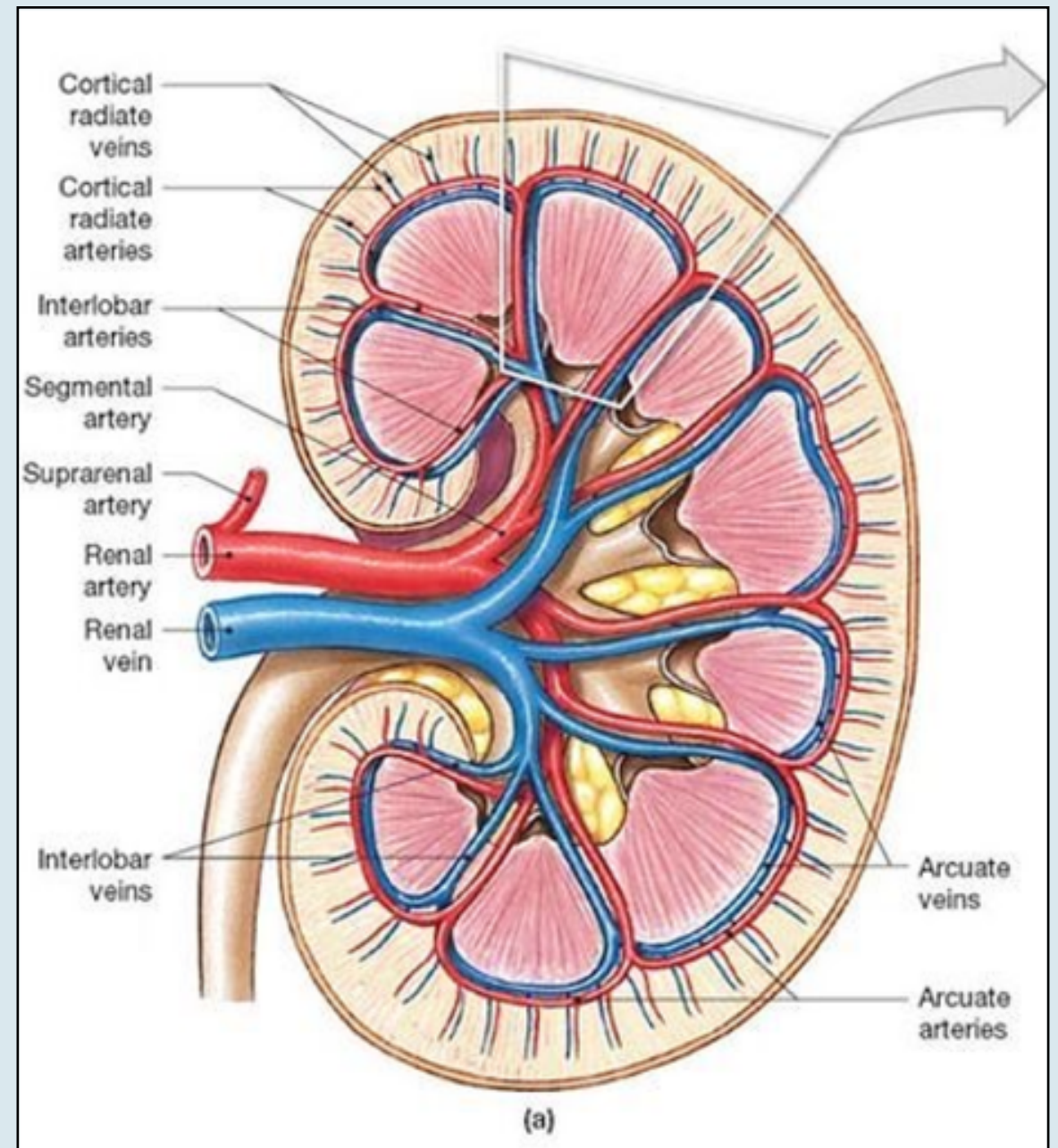
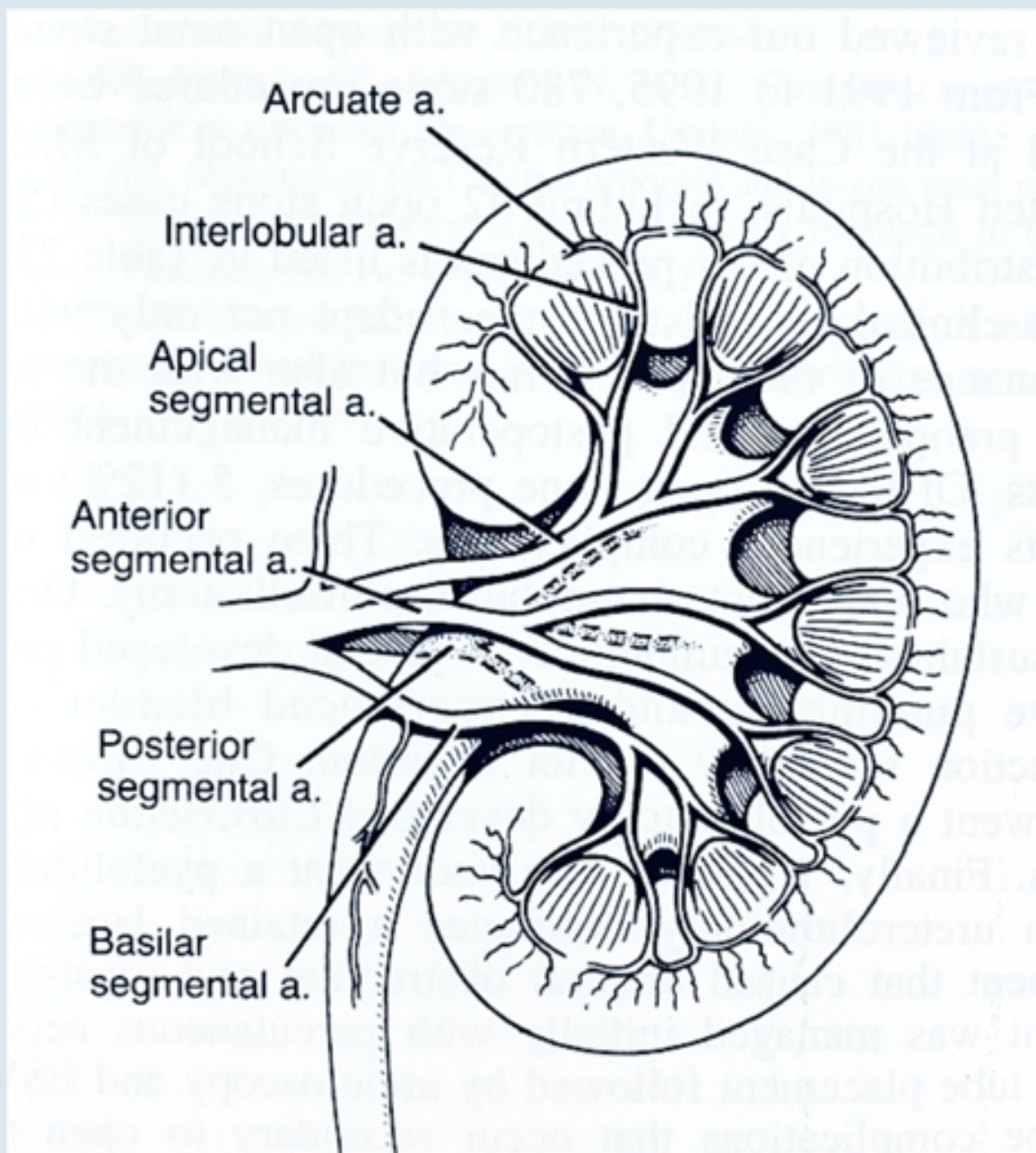
Arterial Blood Supply

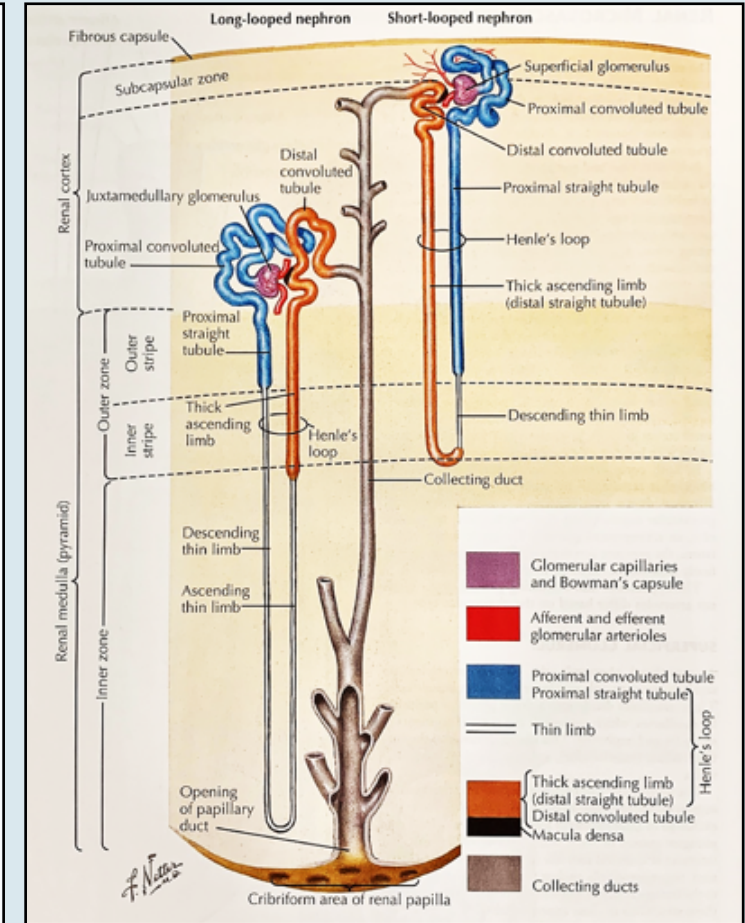
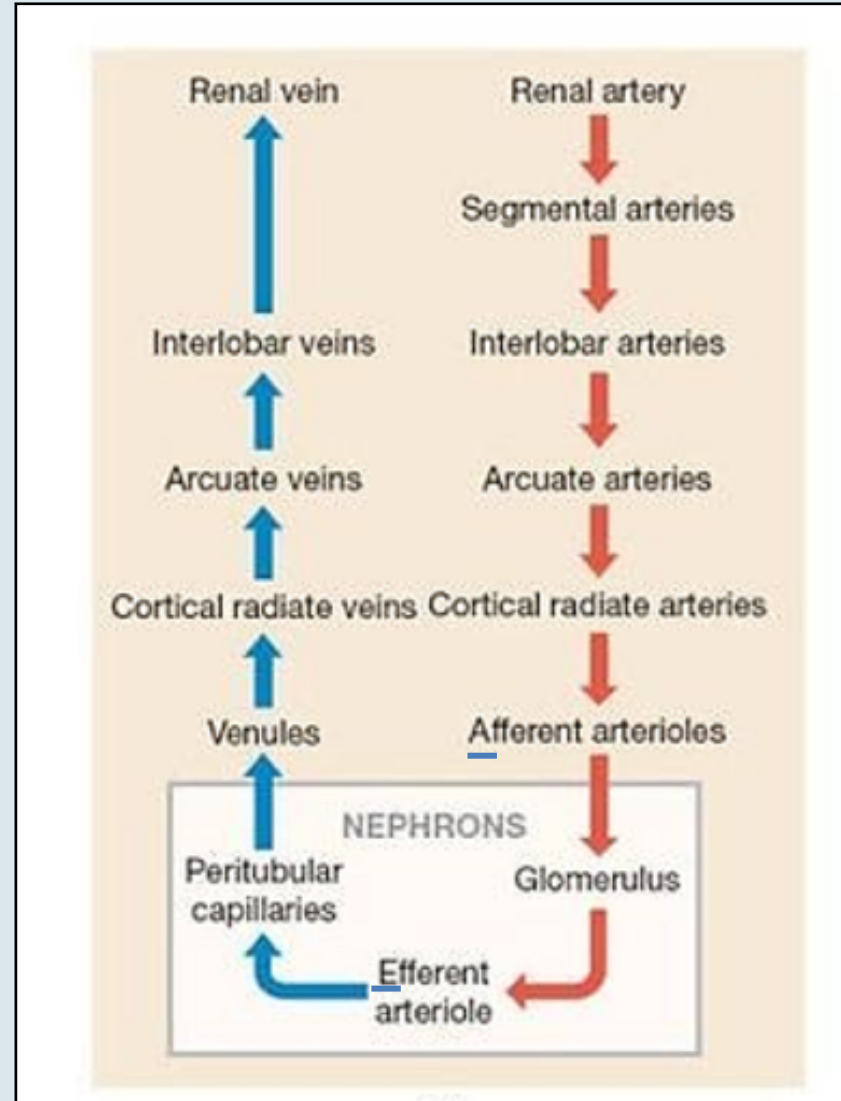
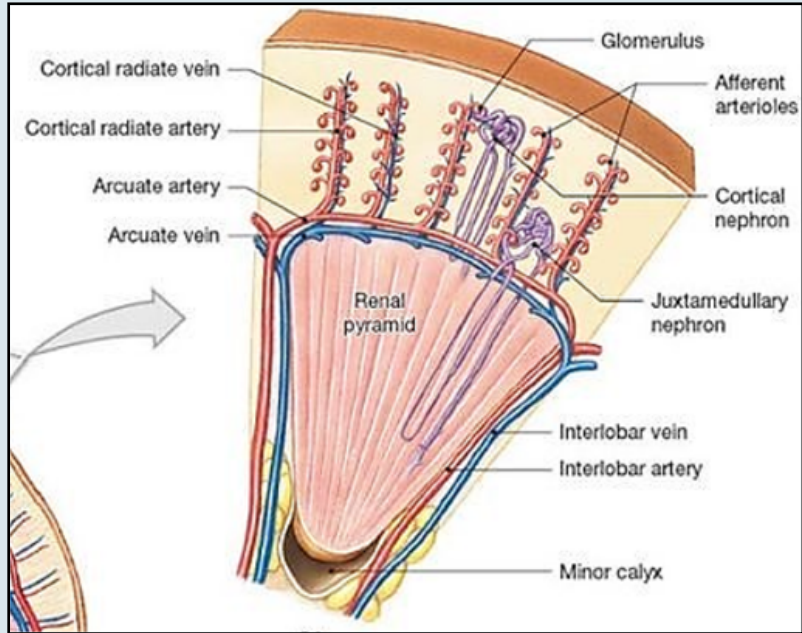






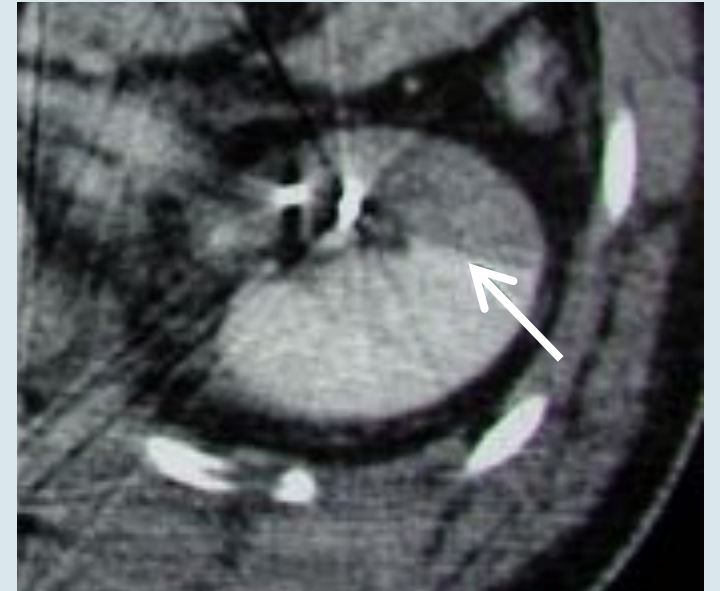






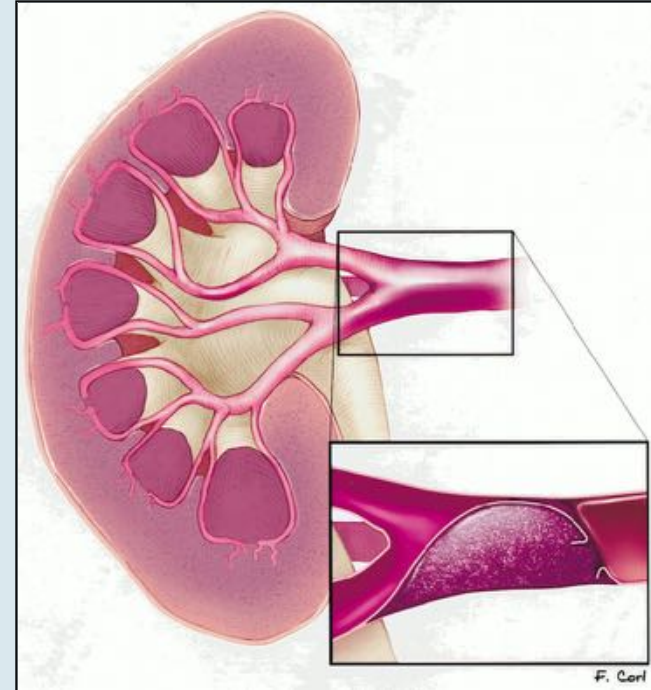
Segmental Vascular Injury

- Renal arteries are end vessels.
- Segmental injury results in ischemia and renal infarct.
- Infarct - Wedge shaped, sharp demarcation
- TX : Observation



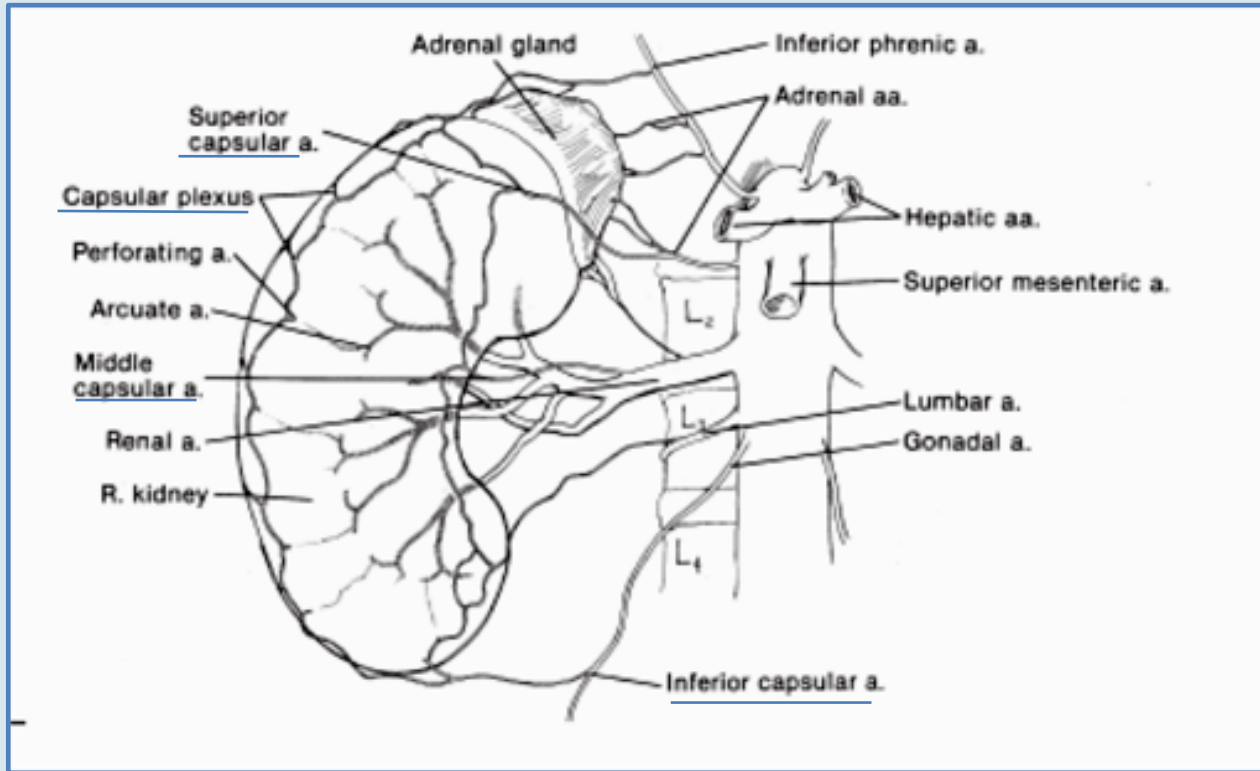
Renal Artery Thrombosis (Grade IV)

- Rapid deceleration injuries
 - Falls from Height
 - MVA
- Inelastic arterial intima tears
 - Cell/PLT aggregation
 - Vessel thrombosis

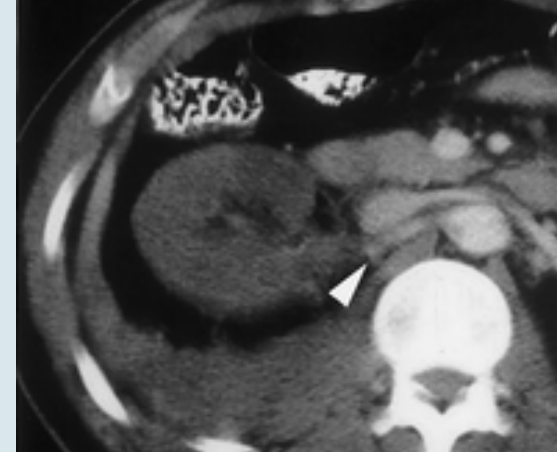


Brandes SB, McAninch : J Trauma. 1999; 47(4):643-9

Renal Artery Thrombosis: Imaging



– Perirenal vessel collateral kidney perfusion



Same pt. after 72hrs

Renal Artery Thrombosis: Imaging



Case #1- MVA

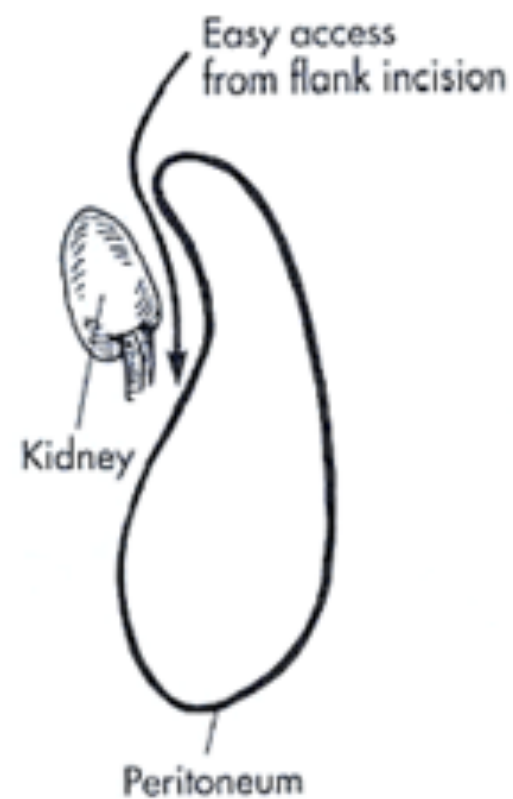
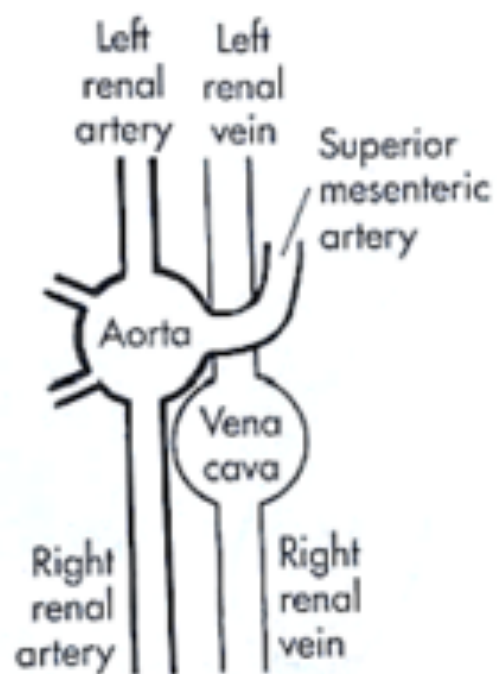


Case # 2 –
Construction site fall

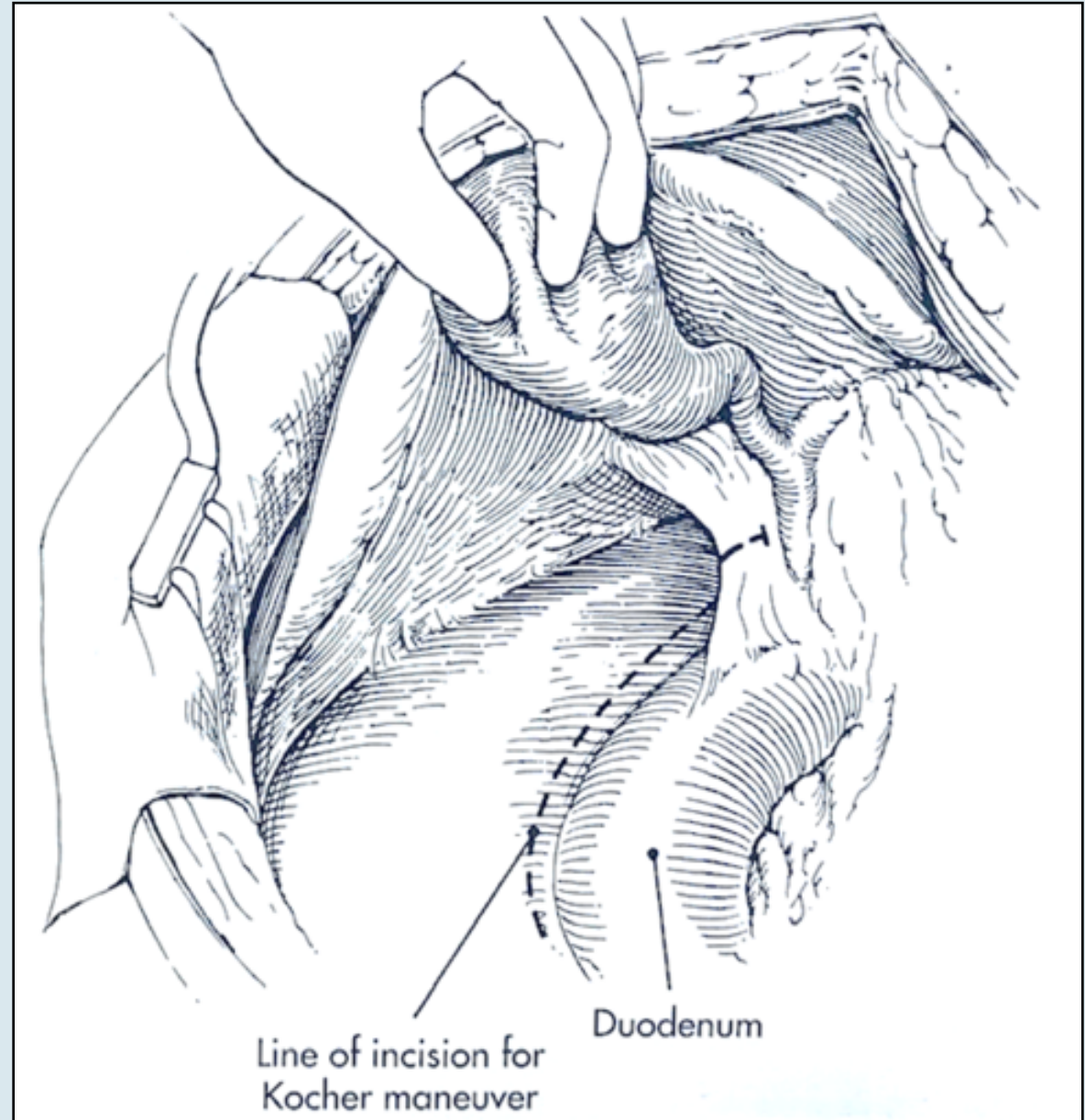
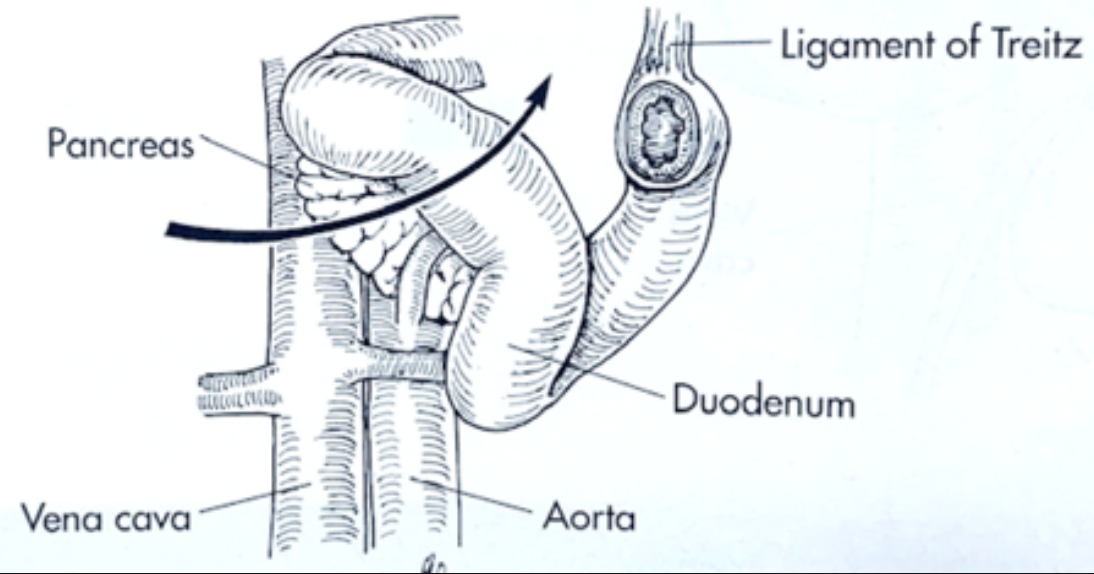
Flank Position

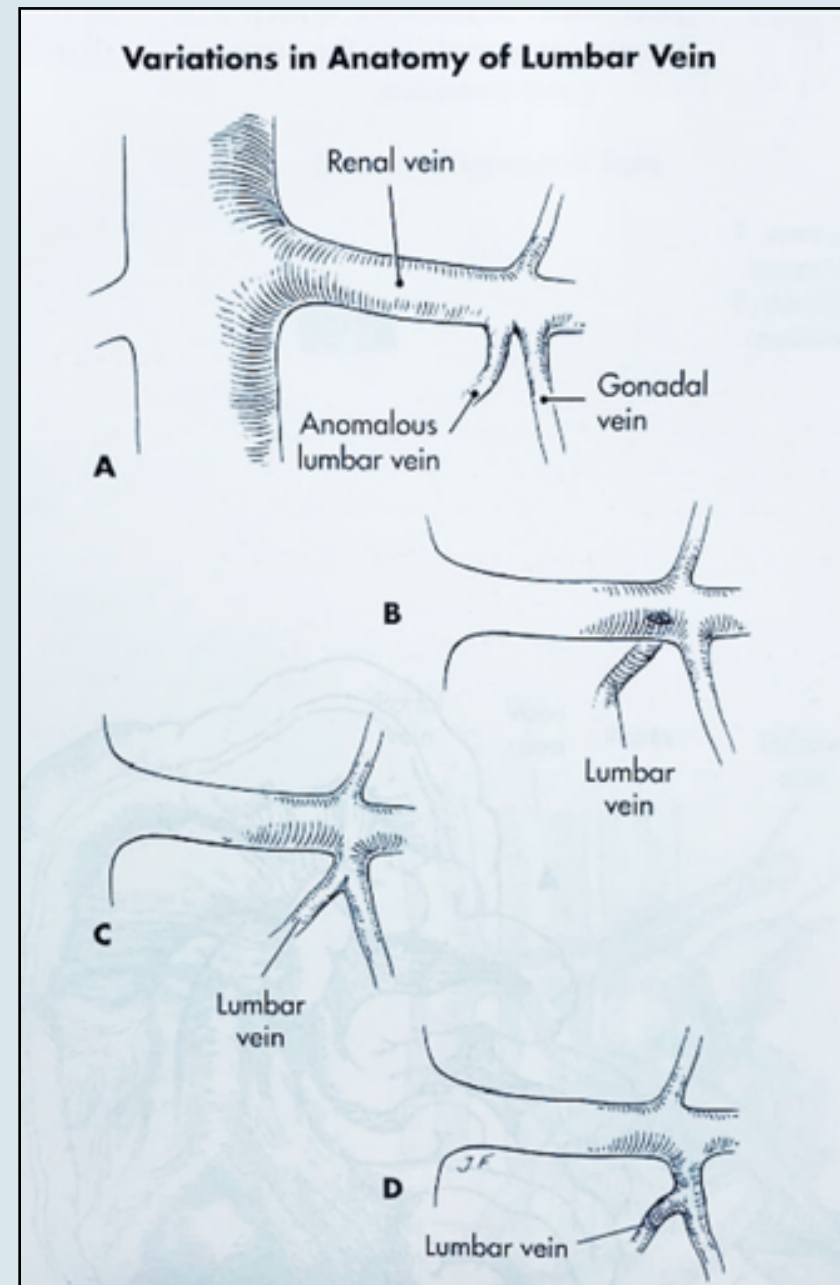
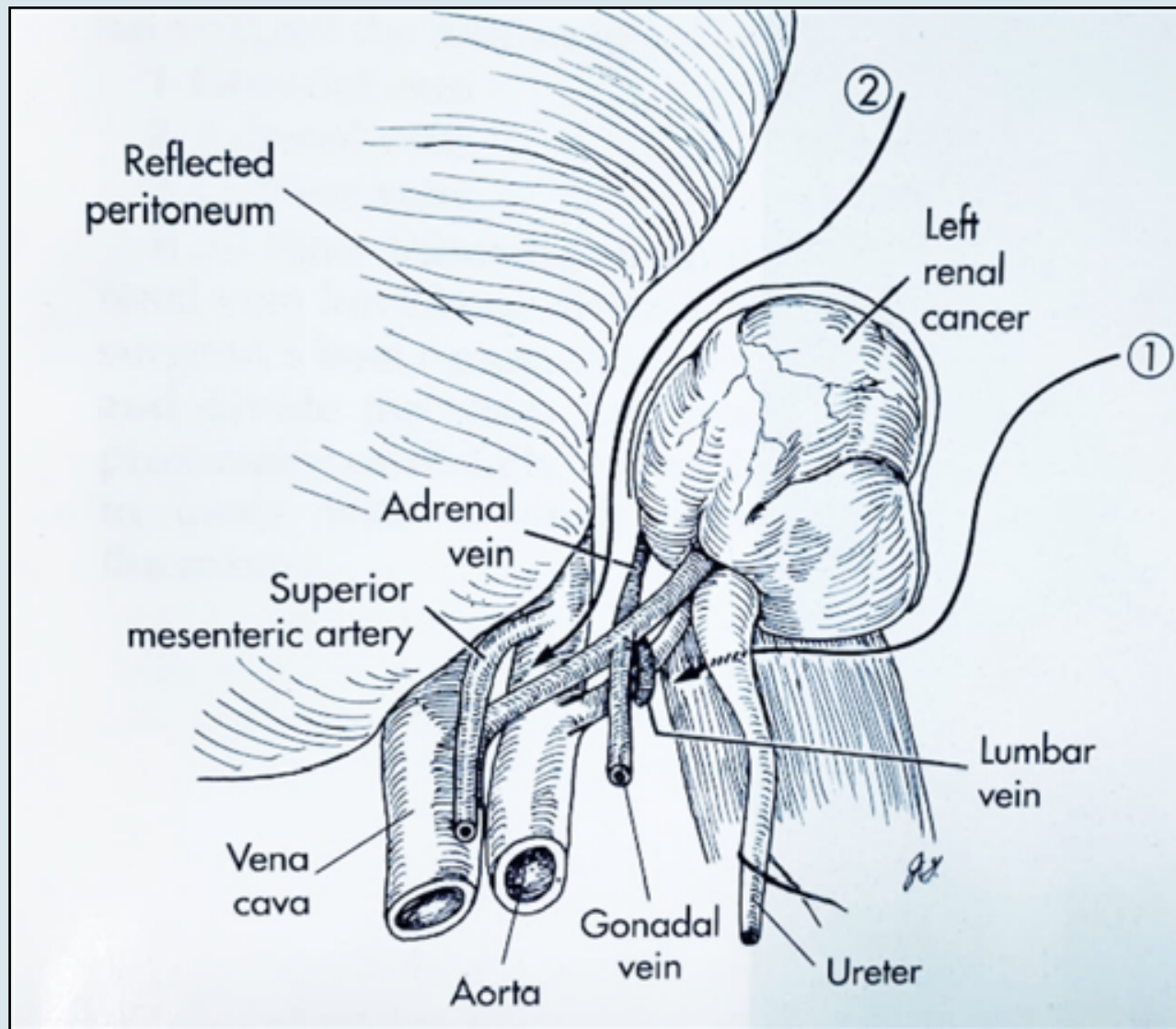


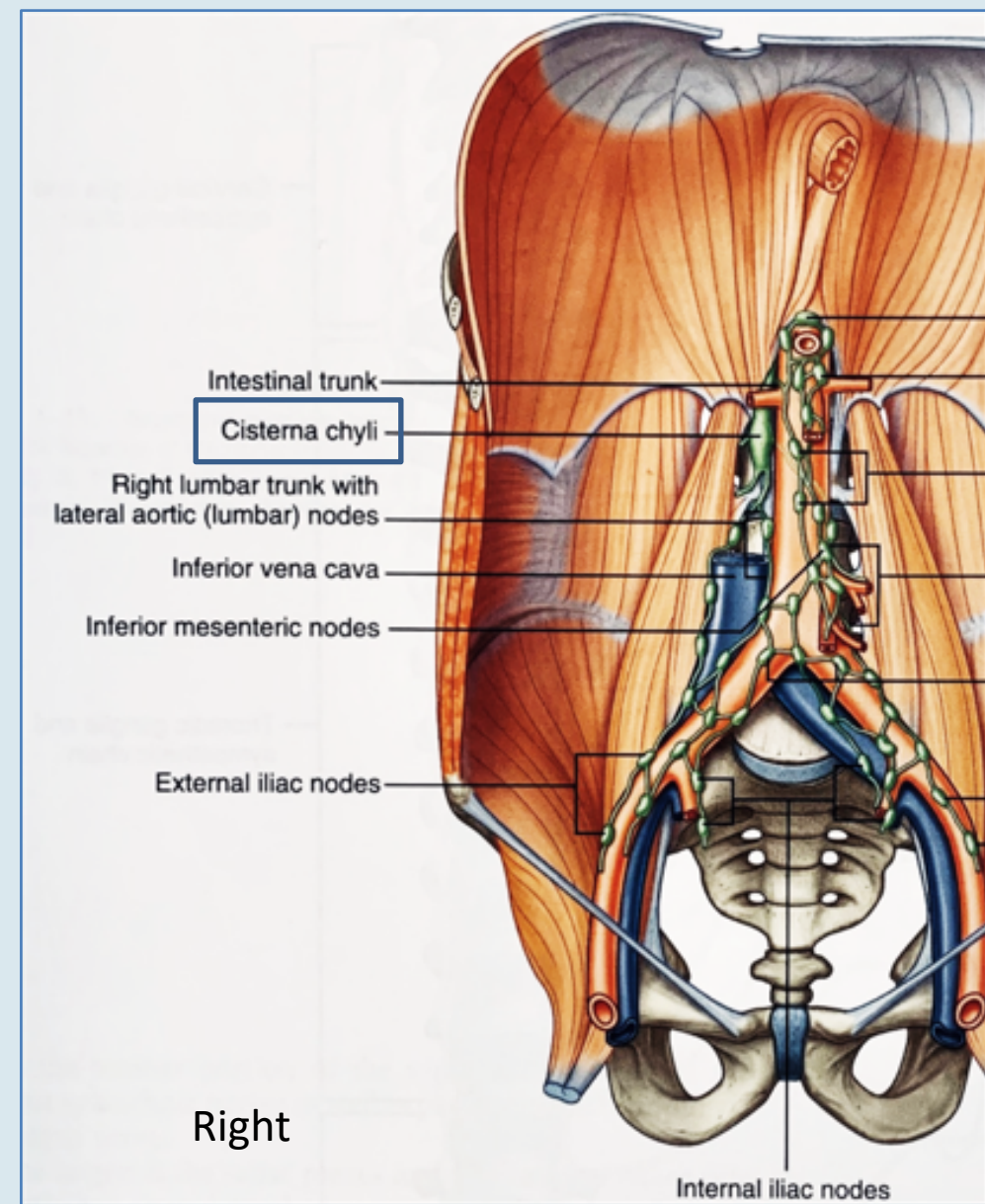
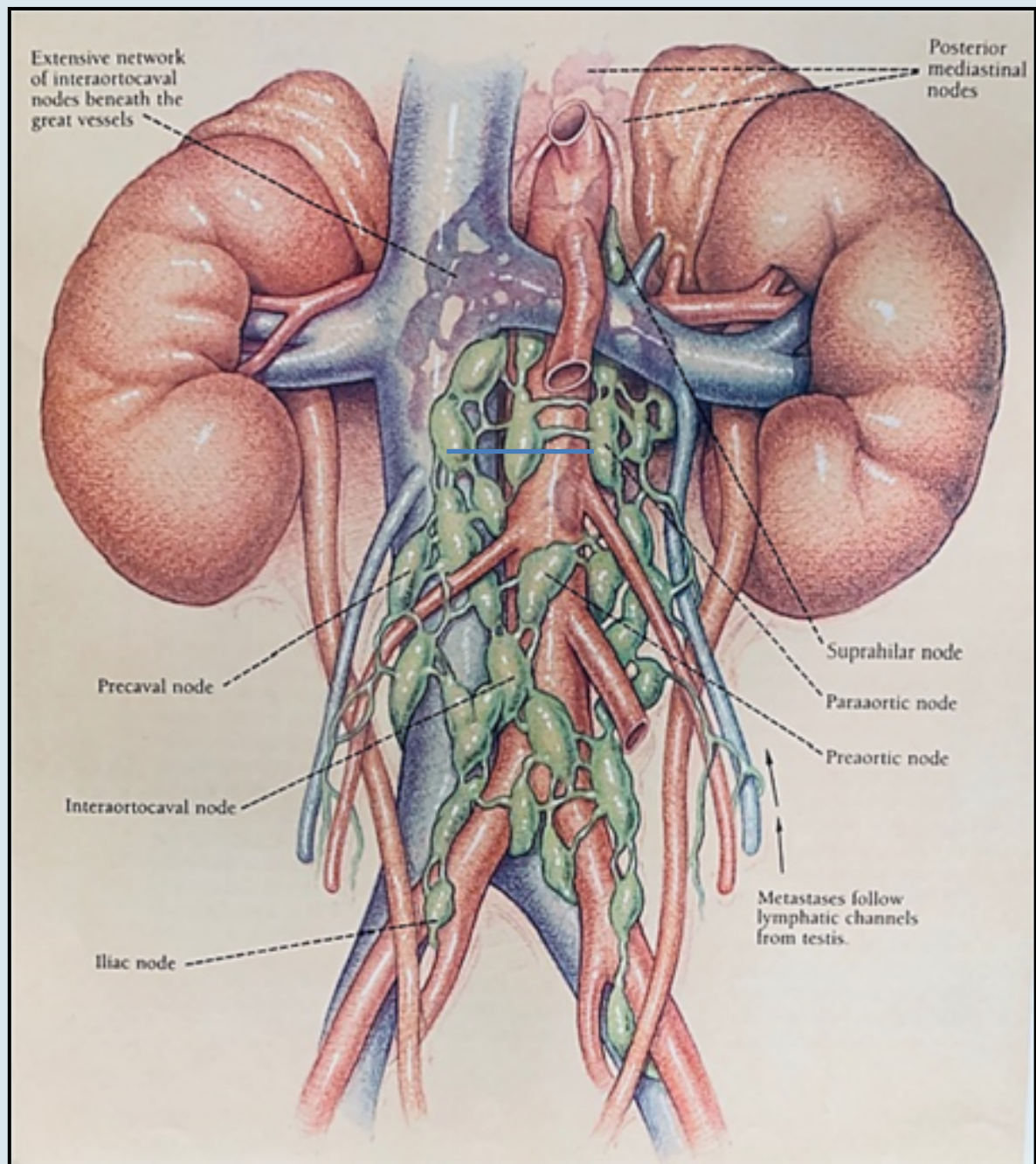
Orientation of Vasculature in Flank Position



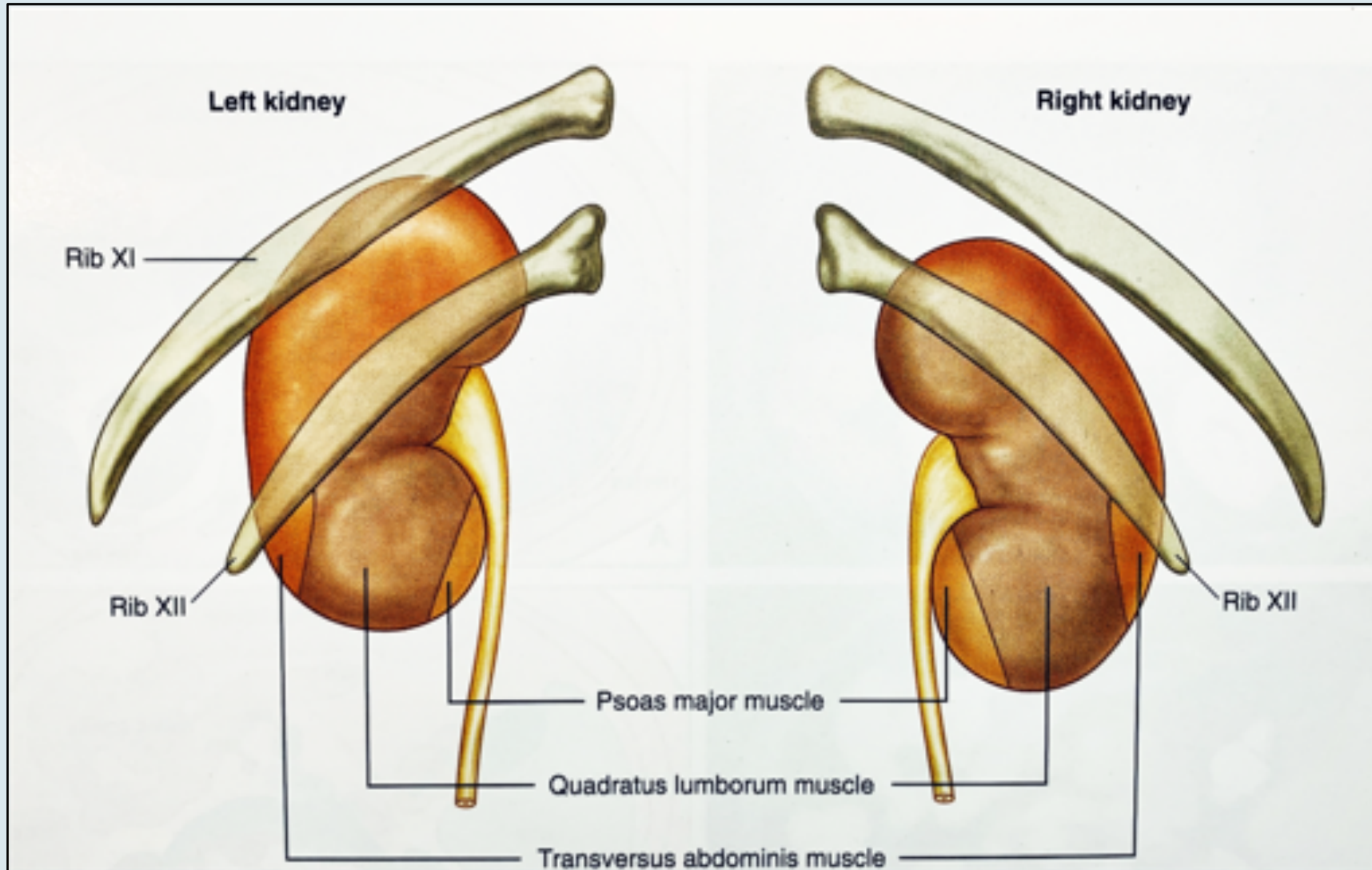
Kocher Maneuver



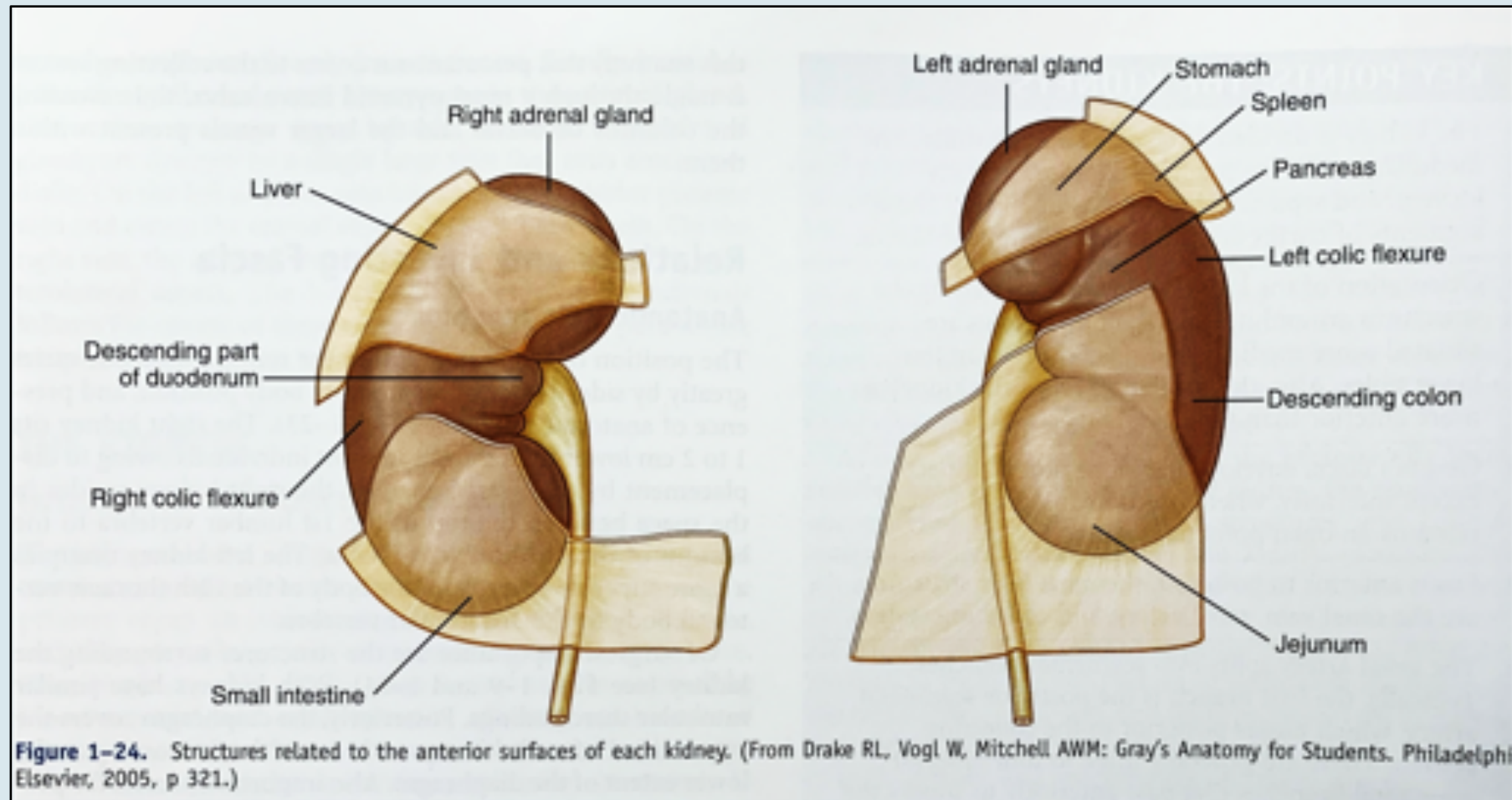




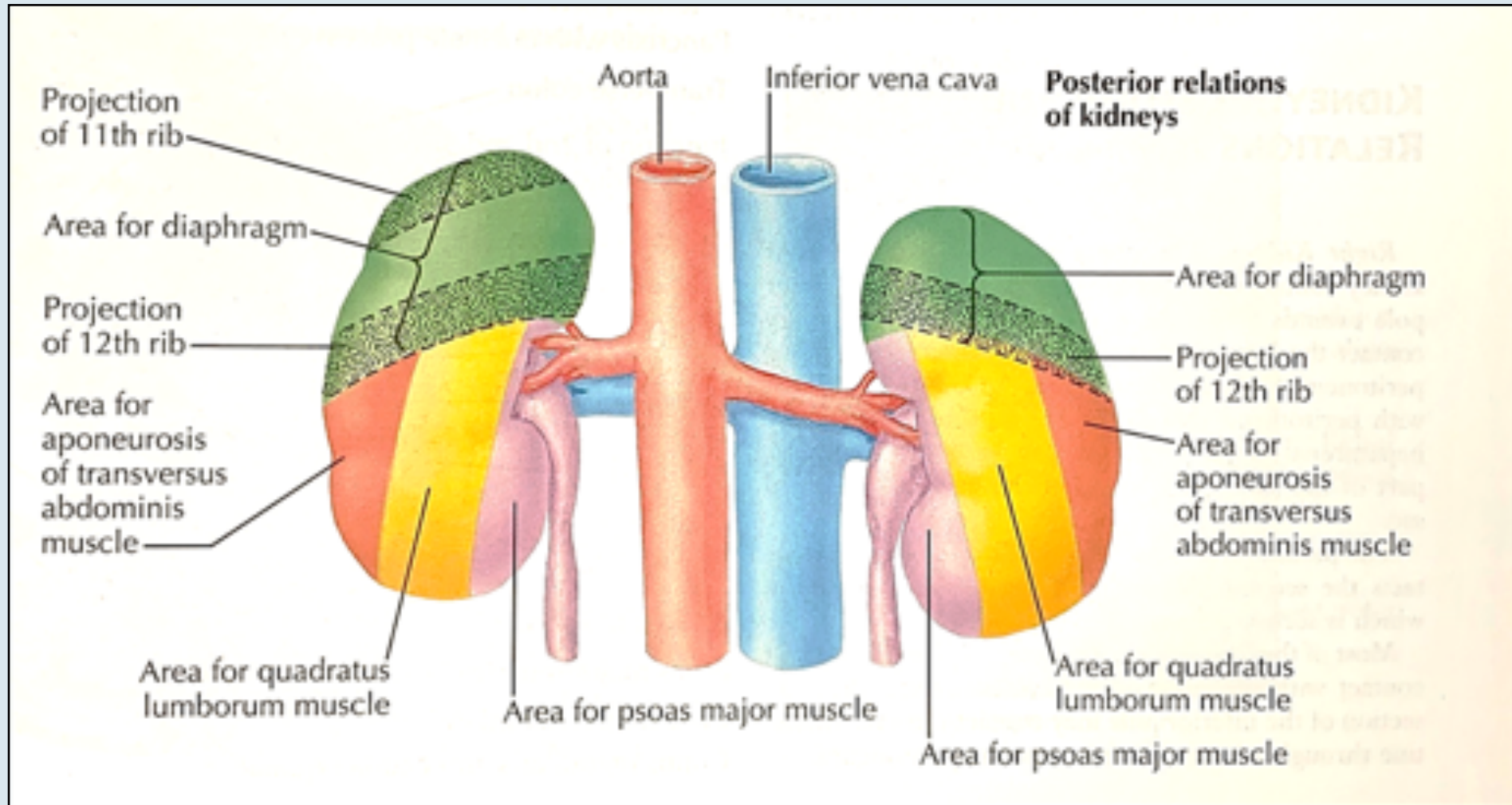
Posterior Kidney Surface

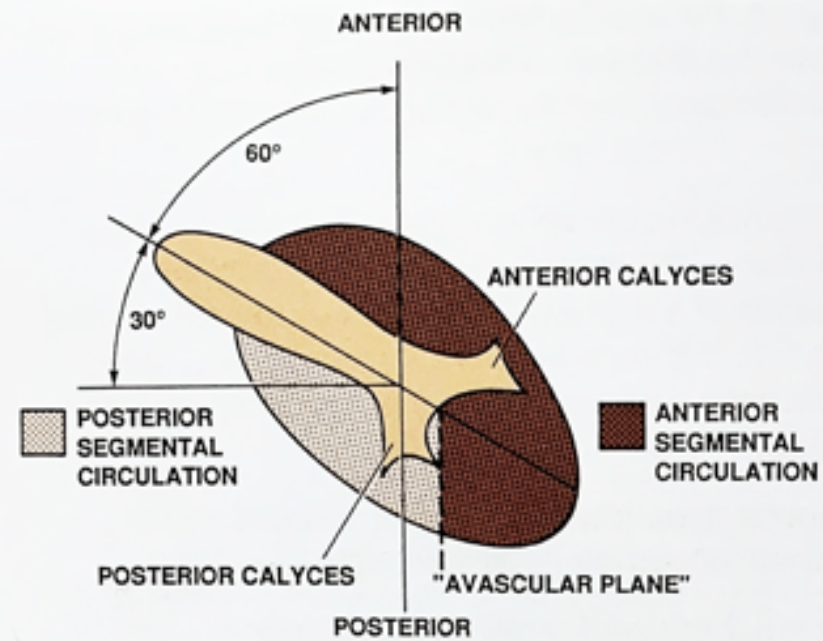


Anterior Kidney Surface

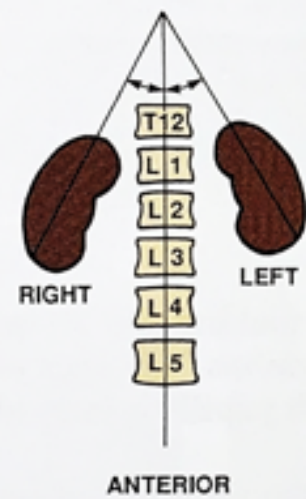


Posterior Kidney Surface

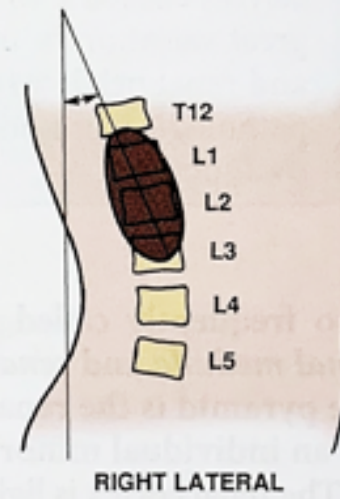




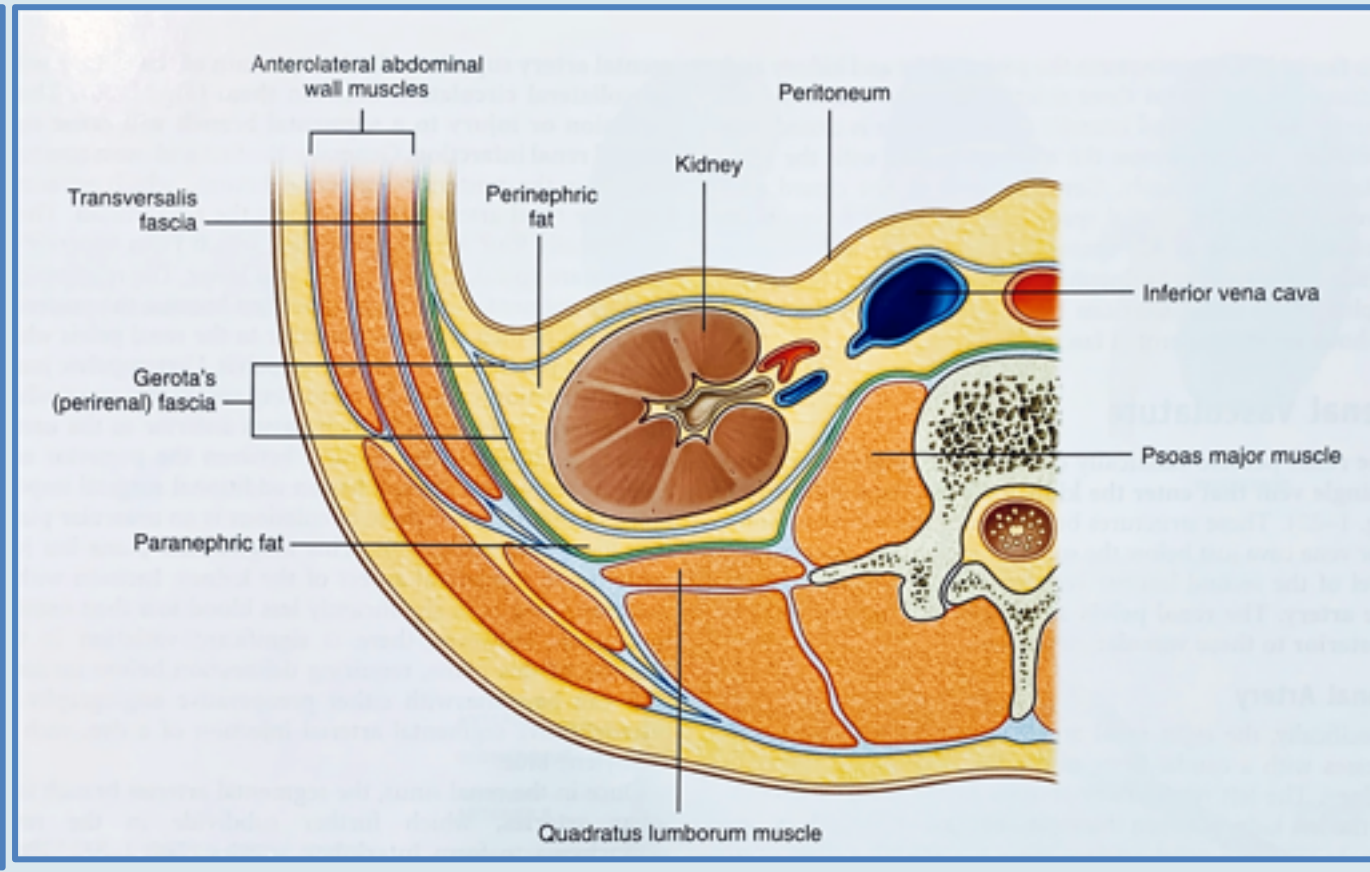
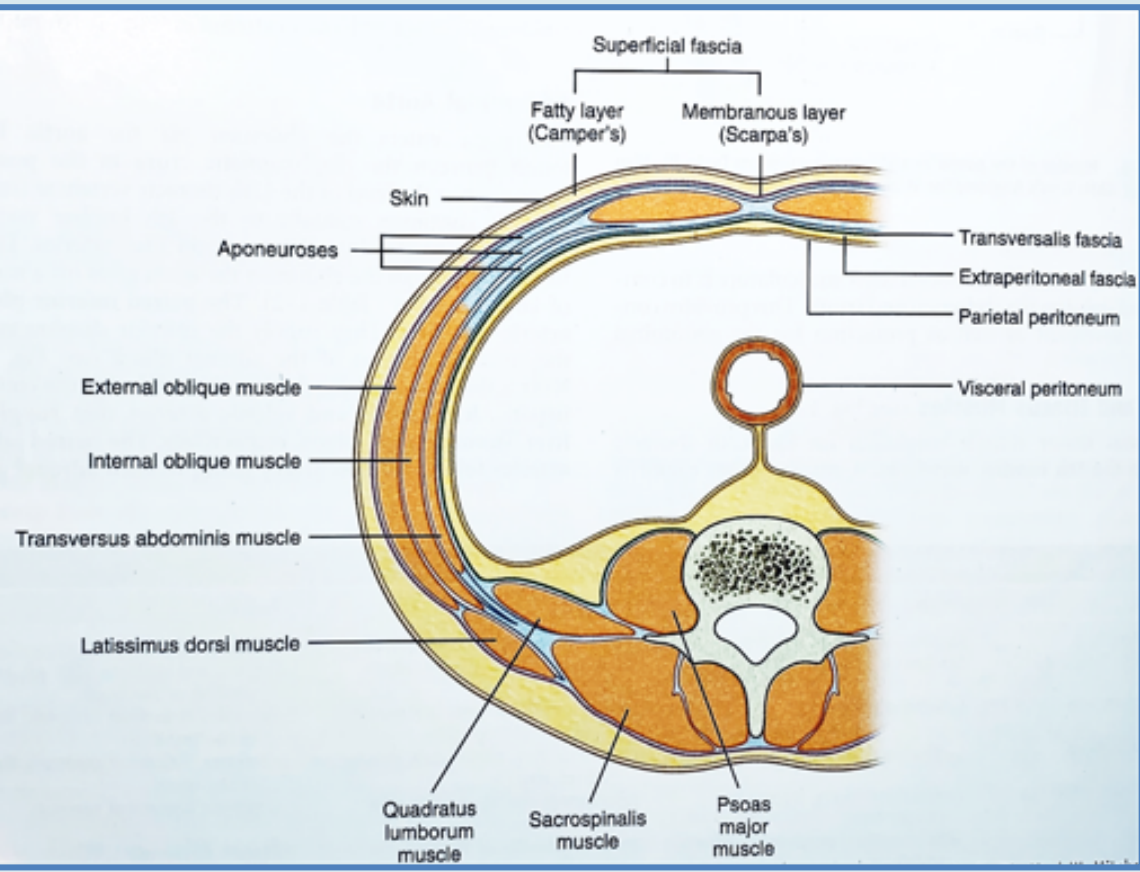
A



B

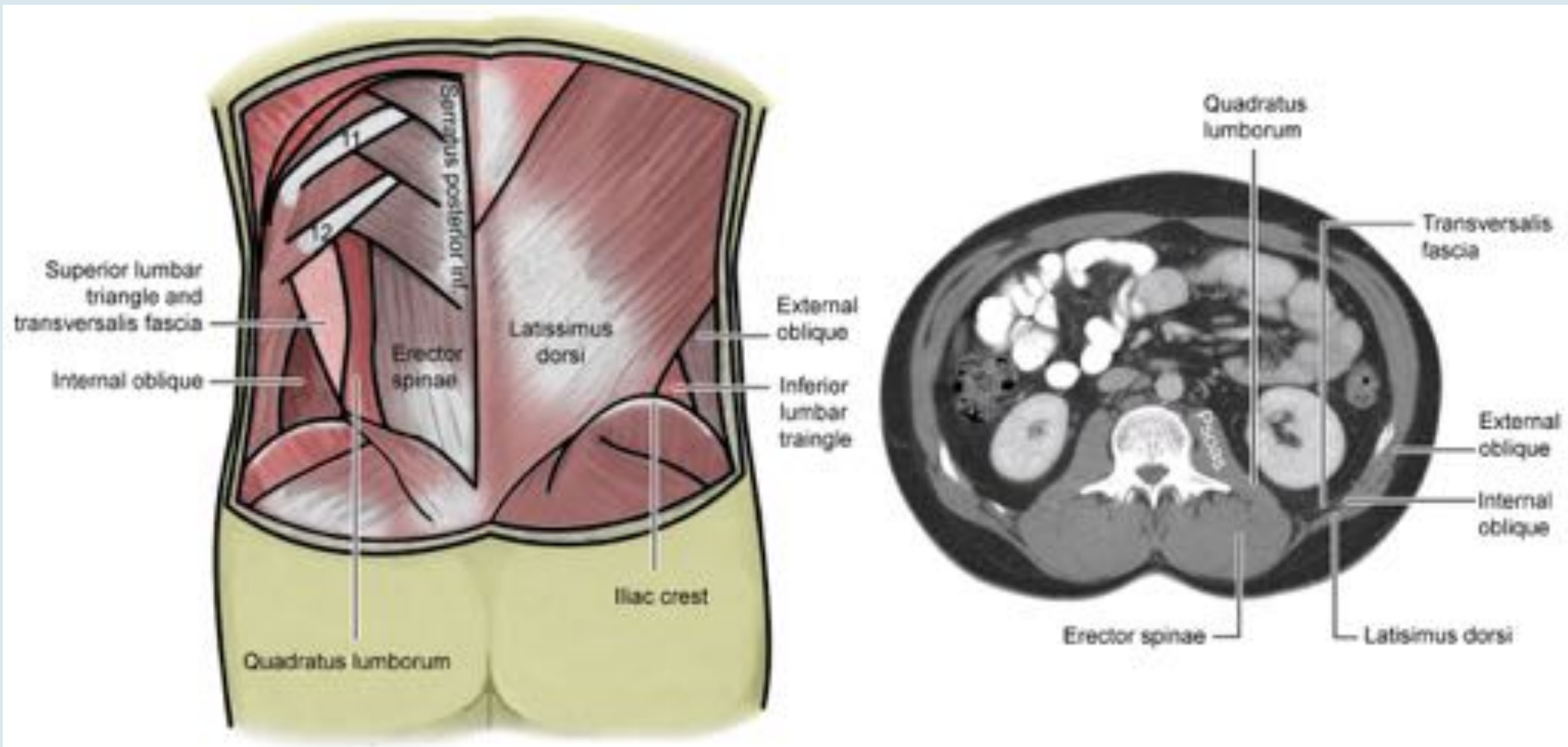


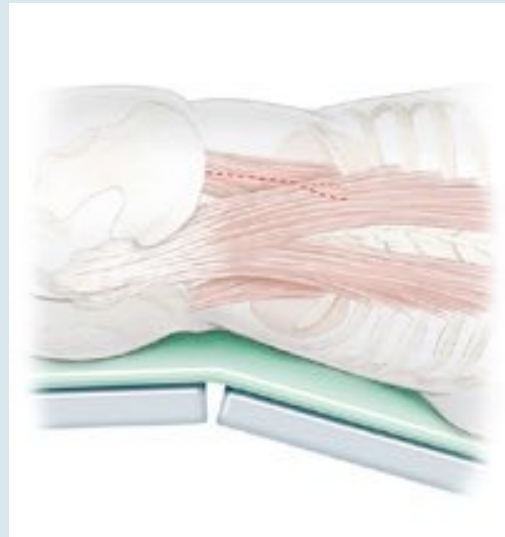
C



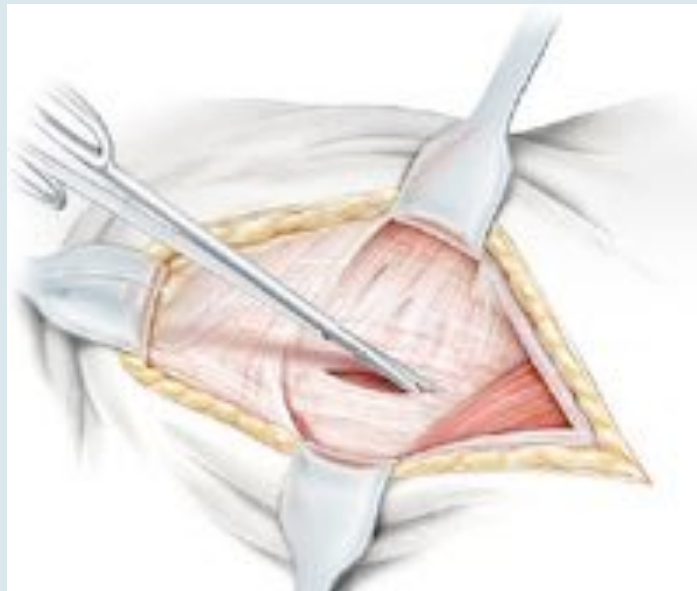
Muscles of the Posterior and Lateral Abdominal Wall

<i>Muscle</i>	<i>Origin</i>	<i>Insertion</i>	<i>Function</i>
Sacrospinalis	Sacrum and lumbar vertebrae	Lower ribs and thoracic vertebrae	Extension of the spine
Quadratus lumborum	5th lumbar vertebra	1st through 4th lumbar vertebrae, 12th rib	Depress and stabilize 12th rib, lateral bending of the trunk
External oblique	Lower eight ribs	Lateral lip of iliac crest, aponeurosis ending in midline raphe	Compress abdominal contents, flexion of the trunk
Internal oblique	Lumbodorsal fascia, iliac crest	Lower four ribs, aponeurosis ending in linea alba	Compress abdominal contents, flexion of the trunk
Transversus abdominis	Lumbodorsal fascia, medial lip of iliac crest	Aponeurosis ending in linea alba	Compress abdominal contents
Psoas	12th thoracic through 5th lumbar vertebrae	Lesser trochanter of femur	Flexion of the hip
Iliacus	Inner aspect of iliac pelvic wing	Lesser trochanter of femur	Flexion of the hip

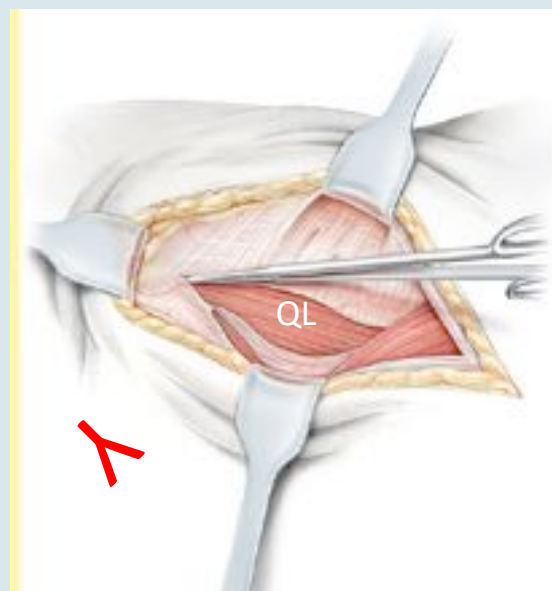




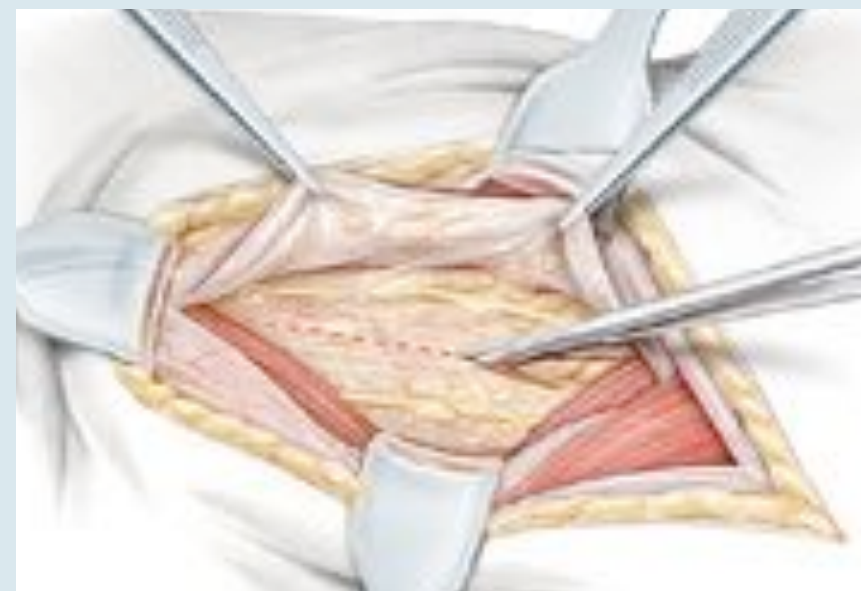
Posterior LD fascia opened



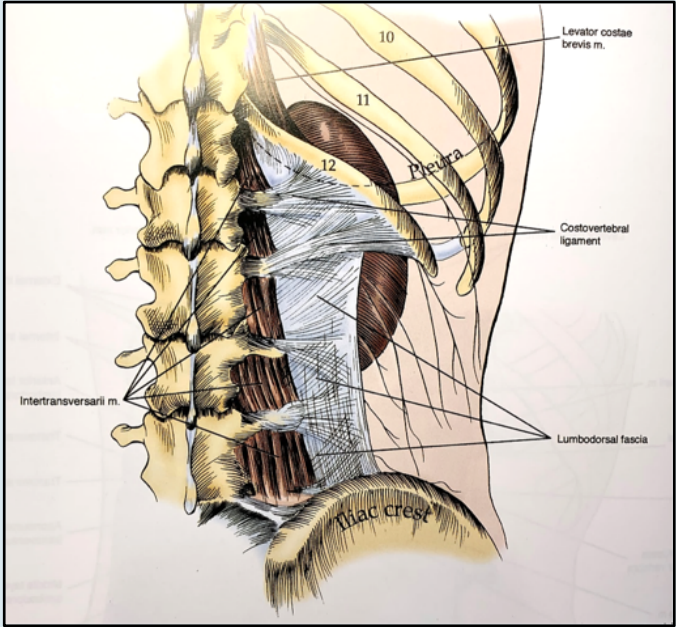
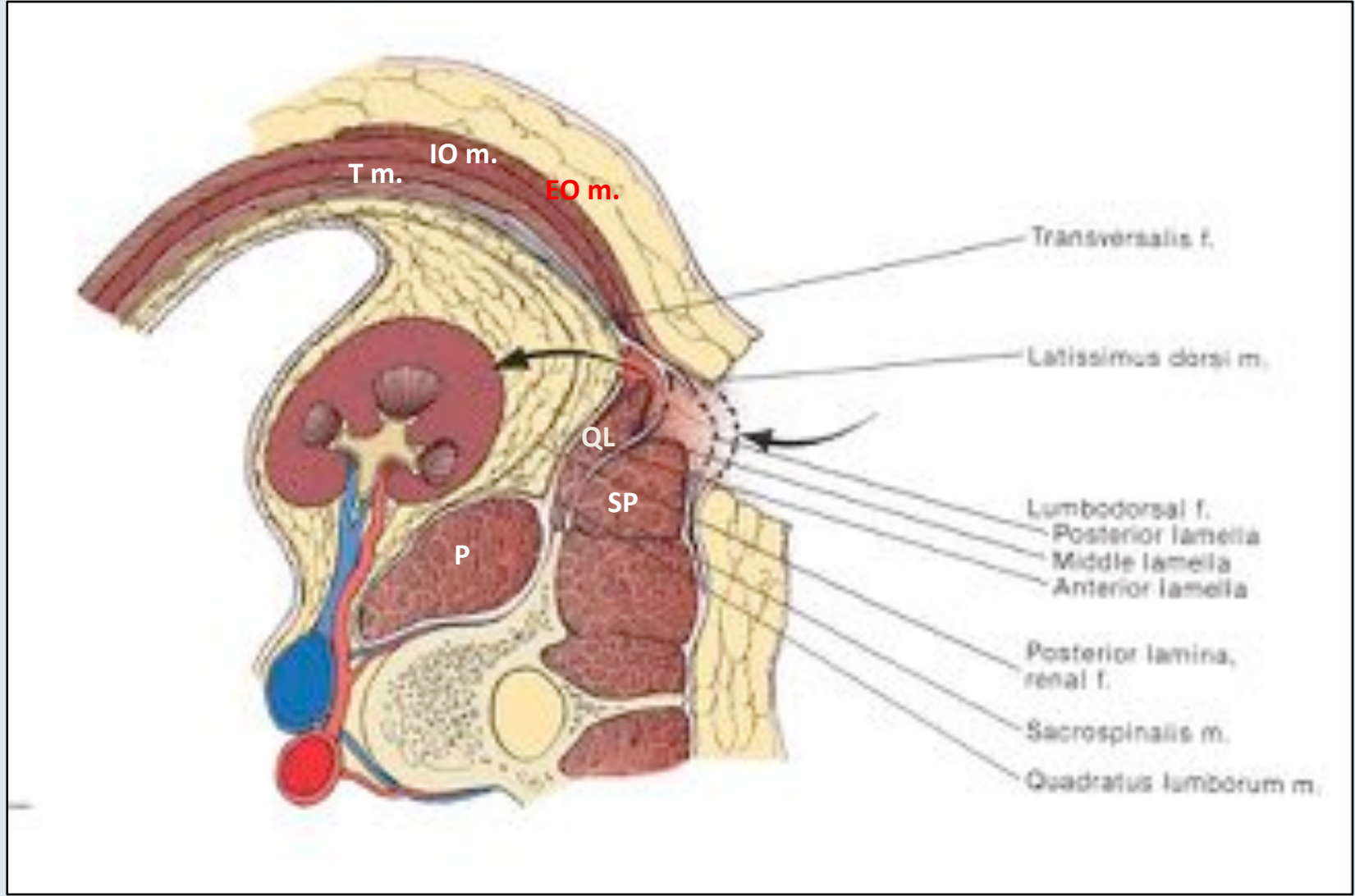
- SP muscle retracted medial.
- Ant. LD fascia opened

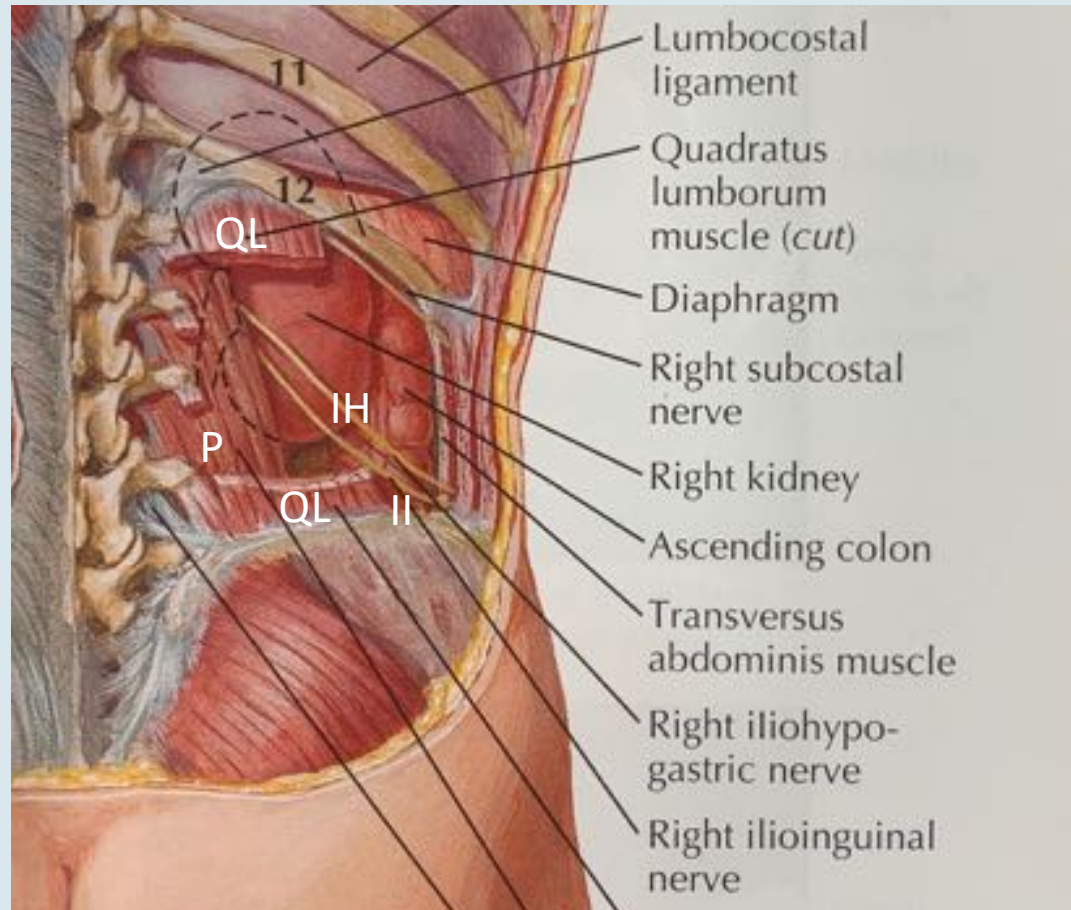


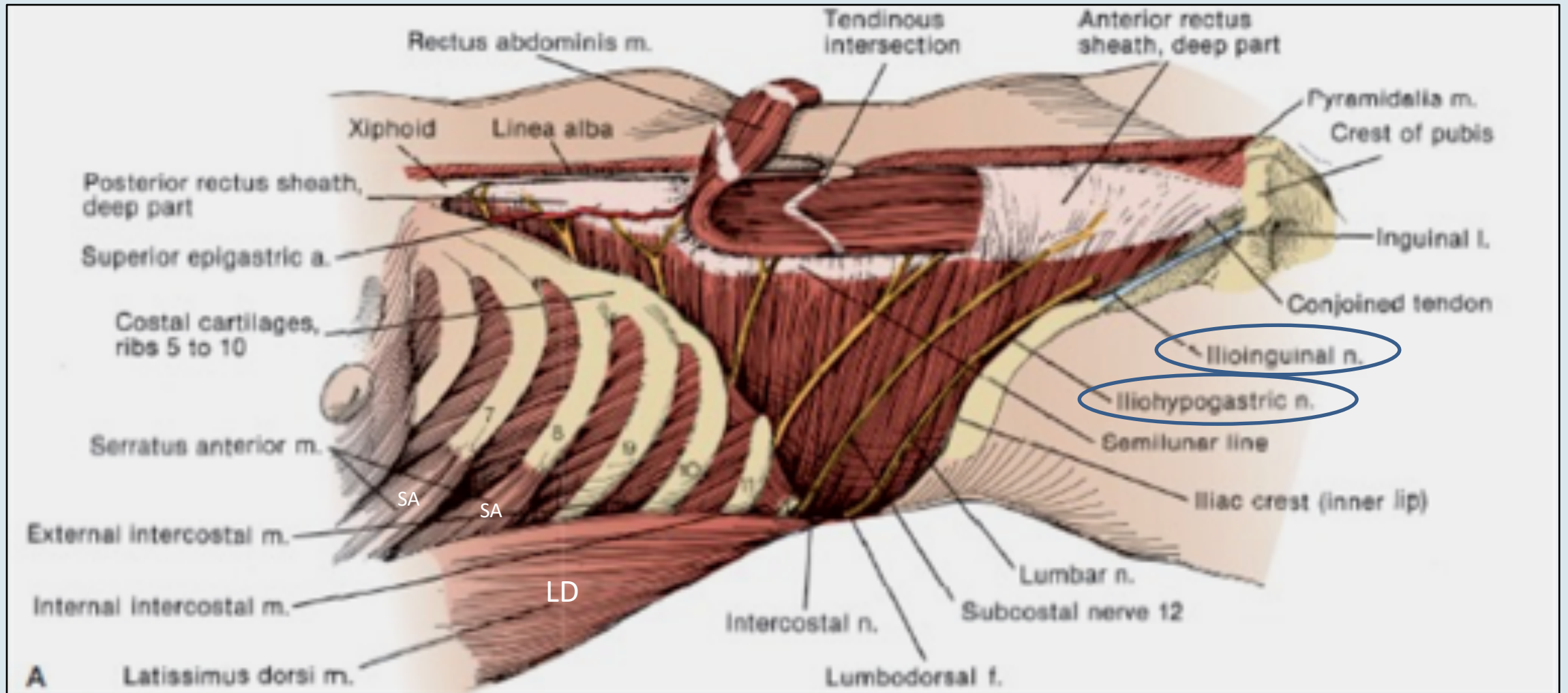
Y shaped fascia opened

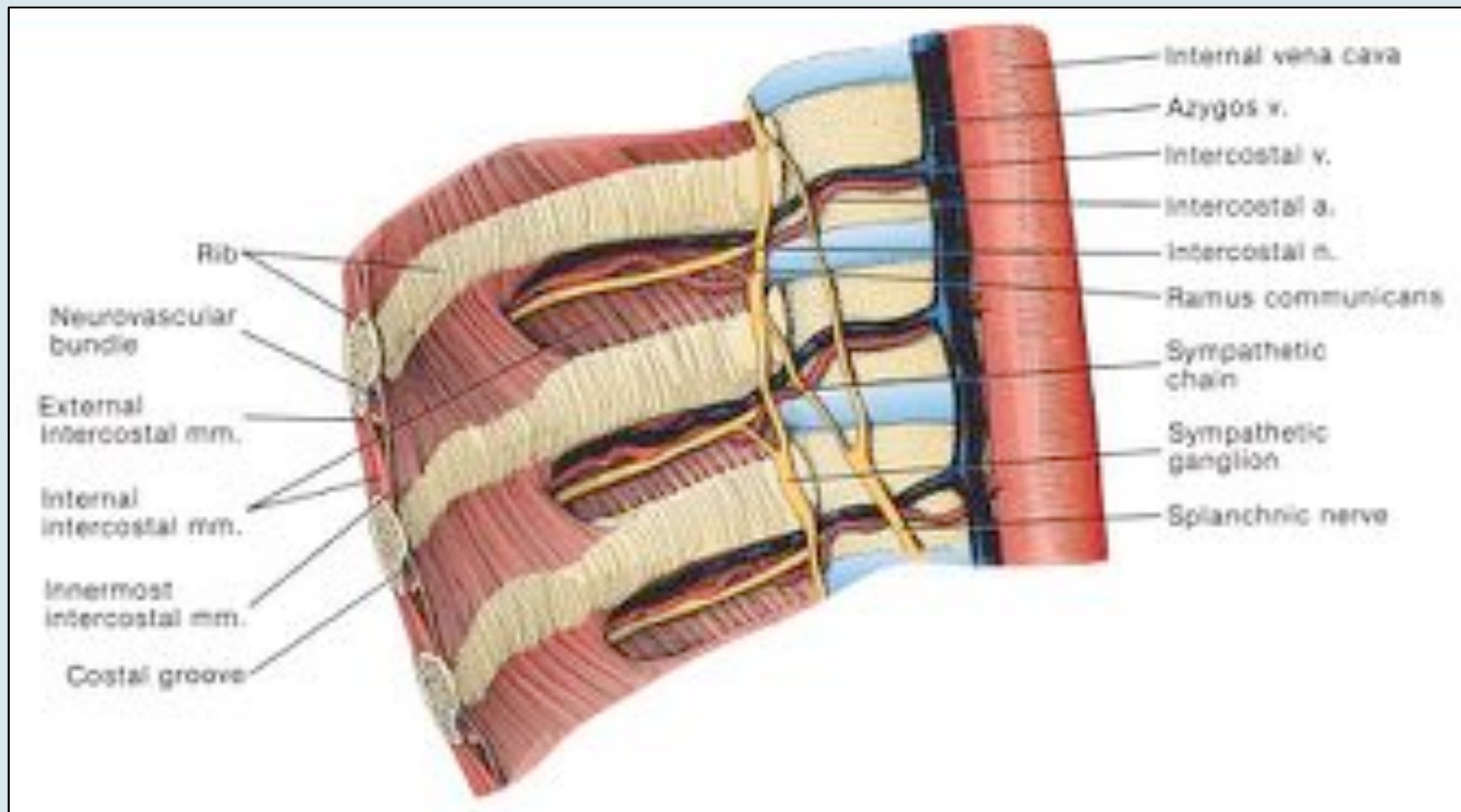


- QL retracted medial .
- Incise bt. iliohypogastric and ilioinguinal n.

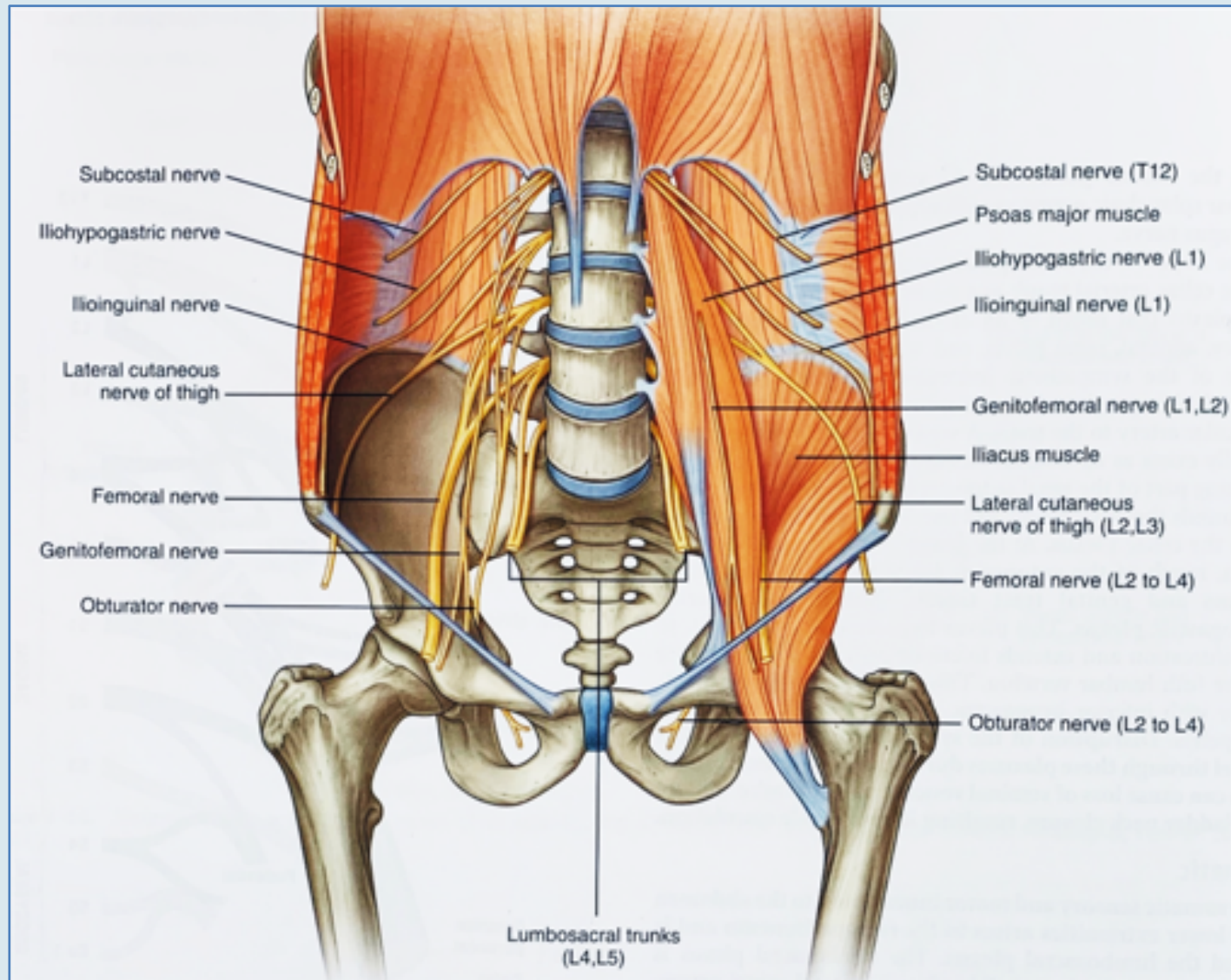








Lumbar Plexus



Lumbosacral Nerve Branches

<i>Branch</i>	<i>Origin</i>	<i>Spinal Segments</i>	<i>Function: Motor</i>	<i>Function: Sensory</i>
Iliohypogastric	Anterior ramus L1	L1	Internal oblique and transversus abdominis	Posterolateral gluteal skin and skin in pubic region
Ilioinguinal	Anterior ramus L1	L1	Internal oblique and transversus abdominis	Skin in the upper medial thigh, and either the skin over the root of the penis and anterior scrotum or the mons pubis and labium majus
Genitofemoral	Anterior rami L1 and L2	L1, L2	Genital branch—male cremasteric muscle	Genital branch—skin of anterior scrotum or skin of mons pubis and labium majus; femoral branch—skin of upper anterior thigh
Lateral cutaneous nerve of thigh	Anterior rami L2 and L3	L2, L3		Skin on anterior and lateral thigh to the knee
Obturator	Anterior rami L2 to L4	L2 to L4	Obturator externus, pectineus, and muscles in medial compartment of thigh	Skin on medial aspect of the thigh
Femoral	Anterior rami L2 to L4	L2 to L4	Iliacus, pectineus, and muscles in anterior compartment of thigh	Skin on anterior thigh and medial surface of leg

Mnemonics

Nerves of the Lumbar plexus

⊗ ⊗ “iiGOLF”

- Iliohypogastric (L1)
- Ilioinguinal (L1)
- Genitofemoral nerve (L1-L2)
- Obturator nerve (L2-L4)
- Lateral cutaneous nerve of thigh (L2-L3)
- Femoral nerve (L2-L4)

Somatic N. of the Lower Abd and Pelvis

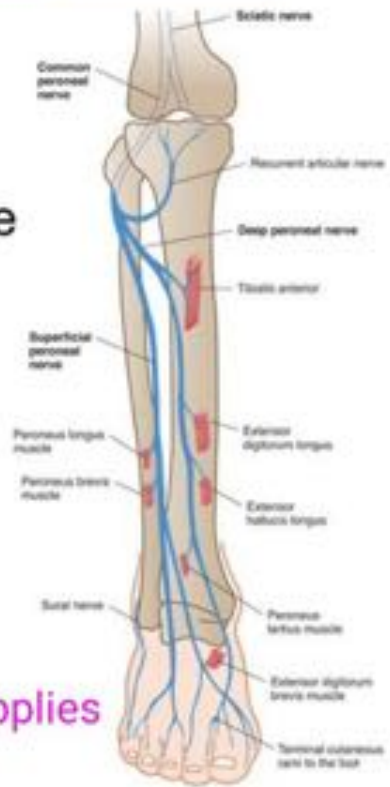
<i>Nerve Name</i>	<i>Origin</i>	<i>Supplies</i>
Iliohypogastric	L1	Motor supply to internal oblique, transversus muscles, sensation over lower anterior abdominal wall
Ilioinguinal	L1	Sensation over anterior pubis (mons) and anterior scrotum or labia
Genitofemoral	L1, L2	Genital branch: motor supply to cremaster muscle, sensation to anterior scrotum; femoral branch: sensation to anterior thigh
Femoral	L2, L3, L4	Motor supply to extensors of the knee, sensation to anterior thigh
Obturator	L2, L3, L4	Motor supply to <u>adductors</u> of the thigh, sensation to medial thigh

<i>Nerve Name</i>	<i>Origin</i>	<i>Supplies</i>
Lumbosacral trunk	L4, L5	Joins the sacral nerves to form the lumbosacral plexus that supplies motor and sensory innervation to the lower extremities
Posterior femoral cutaneous	S2, S3	Sensation to perineum, posterior scrotum, and posterior thigh
Pudendal	S2, S3, S4	Motor to levator ani, muscles of the urogenital diaphragm, anal and striated urethral sphincter, sensation to the perineum, scrotum, and penis
Pelvic somatic efferents	S2, S3, S4	Motor supply to levator ani and striated urethral sphincter
Nervi erigentes	S2, S3, S4	Parasympathetic fibers from the sacral cord supply the pelvic viscera

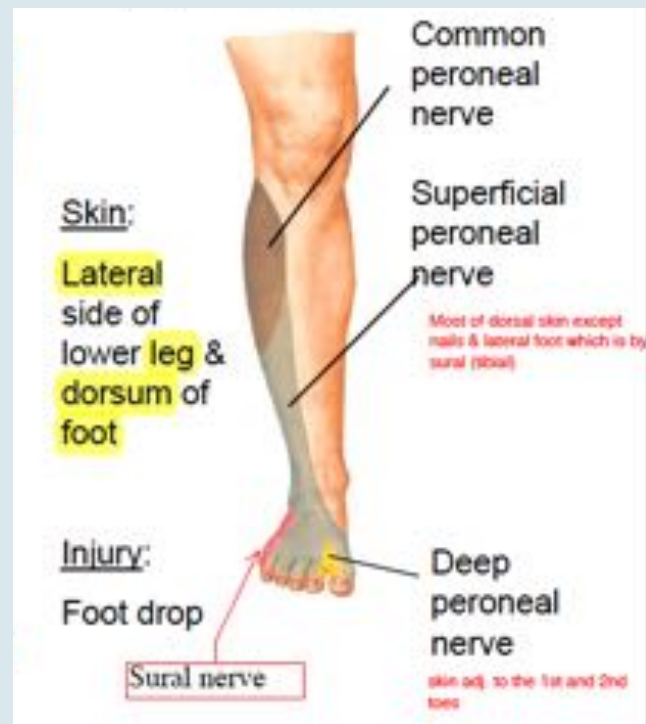


The Common Peroneal Nerve

- Superficial peroneal nerve
 - Motor functions
 - Foot eversion
- Deep peroneal nerve
 - Motor functions
 - Foot dorsiflexion, toe extension



Note : Deep Peroneal N. supplies First web space of Toe.



Hip and knee flexion in lithotomy put the peroneal nerve on stretch and facilitates positioning injury

LUMBAR/PELVIC NERVES UROLOGY

Nerve	Origin	Function	Curiosities
ILIOHYPOGASTRIC	L1	S: lower abdominal wall, pubic area M: lower abdominal wall	
ILIOINGUINAL	L1	S: upper thigh, anterior scrotum, base of penis	It enters transversalis fascia through the internal oblique to enter inguinal canal joining the spermatic cord
GENITOFEMORAL	L1-L2	S: anterior thigh, scrotum, cord M: cremaster	It travels on the anterior face of the Psoas. Can be damaged in ureteral re-implants (hitch/Boari psoas) . Then posterior to spermatic cord (injury lap. varicocelelectomy)
LATERAL FEMORAL CUTANEOUS	L2-L3	S: anterior / lateral thigh	3 cm lateral to internal inguinal ring

LUMBAR/PELVIC NERVES UROLOGY

Nerve	Origin	Function	Curiosities
OBTURADOR	L2-L4	S: posterior thigh M: leg adduction	Stimulated in lateral TURB. Possible injury during pelvic lymphadenectomy/TOT
FEMORAL	L2-L4	S: anterior/medial part of thigh M: quadriceps, sartorius, psoas, leg extension	Travel posterior to the psoas
COMMON PERONEAL	L4-S2	S: lower leg, foot M: dorsiflexión foot	Nerve most damaged in lithotomy—foot drop
PUDENDAL	S2-S4 (Onuf)	S: penis, posterior scrotum M: external sphincter, ejaculatory muscles	BULBOCAVERNOSUS REFLEX

REFLEX:
CREMASTERIC: L1-L2
BULBOCAVERNOSUS: S2-S3
ANAL: S2-S4

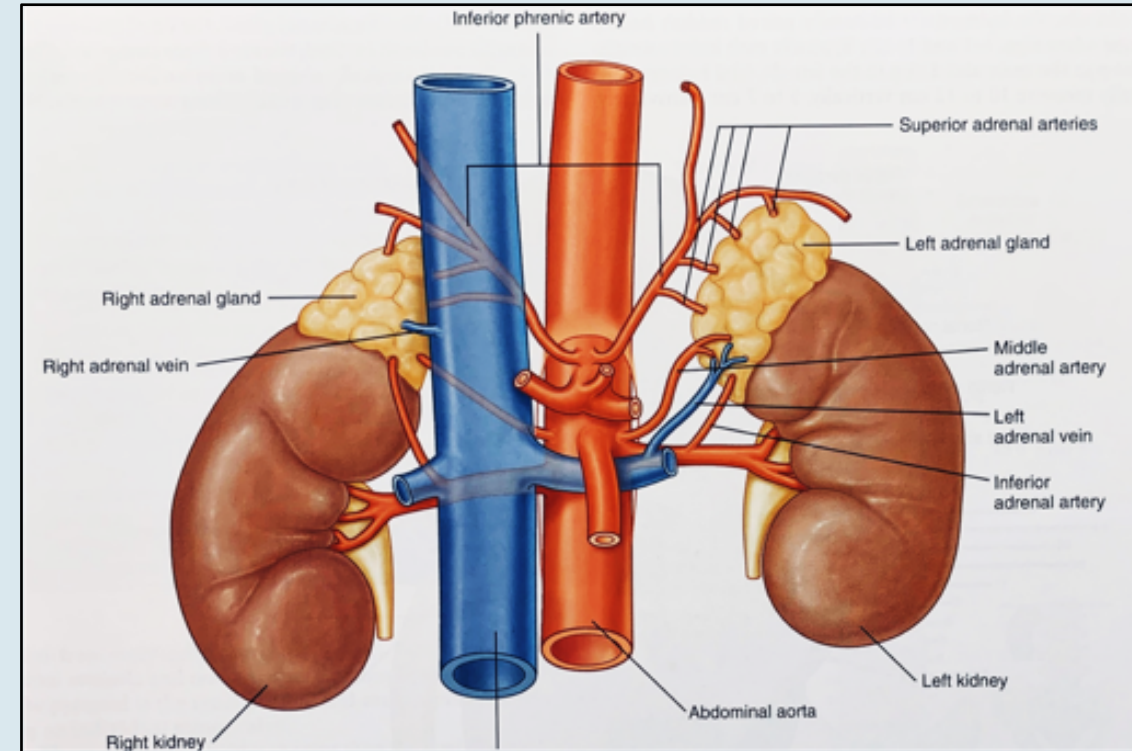
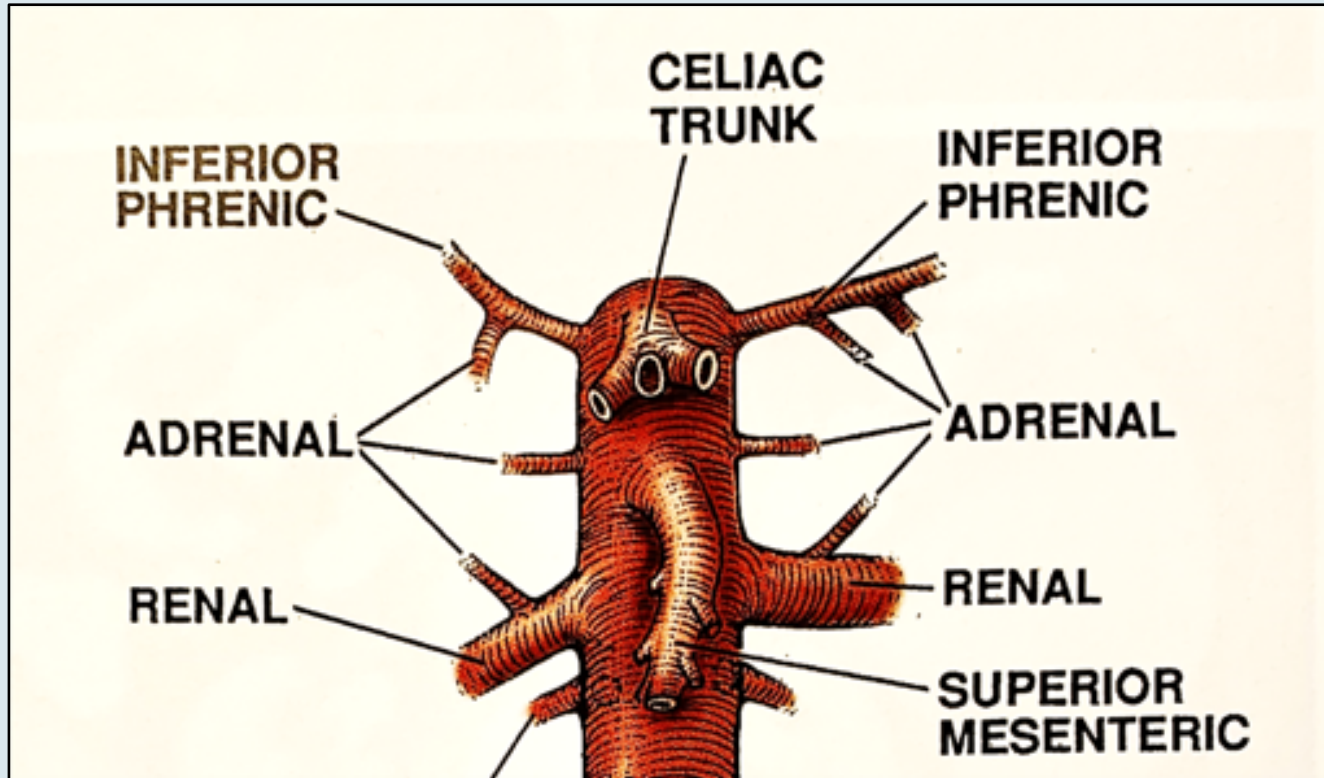
BLADDER PHYSIOLOGY:

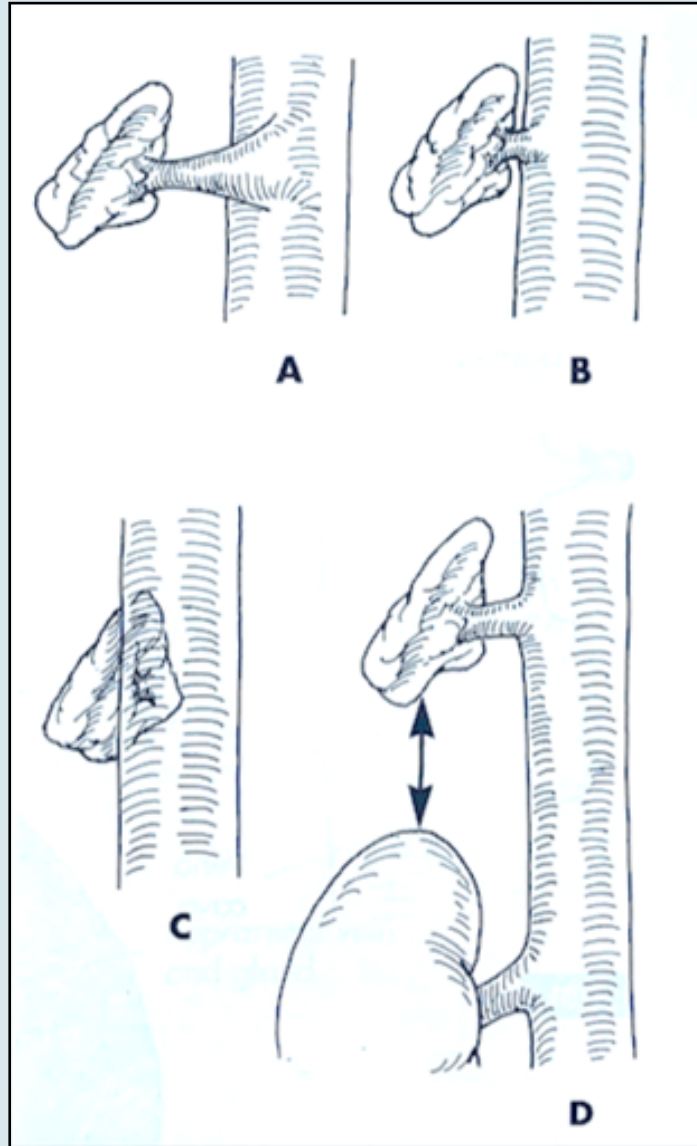
- PARASYMPATHETIC: CONTRACTION: **S2-S4**; **PELVIC NERVES: M3**, **ACH** (THERE ARE MORE M2, BUT M3 MORE IMPORTANT FOR CONTRACT.)
- SYMPATHETIC: RELAXATION/NECK CONTRACTION: **T11-L2**; **HYPOGASTRIC NERVE**: α_1 -TRIGONE/NECK; B3-BODY; NOREPINEPHRINE
- SOMATIC: CONTRACT EXTERNAL SPHINCTER: **S2-S4**; **PUDENDAL NERVE**; NICOTINIC; **ACH**

ERECTION PHYSIOLOGY:

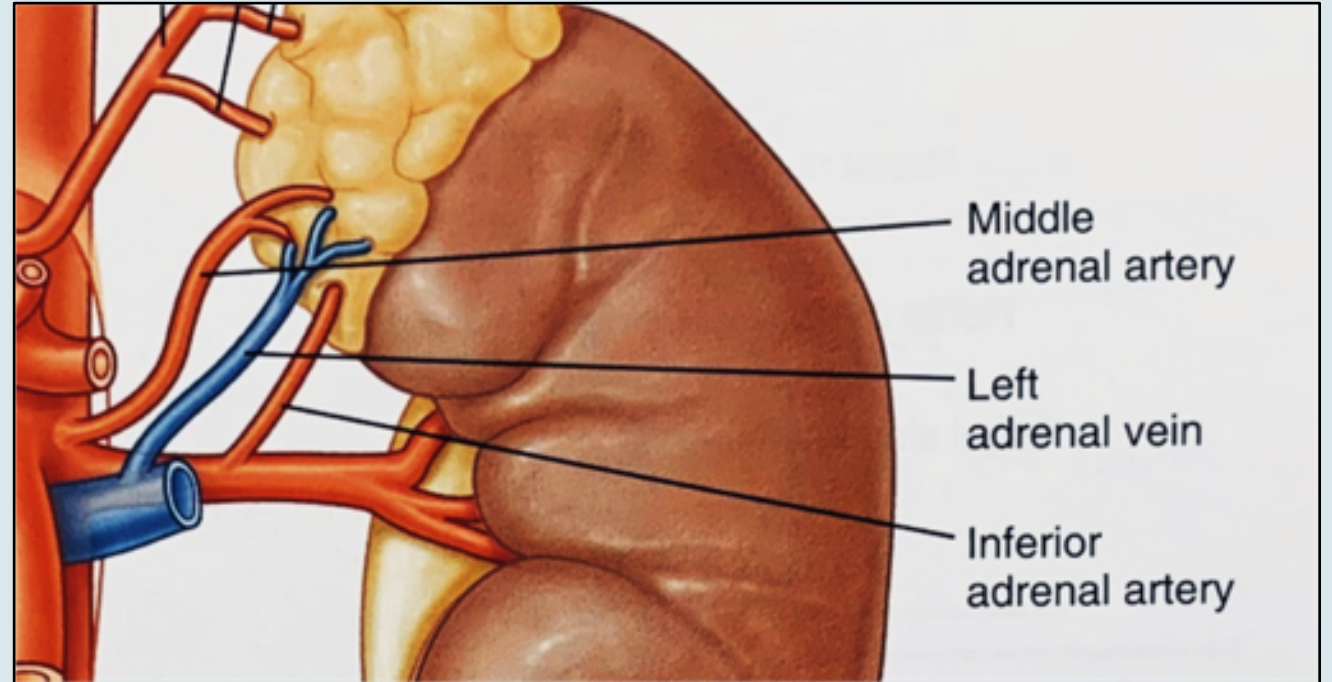
- PARASYMPATHETIC: TUMESCENCE: **S2-S4**. **CAVERNOSAL NERVES** (DAMAGE SACRAL ROOTS IN PROSTATECTOMY)
- SYMPATHETIC: EMISSION OF SEMEN INTO URETHRA: **T10-L2**. **HYPOGASTRIC NERVE** (DAMAGE IN RETROP. LYMPHADENECTOMY)
- SOMATIC: EJACULATION: **S2-S4**. **PUDENDAL NERVE**

Adrenal

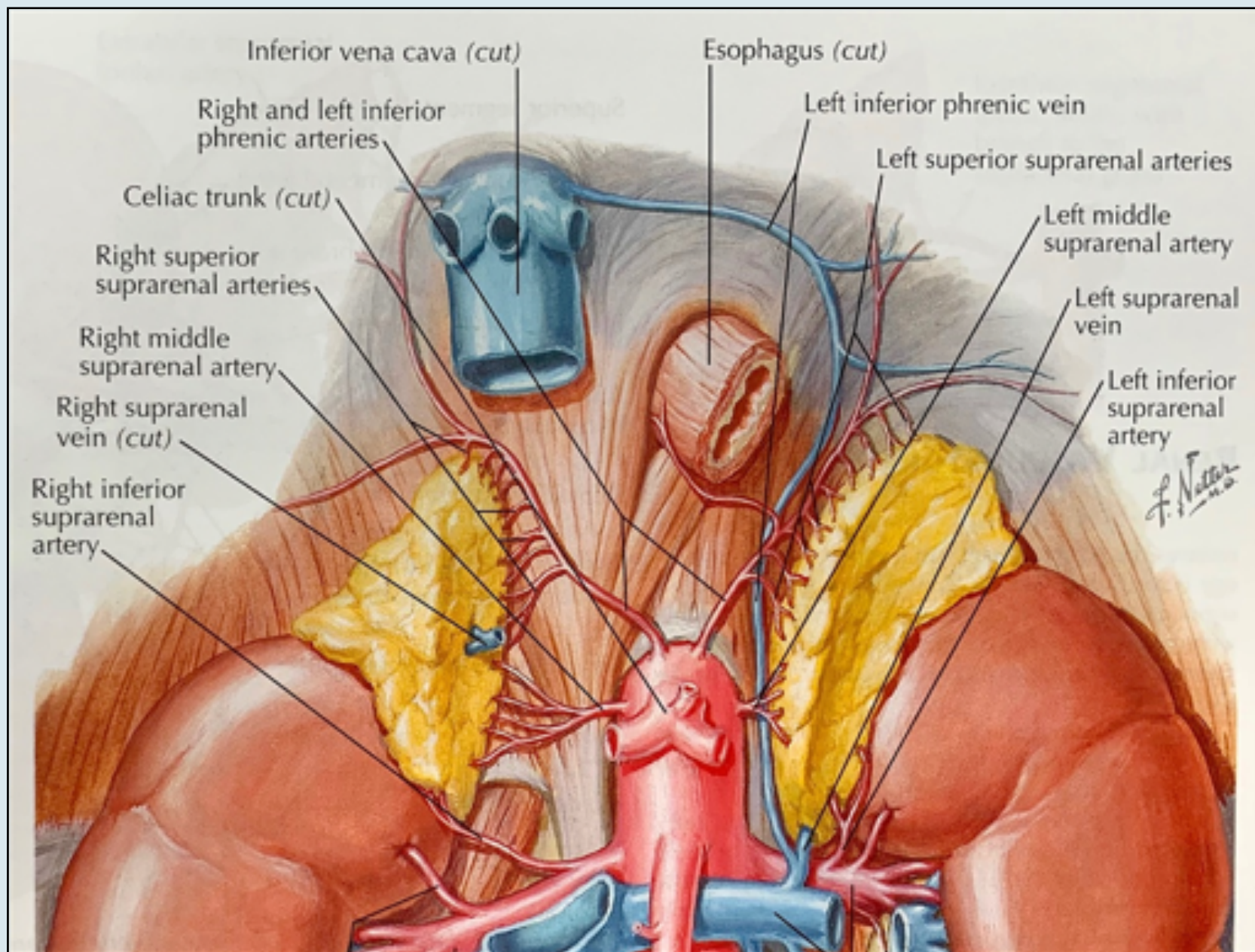




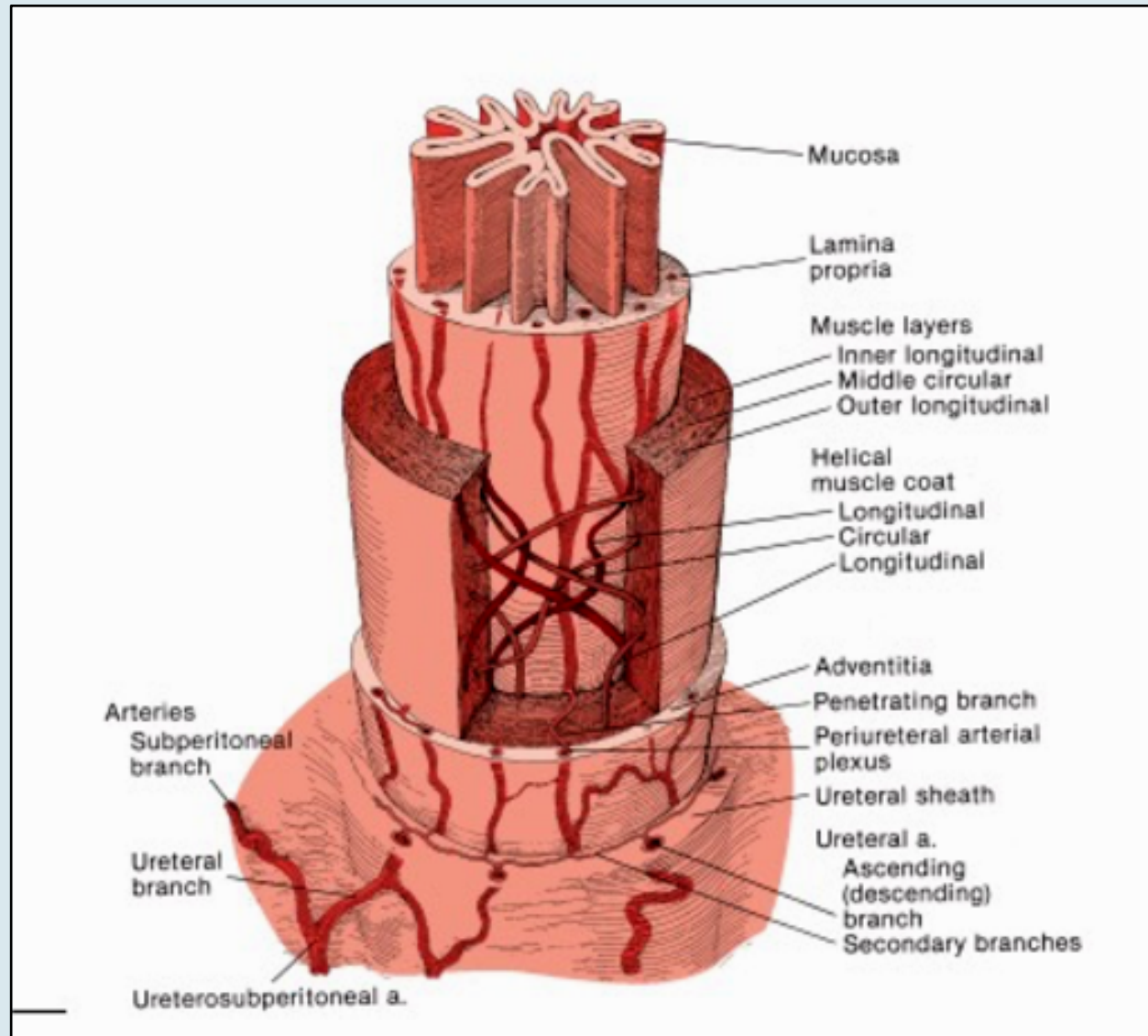
Right Adrenal Vein Variations



Left Adrenal Vein

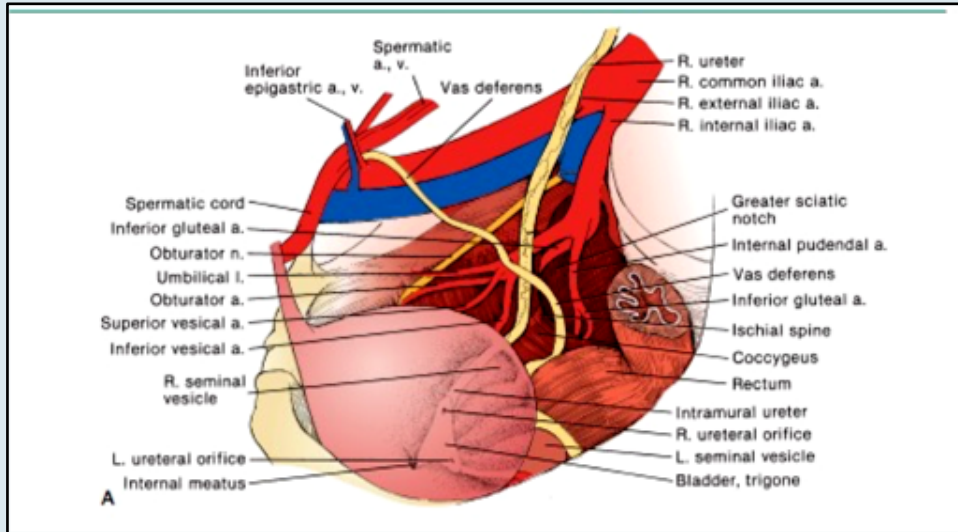


Ureter Anatomy and Vascular Supply

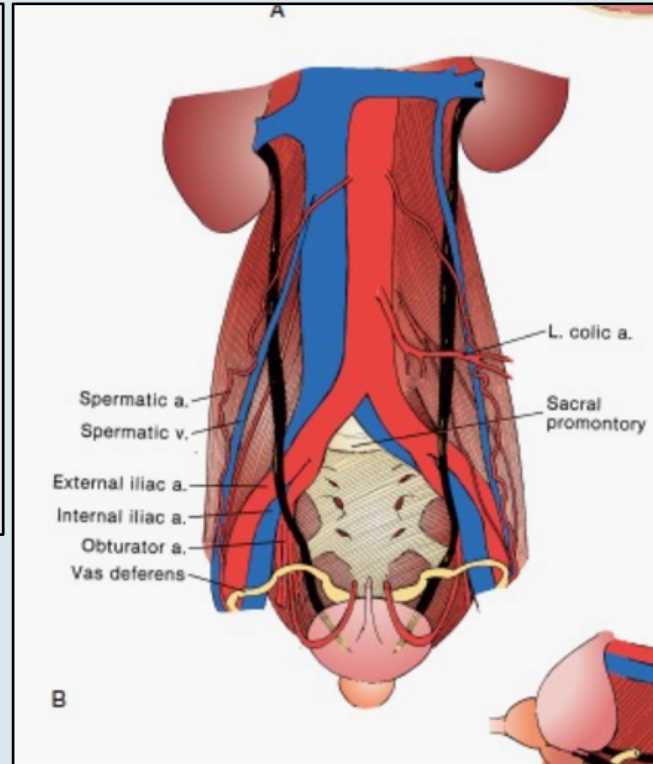


- Mucosa = 3-5 cells thick, transitional epithelium
- No distinct submucosa
- Proximal Ureter
 - thin muscularis = poorly defined inner circular and outer longt.
- Mid and distal ureter
 - muscularis = all 3 layers well defined (inner longt., middle circular and outer longt.)

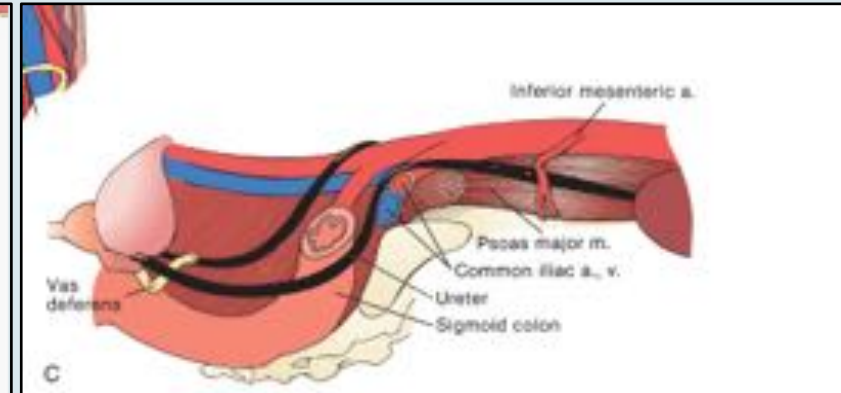
Ureter



Oblique View

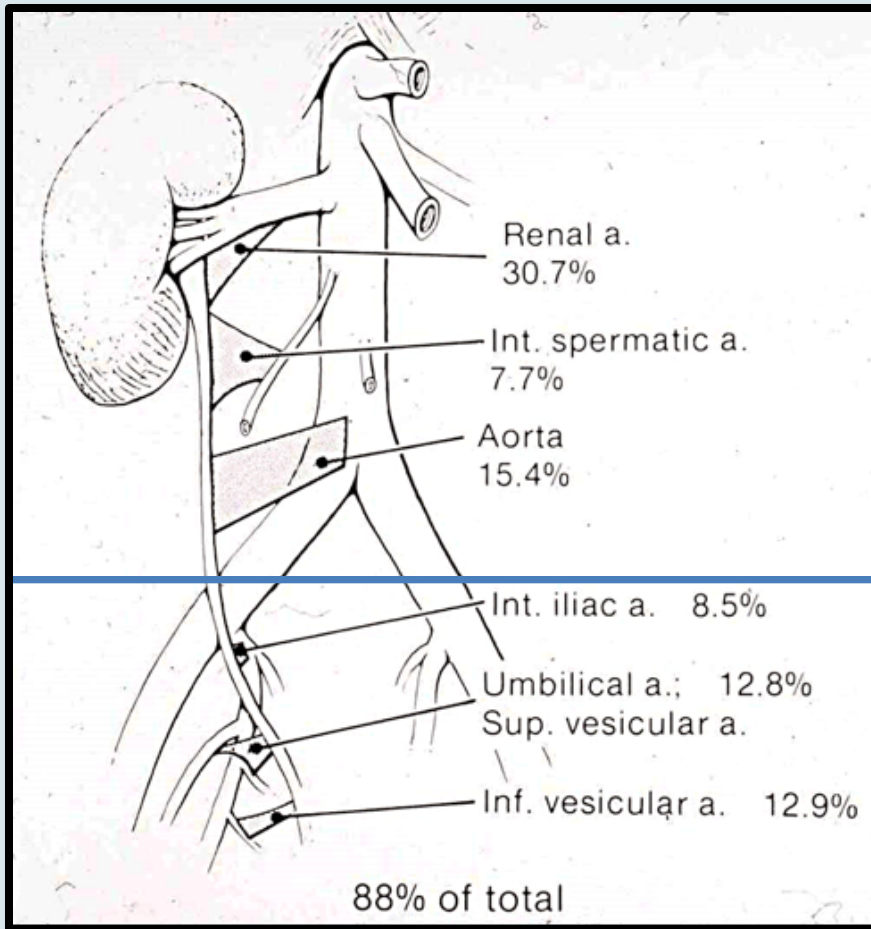


Coronal View



Lateral View

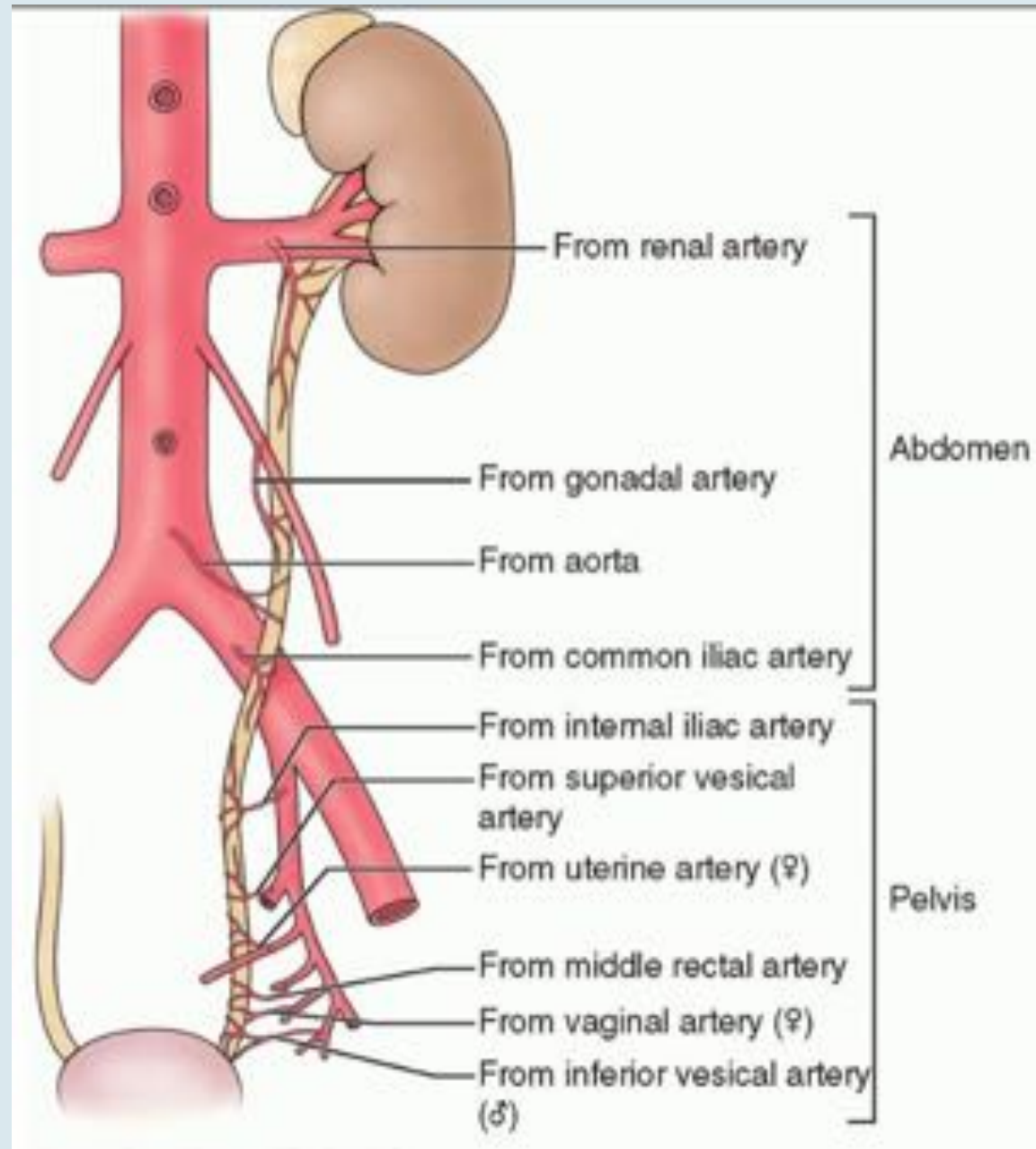
Ureteral Blood Supply

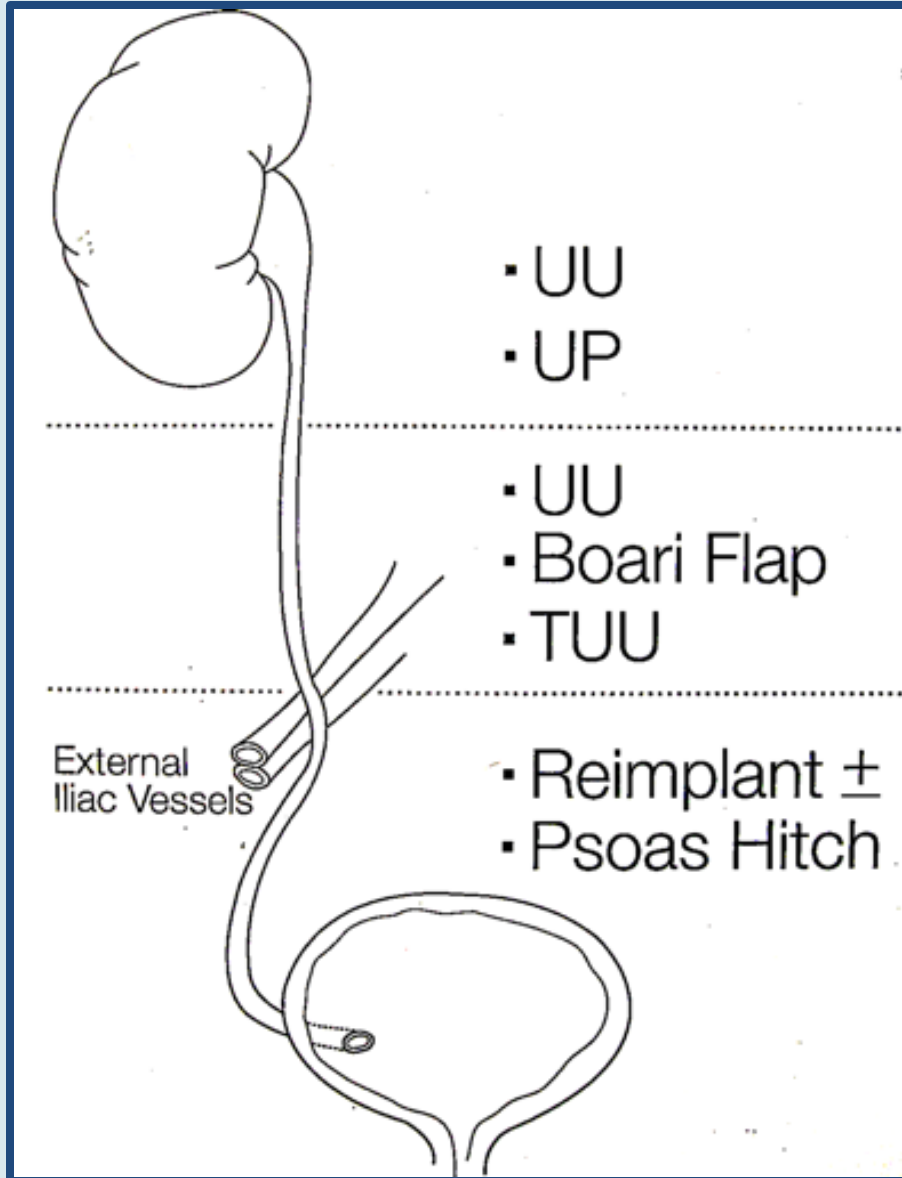


Medial blood supply

Lateral blood supply

Ureter Blood Supply





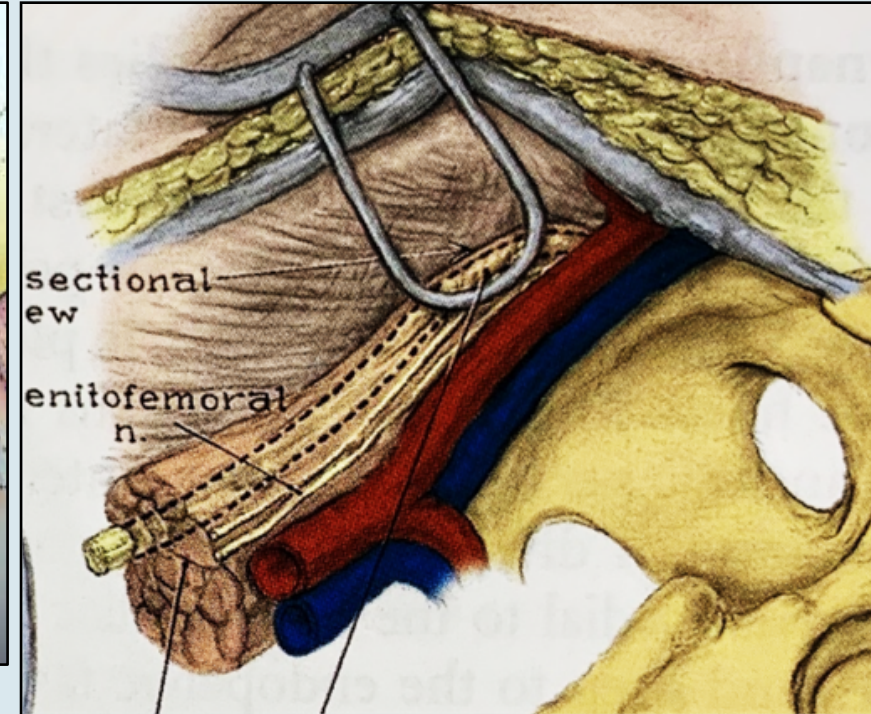
Repair Type by Injury Location

TUU usually a
exam distractor;
Not the answer

Complete Lacerations

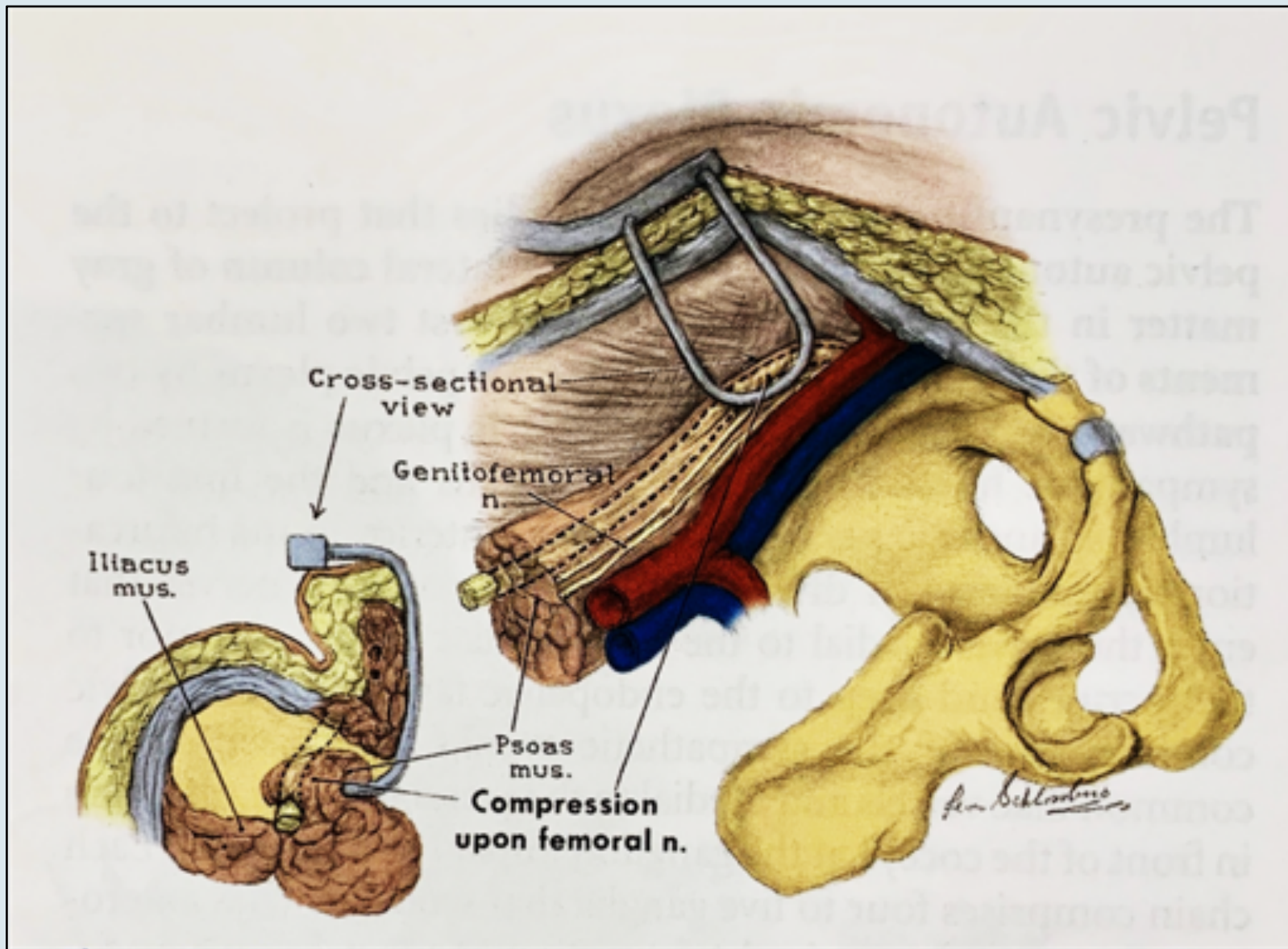
Injury Location	Treatment
Distal third ureter (<2cm)	Reimplant
Distal third ureter (>2cm)	Psoas Hitch
Mid or proximal third ureter (above iliacs)	UU
Extensive defect	Boari flap Ileal ureter Auto- transplant

Psoas Hitch

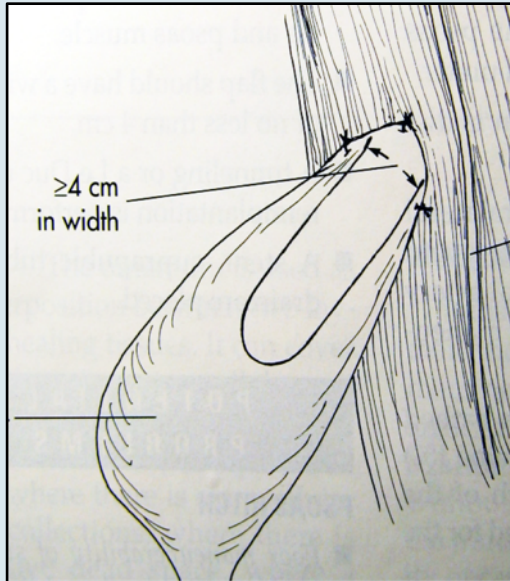


Psoas Hitch

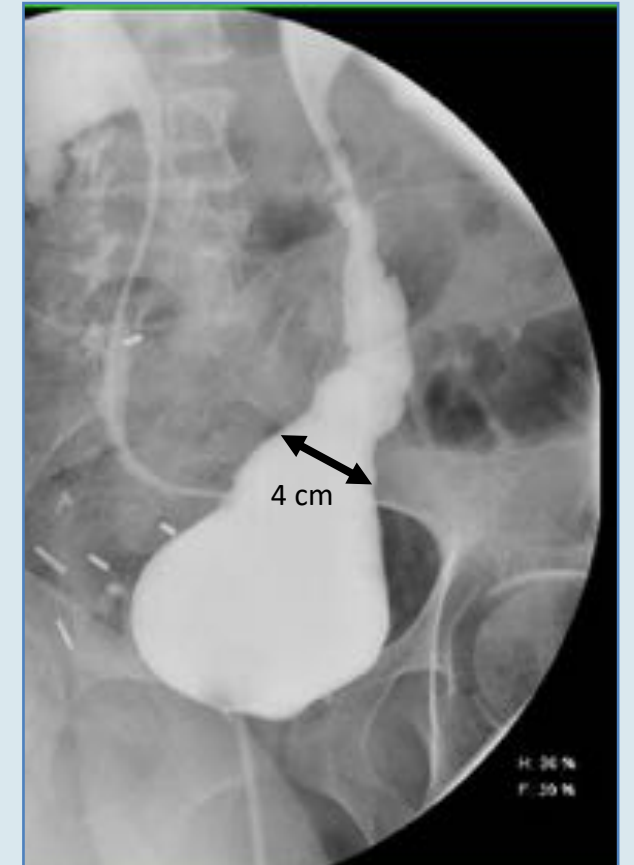
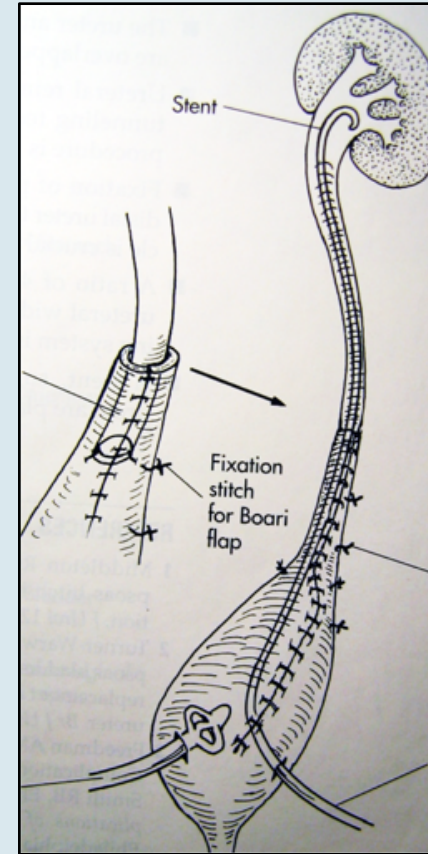
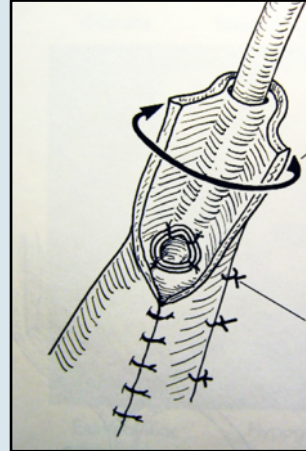
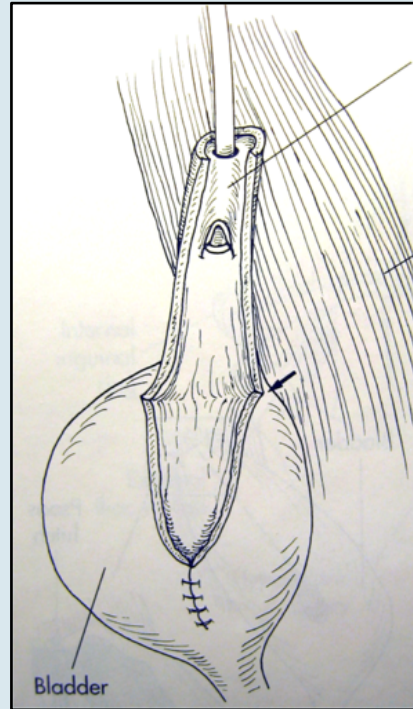
- For injuries of distal third ureter
- Ligate contralateral sup. vesical arteries
- Fix bladder to Psoas minor tendon
- Psoas minor tendon (absent in 10%)
- Avoid genito-femoral nerve
 - sensory nerve, ant. thigh numbness



Boari Flap

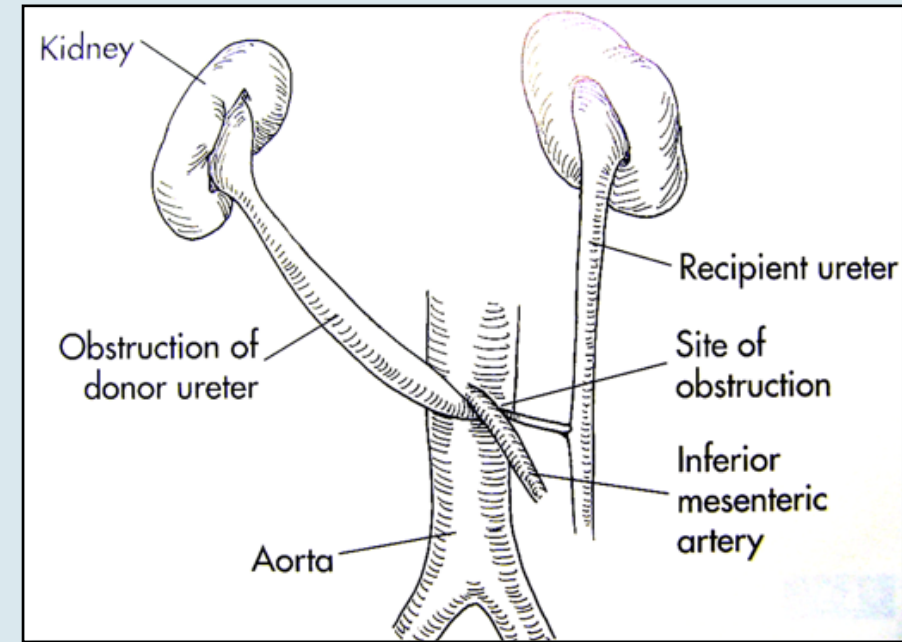


Max - 4 x12 cm



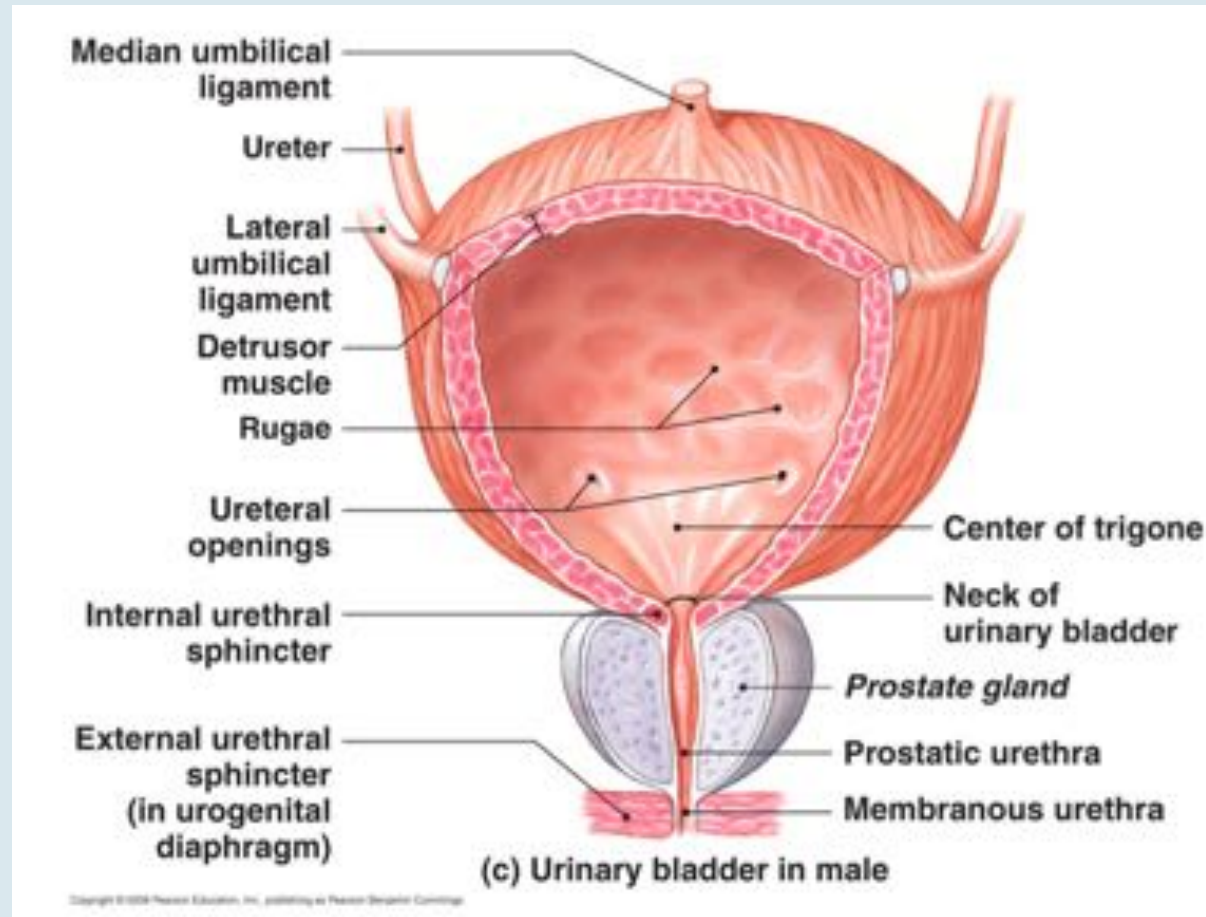
TUU

- Bladder - small, fibrotic, not easy to mobilize
- Contraindications
 - Upper tract TCC, GU TB,
 - Recurrent K stones, Retroperitoneal fibrosis
 - Chronic pyelo, Anomalies of recipient ureter
- Avoid kinking ureter under IMA
- Risks damaging recipient ureter

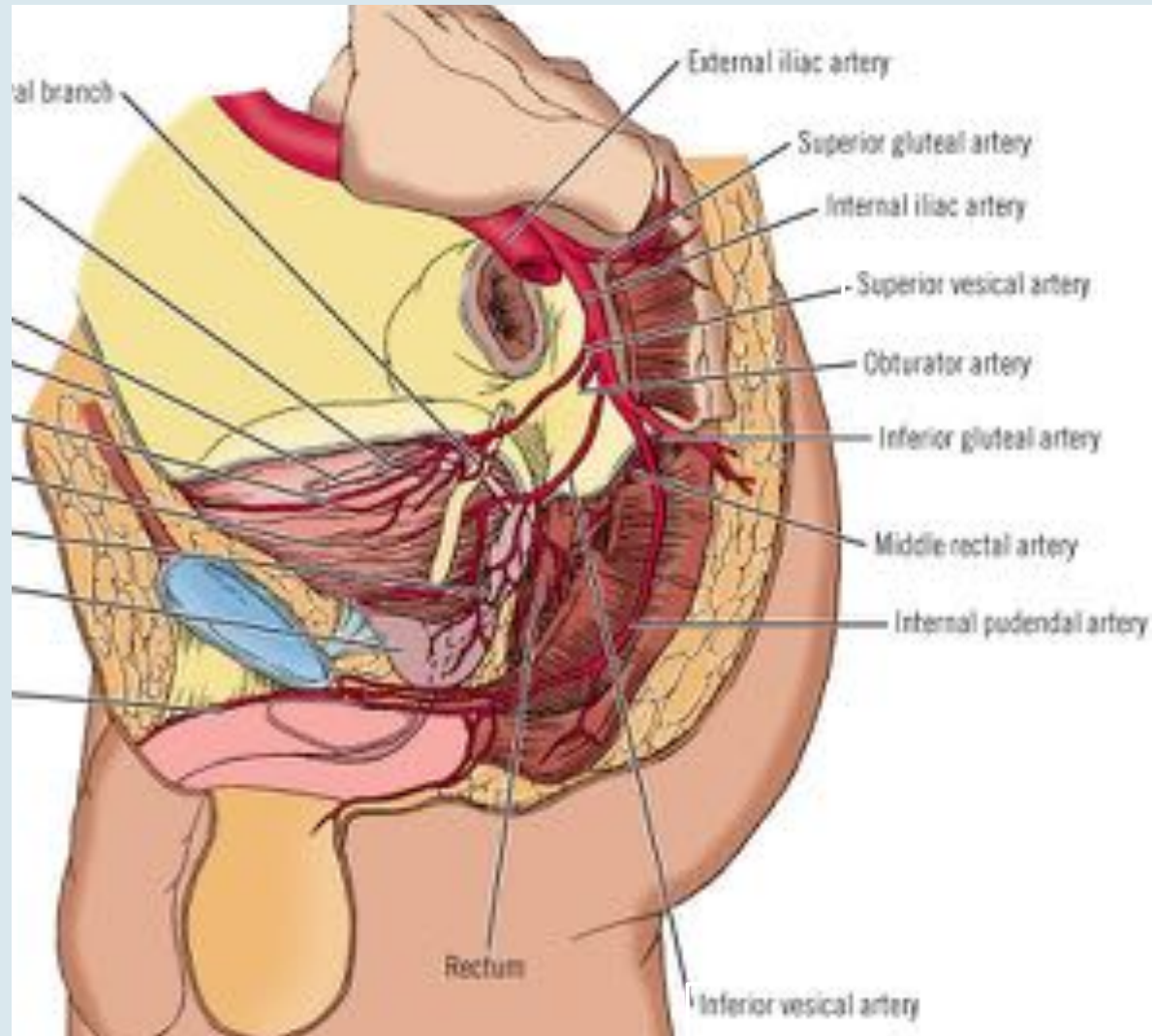


Pelvic Anatomy & Vascular Supply

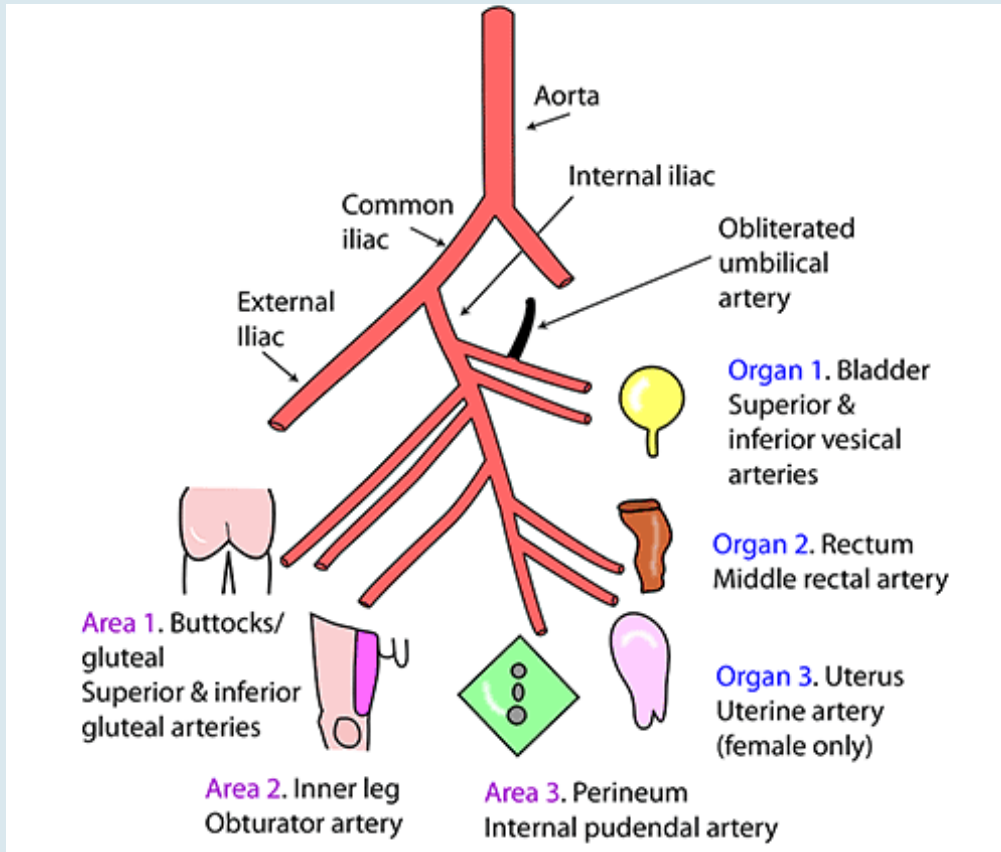
Bladder Anatomy



Bladder Blood Supply



Branches of the Internal Iliac Artery



POSTERIOR branch (3) }}} “pILS”

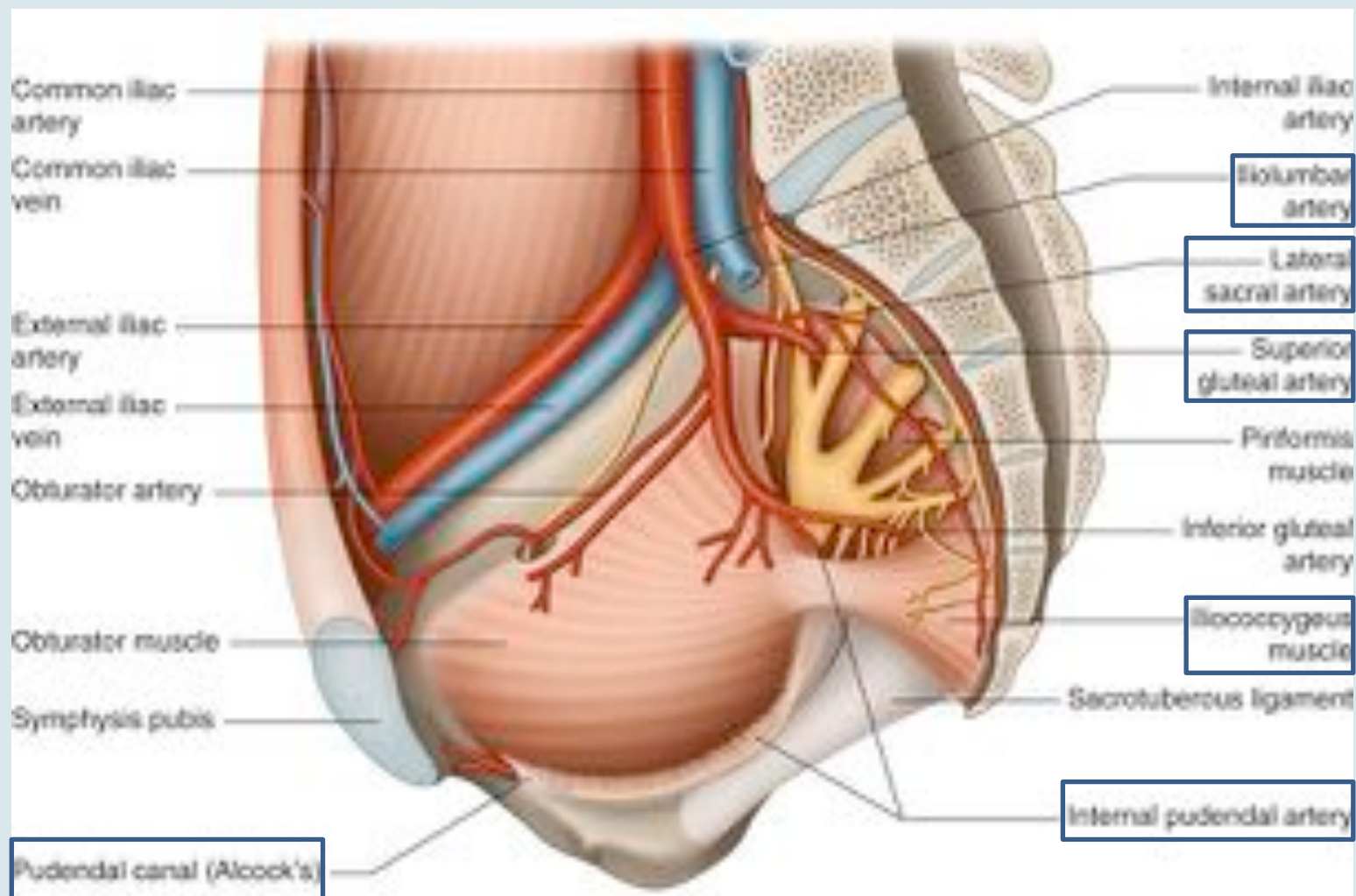
- 1) Iliolumbar (Ascending lumbar)
- 2) Lateral sacral
- 3) Superior gluteal (terminal branch)

ANTERIOR branch (8) }}} “OSIOMUII”

- 1) Obliterated umbilical
- 2) Superior vesical
- 3) Inferior vesical
- 4) Obturator
- 5) Middle rectal
- 6) Uterine (largely replaces the middle rectal or inf. Vesical)
- 7) Inferior gluteal
- 8) Internal pudendal (terminal branch)

2 groups with 3 branches each

Internal Iliac Branches

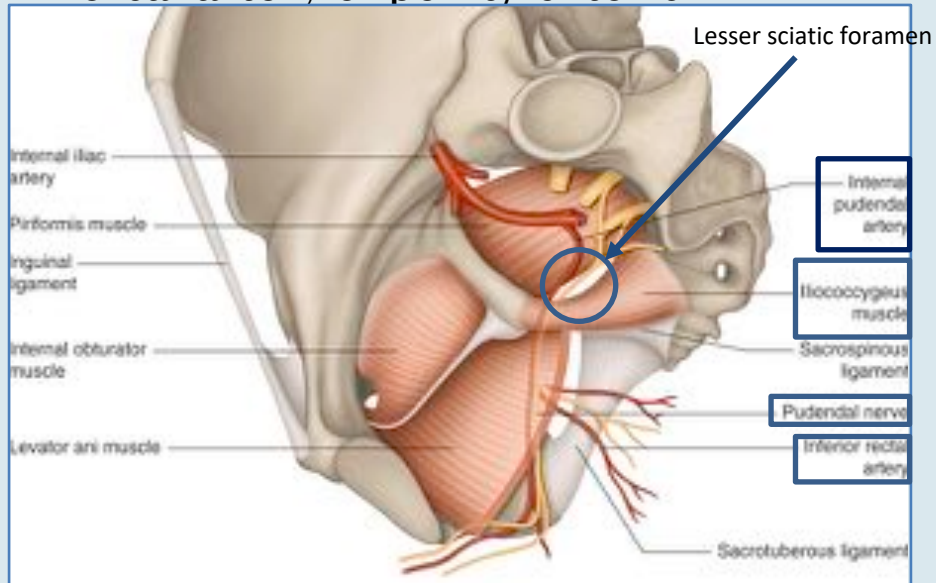
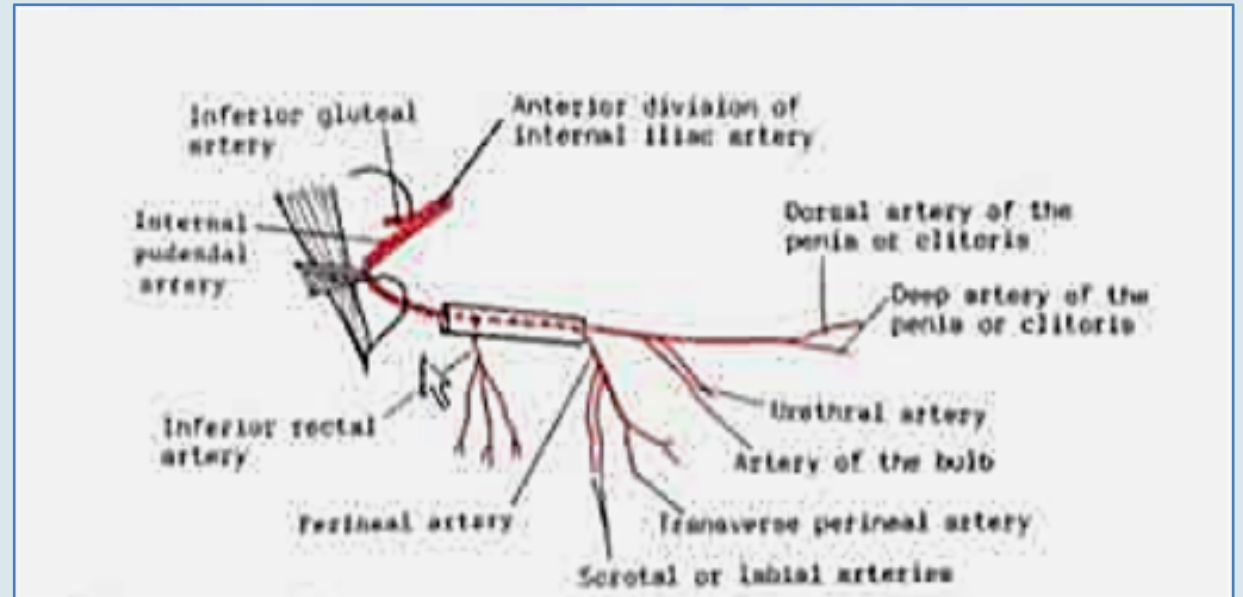


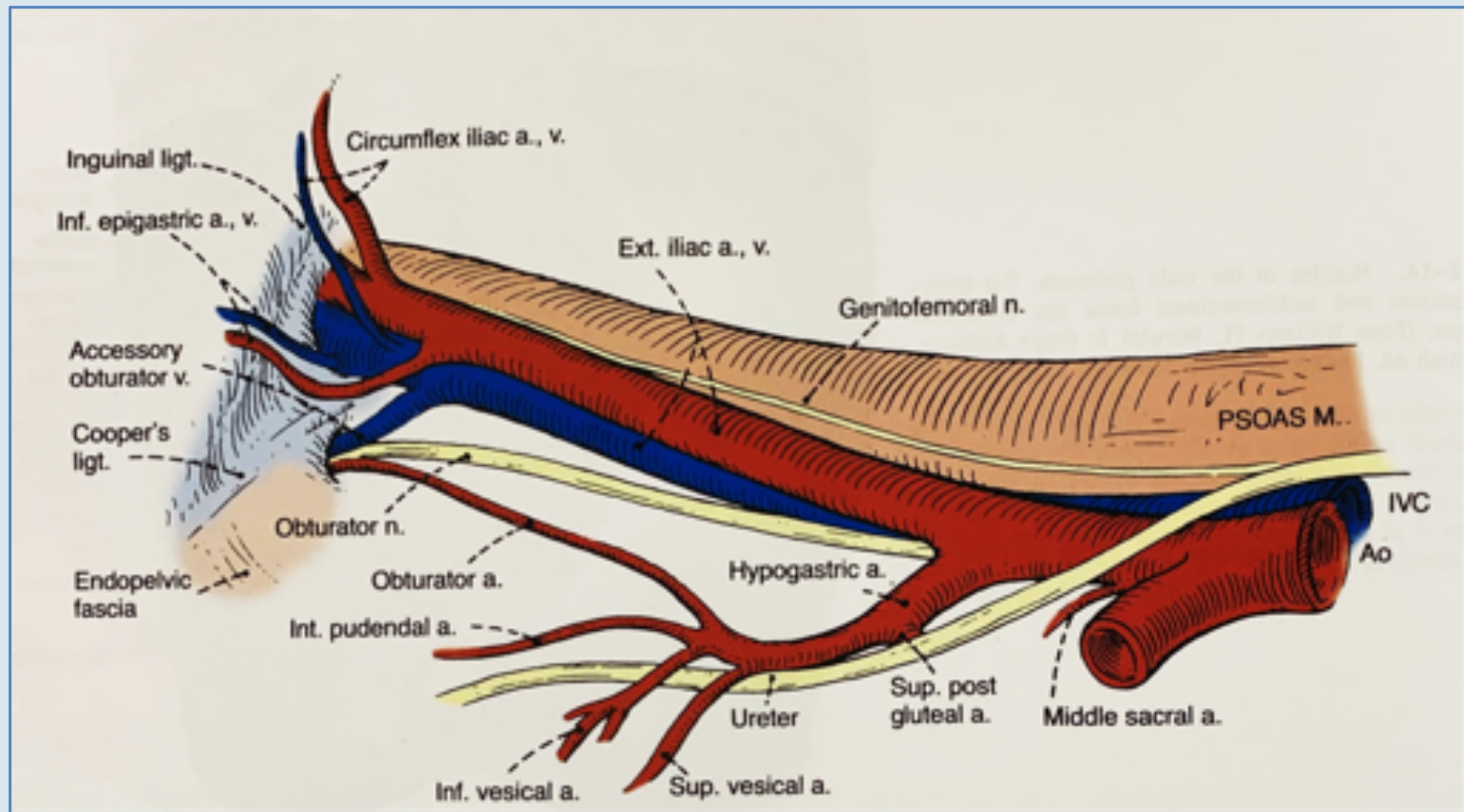
Posterior Branches

Internal Pudendal Artery

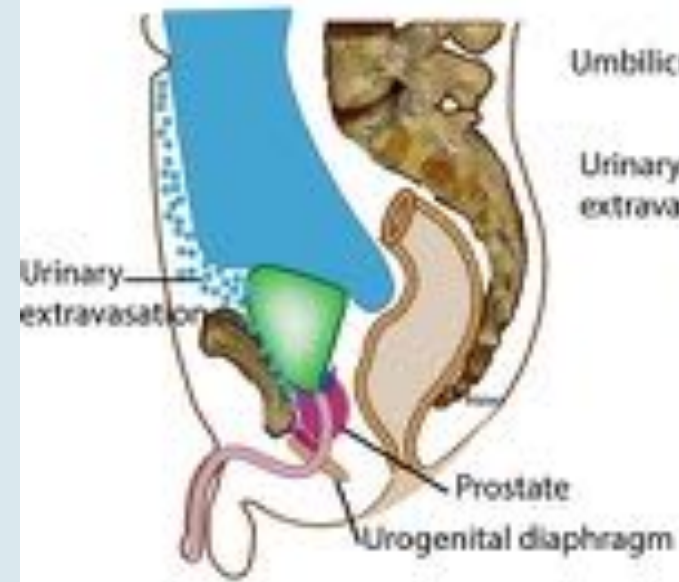
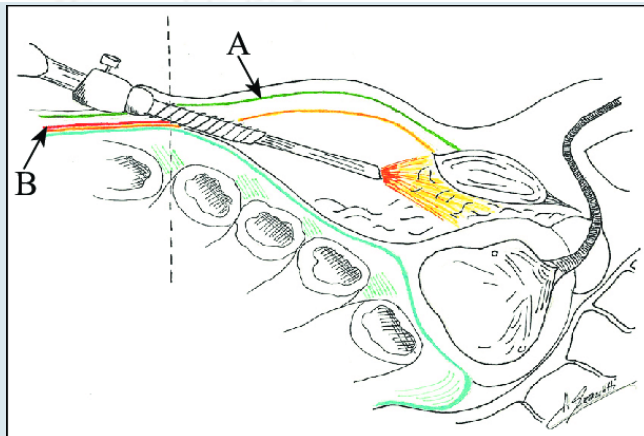
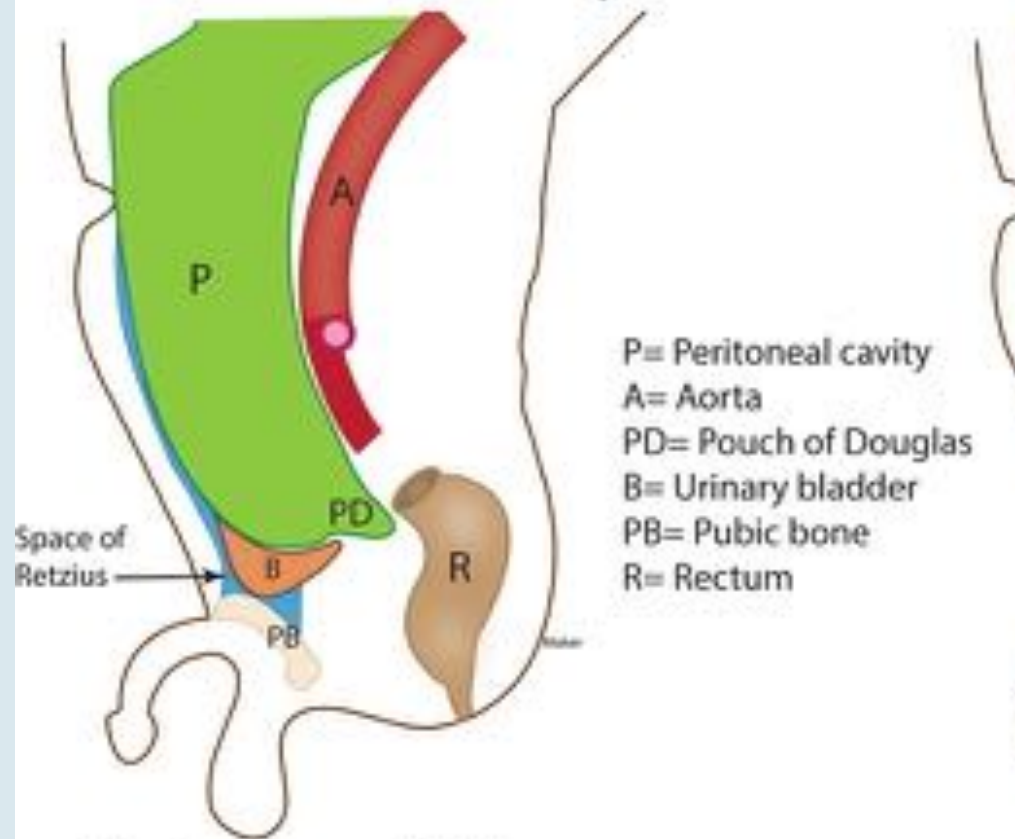
Branches of the internal pudendal artery.

- Inferior rectal
- Perineal
- Posterior scrotal/labial
- Common penile
- Bulbar
- Urethral
- Central cavernosal
- Dorsal artery of penis/ clitoris



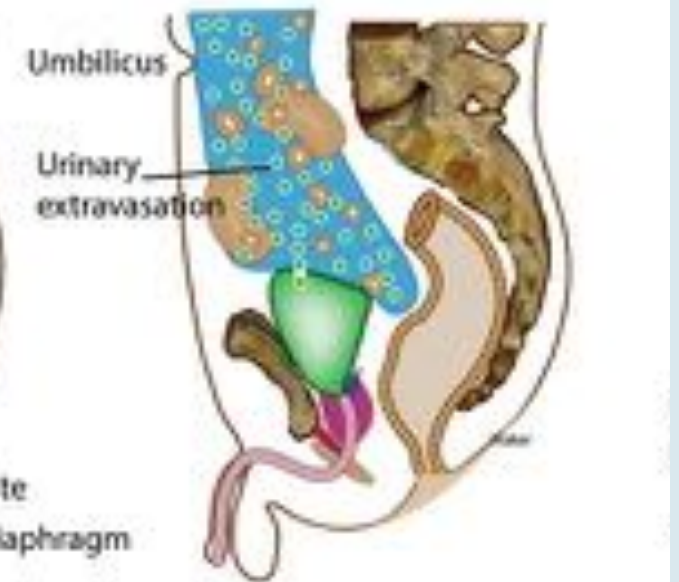


Space of Retzius



Extraperitoneal Rupture

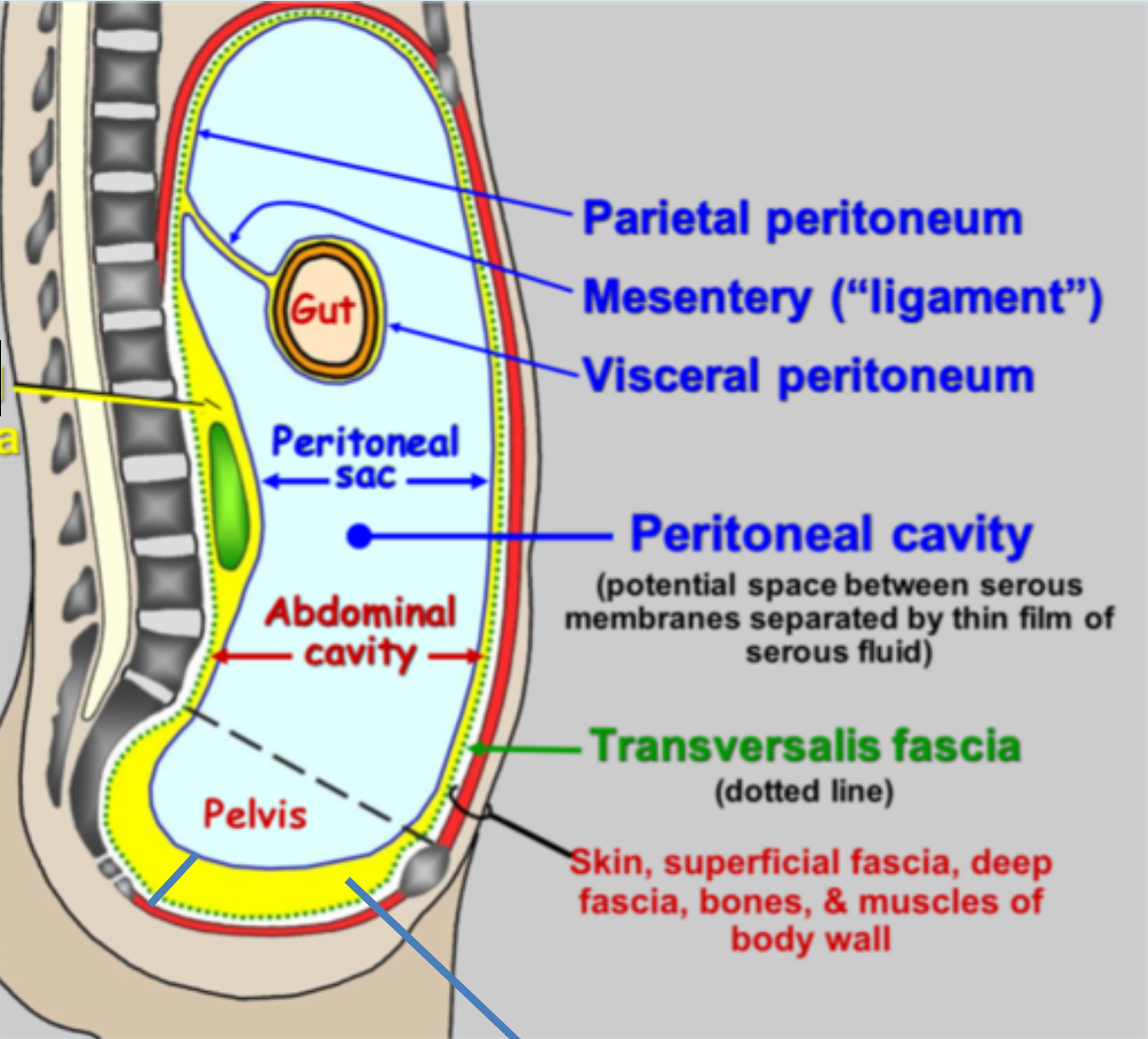
Extraperitoneal rupture of the bladder primarily occupies the space of Retzius.



Intraperitoneal Rupture

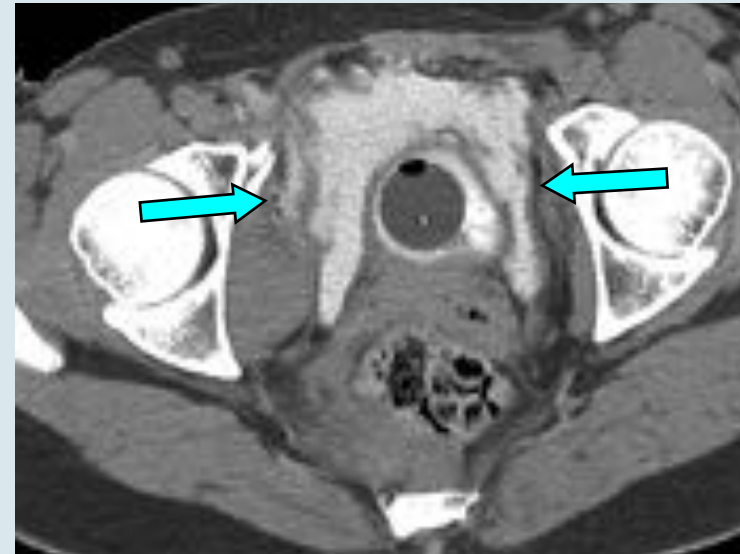
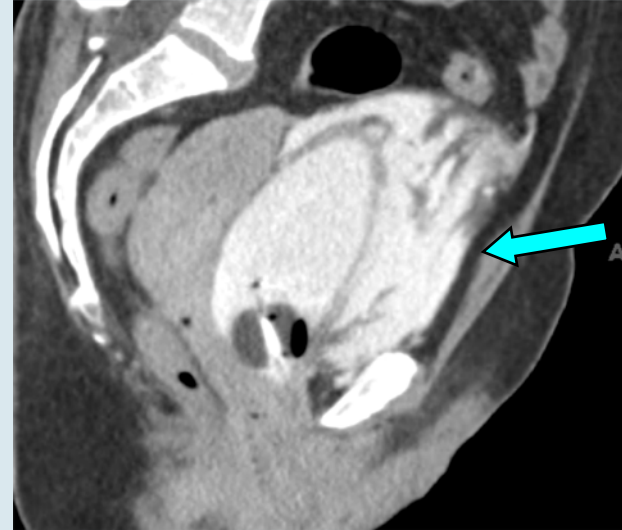
Intraperitoneal rupture drains into the general peritoneal cavity.

Retro P Space



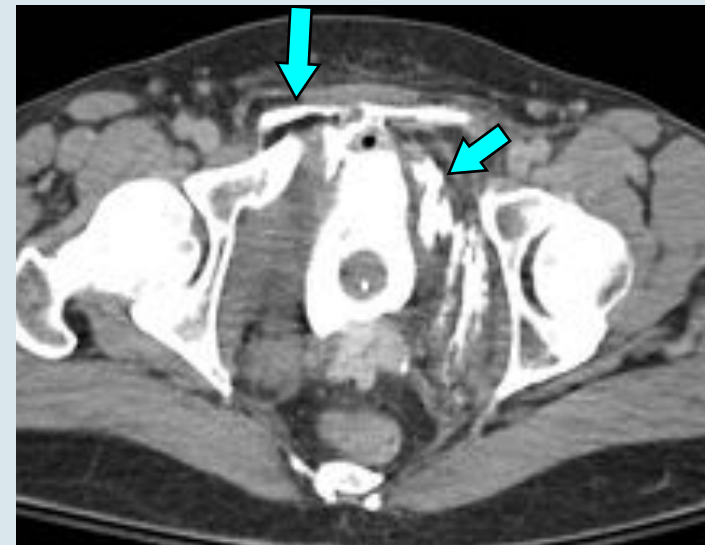
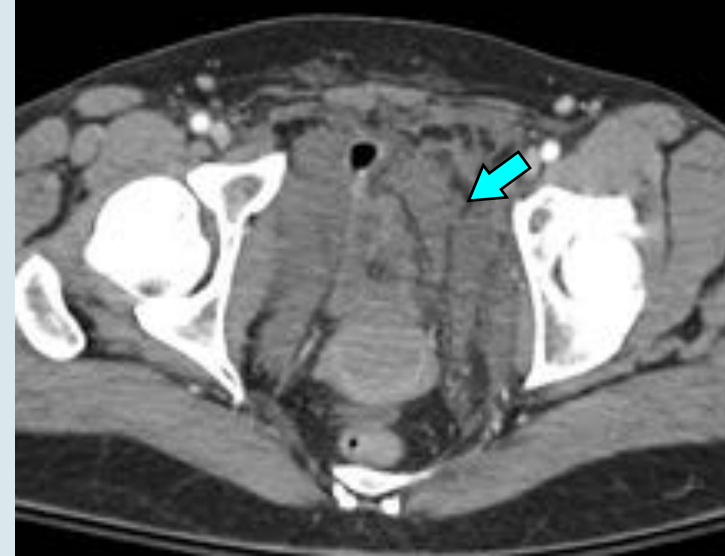
Extra P Space

Bladder Injury - Extraperitoneal

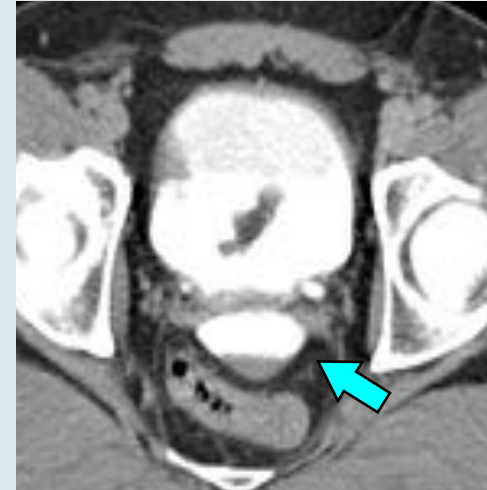


Bladder Injury - Extraperitoneal

- Free fluid in the pelvis & space of Retzius (Non- con)
- Contrast leak into: Anterior abdominal wall & Space of Retzius



Bladder Injury- Intraperitoneal

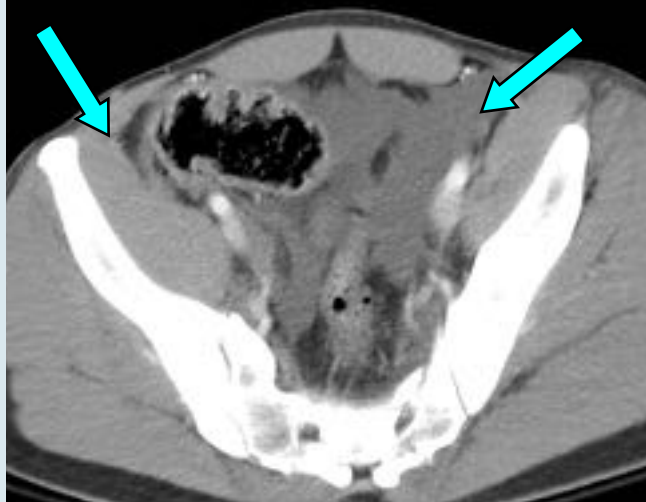


Free intraperitoneal fluid surrounding bowel loops

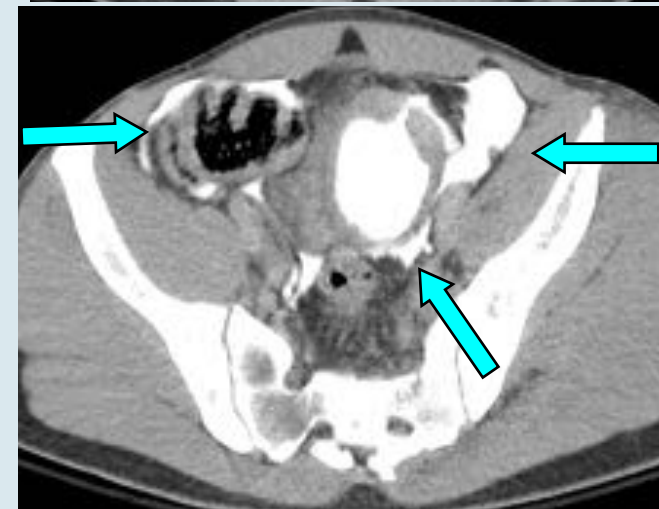
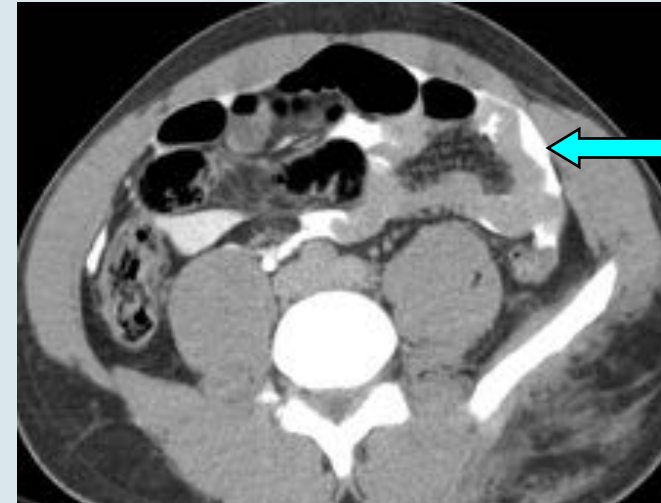
Cul de sac fluid

Intraperitoneal Bladder Injury

- Free Fluid in Paracolic Gutters



Contrast Outlines Bowel and Opacifies Cul de Sac



Bladder Injury

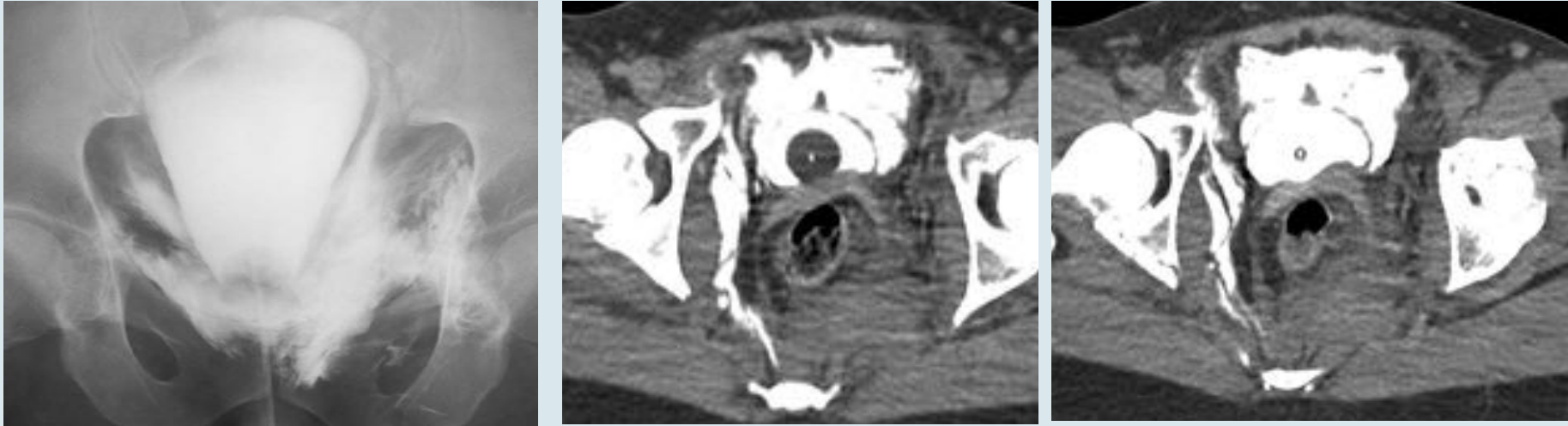


Intraperitoneal



Extraperitoneal

Complicated ExtraP Bladder Injury



- Bladder neck and ExtraP injury

Bowels

Middle colic artery

Right colic artery

Ileocolic artery

Meandering artery of Moskowitz

Middle colic artery

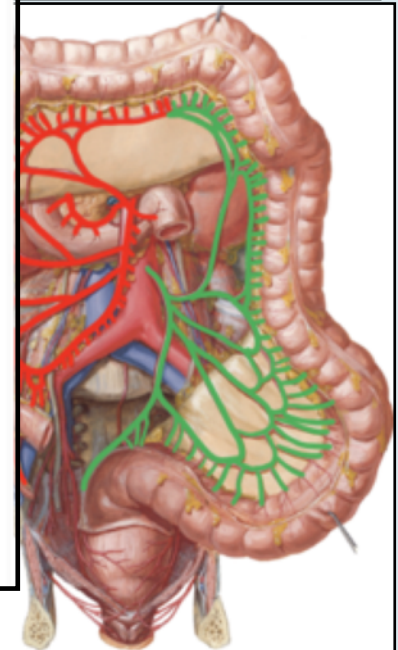
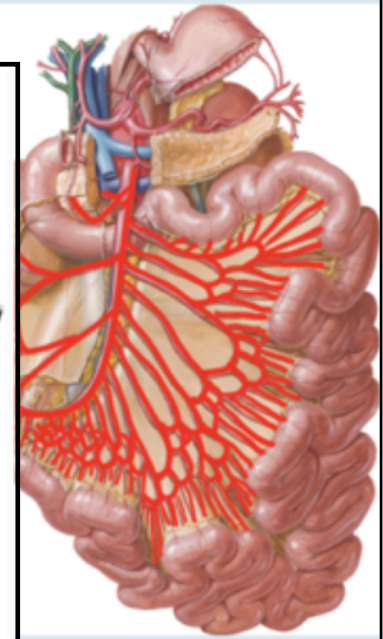
Superior mesenteric artery

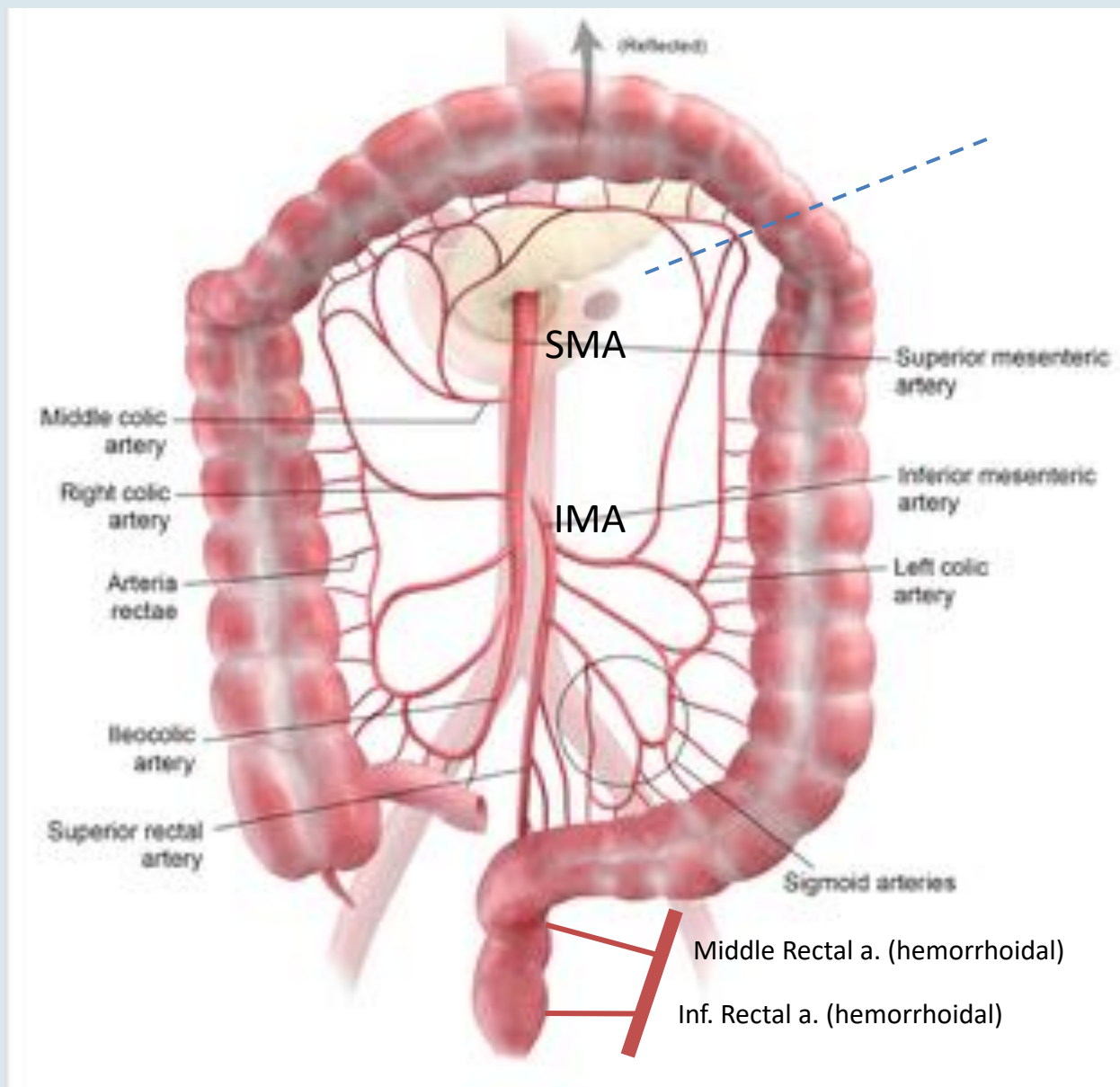
Inferior mesenteric artery

Arc of Riolan

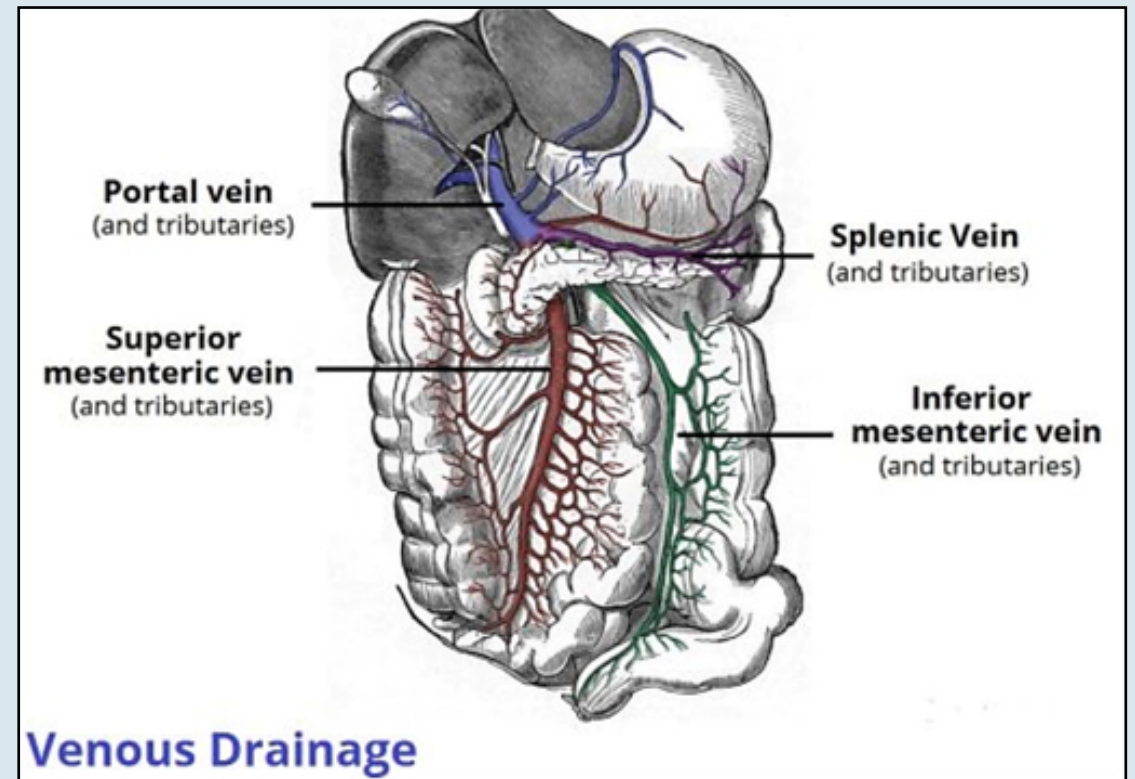
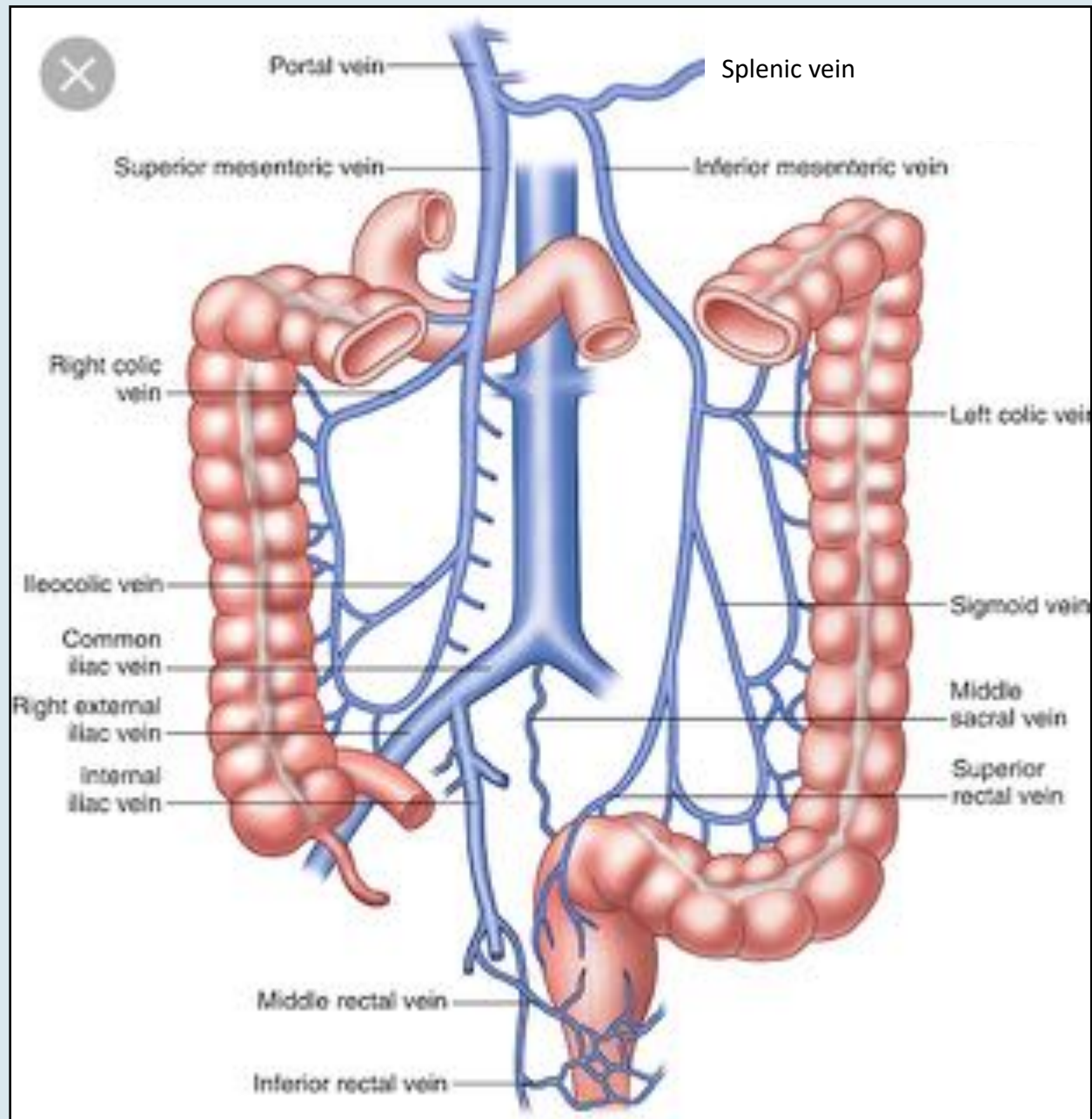
Marginal artery of Drummond

Arterial Supply

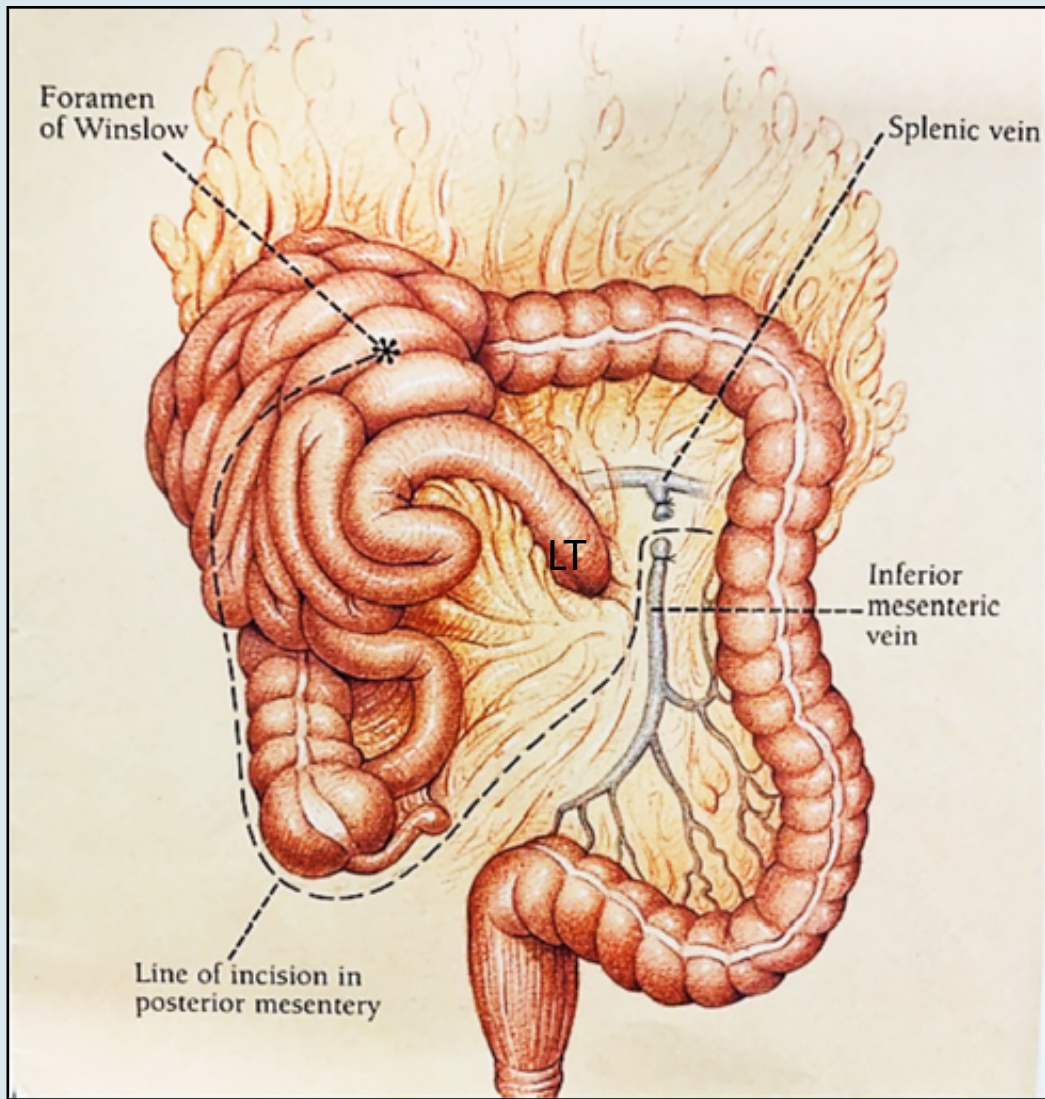




Colon segment	Arterial supply	Venous drainage
Cecuma	Ileocolic artery (branch of superior mesenteric artery (SMA))	Superior mesenteric vein
Ascending		Superior mesenteric vein
Inferior portion	Ileocolic artery (branch of SMA)	
Major portion	Right colic artery (branch of SMA)	
Near hepatic flexure	Middle colic artery (branch of SMA)	
Transverse	Middle colic artery (branch of SMA)	Superior mesenteric vein
Descending	Left colic artery (branch of inferior mesenteric artery (IMA))	Inferior mesenteric vein
Sigmoid		Inferior mesenteric vein
Major portion	Sigmoid artery (branch of IMA)	
Rectosigmoid junction	Rectosigmoid artery (branch of IMA)	
Rectum		
Superior portion	Rectosigmoid artery (branch of IMA)	Inferior mesenteric vein
Remainder of the rectum	Superior rectal artery (branch of IMA)	Inferior mesenteric vein
	Middle rectal artery (branch of internal iliac artery)	Internal iliac vein
	Inferior rectal artery (branch of internal pudendal artery)	Internal iliac vein

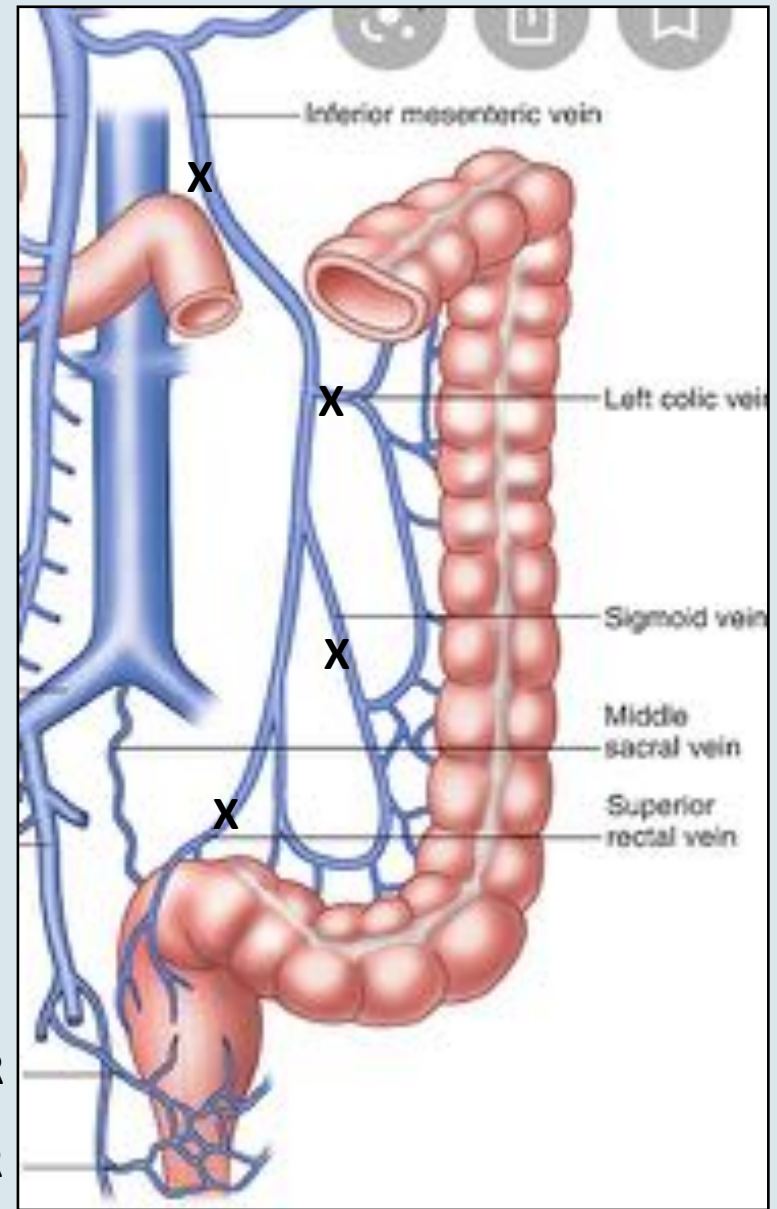


Venous Drainage

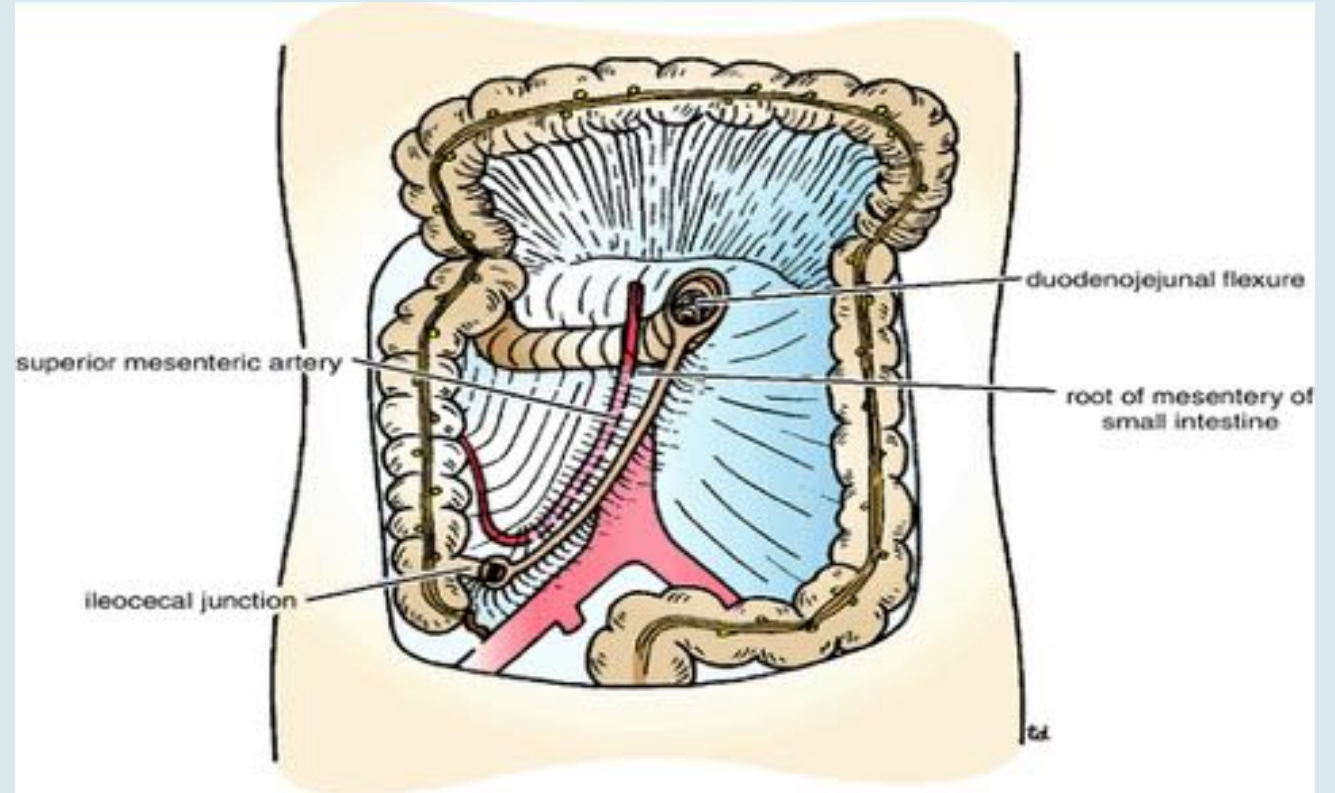
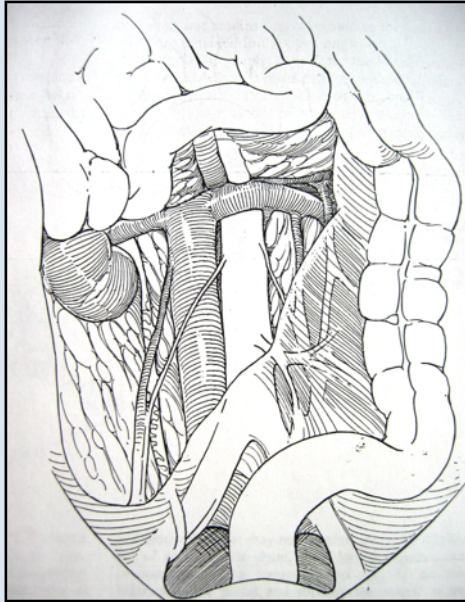
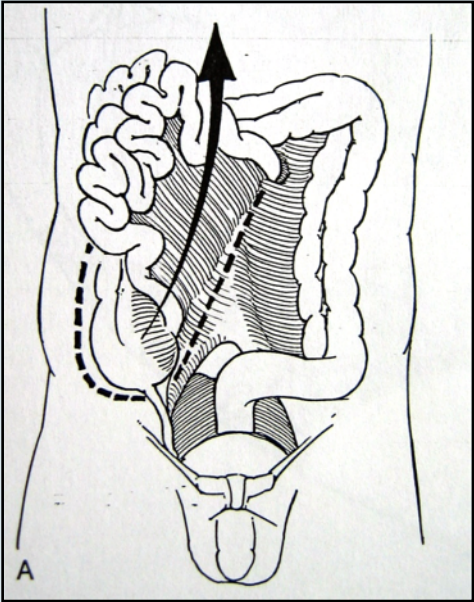
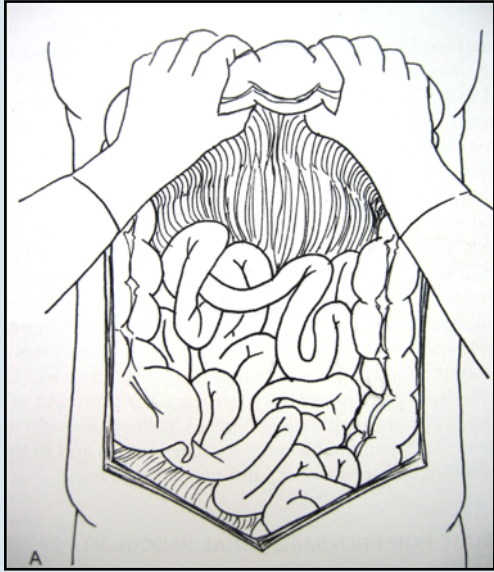


MR

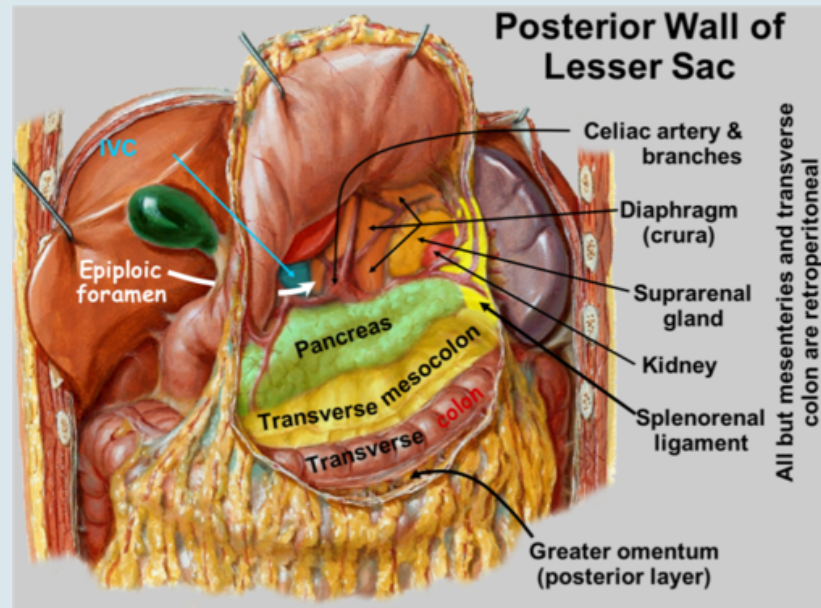
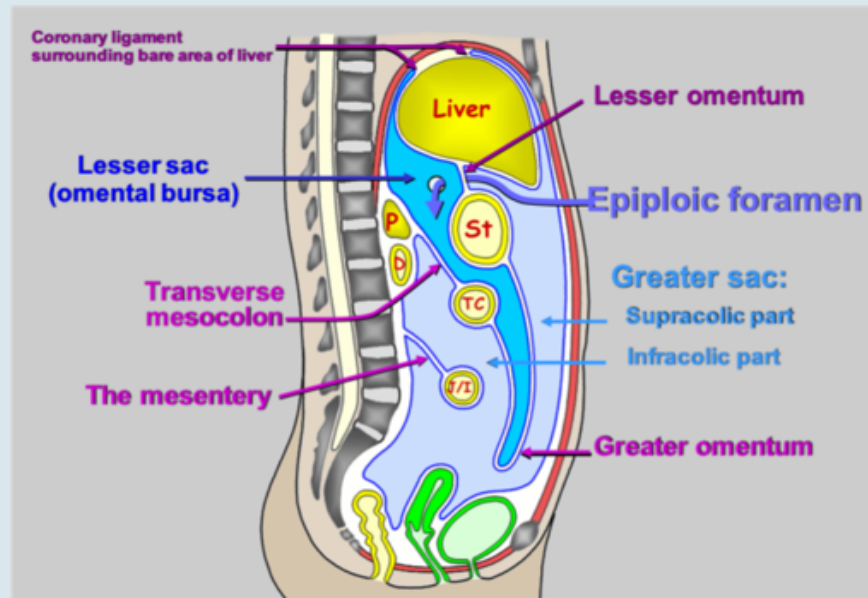
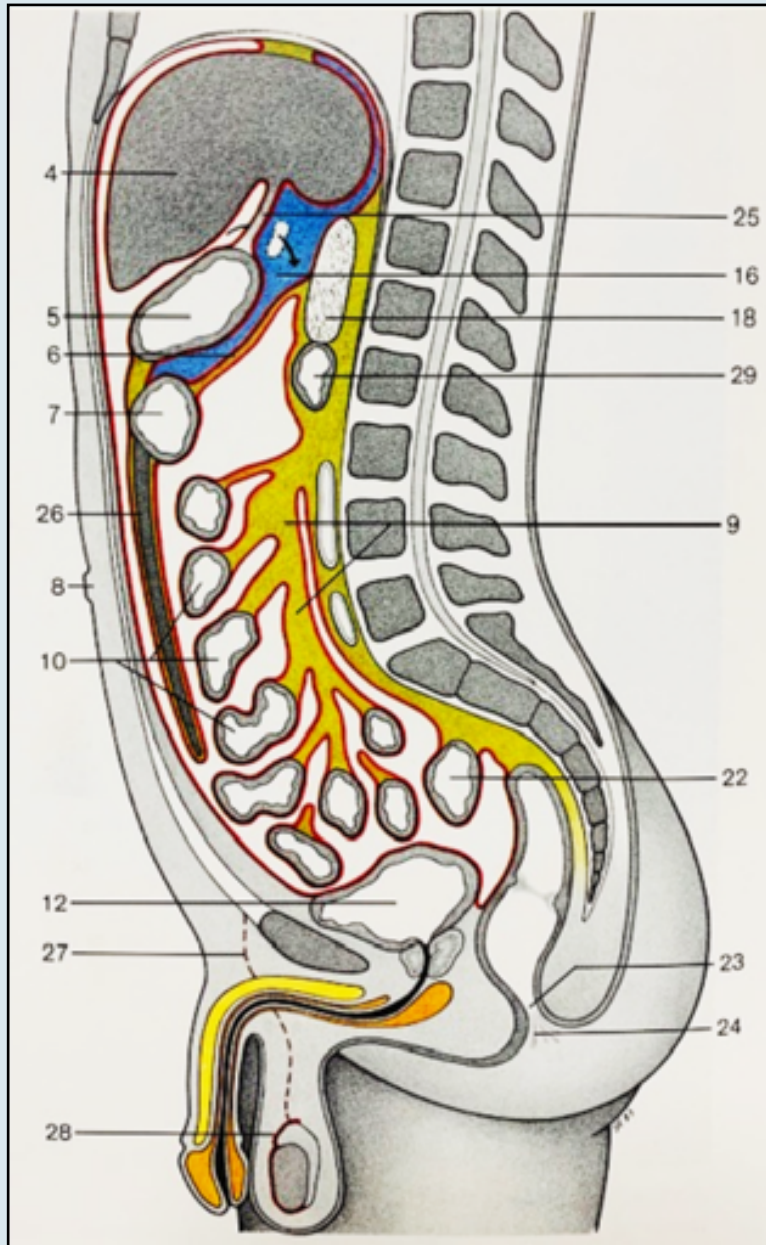
IR

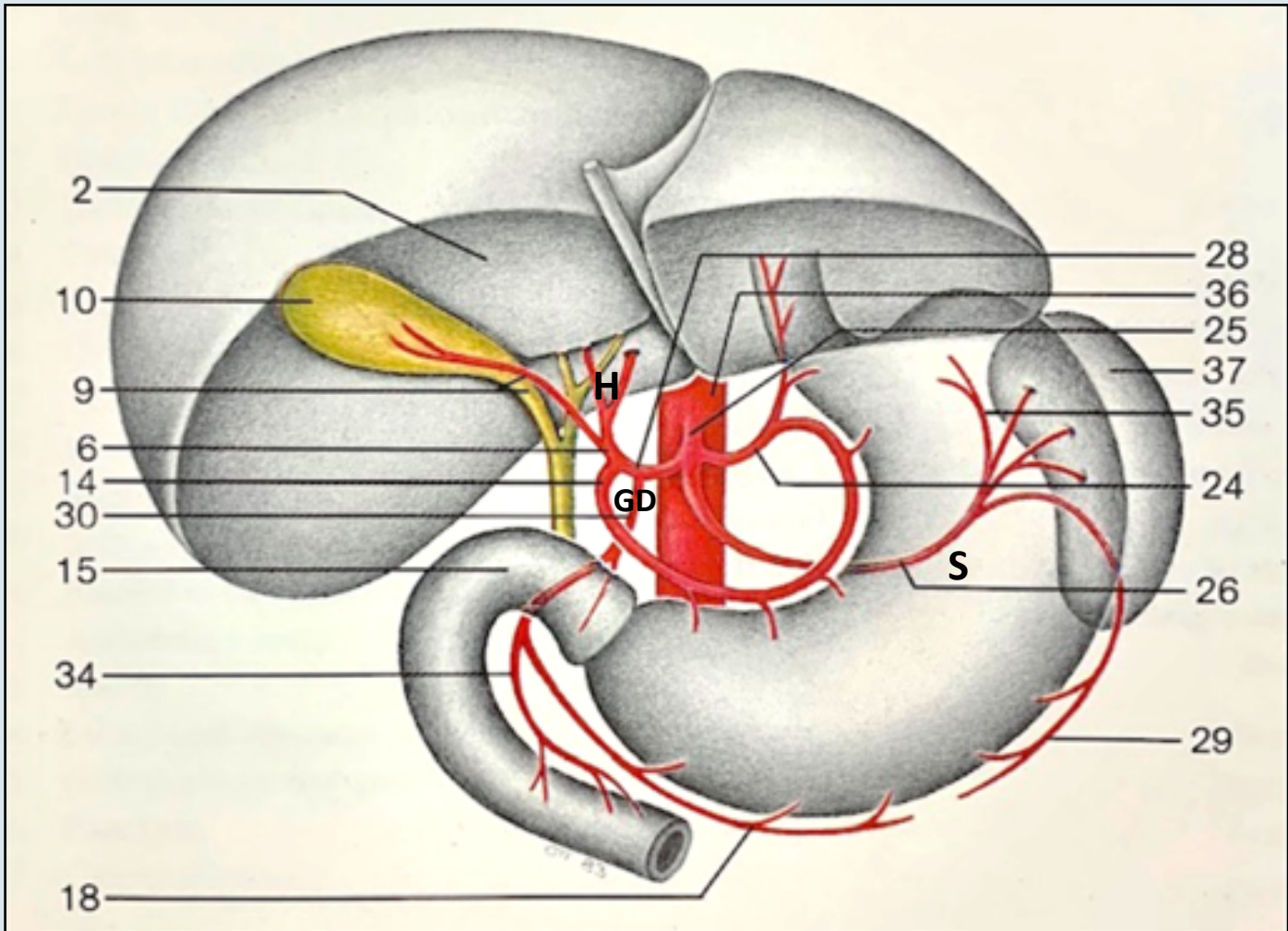


Root of the Mesentery (RPLND Exposure)



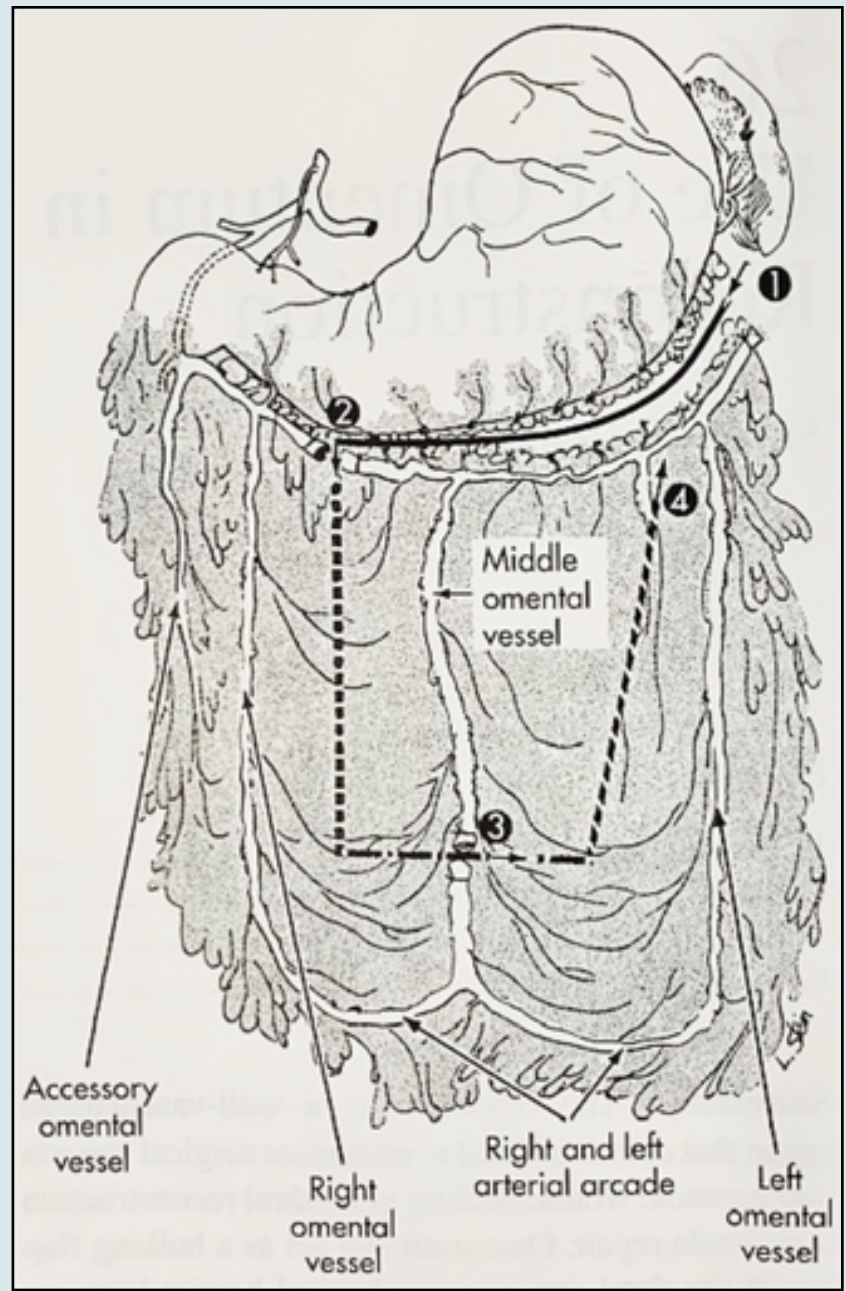
Peritoneal Sac And Subdivisions



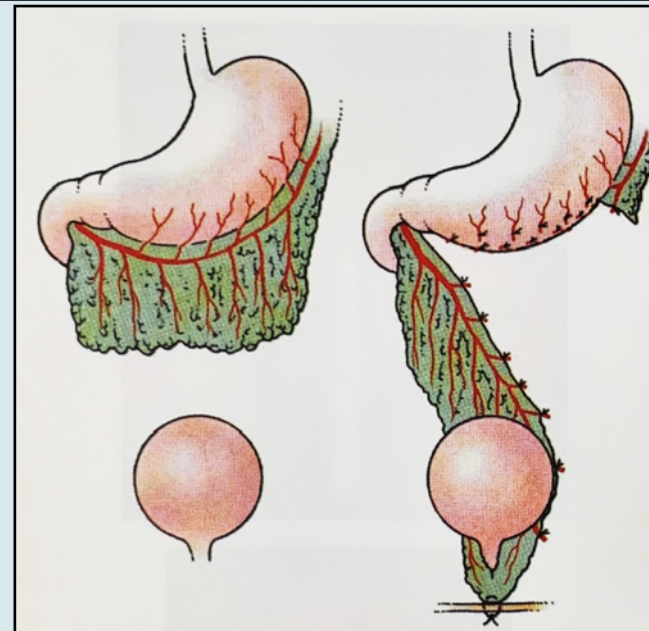
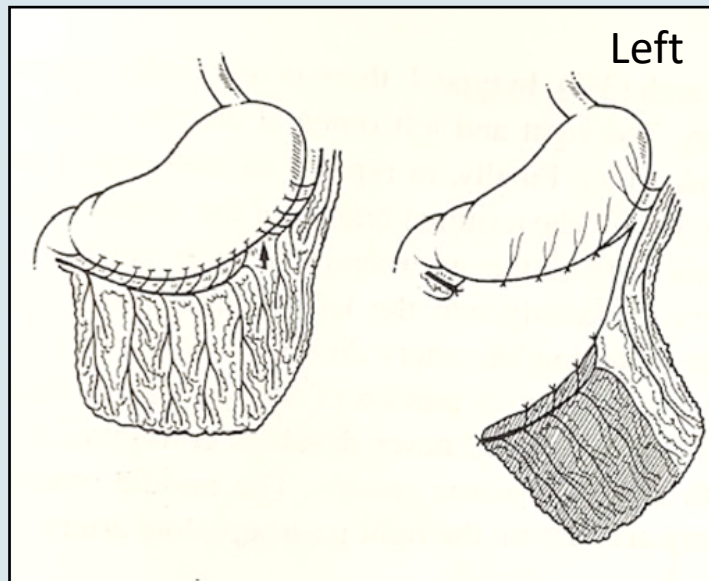
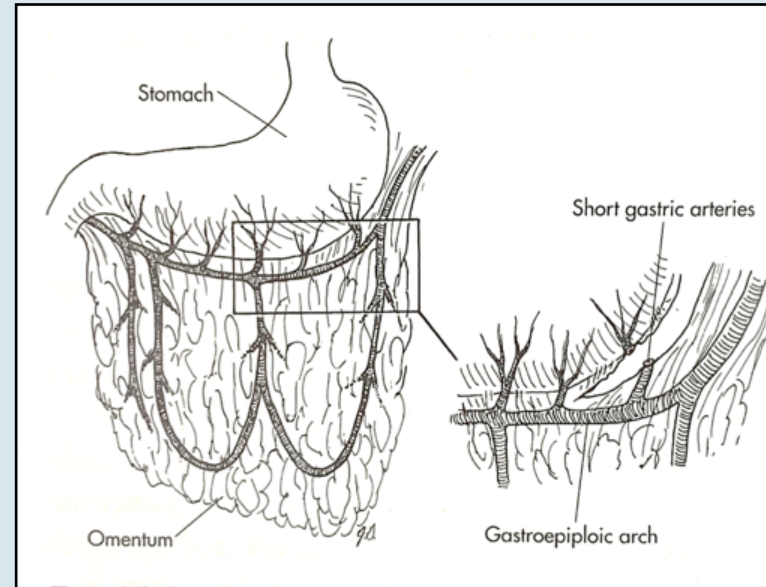
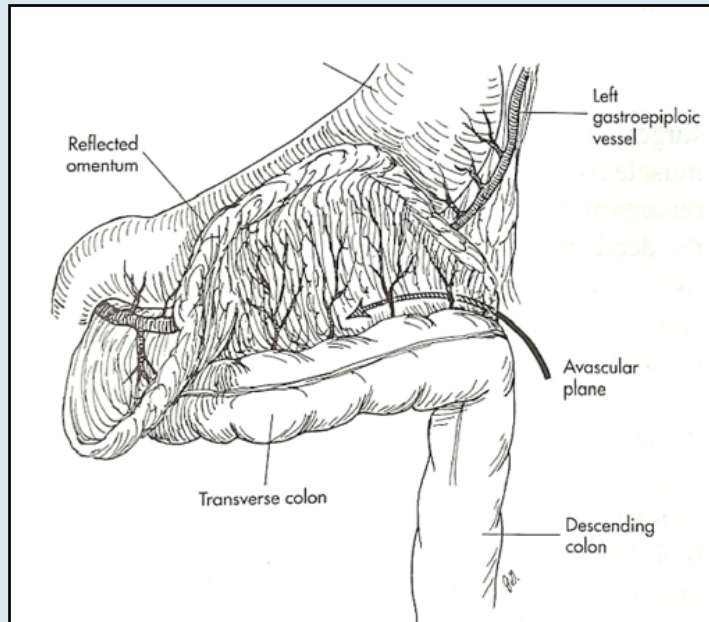


Right

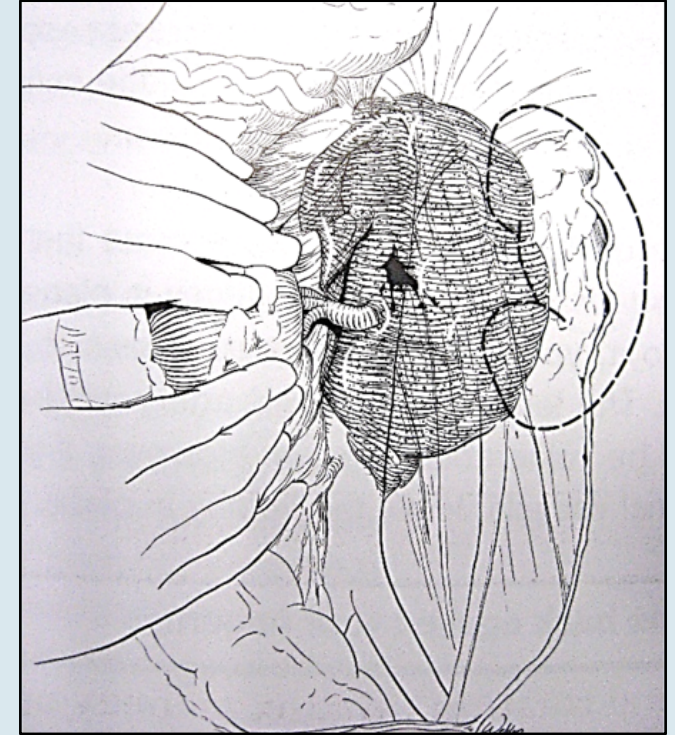
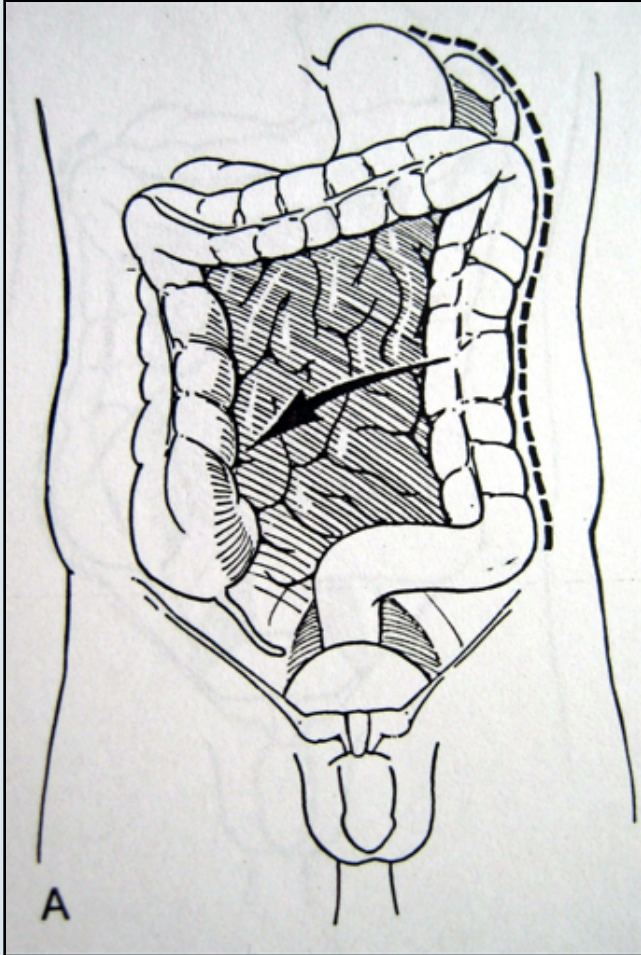
Left



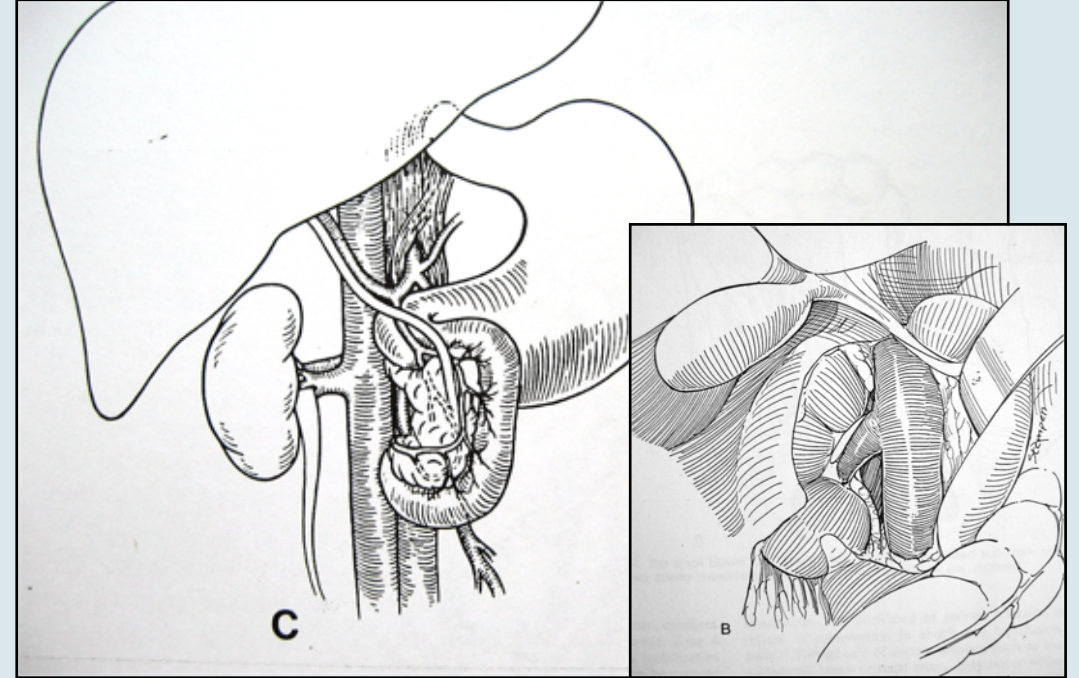
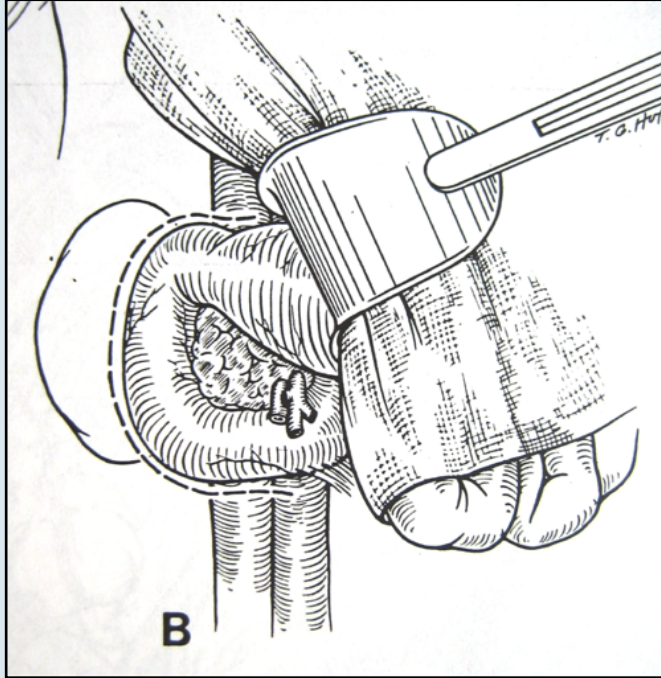
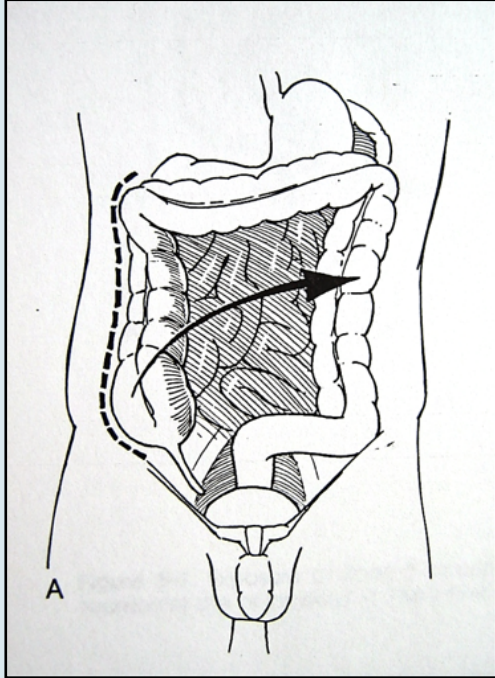
Omentum



Left Hilar Injury Exposure

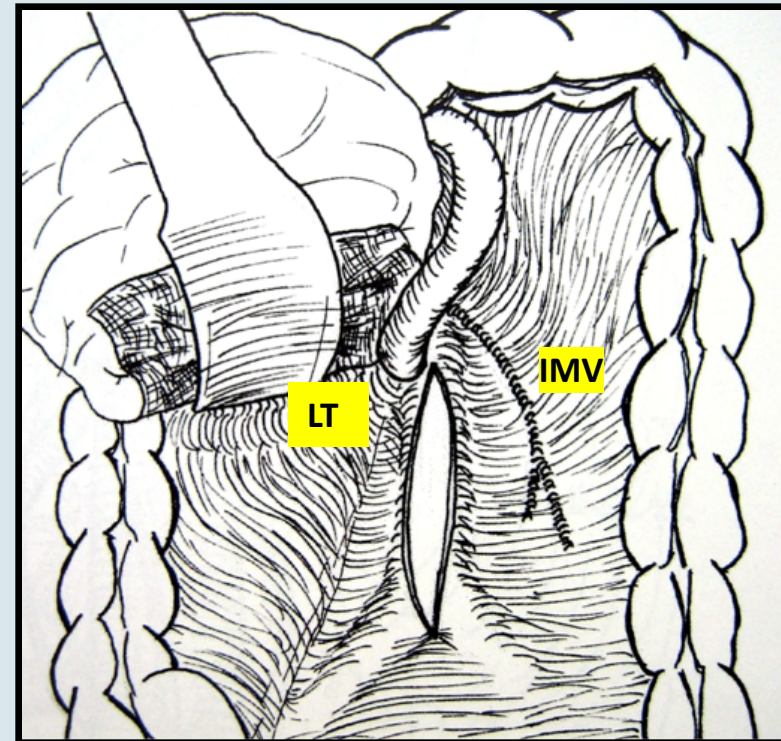


Right Hilum Exposure

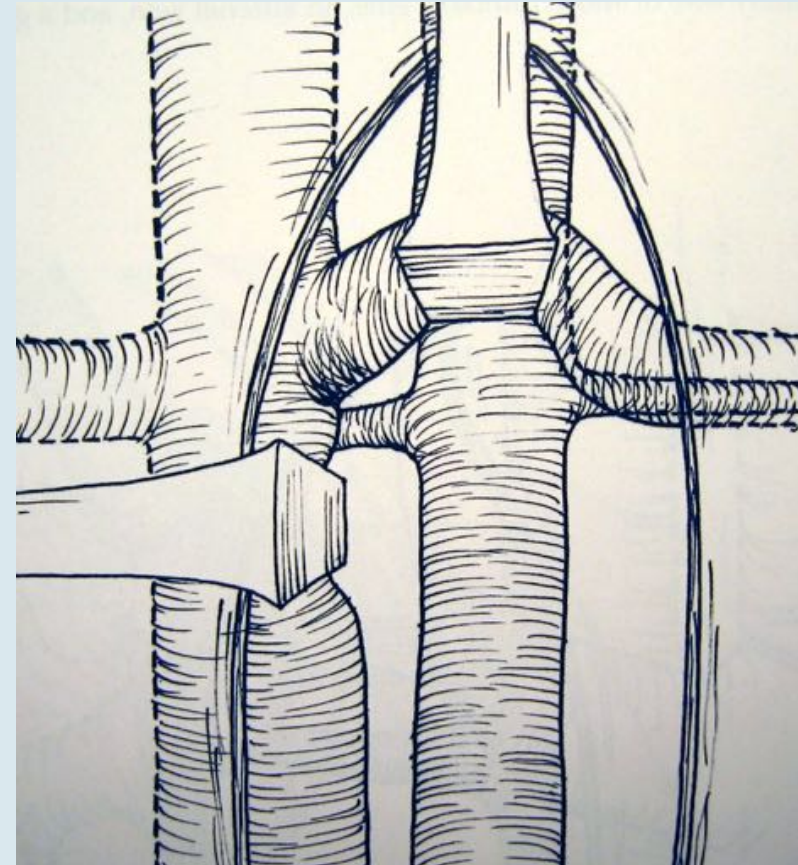
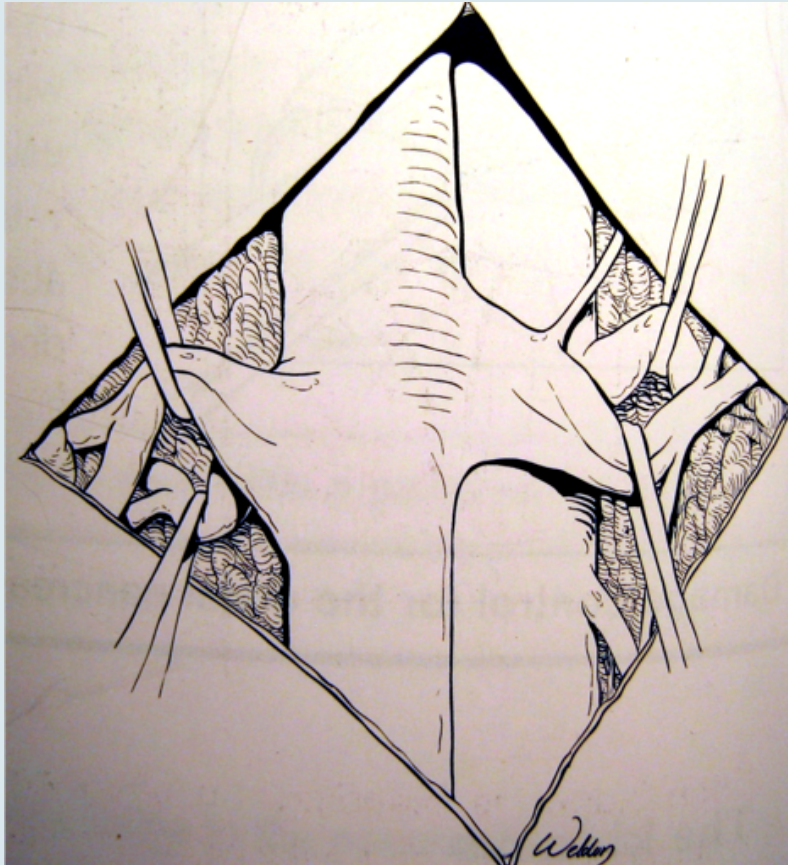


Exposure for midline looping

- IMV and Lig Trietz are constant landmarks
- Regardless of retroP. hematoma size
- Palpate for aorta.
- Location not always obvious from thick lymphatics or hematoma



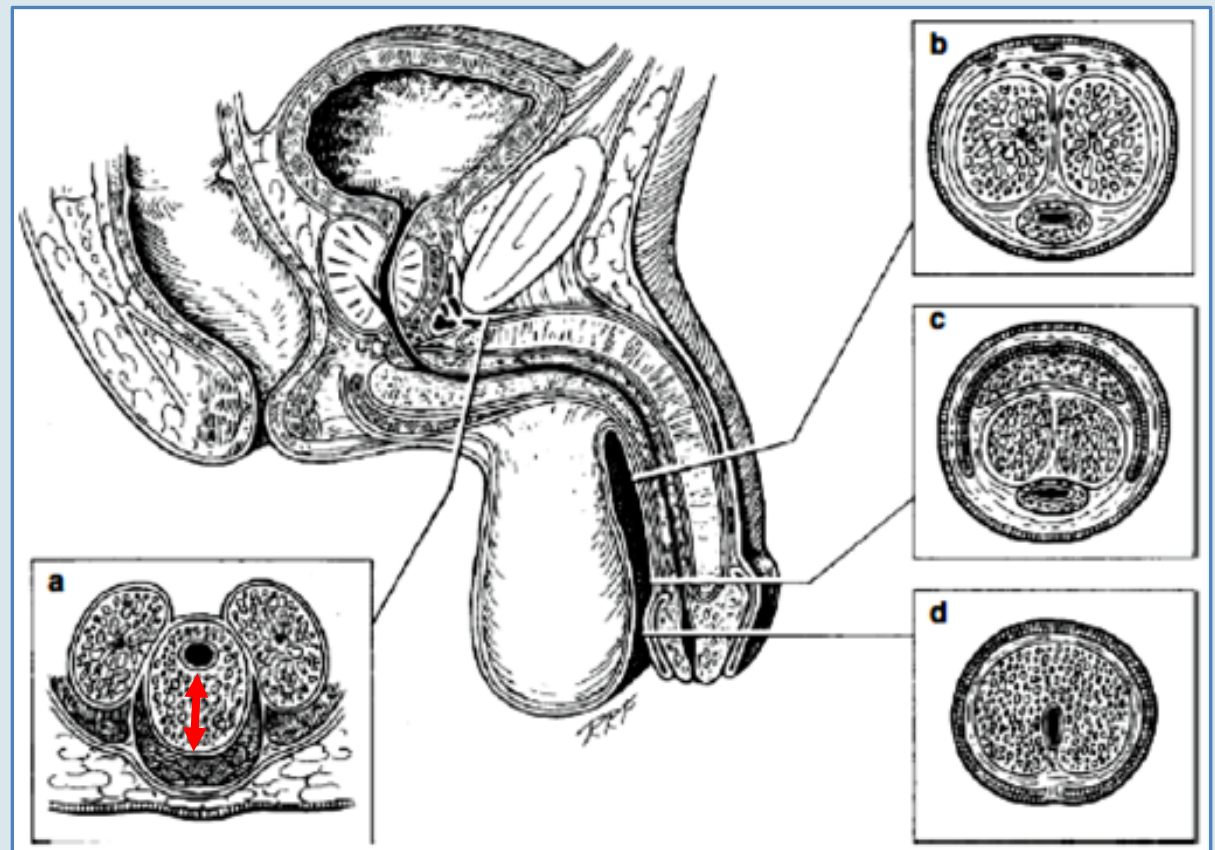
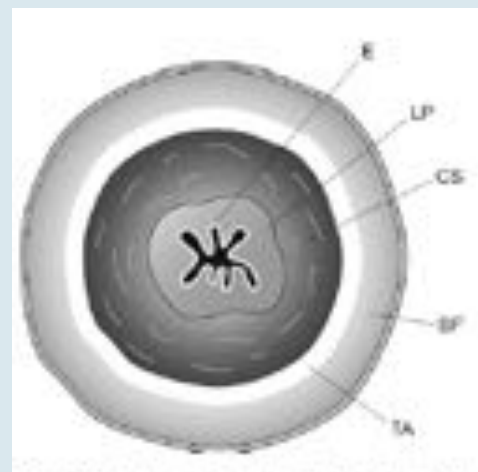
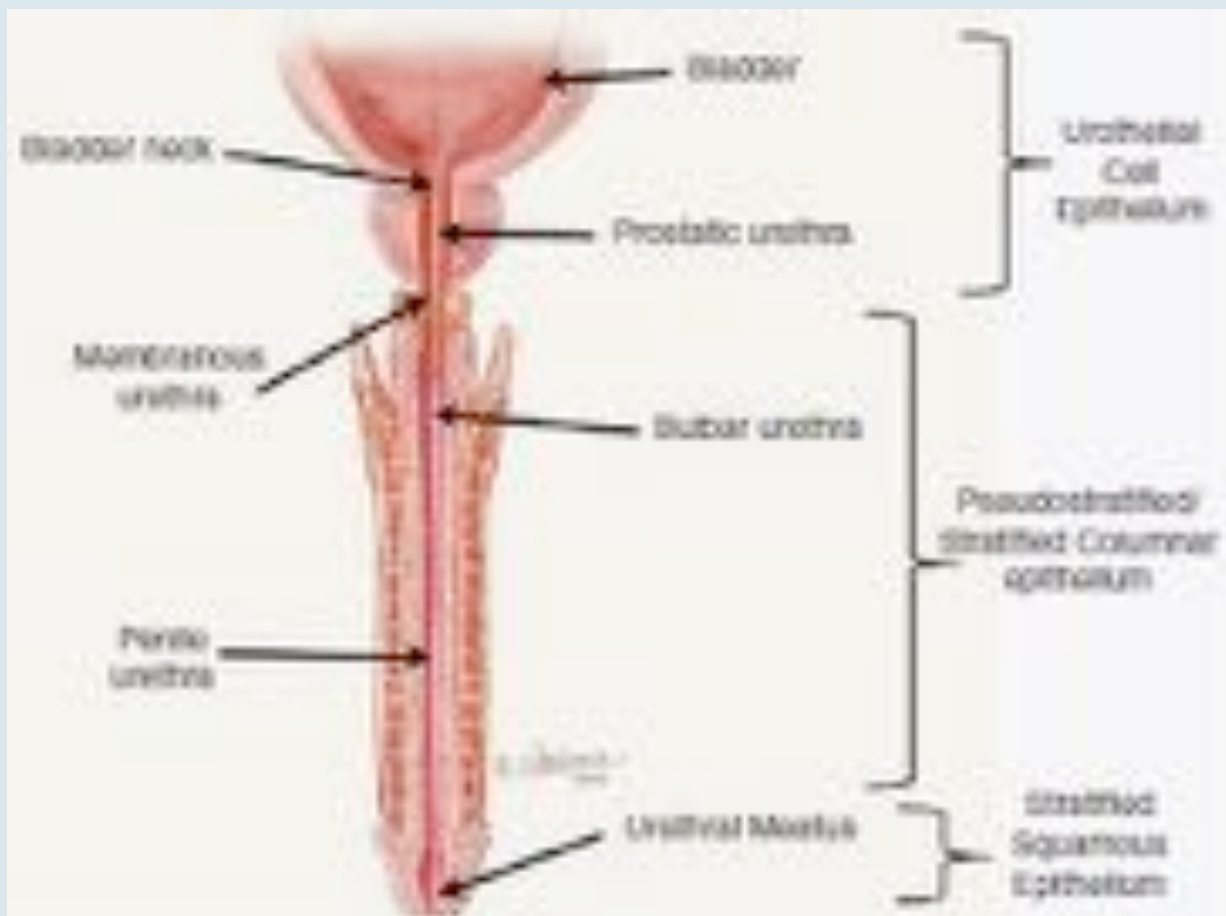
Proximal Vascular Control [Mid line looping]



R renal art exposure

Male External Genital Anatomy and Vascular Supply

Urethral Gross Anatomy



Mnemonics

Fascia that insert into the perineal body

⦿⦿ “Perineal DEC”

- Perineal membrane
- Denonvillier’s fascia
- Endopelvic fascia
- Colles’ fascia

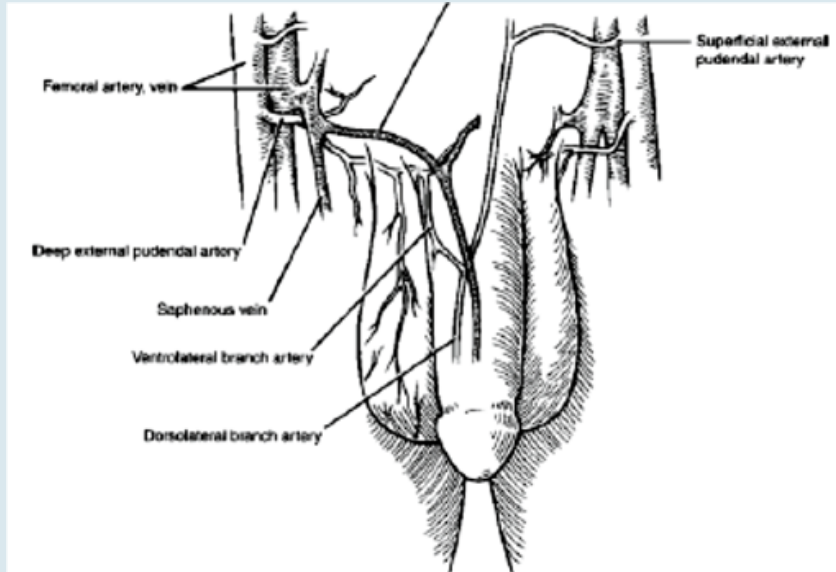
Muscles that insert into the perineal body

⦿⦿ “TREBLE”

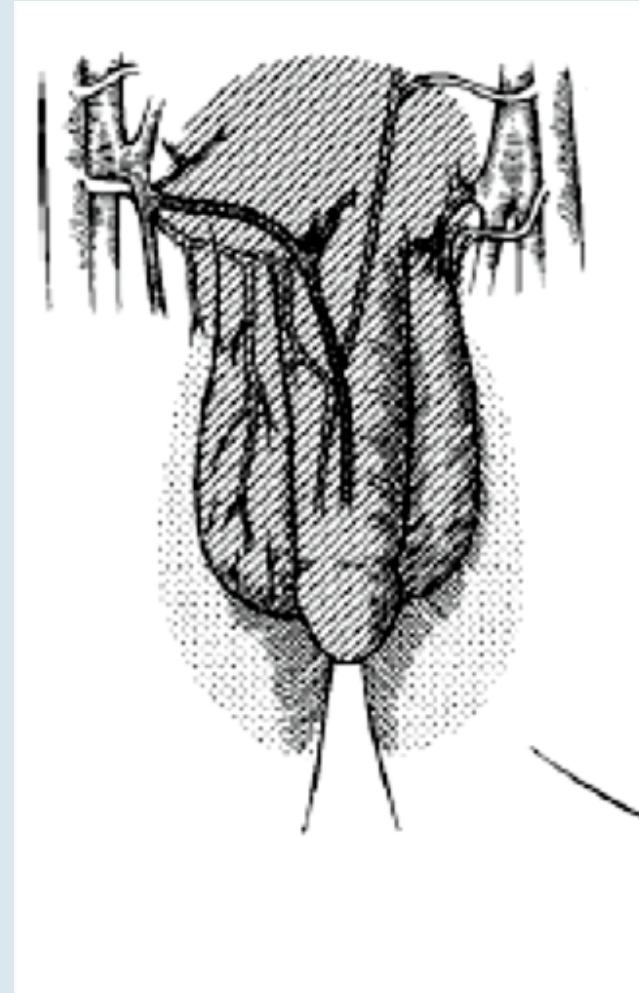
- Transverse perineii (superficial & deep)
- Rectourethralis
- EUS
- Bulbospongiosus
- Levator ani
- External anal sphincter

Male Genital Vascular Anatomy

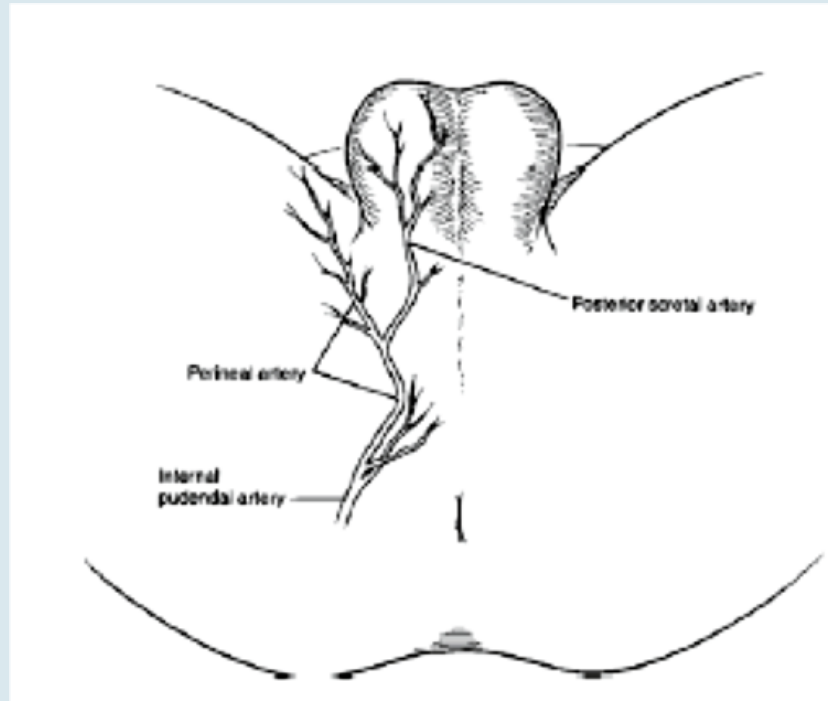
Penile and Anterior Scrotal Skin



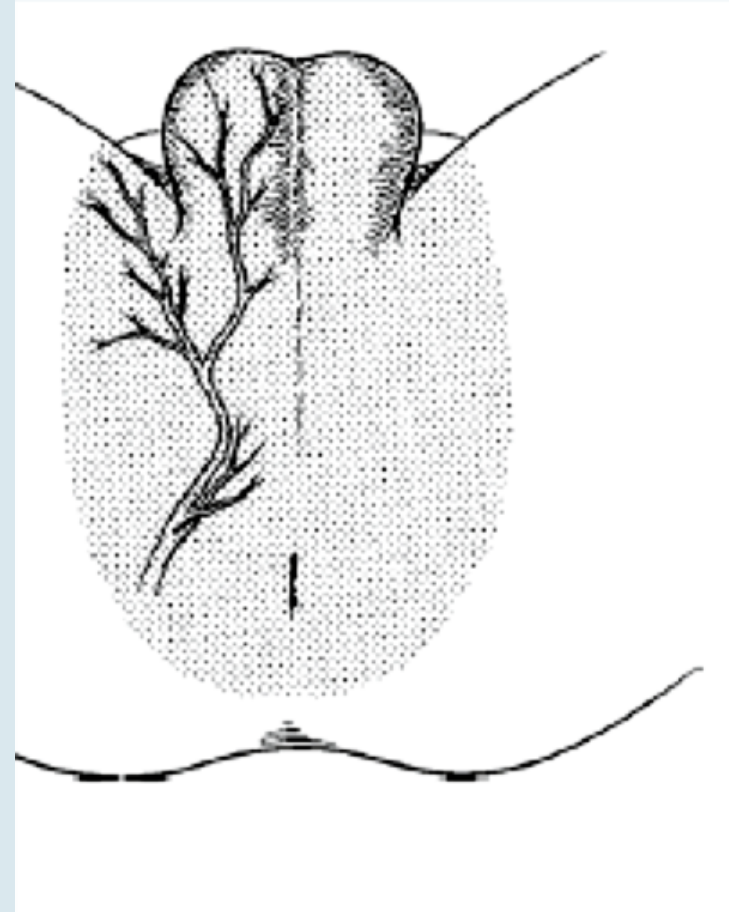
- Dorsolateral and Ventrolateral Art.
- Branch of superficial external pudendal artery
- Branch of femoral artery



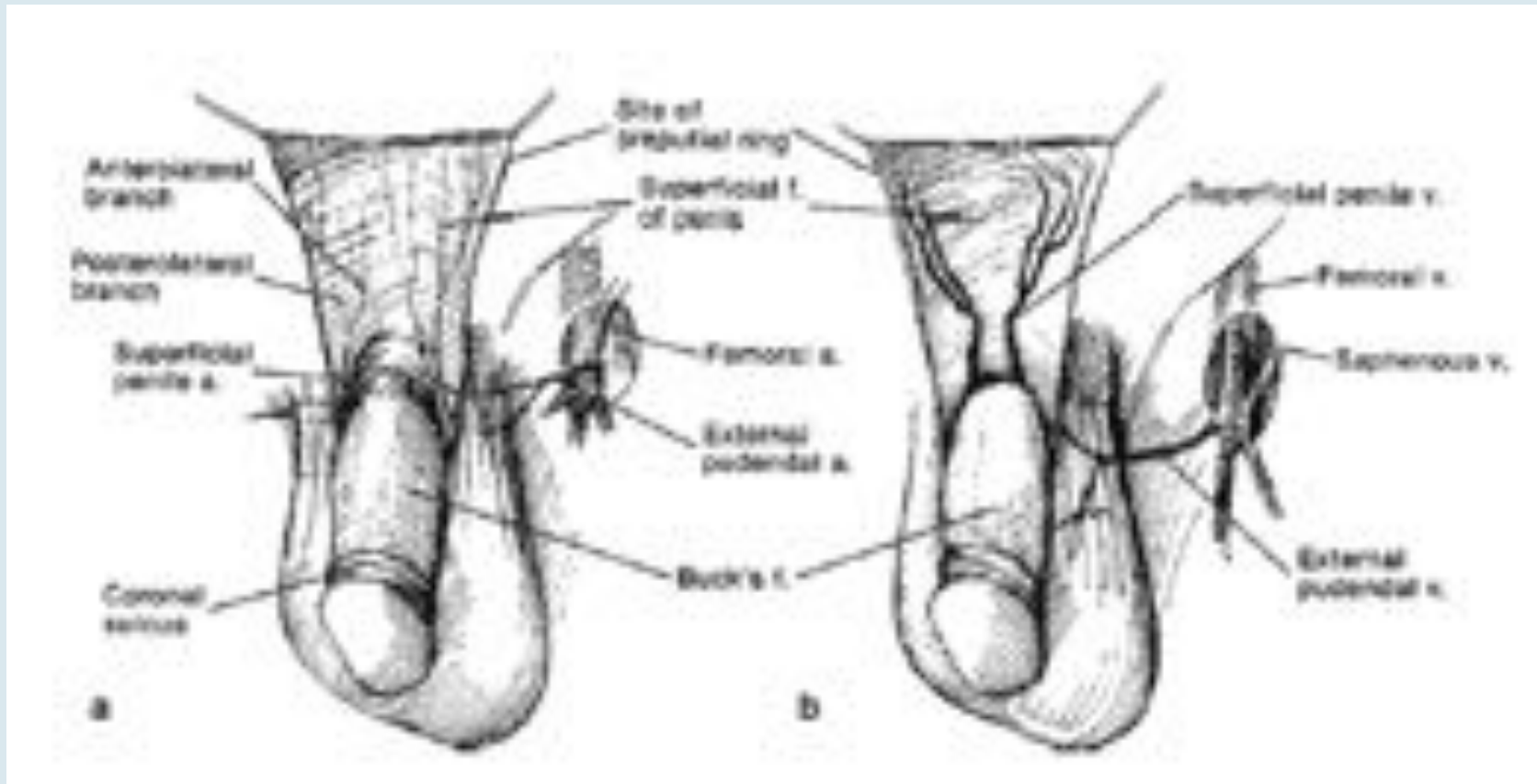
Perineum and Posterior Scrotum



- Posterior scrotal arterial blood supply
- Branch of perineal artery
- Branch of internal pudendal artery



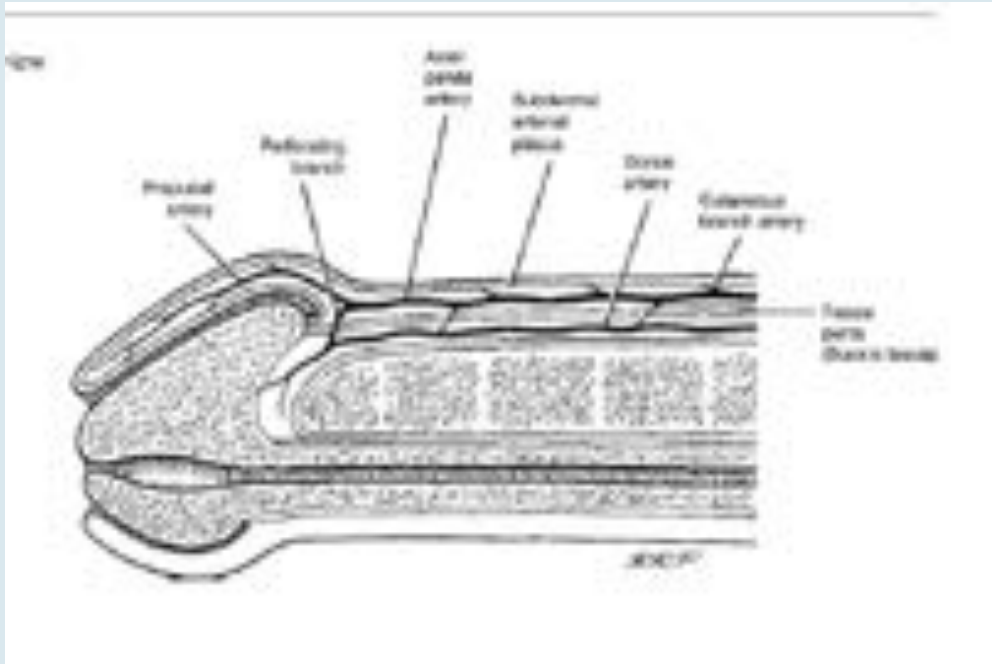
Preputial blood supply



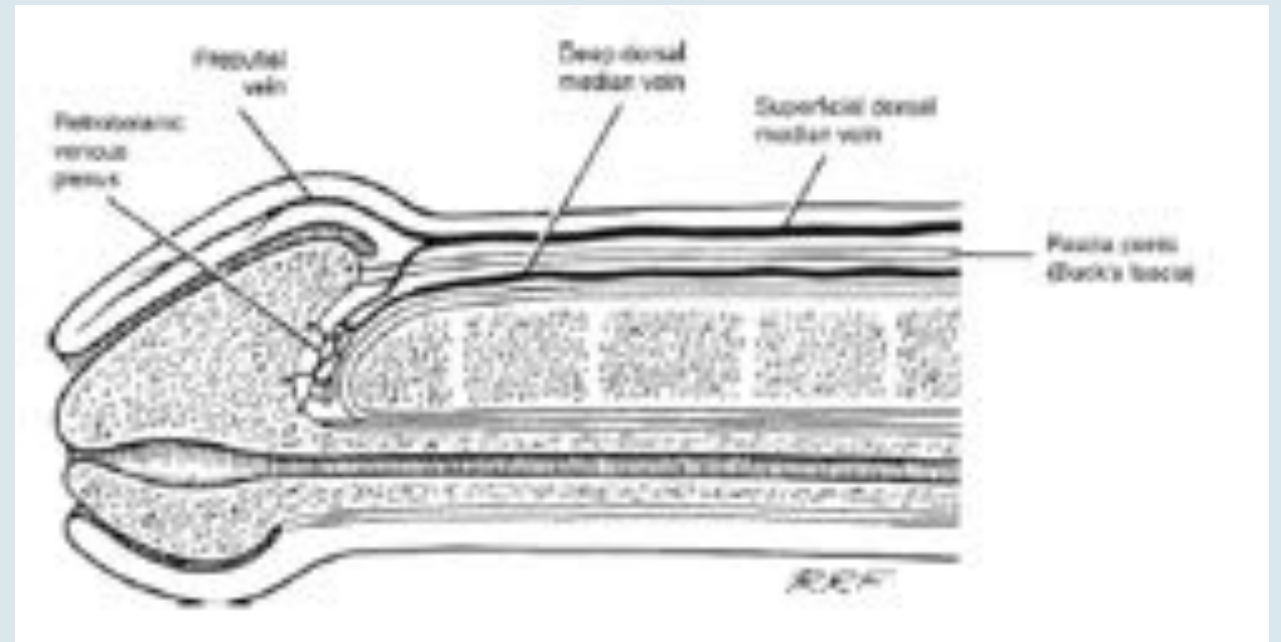
Arterial

Venous

Penile Skin

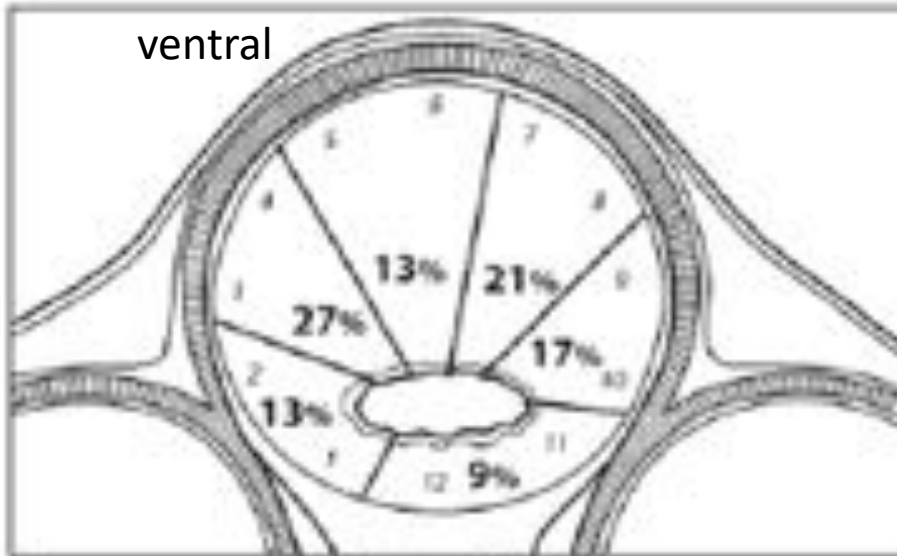


Penile skin arteries

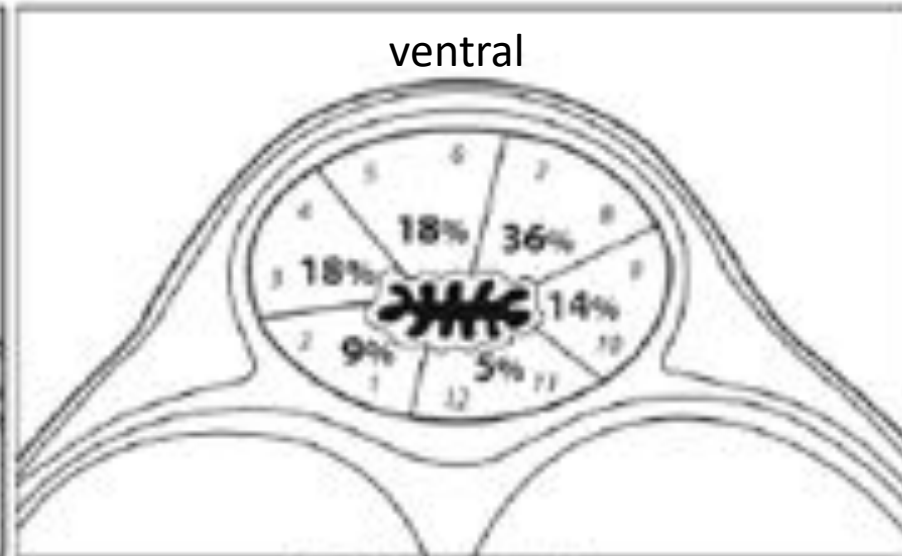


Penile skin vein

Urethral Artery Location

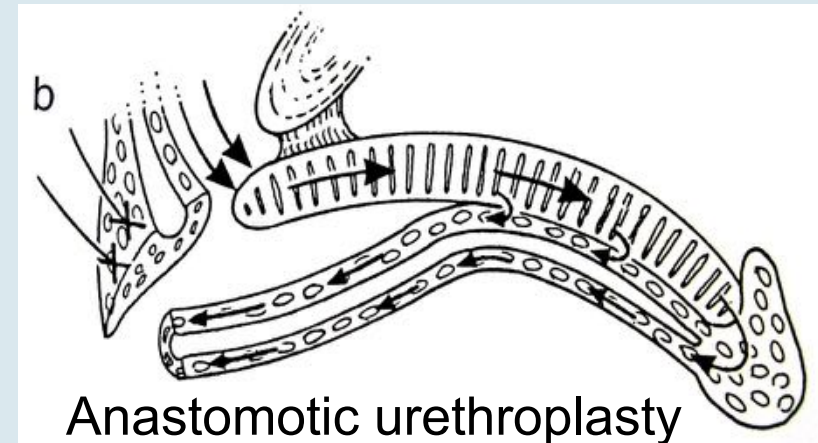
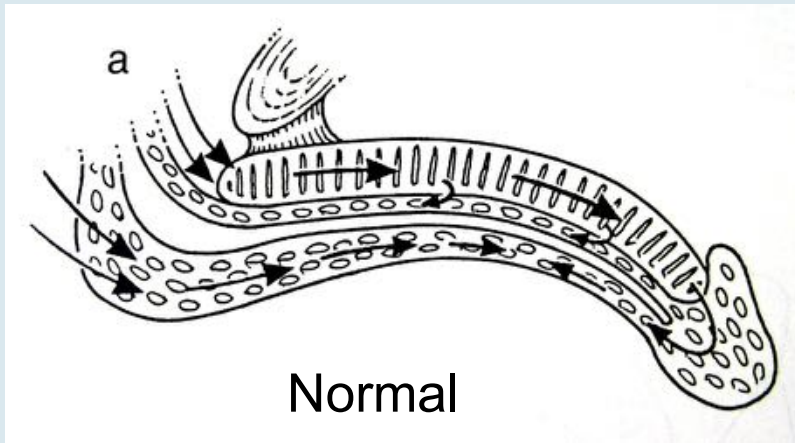
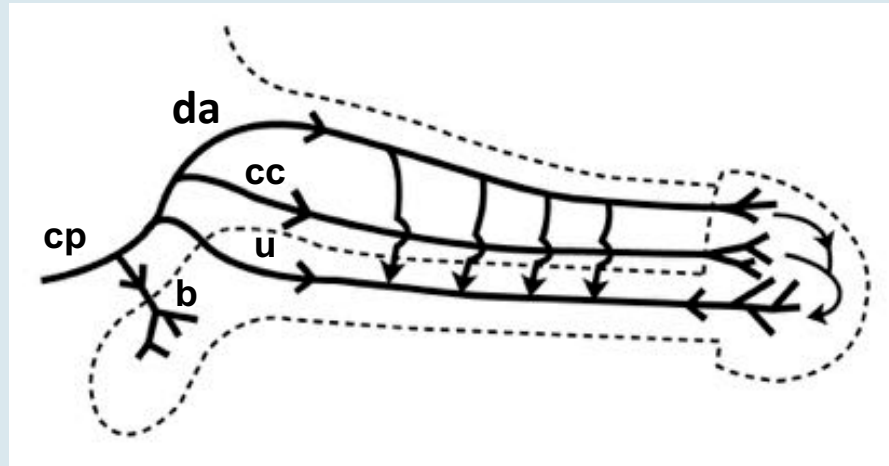


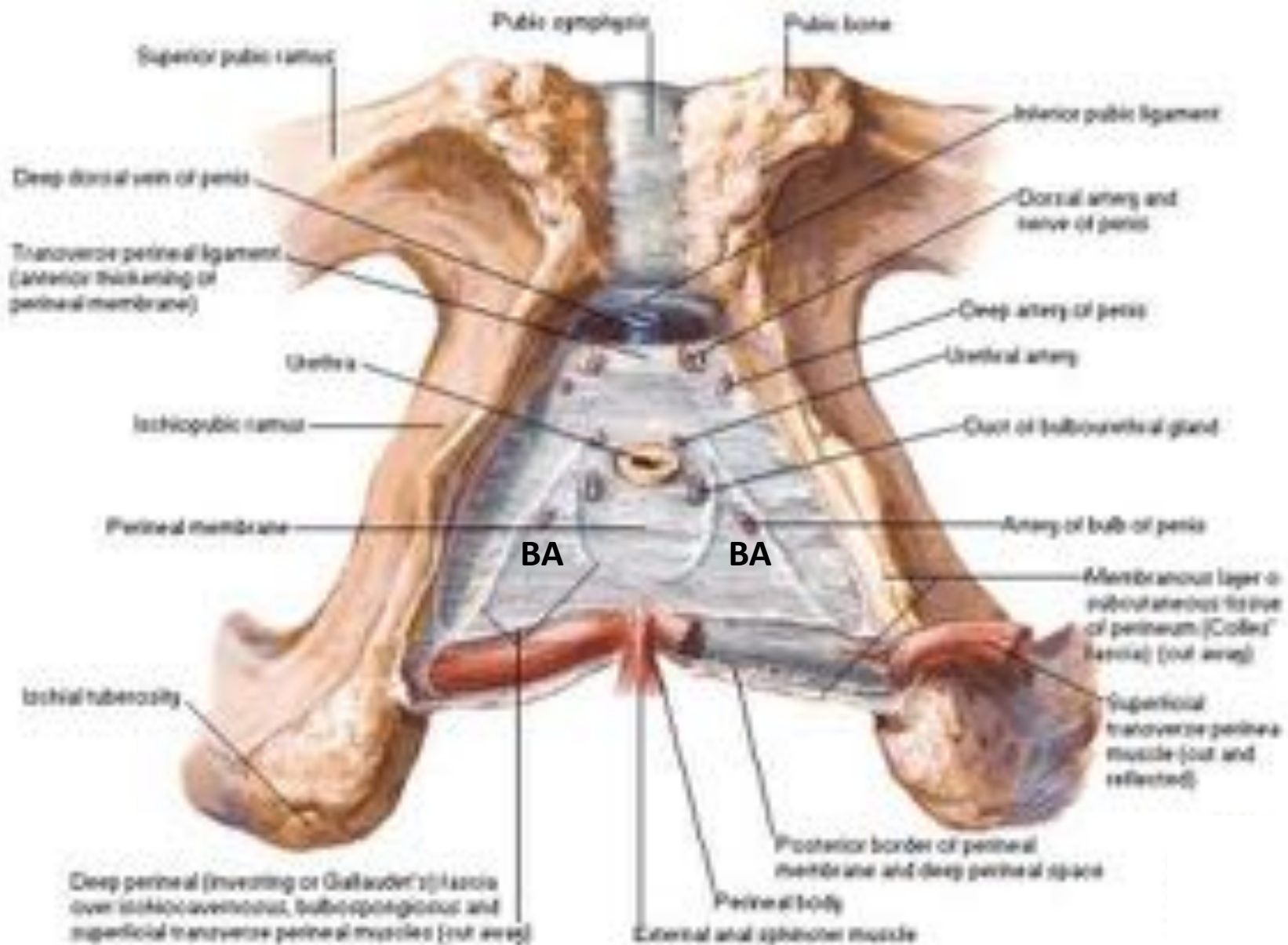
Bulbar urethra



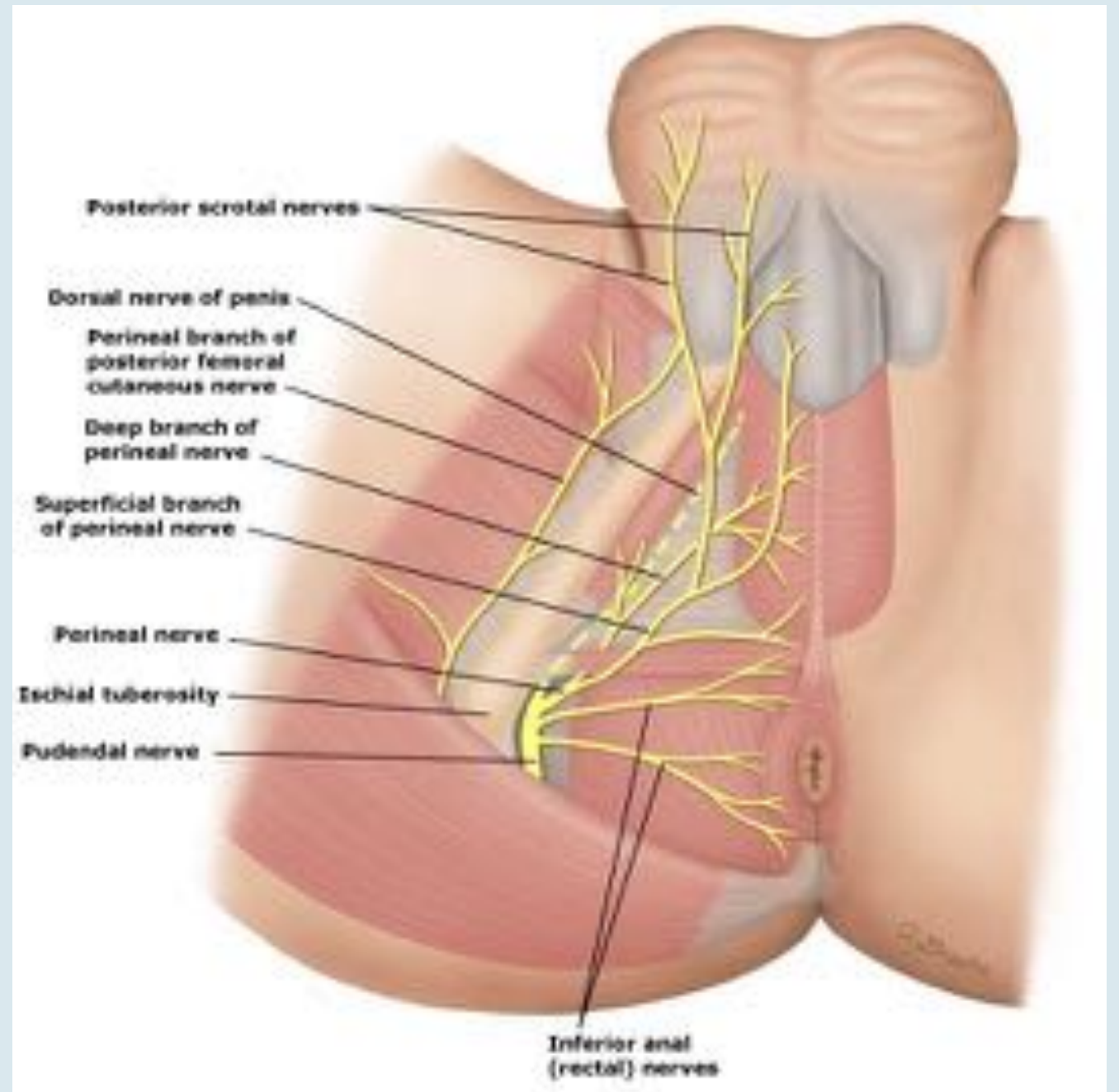
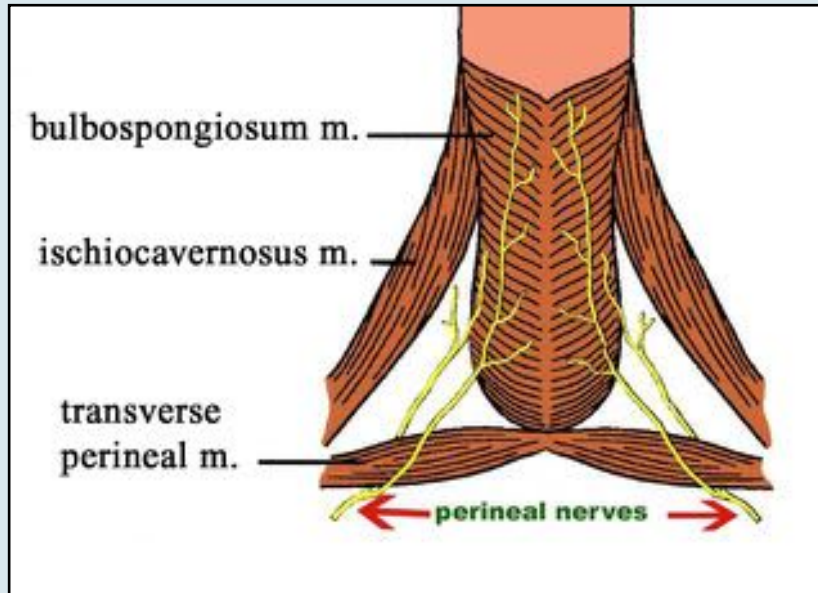
Pendulous urethra

Bipedal Blood Supply



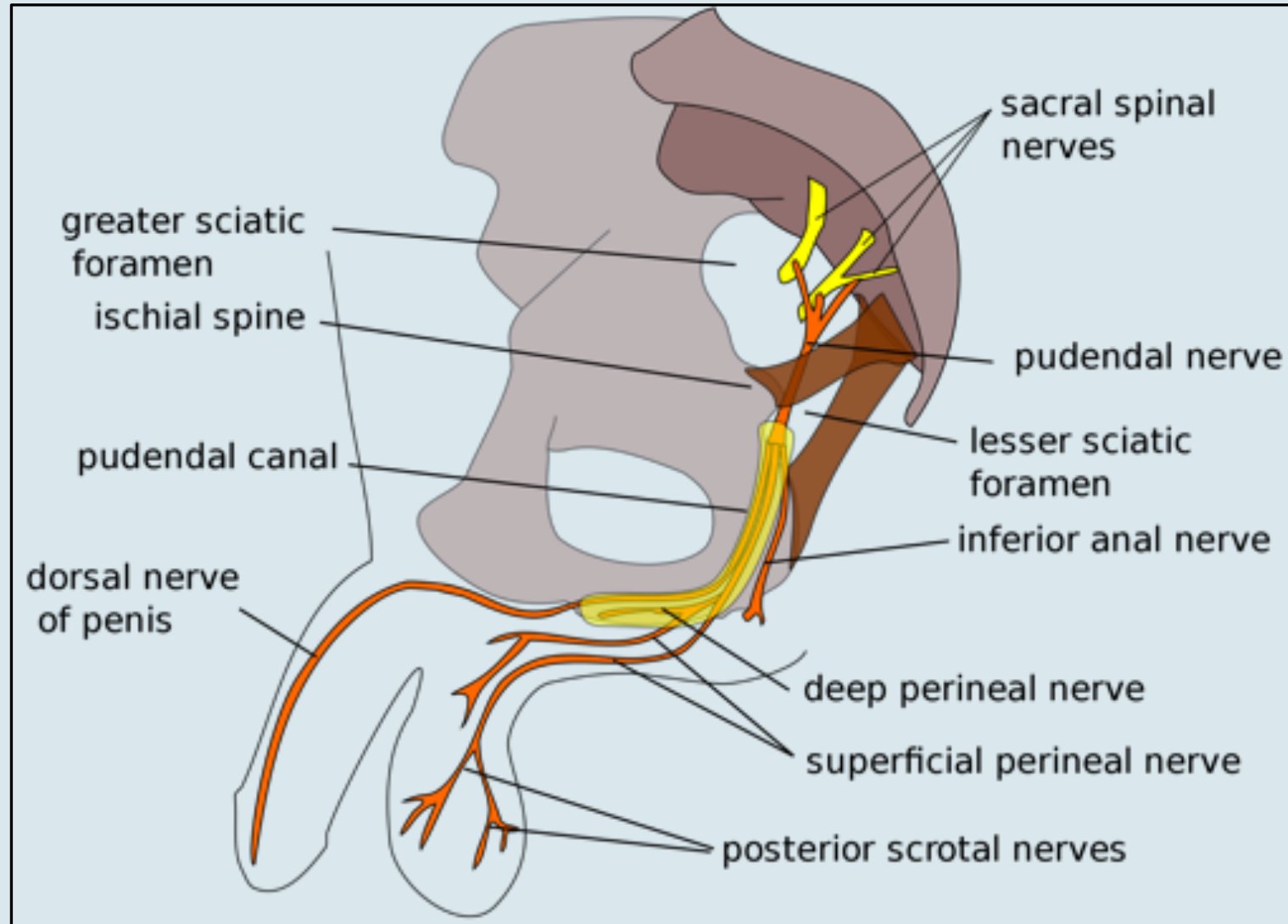


Nerve Anatomy



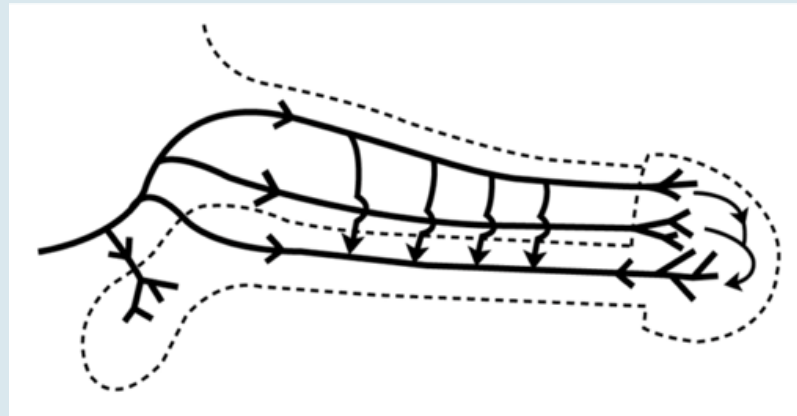
Yucel and Baskin, BJU 2003; 92:624-630

Nerve Anatomy

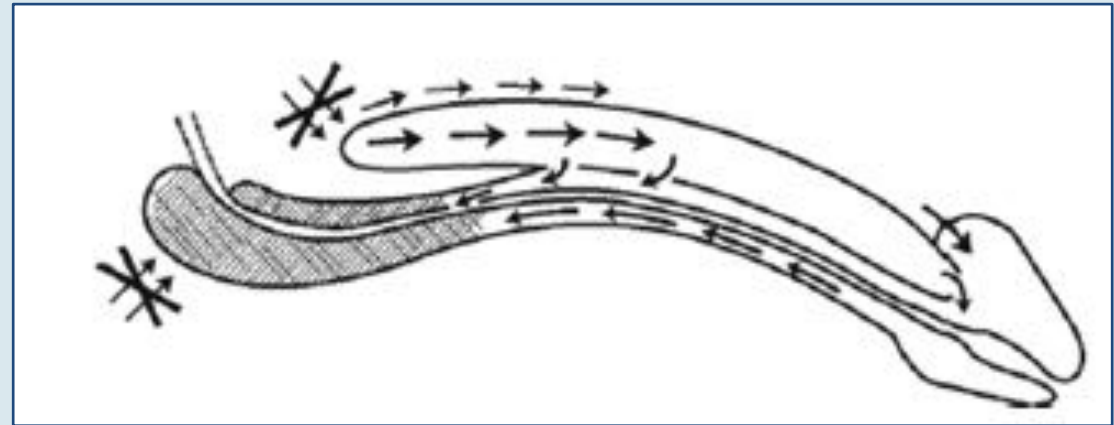
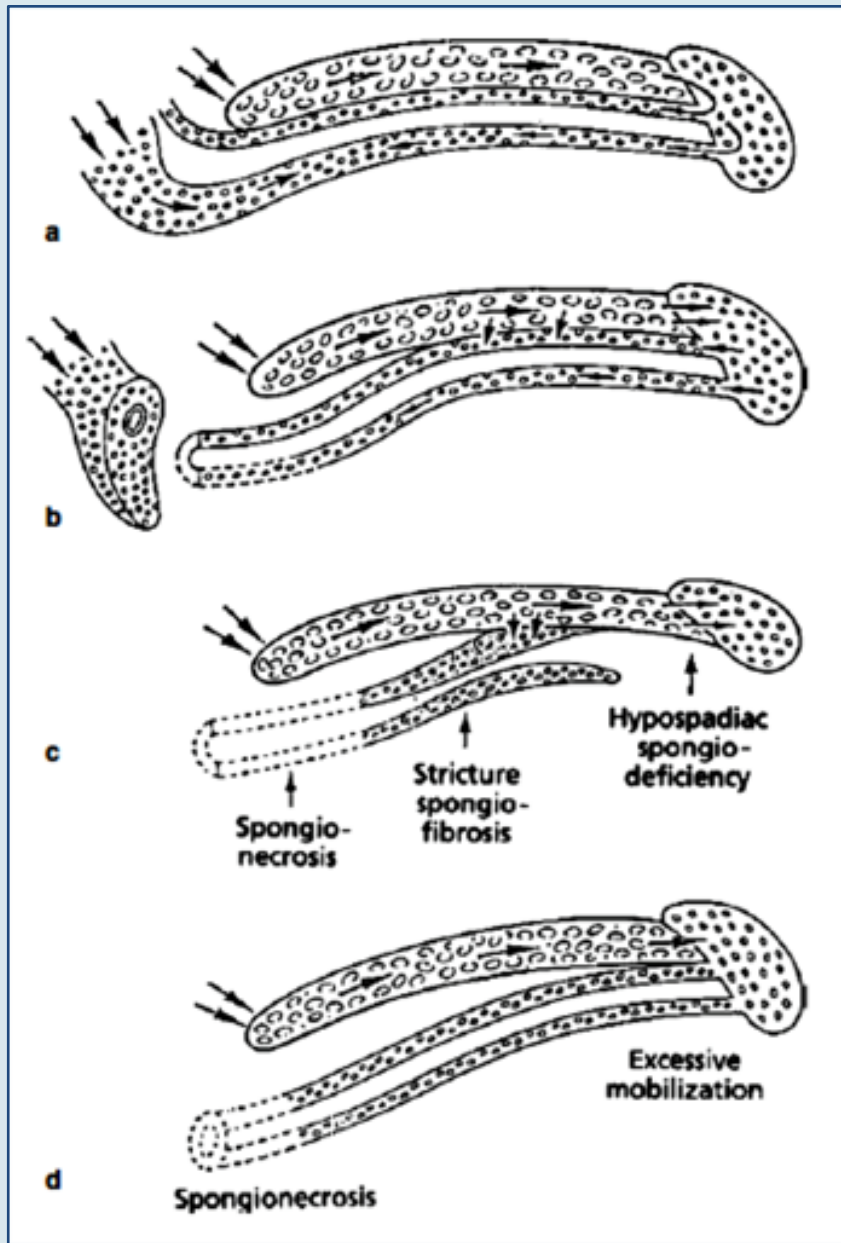


Anastomotic Urethroplasty

- EPA = “urethral flap surgery” that relies on bipedal corpus spongiosal circulation
- Detached from its proximal vascular supply: urethra is dependent on retrograde blood flow

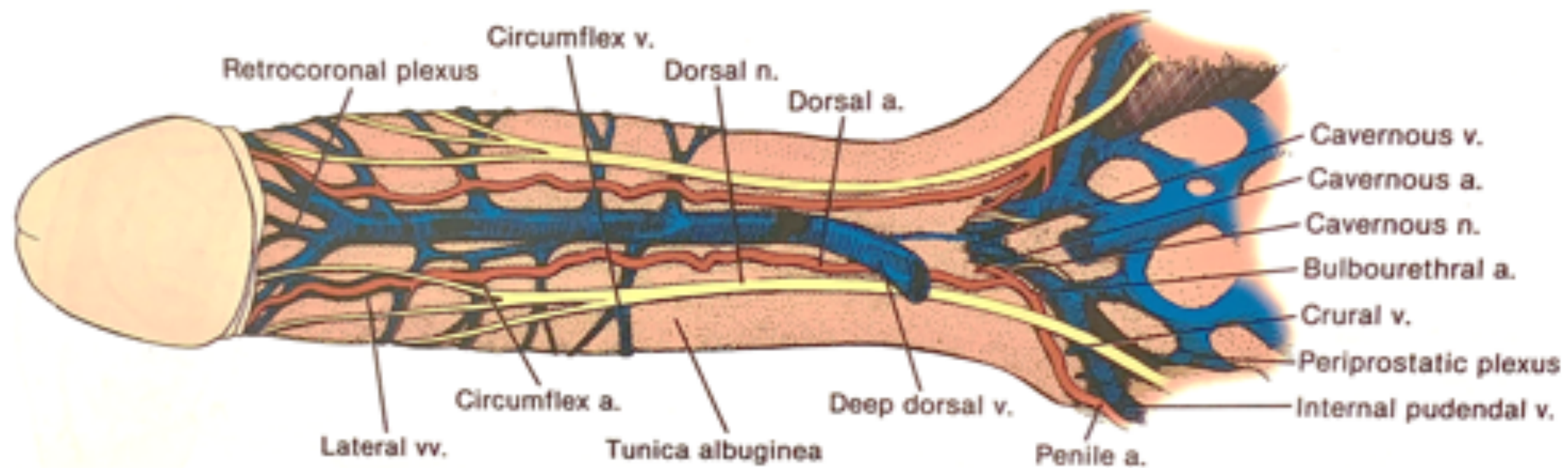


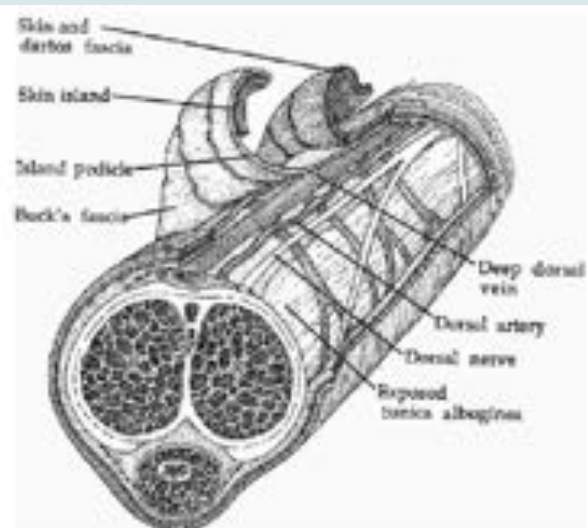
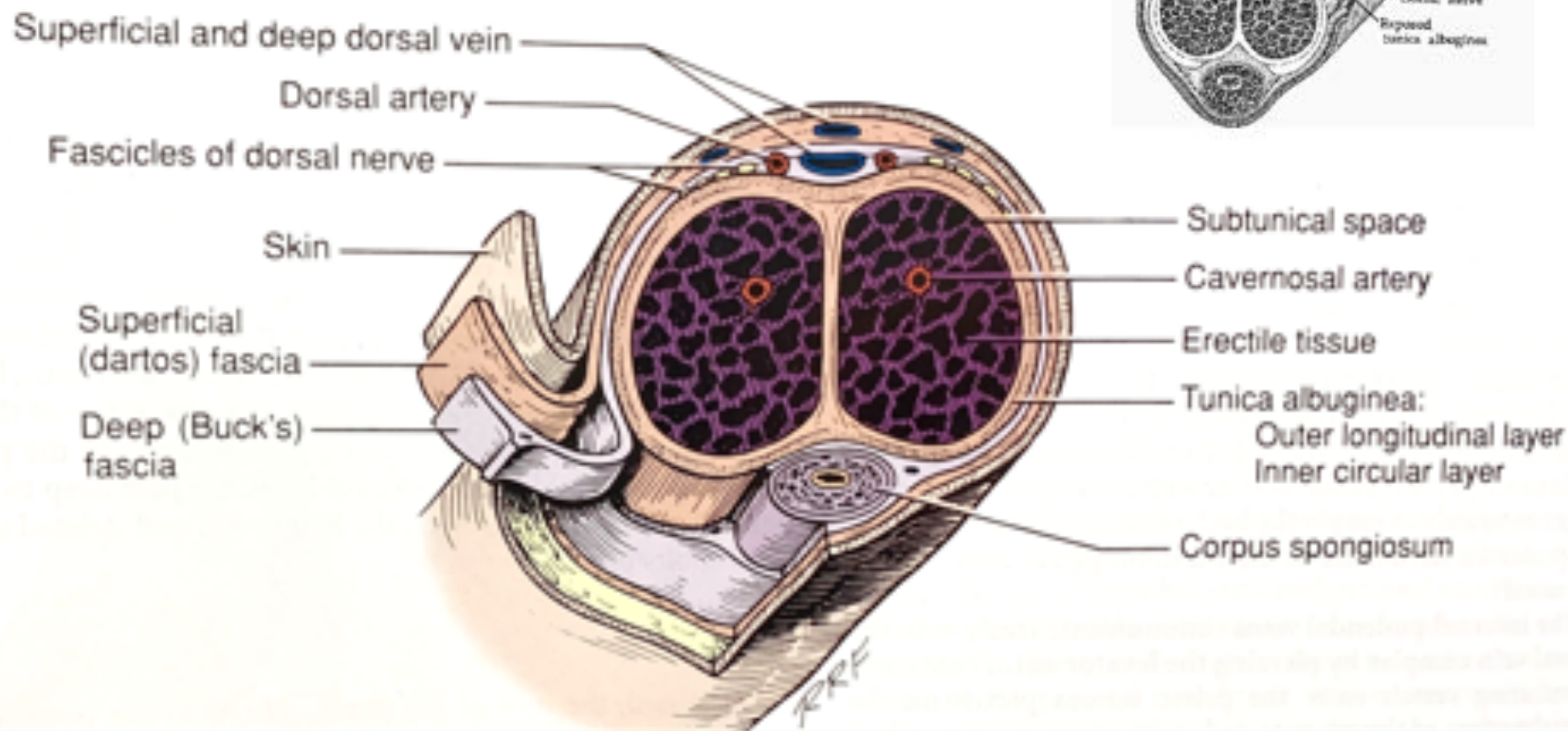
Relative Contraindications



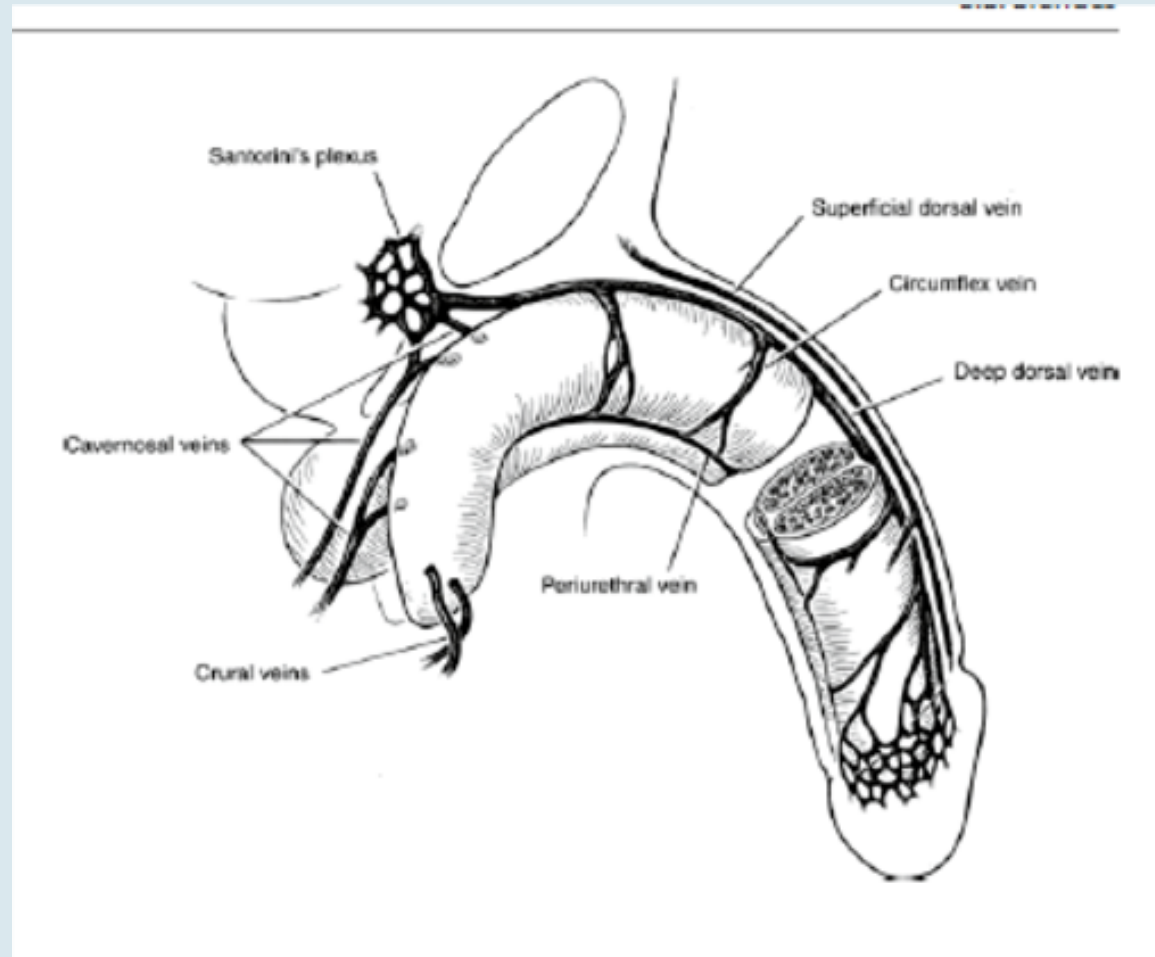
PFUI and Severe ED

Hypospadias



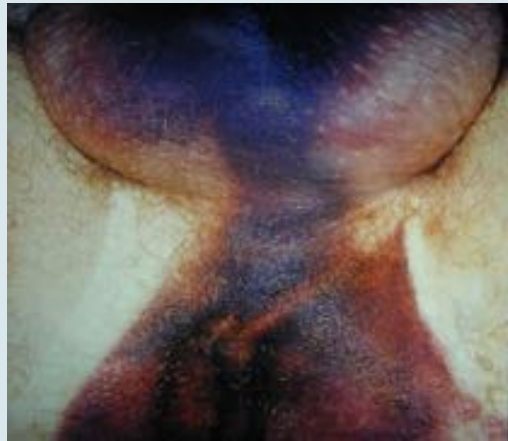


Venous drainage of the penis/urethra



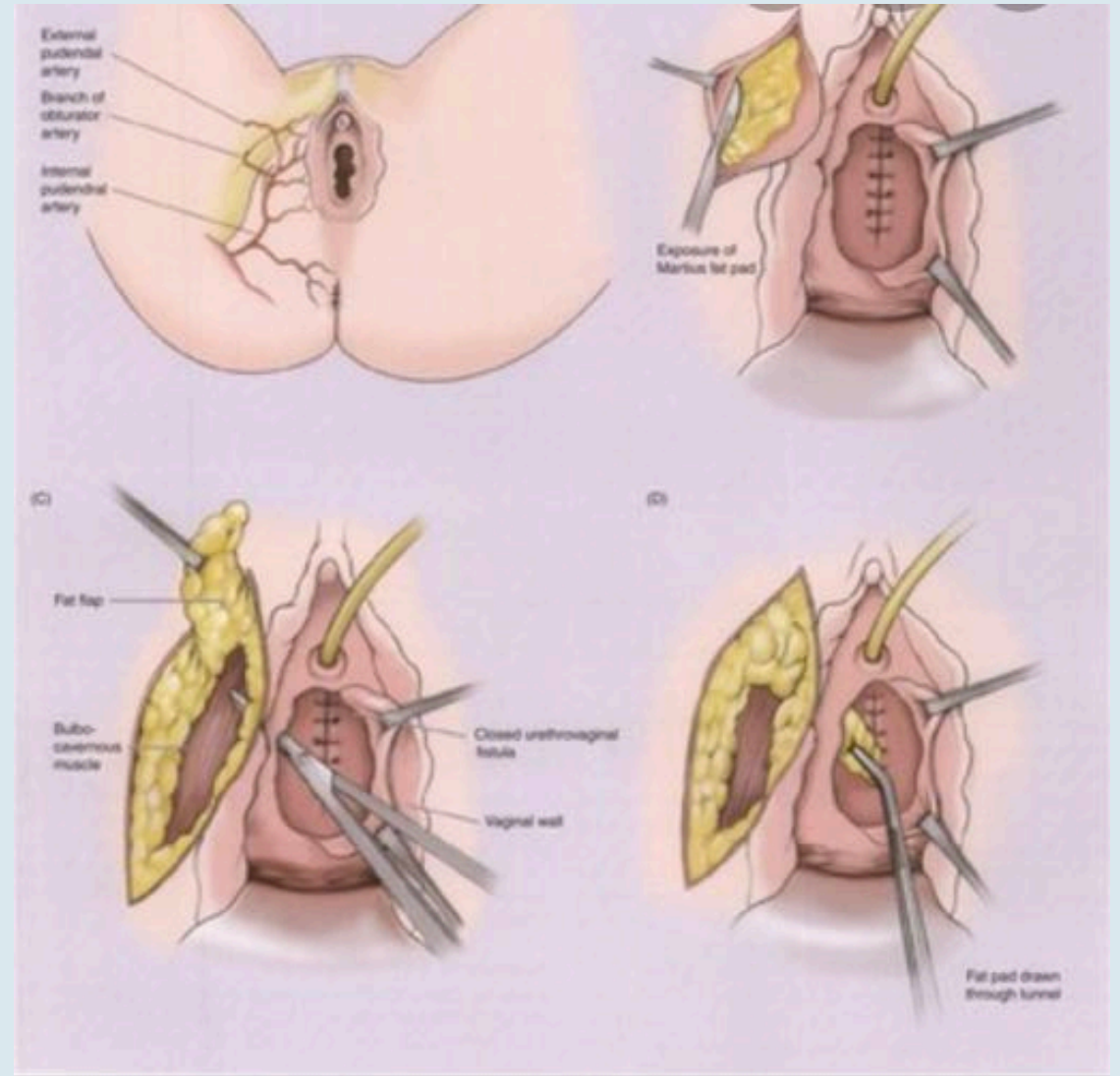
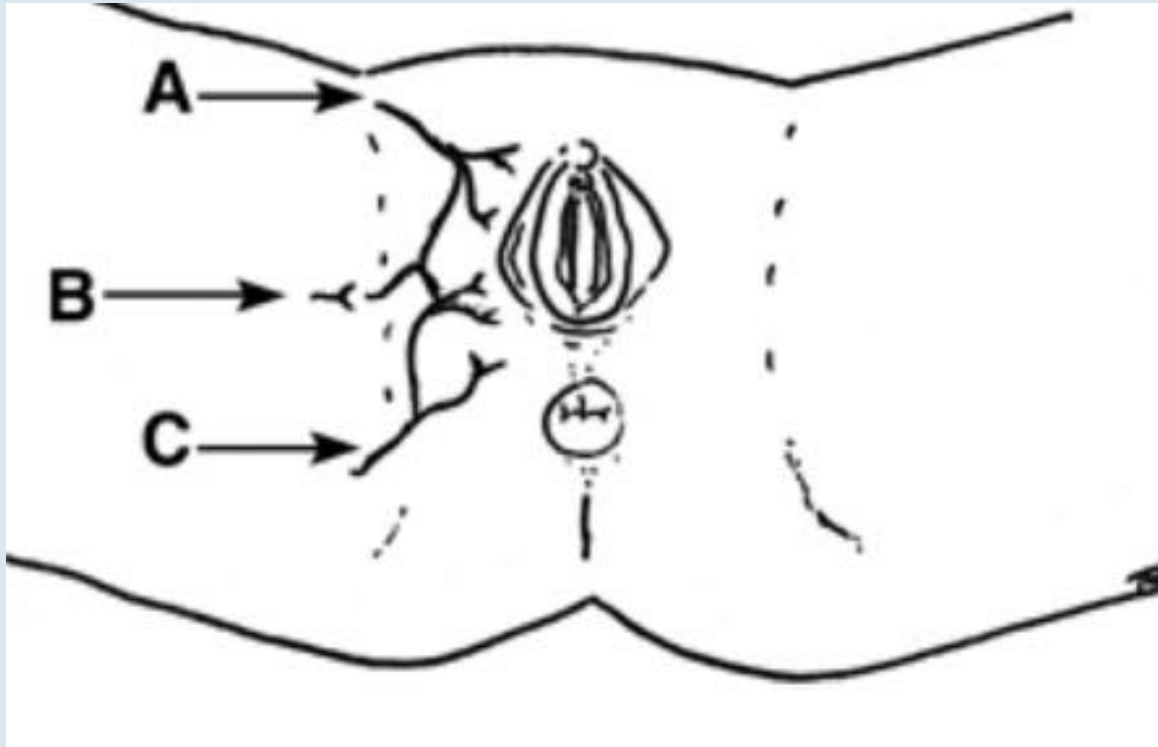


Contained by Buck's fascia

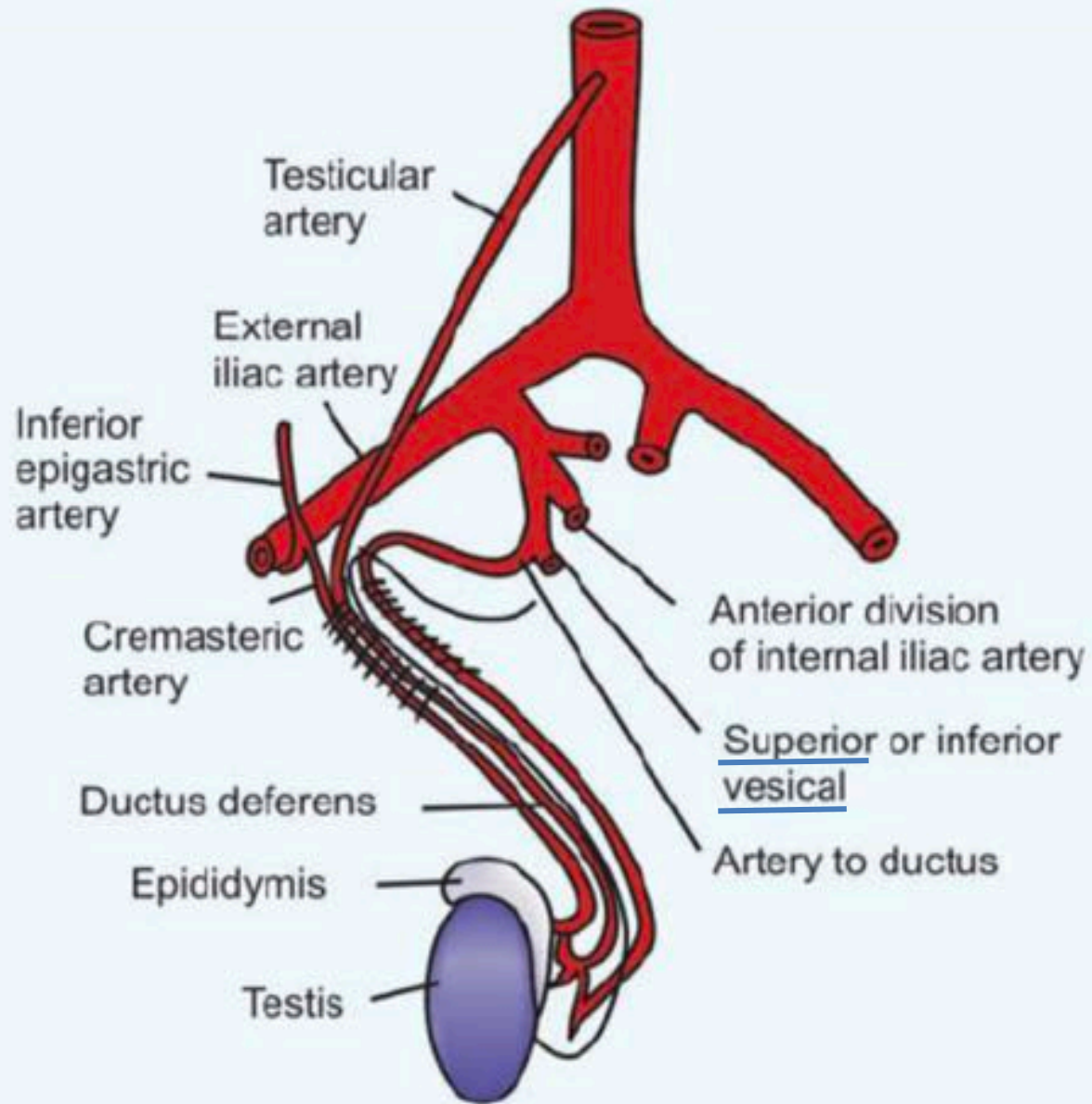


- Contained by Colle's fascia
- Bucks disrupted

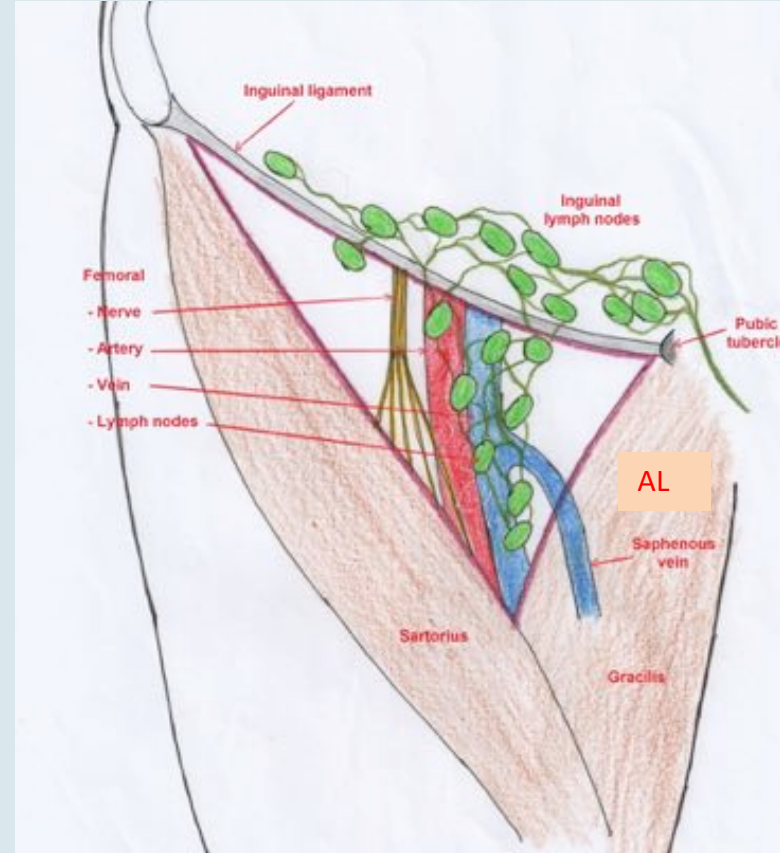
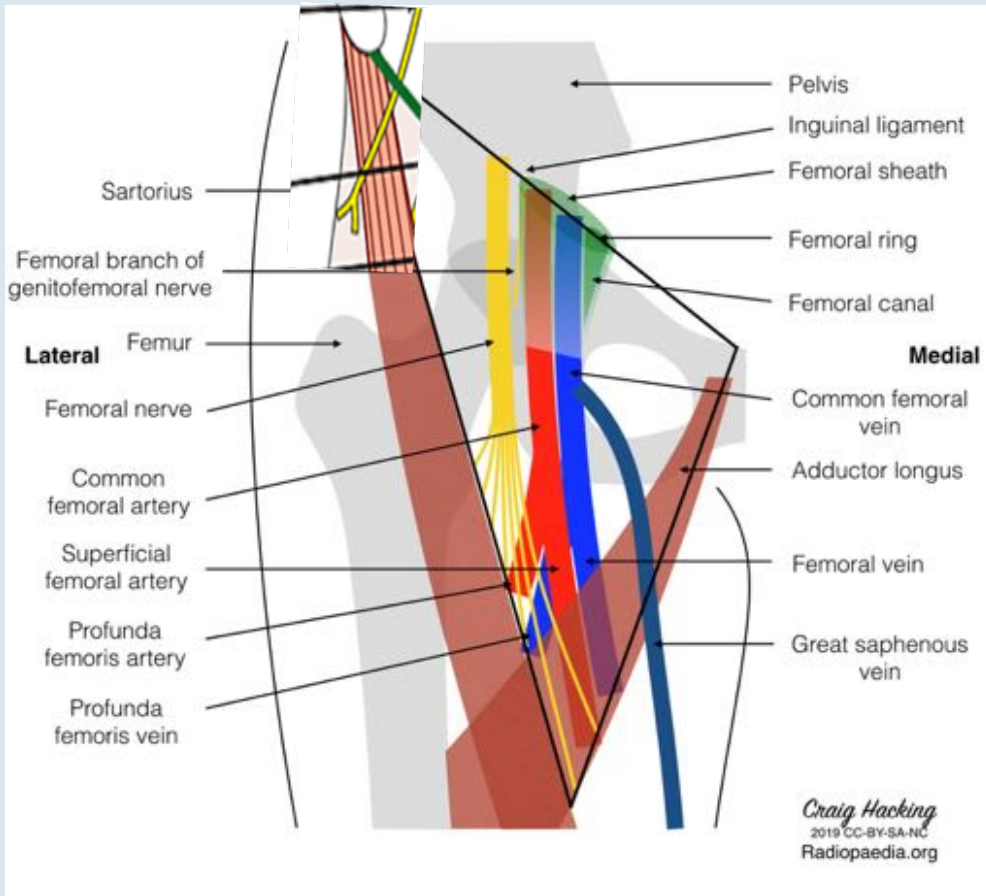
Martius Flap

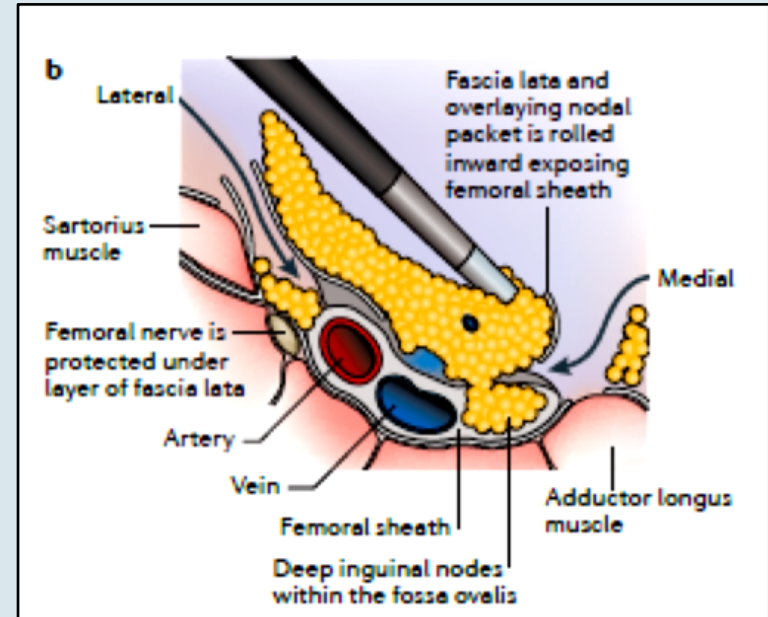
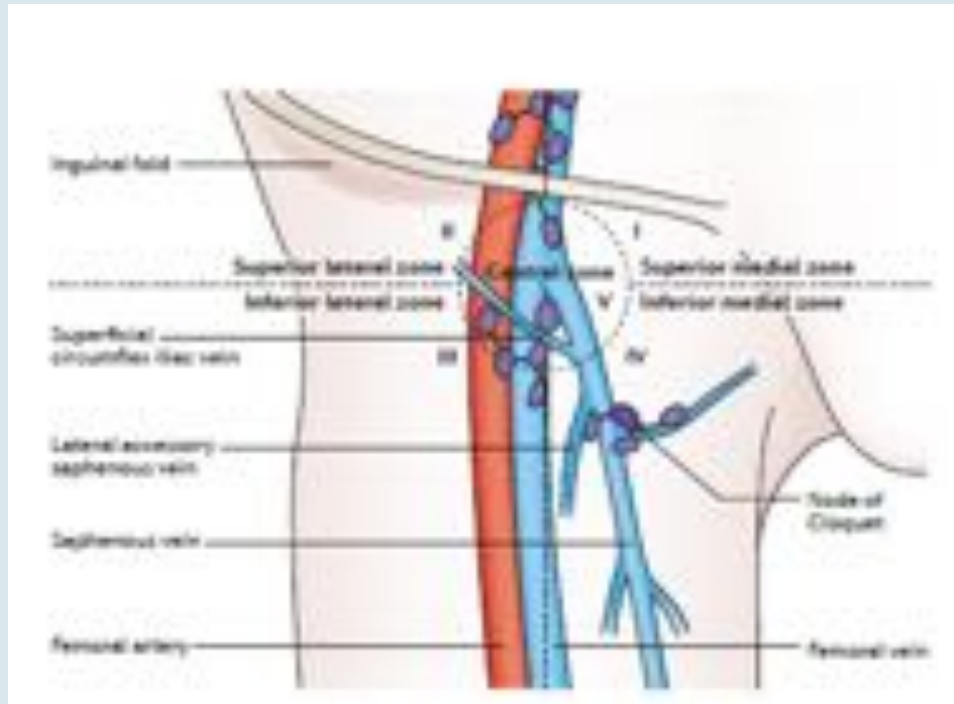
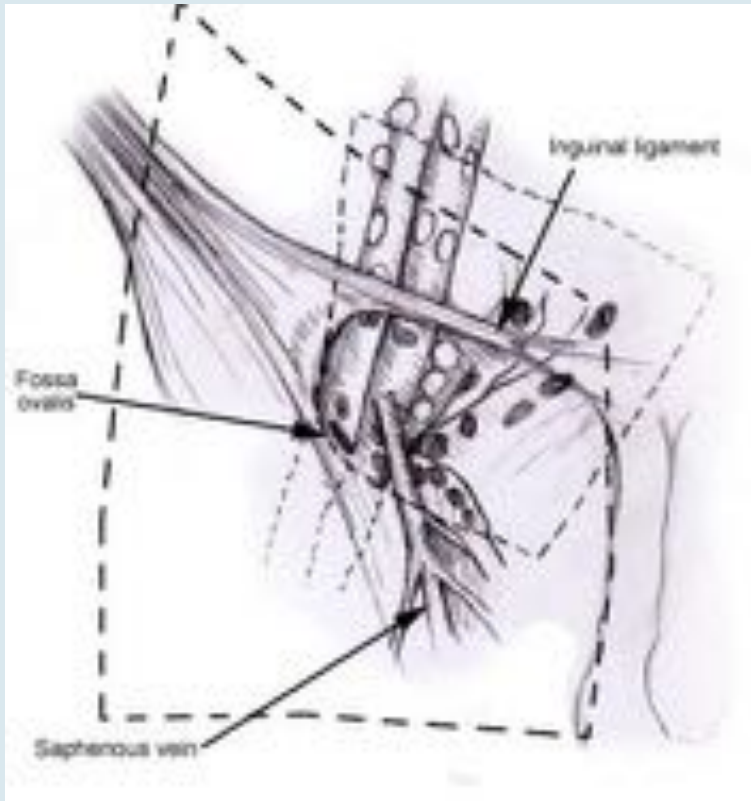


Vas deferens blood supply



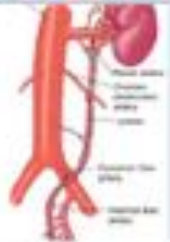
Femoral Triangle





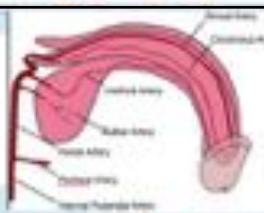
UROLOGY CHEAT SHEETS

ARTERIAL SUPPLY UROLOGY

Organ	Artery	Origin	
ADRENAL	Superior adrenal	Inferior phrenic artery	
	Middle adrenal	Aorta	
	Inferior adrenal	Renal	
RENAL	Renal	Aorta	
URETER	Superior	Renal/ Aorta	
	Inferior	Iliac	
BLADDER	Superior vesical	Anterior branch internal iliac	
	Inferior vesical	Anterior branch internal iliac	
PROSTATE	Prostatic branch	Inferior vesical	

UROLOGY CHEAT SHEETS

ARTERIAL SUPPLY UROLOGY

Organ	Artery	Origin	
URETHRA	Bulbourethral	Common penile	
	Urethral	Internal pudendal	
PENIS	Bulbar	Internal pudendal	
	Urethral		
TESTICLE	Common penile	Aorta	
	Testicular (int.spermatic)		
	Vasal (deferential)		
EPIDIDYMIS	Cremasteric (ext.spermatic)	Superior vesical	
	Sup. Epididymal	Inferior epigastric	
	Inf. Epididymal	Testicular	
SEMINAL VESICAL	Vesicodferential	Vasal	
		Internal iliac	

Urology SASP

Anatomy



American
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Current Exam: 2015
Question 150 of 150

The spread of urinary extravasation secondary to urethral injury below the urogenital diaphragm, when associated with a tear in Buck's fascia, is limited by the following fascial layers:

- ☐ A Denonvilliers' and Colles'.
- ☐ B Colles' and Scarpa's.
- ☐ C Scarpa's and Denonvilliers'.
- ☐ D dartos and Colles'.
- ☐ E dartos and Denonvilliers'.

Click the letter response to move to the next question.



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Current Exam: 2015
Question 150 of 150

The spread of urinary extravasation secondary to urethral injury below the urogenital diaphragm, when associated with a tear in Buck's fascia, is limited by the following fascial layers:

B: "Colles' and Scarpa's," is correct.

When infradiaphragmatic urinary extravasation extends through Buck's fascia, it is limited only by Colles' fascia which attaches posteriorly at the triangular ligament and laterally at the fascia lata of the thigh. Colles' fascia is continuous anteriorly with Scarpa's fascia which extends superiorly to the thoracoclavicular fascia. Therefore, both Colles' and Scarpa's fascia limit such an extravasation. Such an extravasation, particularly when associated with infection (periurethral phlegmon), can result in edema and necrosis of the skin of the penis, scrotum, and anterior body wall. Denonvillier's fascia does not connect with Colles', Scarpa's, or dartos fascias. Colles' is contiguous with dartos fascia.

Chung BI, Sommer G, Brooks JD: Anatomy of the lower urinary tract and male genitalia, Wein, AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA (eds): CAMPBELL-WALSH UROLOGY, ed 10. Philadelphia, Elsevier Saunders, 2012, vol 1, chap 2, p 33.

CONTINUE ►

Current Exam: 2014
Question 72 of 150

 American Urological Association
Education and Research, Inc.

The nerve that is most likely to be injured during a psoas hitch for a tapered ureteral reimplantation is the:

- ☐ A obturator.
- ☐ B ilioinguinal.
- ☐ C genitofemoral.
- ☐ D femoral.
- ☐ E iliohypogastric.

Click to flip question or view next question

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American
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Current Exam: 2014
Question 72 of 150

The nerve that is most likely to be injured during a psoas hitch for a tapered ureteral reimplantation is the:

D: "femoral." is correct.

The femoral nerve is of L2-L4 origin and has both motor and sensory components, providing sensation to the anterior thigh and motor innervation to the extensors of the knee. The femoral nerve travels within the belly and exits through the lateral aspect of the psoas muscle to pass under the ilioinguinal ligament. There are two potential injuries to the femoral nerve during a psoas hitch: the nerve can become entrapped from a suture placed at right angle to the muscle fibers and the direction of the nerve, or if performed by an open approach, the blades of a retractor can compress the psoas muscle and can result in a femoral nerve palsy. The ilioinguinal and genitofemoral nerves are easily identified during exposure for the psoas hitch and are readily mobilized away from the operative field.

Chung BI, Sommer G, Brooks JD: *Anatomy of the lower urinary tract and male genitalia*, Wein AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA (eds): *CAMPBELL-WALSH UROLOGY*, ed 10. Philadelphia, Elsevier Saunders, 2012, vol 1, chap 2, p 47.

CONTINUE ►



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Current Exam: 2015
Question 46 of 150

A 64-year-old, T4 paraplegic man on CIC is admitted for treatment of pneumonia. He suddenly develops a severe headache and has a heart rate of 42 bpm, and blood pressure of 210/130 mmHg. The next step is:

E: "place a urethral catheter." is correct.

step in management. All clothing should subsequently be loosened and the patient's upper torso should be elevated. If these maneuvers do not result in a decrease in blood pressure, topical or oral nitroglycerin is the recommended first line medical therapy. Topical nitroglycerin is preferred due to the ability to wipe off the medication from the skin if rebound hypotension should occur. Prior to nitroglycerin use, it must be verified that the patient has not taken a PDE-5 inhibitor within the prior 24 hours, the combination of NTG and a PDE-5 inhibitor increases the risk of severe rebound hypotension. If the patient has used a PDE-5 inhibitor, captopril 25 mg given sublingually or chewed is the drug of choice. Sublingual nifedipine once routinely recommended for this complication is no longer the drug of choice due to variable absorption, and episodic rebound hypotension that has resulted in strokes or myocardial infarction. If the blood pressure does not improve rapidly or rebound, hypertension develops the patient should be examined for other causes of AD including fecal impaction, renal or bladder calculi, decubitus ulcers and asymptomatic broken bones.

Wein AJ, Dmochowski RR: Neuromuscular dysfunction of the lower urinary tract, Wein, AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA (eds): CAMPBELL-WALSH UROLOGY, ed 10. Philadelphia, Elsevier Saunders, 2012, vol 3, chap 65, p 1926.

CONTINUE ►





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Current Exam: 2015
Question 51 of 150

The right adrenal vein enters:

A

 right renal vein.

B

 right inferior phrenic vein.

C

 right gonadal vein.

D

 IVC.

E

 ascending lumbar vein.

Click the letter response to move to the next question.

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Current Exam: 2015
Question 51 of 150

The right adrenal vein enters:

D: "IVC." is correct.

The right adrenal vein enters the IVC directly on its posterolateral aspect. It does not enter other veins between the adrenal gland and the IVC as occurs on the left side. The left adrenal vein joins with the left phrenic vein and enters the cranial aspect of the left renal vein. The lumbar vein and left gonadal vein enter the left renal vein but do not receive the adrenal vein.

Anderson JK, Cadeddu JA: Surgical anatomy of the retroperitoneum, adrenals, kidneys, and ureters, Wein, AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA (eds): CAMPBELL-WALSH UROLOGY, ed 10. Philadelphia, Elsevier Saunders, 2012, vol 1, chap 1, p 19.

CONTINUE ►



The nerve supply of the adrenal gland is:

- ☐ A parasympathetic to medulla.
- ☐ B sympathetic to medulla.
- ☐ C parasympathetic to cortex; sympathetic to medulla.
- ☐ D sympathetic to cortex and medulla.
- ☐ E sympathetic to cortex; parasympathetic to medulla.

Click the letter response to move on to the next question.



PREVIOUS UNANSWERED



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The nerve supply of the adrenal gland is:

B: "sympathetic to medulla." is correct.

The only nerves to the adrenal which have been demonstrated are sympathetic branches from T10-L1 coursing through the splanchnic nerves. Cortical innervation or parasympathetic innervation have not been demonstrated.

Hirman F Jr. ATLAS OF UROLOGICAL ANATOMY. Philadelphia, WB Saunders Co, 1993, p 291

CONTINUE ►

To perform an appendicovesicostomy, the blood supply to the appendix that must be preserved arises from a branch of which artery:

- ☐ A ileal.
- ☐ B anterior cecal.
- ☐ C posterior cecal.
- ☐ D ascending colic.
- ☐ E inferior mesenteric.

Click the letter response to move on to the next question.



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To perform an appendicovesicostomy, the blood supply to the appendix that must be preserved arises from a branch of which artery:

A: "ileal," is correct.

The appendix is supplied by the appendiceal artery, usually a branch of the ileal artery, itself a branch of the superior mesenteric artery.

Hirman F Jr. ATLAS OF UROLOGICAL ANATOMY. Philadelphia, WB Saunders Co, 1993, p 84

CONTINUE ►

The best artery to use as a pedicle for a gastrocystoplasty when avoiding use of the antrum is the:

- ☐ A right gastroepiploic.
- ☐ B left gastroepiploic.
- ☐ C gastroduodenal.
- ☐ D right gastric.
- ☐ E left gastric.

Click the letter response to move on to the next question.



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The best artery to use as a pedicle for a gastrocystoplasty when avoiding use of the antrum is the:

A: "right gastroepiploic." is correct.

The antrum should probably be avoided when performing a gastrocystoplasty because bladder distention might lead to increased gastrin secretion and ulcer formation. To avoid the antrum, the pedicle should come from the right and the optimal vessel is the right gastroepiploic.

Rink RC, Adams: Augmentation cystoplasty, in Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ (eds): CAMPBELL'S UROLOGY, ed 7. Philadelphia, WB Saunders Co, 1998, vol 3, chap 102, pp 3168-3189.

CONTINUE ►

Retroperitoneal organs juxtaposed to the left kidney are:

- ☐ A adrenal, spleen, pancreas.
- ☐ B adrenal, pancreas, colon.
- ☐ C spleen, jejunum, colon.
- ☐ D adrenal, colon, spleen.
- ☐ E spleen, duodenum, pancreas.

Click the letter response to move on to the next question



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AUA SELF-ASSESSMENT STUDY PROGRAM Current Exam: 2003 Question 141 of 150

Retroperitoneal organs juxtaposed to the left kidney are:

B: "adrenal, pancreas, colon." is correct.

Retroperitoneal structures that are juxtaposed to the left kidney are the adrenal, pancreas, and colon. The spleen and jejunum are intraperitoneal organs.

Kabalin JN: Surgical anatomy of the retroperitoneum, kidneys, and ureters, in Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ (eds): CAMPBELL'S UROLOGY, ed 7. Philadelphia, WB Saunders Co, 1998, vol 1, chap 2, pp 61-68.

CONTINUE ►

start AUA SELF Macromedia Flash 7 Hematology Testicular Tumors Anatomy Infection and Proliferation 10:47 PM

The inferior mesenteric artery is ligated during a RPLND for testis cancer. Blood supply to the sigmoid colon is now derived from which artery:

- ☐ A right colic.
- ☐ B superior hemorrhoidal.
- ☐ C middle hemorrhoidal.
- ☐ D sigmoid.
- ☐ E middle sacral.

Click the letter response to move on to the next question.



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SAVE



The inferior mesenteric artery is ligated during a RPLND for testis cancer. Blood supply to the sigmoid colon is now derived from which artery:

C: "middle hemorrhoidal." is correct.

The main arterial supply of the sigmoid colon is from the sigmoid and superior hemorrhoidal branches of the inferior mesenteric artery. The major collateral vessels are the middle and inferior hemorrhoidal arteries which arise from the internal iliac artery. They anastomose freely with the superior hemorrhoidal branches.

Evans RM, Reddy PK: Colonic neobladder, in Libertino JA (ed): RECONSTRUCTIVE UROLOGIC SURGERY, ed 3. St. Louis, Mosby-Year Book, 1998, chap 37, p 368.

CONTINUE ►

Dilated Cowper's ducts seen on urethrography are:

- ☐ A lateral to the membranous urethra.
- ☐ B posterior to the prostatic urethra.
- ☐ C anterior to the bulbous urethra.
- ☐ D posterior to the bulbous urethra.
- ☐ E posterior to the membranous urethra.

Click the letter response to move on to the next question.



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Dilated Cowper's ducts seen on urethrography are:

D: "posterior to the bulbous urethra," is correct.

Cowper's glands are located on each side of the membranous urethra within the urogenital diaphragm. The duct of each is one inch long and passes through the urethral opening in the urogenital diaphragm along the posterior aspect of the bulbous urethra and opens into the posterior aspect of the bulb.

Brooks JD: Anatomy of the lower urinary tract and male genitalia, in Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ (eds): CAMPBELL'S UROLOGY, ed 8. Philadelphia, WB Saunders Co, 2002, chap 2, pp 41-80.

CONTINUE ►

A 40-year-old man suffers a gunshot to the abdomen with left ureteral transection at the L3 vertebral level, and a ureteroureterostomy is performed. Postoperatively, he is not able to flex his thigh or extend his leg. These deficits are due to dysfunction of the:

- ☐ A femoral nerve.
- ☐ B iliopsoas muscle.
- ☐ C genitofemoral nerve.
- ☐ D lateral femoral cutaneous nerve.
- ☐ E quadriceps femoris muscle.

Click the letter response to move on to the next question.



PREVIOUS UNANSWERED



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SAVE



A 40-year-old man suffers a gunshot to the abdomen with left ureteral transection at the L3 vertebral level, and a ureteroureterostomy is performed. Postoperatively, he is not able to flex his thigh or extend his leg. These deficits are due to dysfunction of the:

A: "femoral nerve," is correct.

The femoral nerve arises from the second, third, and fourth lumbar spinal segments. It appears at the lateral edge of the psoas muscle and descends into the thigh. It supplies a number of muscles including the quadriceps femoris complex, articularis genu, sartorius, pectineus and ilopsoas.

Berry M, Bannister LH, Standring SM. Nervous system, in Bannister LH, Berry MM, Collins P, Dyson M, Dussek JE, Ferguson MWJ (eds): GRAY'S ANATOMY, ed 38. New York, Churchill Livingstone, 1995, chap 8, pp 1269-1282.

CONTINUE ►

The blood supply to an ileal conduit originates from the following artery:

- ☐ A superior mesenteric.
- ☐ B common iliac.
- ☐ C inferior mesenteric.
- ☐ D circumflex iliac.
- ☐ E celiac.

Click the letter response to move on to the next question.



PREVIOUS UNANSWERED



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SAVE



The blood supply to an ileal conduit originates from the following artery:

A: "superior mesenteric." is correct.

The superior mesenteric artery is the blood supply to the small bowel and proximal colon. The inferior mesenteric artery supplies blood to the mid and distal colon. The celiac axis provides blood to the liver, spleen, stomach, pancreas and duodenum. The iliac and circumflex iliac arteries do not provide blood supply to the intestine.

Kabalin JN. Surgical anatomy of the retroperitoneum, kidneys, and ureters, in Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ (eds): CAMPBELL'S UROLOGY, ed 8. Philadelphia, WB Saunders Co, 2002, vol 1, chap 1, p 3.

CONTINUE ►

The upper ureter is more susceptible to serious injury during endourological procedures because it:

- ☐ A is less distensible.
- ☐ B has thin submucosa.
- ☐ C has thin muscularis.
- ☐ D has thin mucosa.
- ☐ E has variable blood supply.

Click the letter response to move on to the next question.



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The upper ureter is more susceptible to serious injury during endourological procedures because it:

C: "has thin muscularis." is correct.

The ureteral wall consists of three different layers. However, the composition of these layers is not constant for the entire length of the ureter. The mucosa, which is four or five cell layers thick, consists of transitional epithelium, and a lamina propria with loose or dense connective tissue, but not a distinct submucosa. The muscularis varies in its composition over the course of the ureter. In the proximal ureter, it consists of a thin, poorly defined inner circular and an outer longitudinal layer. Both the mid and distal ureter have a muscularis which is distinctly composed of an inner longitudinal, middle circular, and outer longitudinal fibers. This deficiency in the muscularis of the upper ureter and the geometric arrangement of large areas of collagenous connective tissue interspersing the muscle bundles is thought to make the upper ureter more susceptible to serious ureteral injury.

Kabalin JN: Surgical anatomy of the retroperitoneum, kidneys, and ureters, in Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ (eds): CAMPBELL'S UROLOGY, ed 8. Philadelphia, WB Saunders Co, 2002, vol 1, chap 1, p 3.

CONTINUE ►

A 56-year-old man undergoes a difficult radical perineal prostatectomy that lasts six hours. Postoperatively he has weakness of the left foot with inability to dorsiflex. The nerve most likely injured is the:

- ☐ A femoral.
- ☐ B genitofemoral.
- ☐ C sciatic.
- ☐ D obturator.
- ☐ E peroneal.

Click the letter response to move on to the next question.



PREVIOUS UNANSWERED



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SAVE



A 56-year-old man undergoes a difficult radical perineal prostatectomy that lasts six hours. Postoperatively he has weakness of the left foot with inability to dorsiflex. The nerve most likely injured is the:

E: "peroneal." is correct.

The patient has an injury to the common peroneal nerve. Of the lower extremity nerves, the common peroneal nerve is at greatest risk for injury. This occurs most commonly after operations in the lithotomy position. After leaving the popliteal fossa, the nerve crosses anterolaterally around the head of the fibula. In this superficial location over the bony prominence of the knee, it is exposed to compression injury. Stretching the nerve by knee and hip flexion also increases the risk for pressure injuries. This nerve supplies the tibialis anterior which provides dorsiflexion of the foot.

Walsh PC: Anatomic radical retropubic prostatectomy, in Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ (eds): CAMPBELL'S UROLOGY, ed 8. Philadelphia, WB Saunders Co, 2002, vol 4, chap 90, p 3107.

Brooks JD: Anatomy of the lower urinary tract and male genitalia, in Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ (eds): CAMPBELL'S UROLOGY, ed 8. Philadelphia, WB Saunders Co, 2002, vol 1, chap 2, p 41

CONTINUE ►

The first branch of the internal iliac (hypogastric) artery is the:

- ☐ A obliterated umbilical.
- ☐ B superior gluteal.
- ☐ C obturator.
- ☐ D superior vesical.
- ☐ E middle sacral.

Click the letter response to move on to the next question.



PREVIOUS UNANSWERED



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SAVE



The first branch of the internal iliac (hypogastric) artery is the:

B: "superior gluteal." is correct.

This artery supplies the pelvic viscera, muscular part of the pelvis and gluteal area. The internal iliac begins at the level of the intervertebral disc between L5 and S1 where it is crossed by the ureter. It is separated from the sacroiliac joint by the internal iliac vein and lumbosacral trunk. It divides into an anterior and posterior division at the edge of the greater sciatic foramen. The posterior trunk is more cephalad and the superior gluteal is the first branch.

Brooks JD: Anatomy of the lower urinary tract and male genitalia, in Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ (eds): CAMPBELL'S UROLOGY, ed 8. Philadelphia, WB Saunders Co, 2002, vol 1, chap 2, p 41.

CONTINUE ►

The posterior surface of the kidney is adjacent to the:

- ☐ A quadratus lumborum muscle and diaphragm.
- ☐ B psoas and latissimus dorsi muscles.
- ☐ C diaphragm and psoas muscle.
- ☐ D transversus abdominis and psoas muscles.
- ☐ E paraspinous and intercostal muscles.

Click the letter response to move on to the next question



PREVIOUS UNANSWERED



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SAVE



The posterior surface of the kidney is adjacent to the:

A: "quadratus lumborum muscle and diaphragm." is correct.

The diaphragm extends around the posterior aspect of the kidney. The anteromedial surface of the kidney is adjacent to the psoas major but the posterior surface lies adjacent to the quadratus lumborum. The transversus abdominus muscle is more ventral.

Kabalin JN: Surgical anatomy of the retroperitoneum, kidneys, and ureters, in Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ (eds): CAMPBELL'S UROLOGY, ed 8. Philadelphia, WB Saunders Co, 2002, vol 1, chap 1, p 3.

CONTINUE ►

During exploration for an appendiceal abscess, the spermatic artery and vein are divided. Survival of the testis is dependent on blood supply from a branch of the:

- ☐ A obturator artery.
- ☐ B superior vesical artery.
- ☐ C inferior vesical artery.
- ☐ D posterior scrotal artery.
- ☐ E internal pudendal artery.

Click the letter response to move on to the next question.



PREVIOUS UNANSWERED



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SAVE



During exploration for an appendiceal abscess, the spermatic artery and vein are divided. Survival of the testis is dependent on blood supply from a branch of the:

C: "inferior vesical artery." is correct.

Following ligation of the testicular artery, the blood supply to the testis is from the artery to the vas deferens, a branch of the inferior vesical artery and from the external spermatic artery a branch of the inferior epigastric artery

Silver RT, Docimo SG: Cryptorchidism, in Gonzales ET, Bauer SB (eds): PEDIATRIC UROLOGY PRACTICE. Philadelphia, Lippincott Williams & Wilkins, 1999, chap 29, p 511

CONTINUE ►

The structure found immediately lateral to the femoral artery as it passes posterior to the inguinal ligament is the:

- ☐ A sartorius muscle.
- ☐ B femoral vein.
- ☐ C femoral nerve.
- ☐ D iliohypogastric nerve.
- ☐ E lateral femoral cutaneous nerve.

Click the letter response to move on to the next question.



PREVIOUS UNANSWERED



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SAVE



The structure found immediately lateral to the femoral artery as it passes posterior to the inguinal ligament is the:

C: "femoral nerve." is correct.

The anatomy of the femoral canal from lateral to medial is the femoral nerve, the femoral artery, the femoral vein and lymphatic channels. This is important when drawing blood from the femoral vessels. One should be aware of this relationship when dissecting out the saphenous vein.

Kabalin JN: Surgical anatomy of the retroperitoneum, kidneys, and ureters, in Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ (eds): CAMPBELL'S UROLOGY, ed 8. Philadelphia, WB Saunders Co, 2002, vol 3, chap 1, p 14

CONTINUE ►

The anatomical relationship of the left internal spermatic vein(s) to the left ureter in the retroperitoneum 2 cm above the internal inguinal ring is:

- ☐ A anterior and lateral.
- ☐ B anterior and medial.
- ☐ C posterior and lateral.
- ☐ D posterior and medial.
- ☐ E medial and adjacent.

Click the letter response to move on to the next question.



PREVIOUS UNANSWERED



PREVIOUS

NEXT



NEXT UNANSWERED



SAVE



The anatomical relationship of the left internal spermatic vein(s) to the left ureter in the retroperitoneum 2 cm above the internal inguinal ring is:

A: "anterior and lateral." is correct.

The left spermatic vein courses from the internal ring to the renal vein. At the internal ring, the vein is anterior and lateral to the ureter which crosses the iliac vessels. The vein crosses anterior to the ureter in its mid-portion and inserts into the left renal vein medial to the upper ureter. In ligating a varicocele, venous ligation may be carried out within the inguinal canal or intra-abdominally, in which case this anatomic relationship is important to know.

Kabalin JN: Surgical anatomy of the retroperitoneum, kidneys, and ureters, in Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ (eds): CAMPBELL'S UROLOGY, ed 8. Philadelphia, WB Saunders Co, 2002, vol 3, chap 1, p 38.

CONTINUE ►

A 14-year-old boy has a straddle injury to the perineum. Physical examination reveals ecchymosis limited to the penis and scrotum. The fascia that contains the extravasated blood is:

- ☐ A Buck's.
- ☐ B dartos.
- ☐ C Colles'.
- ☐ D external spermatic.
- ☐ E transversalis.

Click the letter response to move on to the next question.



PREVIOUS UNANSWERED



PREVIOUS

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NEXT UNANSWERED



SAVE



A 14-year-old boy has a straddle injury to the perineum. Physical examination reveals ecchymosis limited to the penis and scrotum. The fascia that contains the extravasated blood is:

C: "Colles'." is correct.

The corporal bodies are surrounded by tunica albuginea. Buck's fascia surrounds the corpora cavernosa and corpus spongiosum. If the injury to the urethra is contained within Buck's fascia the hematoma will remain confined to the shaft of the penis. Rupture through Buck's fascia leads to extension of the hematoma into the scrotum. The classic presentation of a urethral injury contained within Colles' fascia is that of a butterfly hematoma of the perineum. Superiorly the extravasation can extend to the clavicles where Scarpa's fascia, the abdominal extension of Colles' fascia, attaches.

Brooks J. Anatomy of the lower urinary tract and male genitalia, in Walsh PC, Retk AB, Vaughan ED Jr, Wein AJ (eds): CAMPBELL'S UROLOGY, ed 8. Philadelphia, WB Saunders Co, 2002, vol 3, chap 2, p 43.

CONTINUE ►

The round ligament:

- ☐ A lies in the base of the broad ligament.
- ☐ B carries with it the vascular supply of the uterus.
- ☐ C carries with it the vascular supply of the ovaries.
- ☐ D connects to the upper part of the uterus.
- ☐ E penetrates the femoral ring to lie within the labia.

Click the letter response to move on to the next question



PREVIOUS UNANSWERED



PREVIOUS

NEXT



NEXT UNANSWERED



SAVE



The round ligament:

D: "connects to the upper part of the uterus." is correct.

Each round ligament arises from the top of the side of the uterus and passes anteriorly and laterally towards the deep inguinal ring. The round ligaments run in the upper part of the broad ligament to the uterus while all other ligaments run to the base of the uterus and cervix. The round ligament is encountered during radical cystectomy in the female.

Brooks JD: Anatomy of the lower urinary tract and male genitalia, in Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ (eds): CAMPBELL'S UROLOGY, ed 8. Philadelphia, WB Saunders Co, 2002, vol 1, chap 2, p 67.

CONTINUE ►

If the inferior mesenteric artery is ligated, which of the following arteries maintains blood supply to the rectum:

- ☐ A superior mesenteric.
- ☐ B ileocolic.
- ☐ C middle sacral.
- ☐ D external iliac.
- ☐ E hypogastric.

Click the letter response to move on to the next question.



PREVIOUS UNANSWERED



PREVIOUS



NEXT

NEXT UNANSWERED



SAVE



If the inferior mesenteric artery is ligated, which of the following arteries maintains blood supply to the rectum:

E: "hypogastric." is correct.

Blood supply to the rectum arises proximally from the superior rectal (hemorrhoidal) artery, inferior mesenteric artery, and distally from the middle (hemorrhoidal) and inferior rectal arteries. When the inferior mesenteric artery is ligated, blood supply to the rectum is maintained by the middle hemorrhoidal artery which is a branch of the posterior division of the hypogastric artery and the inferior rectal artery which is a branch of the internal pudendal artery.

Sheinfeld J, McKiernan J, Bosl GJ. Surgery of testicular tumors, in Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ (eds). CAMPBELL'S UROLOGY, ed 8. Philadelphia, WB Saunders Co, 2002, vol 4, chap 82, pp 2920-2944.

CONTINUE ►

A 38-year-old woman with extensive prior pelvic radiation has a long left distal ureteral stricture. At the time of psoas hitch and ureteral reimplant, an omental wrap is planned. The vascular supply of the omentum is most reliably based upon which artery:

- ☐ A splenic.
- ☐ B gastroduodenal.
- ☐ C right gastroepiploic.
- ☐ D short gastric.
- ☐ E left gastroepiploic.

Click the letter response to move on to the next question.



PREVIOUS UNANSWERED



PREVIOUS



NEXT



NEXT UNANSWERED



SAVE

A 38-year-old woman with extensive prior pelvic radiation has a long left distal ureteral stricture. At the time of psoas hitch and ureteral reimplant, an omental wrap is planned. The vascular supply of the omentum is most reliably based upon which artery:

C: "right gastroepiploic." is correct.

The blood supply of the omentum arises from the gastroepiploic arteries. The right gastroepiploic is best chosen for development of the wrap as the left is relatively small and more variable in its anatomy.

Turnage RH, Li BD, McDonald, JC: Abdominal wall, umbilicus, peritoneum, mesentery, omentum, and retroperitoneum, in Townsend C, Beauchamp RD, Evers BM, Mattox KL (eds): *SABISTON'S TEXTBOOK OF SURGERY*, ed 17. Philadelphia, Elsevier-Saunders Publishing, 2004, chap 41, p 1167.

CONTINUE ►

The obliterated umbilical artery courses:

- ☐ A posterior to the middle hemorrhoidal artery.
- ☐ B lateral to the obturator nerve.
- ☐ C medial to the seminal vesicles.
- ☐ D anterior to the ureter.
- ☐ E caudal to the ampulla of the vas deferens.

Click the letter response to move on to the next question.



PREVIOUS UNANSWERED



PREVIOUS

NEXT



NEXT UNANSWERED



SAVE



The obliterated umbilical artery courses:

D: "anterior to the ureter." is correct.

The obliterated umbilical artery is a consistent landmark for both open and laparoscopic surgery. It is a branch of the internal iliac artery and runs lateral to the bladder and medial to the obturator nerve. It is found anterior to the ureter in the pelvis.

Abala A, Keating MA. Vesicoureteral reflux and megaureter. In Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ (eds): CAMPBELL'S UROLOGY, ed 8. Philadelphia, WB Saunders Co, 2002, vol 3, chap 59, p 2080.

CONTINUE ►

During exploration of a retroperitoneal hematoma from blunt renal trauma, the best anatomic landmark for the left renal artery is the:

- ☐ A inferior mesenteric artery.
- ☐ B left renal vein.
- ☐ C right renal artery.
- ☐ D left gonadal vein.
- ☐ E left ureter.

Click the letter response to move on to the next question



PREVIOUS UNANSWERED



PREVIOUS

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NEXT UNANSWERED



SAVE



During exploration of a retroperitoneal hematoma from blunt renal trauma, the best anatomic landmark for the left renal artery is the:

B: "left renal vein." is correct.

The left renal artery originates from the aorta just lateral and superior to the left renal vein. Identifying the left renal vein as it crosses the aorta provides the best anatomic landmark for the left renal artery. The right renal artery is retrocaudal and not a good landmark. The inferior mesenteric artery is caudad to the renal artery. The inferior mesenteric vein is a good landmark for the location of the aorta during emergent exploration. An incision is made medial to the inferior mesenteric vein. This is extended cephalad to the ligament of Treitz. The aortic dissection is carried cephalad to the left renal vein allowing identification of the renal arteries.

McAninch W, Santucci RA: Renal and ureteral trauma, in Wein AJ, Kavoussi LR, Noack AC, Partin AW, Peters CA (eds): CAMPBELL'S UROLOGY, ed 9 Philadelphia, Saunders Elsevier, 2007, vol 2, chap 39, pp 1276-1286.

CONTINUE ►

The spread of urinary extravasation secondary to urethral injury below the urogenital diaphragm, when associated with a tear in Buck's fascia, is limited by the following fascial layers:

- ☐ A Denonvilliers' and Colles'.
- ☐ B Colles' and Scarpa's.
- ☐ C Scarpa's and Denonvilliers'.
- ☐ D dartos and Colles'.
- ☐ E dartos and Denonvilliers'.

Click the letter response to move on to the next question



PREVIOUS UNANSWERED



PREVIOUS

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NEXT UNANSWERED



SAVE



The spread of urinary extravasation secondary to urethral injury below the urogenital diaphragm, when associated with a tear in Buck's fascia, is limited by the following fascial layers

B: "Colles' and Scarpa's." is correct.

When intradaphragmatic urinary extravasation extends through Buck's fascia, it is limited only by Colles' fascia which attaches posteriorly at the triangular ligament and laterally at the fascia lata of the thigh. Colles' fascia is continuous anteriorly with Scarpa's fascia which extends superiorly to the coracoclavicular fascia. Therefore, both Colles' and Scarpa's fascia limit such an extravasation. Such an extravasation, particularly when associated with infection (penurethral phlegmon), can result in edema and necrosis of the skin of the penis, scrotum, and anterior body wall.

Jordan GH, Schlossberg SM: Surgery of the penis and urethra, in Wein AJ, Kavoussi LR, Naick AC, Partin AW, Peters CA (eds): CAMPBELL'S UROLOGY, ed 9. Philadelphia: Saunders Elsevier, 2007, vol 1, chap 33, p 1823.

CONTINUE ►

The obliterated umbilical artery originates from which of the following arteries:

- ☐ A superior gluteal.
- ☐ B obturator.
- ☐ C middle sacral.
- ☐ D internal iliac.
- ☐ E external iliac.

Click the letter response to move on to the next question



PREVIOUS UNANSWERED



PREVIOUS

NEXT



NEXT UNANSWERED



SAVE



The obliterated umbilical artery originates from which of the following arteries:

D: "internal iliac." is correct.

The umbilical artery is the first visceral branch of the internal iliac artery and is very commonly a large trunk that in its proximal unobliterated section gives rise to the superior vesical artery as its first branch. The obliterated umbilical artery is an important landmark in the pelvis as it sweeps lateral to the ureter at the pelvic brim. It can be used to mark the peritoneum in pelvic dissections and may be confused with the vas deferens in the male.

Brooks JD. Anatomy of the lower urinary tract and male genitalia, in Wein AJ, Kavoussi LR, Novack AC, Partin AW, Peters CA (eds): CAMPBELL'S UROLOGY, ed 9. Philadelphia, Saunders Elsevier, 2007, vol 1, chap 2, p 43.

CONTINUE ►

The deep dorsal vein of the penis courses:

- ☐ A between Colles' and Buck's fascia.
- ☐ B between Buck's fascia and tunica albuginea.
- ☐ C between the corpora cavernosa.
- ☐ D in the subtunical space.
- ☐ E in the center of the corpus cavernosum.

Click the letter response to move on to the next question



PREVIOUS UNANSWERED



PREVIOUS



NEXT



NEXT UNANSWERED

SAVE



The deep dorsal vein of the penis courses

B: "between Buck's fascia and tunica albuginea." is correct.

The venous return from the penis is from the cavernous veins and the deep and superficial dorsal veins. The deep dorsal vein drains the glans penis as well as a major portion of the cavernous spaces of the corpus cavernosum. The vein lies beneath Buck's fascia and proceeds between the suspensory ligament of the penis to enter the urogenital diaphragm between the arcuate and transverse pubic ligament. It empties into the preprostatic plexus.

Brooks JD. Anatomy of the lower urinary tract and male genitalia, in Wein AJ, Kavoussi LR, Novack AC, Partin AW, Peters CA (eds): CAMPBELL'S UROLOGY, ed 9. Philadelphia, Saunders Elsevier, 2007, vol 1, chap 2, p 70

CONTINUE ►

During radical nephrectomy in a 50-year-old man, the superior mesenteric artery is inadvertently divided. The bowel segment likely to maintain normal blood supply is:

- ☐ A duodenum.
- ☐ B jejunum.
- ☐ C ileum.
- ☐ D cecum.
- ☐ E ascending colon.

Click the letter response to move on to the next question.



PREVIOUS UNANSWERED



PREVIOUS

NEXT



NEXT UNANSWERED



SAVE



During radical nephrectomy in a 50-year-old man, the superior mesenteric artery is inadvertently divided. The bowel segment likely to maintain normal blood supply is:

A: "duodenum." is correct.

The duodenum is supplied by the pancreaticoduodenal and the gastroduodenal arteries which arise from the celiac trunk. All of the other bowel segments are supplied by branches of the superior mesenteric artery. Although ligation of the superior mesenteric artery, may not result in ischemic changes, assessment of bowel viability should be done. Primary repair of the vessel should be undertaken if feasible.

Moore KL, Dalley AP, Agur AMR: The abdomen, in CLINICALLY ORIENTED ANATOMY, ed 5. Philadelphia, Lippincott Williams & Wilkins, 2006, chap 2, p 274.

Dahl DM, McDougal WS: Use of intestinal segments in urinary diversion, in Wein AJ, Karsousi LR, Novick AC, Partin AW, Peters CA (eds): CAMPBELL'S UROLOGY, ed 9. Philadelphia, Saunders Elsevier, 2007, vol 3, chap 80, pp 2534-2536.

CONTINUE ►



The blood supply to the appendix that must be preserved during an appendicovesicostomy arises from a branch of which artery:

- ☐ A ileal.
- ☐ B anterior cecal.
- ☐ C posterior cecal.
- ☐ D ascending colic.
- ☐ E inferior mesenteric.

Click the letter response to move on to the next question



PREVIOUS UNANSWERED



PREVIOUS



NEXT



NEXT UNANSWERED



SAVE



The blood supply to the appendix that must be preserved during an appendicovesicostomy arises from a branch of which artery:

A: "ileal." is correct.

The superior mesenteric artery (SMA) provides blood supply to the terminal ileum (distal 6 inches), appendix, ascending colon and transverse colon through the ileocecal (ileum, appendix and cecum), right (ascending colon), and middle (transverse colon) colic arteries. A separate mesentery exists from the ileocecal artery to the appendix allowing for the appendix to be separated from the cecum but maintain its blood supply for implantation into the bladder or another bowel segment. The mesentery of the appendix can be "windowed" for imbrication of the cecum around the appendix as is accomplished with the antegrade continence enema (ACE) procedure. The marginal artery of Drummond completes an anastomosing arcade between the middle colic artery of the SMA and the left colic artery of the inferior mesenteric artery, allowing for separation and mobilization of various segments of the large bowel for reconstructive purposes. The right colic artery most often arises directly from the SMA which can limit the mobilization of the cecum and right colon into the pelvis, at times requiring division of the right colic artery. When the right colic artery arises as a branch of the ileocecal artery mobilization of the cecum and right colon is considerably easier.

Dahl DM, McDougal WS: Use of intestinal segments in urinary diversion, in Wein AJ, Kavoussi LR, Novick AC, Patin AW, Peters CA (eds): CAMPBELL'S UROLOGY, ed 9. Philadelphia, Saunders Elsevier, 2007, vol 3, chap 80, p 2536

Adams MC, Joseph DB: Urinary tract reconstruction in children, in Yilkin AJ, Kavoussi LR, Novick AC, Patin AW, Peters CA (eds): CAMPBELL'S UROLOGY, ed 9. Philadelphia, Saunders Elsevier, 2007, vol 4, chap 124, p 3694-95.

CONTINUE ►



During staging pelvic lymphadenectomy for prostatic carcinoma, a delicate nerve, anterior and lateral to the right external iliac artery and lying along the anterior surface of the psoas muscle, is inadvertently severed. The expected ipsilateral neurological deficit is:

- ☐ A inability to adduct the thigh.
- ☐ B inability to abduct the thigh.
- ☐ C inability to flex the thigh.
- ☐ D anesthesia of the lateral thigh.
- ☐ E anesthesia of the anterior thigh and lateral scrotum.

Click the letter response to move on to the next question



PREVIOUS UNANSWERED



PREVIOUS



NEXT

NEXT UNANSWERED



SAVE



During staging pelvic lymphadenectomy for prostatic carcinoma, a delicate nerve, anterior and lateral to the right external iliac artery and lying along the anterior surface of the psoas muscle, is inadvertently severed. The expected ipsilateral neurological deficit is:

E: "anesthesia of the anterior thigh and lateral scrotum." is correct.

The genitofemoral nerve lies on the anterior aspect of the psoas muscle and is often used as the landmark for the lateral margin of the dissection for a pelvic lymphadenectomy. The genitofemoral nerve supplies sensation to the anterolateral scrotum and the anterior thigh and has no motor innervative functions. The femoral nerve lies deep in the psoas muscle and is, therefore, less often injured during a pelvic lymphadenectomy. It has both sensory and motor functions, supplying sensation to the medial and anterior thigh and motor innervation to the quadriceps muscle which facilitates hip flexion. Injury to the obturator nerve, which lies posterior to the iliac artery, results in the inability to adduct the thigh. The obturator nerve, however, is easier seen and palpable due to its size, compared to the genitofemoral nerve.

Anderson JK, Kabalin JN, Cadeddu JA: Surgical anatomy of the retroperitoneum, adrenals, kidneys, and ureters, in Wein AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA (eds): CAMPBELL'S UROLOGY, ed 9. Philadelphia, Saunders Elsevier, 2007, vol 1, chap 1, p 18.

CONTINUE ►



If the inferior mesenteric artery is ligated, the artery that maintains blood supply to the rectum is:

- ☐ A superior mesenteric.
- ☐ B ileocolic.
- ☐ C middle sacral.
- ☐ D external iliac.
- ☐ E hypogastric.

Click the letter response to move to the next question.





If the inferior mesenteric artery is ligated, the artery that maintains blood supply to the rectum is:

- C: "middle sacral" is incorrect.
E: "hypogastric" is the correct answer.

Blood supply to the rectum arises proximally from the superior rectal (hemorrhoidal) artery, inferior mesenteric artery, and distally from the middle (hemorrhoidal) and inferior rectal arteries. When the inferior mesenteric artery is ligated, blood supply to the rectum is maintained by the middle hemorrhoidal artery which is a branch of the posterior division of the hypogastric artery and the inferior rectal artery which is a branch of the internal pudendal artery.

Shainfield J, Bosl GJ: Surgery of testicular tumors, Wein AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA (eds): CAMPBELL-WALSH UROLOGY, ed 10. Philadelphia, Elsevier Saunders, 2012, vol 1, chap 32, pp 876-880.



A 25-year-old man undergoes excision and primary anastomosis for a 2 cm bulbar urethral stricture. Postoperatively the patient experiences normal erectile function, but difficulty with antegrade ejaculation. The structure most likely injured is the:

- ☐ A bulbospongiosus.
- ☐ B transverse perineum.
- ☐ C bulbocavernosus muscle.
- ☐ D corpus cavernosum.
- ☐ E corpus spongiosum.

Click the letter response to move to the next question.





A 25-year-old man undergoes excision and primary anastomosis for a 2 cm bulbar urethral stricture. Postoperatively the patient experiences normal erectile function, but difficulty with antegrade ejaculation. The structure most likely injured is the:

C: "bulbocavernosus muscle," is correct.

The bulbocavernosus muscle is most responsible for antegrade ejaculation through rhythmic contractions that compress the bulb to expel semen from the urethra. Significant injury or damage to this structure is thought to cause ejaculatory dysfunction. The corpus spongiosum pressurizes and constricts the urethra during ejaculation. The bulbospongiosus, and transverse perineum do not contribute to ejaculation. Injury to the corpus cavernosum could result in erectile dysfunction.

Luo TF: Physiology of penile erection and pathophysiology of erectile dysfunction, Wein AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA (eds). CAMPBELL-WALSH UROLOGY, ed 10. Philadelphia, Elsevier Saunders, 2012, vol 6, chap 23, p 690.



A vascular pedicle of the omentum is preferentially based on which artery when using an omental flap for repair of a vesicovaginal fistula:

- ☐ A right gastroepiploic.
- ☐ B left gastroepiploic.
- ☐ C superior mesenteric.
- ☐ D gastric.
- ☐ E splenic.

Click the left response to move to the next question.





A vascular pedicle of the omentum is preferentially based on which artery when using an omental flap for repair of a vesicovaginal fistula:

C: "superior mesenteric." is incorrect.

A: "right gastroepiploic." is the correct answer.

An omental flap should be preferentially based on the right gastroepiploic artery. The pedicle is mobilized off the stomach from the left. This will result in a well-vascularized and sufficiently long flap based on the right gastroepiploic. The right gastroepiploic is a larger vessel than the left, and its origin is somewhat caudal as compared to the left allowing a shorter course into the deep pelvis.

Rovner ES: Urinary tract fistulae. Wein AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA (eds): CAMPBELL-WALSH UROLOGY, ed 10. Philadelphia, Elsevier Saunders, 2012, vol 3, chap 77, pp 2237-2241.

56. During an inguinal approach to a pediatric hernia, the ilioinguinal nerve can be separated from the cord structures by entering the:
- A. external oblique fascia.
 - B. cremaster.
 - C. internal spermatic fascia.
 - D. processus vaginalis.
 - E. Scarpa fascia.

Question #56

ANSWER=B

The ilioinguinal nerve runs in the cremaster layer, and can be effectively spared by opening the cremaster and separating it from the remainder of the cord. The nerve does not have to be individually dissected.

Chung BI, Sommer G, Brooks JD: Anatomy of the lower urinary tract and male genitalia, Wein, AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA (eds): CAMPBELL-WALSH UROLOGY, ed 10. Philadelphia, Elsevier Saunders, 2012, vol 1, chap 2, pp 46-47.

107. Acute bleeding after ligation and division of the renal hilum during left nephrectomy is most commonly from the:
- A. posterior renal vein.
 - B. anterior renal artery.
 - C. gonadal vein.
 - D. lumbar vein.
 - E. adrenal vein.

Question #107

ANSWER=D

The most common source of bleeding after division of the renal hilum on the left is a lumbar vein. The lumbar vein lies posteriorly as it inserts into the renal vein. When ligation is too proximal towards the inferior vena cava, this vein can be encountered. The testicular and adrenal vein may cause bleeding but usually are well visualized. Anatomically, the posterior and anterior branches of the renal artery are included with ligation of the hilum unless this occurs too close to the kidney.

Elkoushy MA, Andonian S: Surgical, radiologic, and endoscopic anatomy of the kidney and ureter, in Wein AJ, Kavoussi LR, Partin AW, Peters CA (eds): CAMPBELL-WALSH UROLOGY, ed 11. Philadelphia, Elsevier, 2015, vol 2, chap 42, p 972.

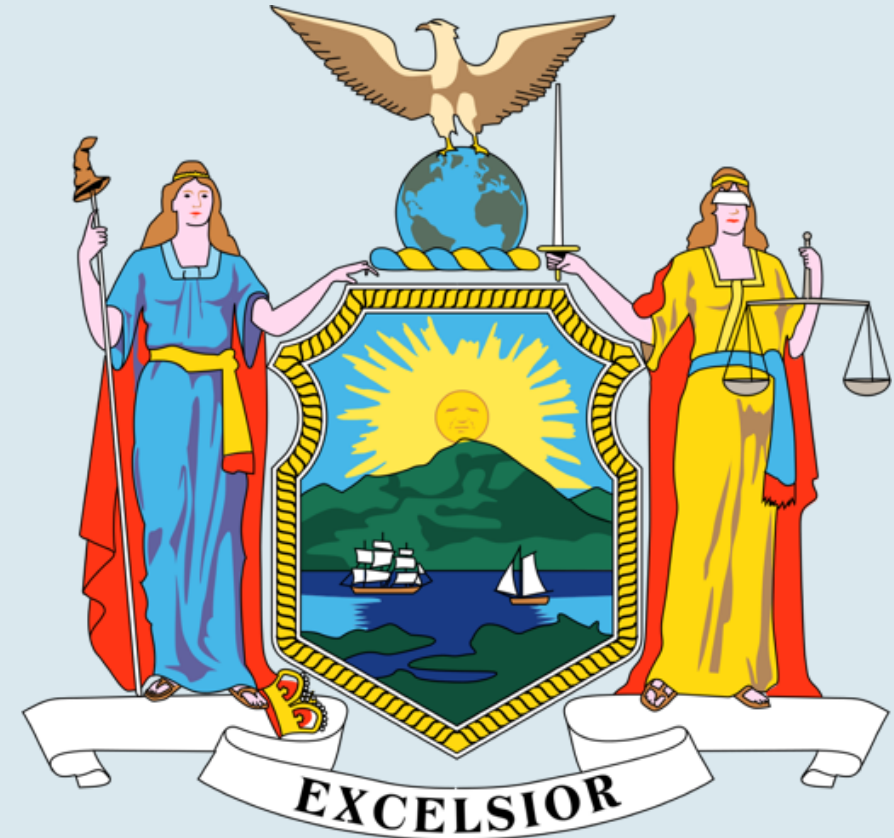
64. A transperitoneal exposure of the right renal hilum requires mobilization of the:
- A. stomach.
 - B. duodenum.
 - C. hepatocolic ligament.
 - D. superior mesenteric artery.
 - E. inferior mesenteric vein.

Question #64

ANSWER=B

The second (descending) portion of the duodenum is of most importance to the urologist because it lies immediately anterior to the right renal hilum and pelvis. This portion of the duodenum is frequently mobilized (referred to as a Kocher maneuver) to expose the right kidney during a transperitoneal approach. The second portion also receives the common bile duct and surrounds the head of the pancreas. Stomach mobilization is not necessary for the right renal hilar exposure. Neither the superior mesenteric artery nor inferior mesenteric vein need to be mobilized to expose the right renal hilum. Mobilization of the hepatocolic ligament will provide exposure to the upper pole of the right kidney, but does not provide access to the hilum of the right kidney.

Thank you.



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