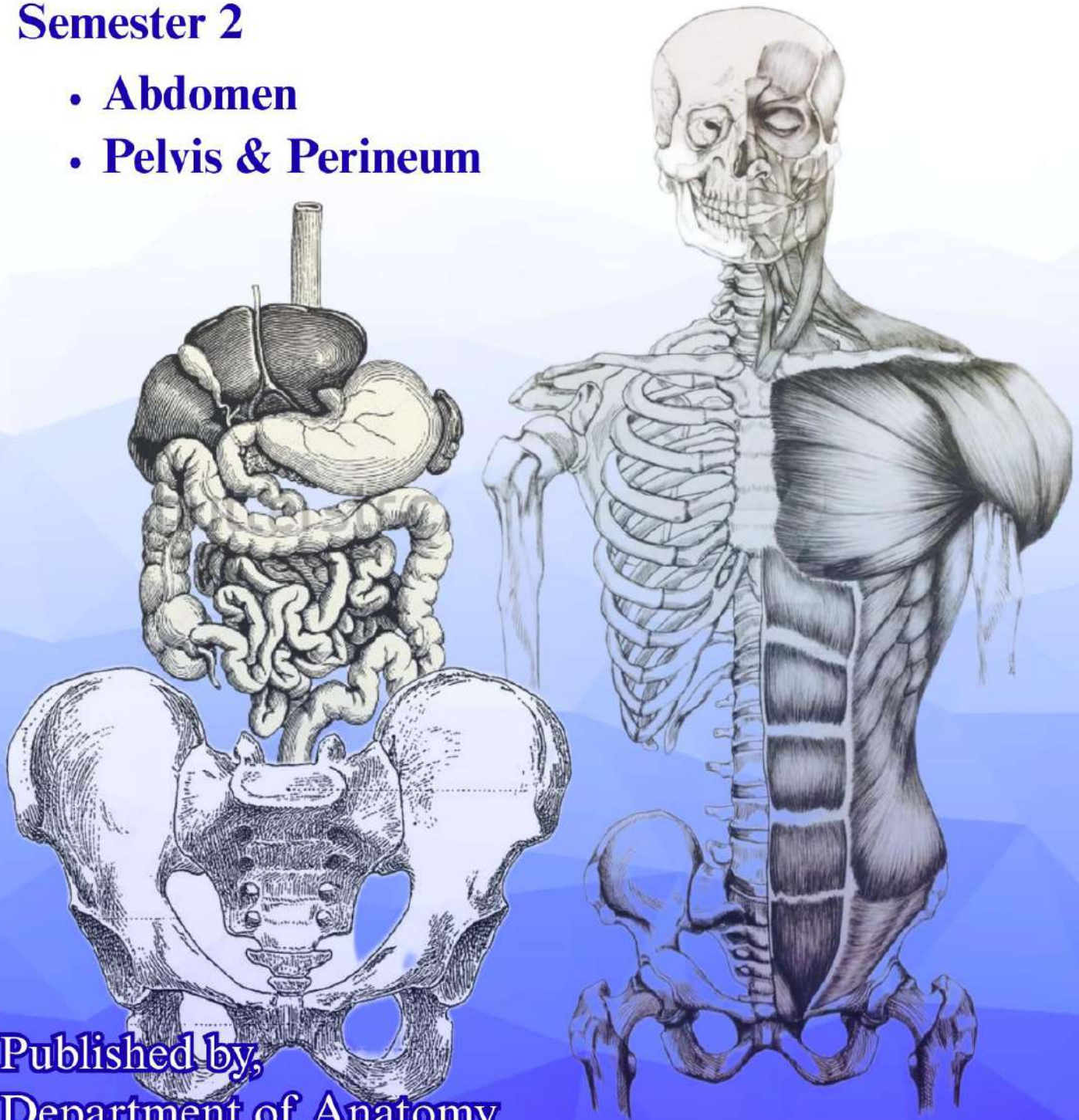
MASTERING ANATOMY
A Comprehensive Guide to MCQs, Essays, and OSPEs
Part II

Uva Wellassa University

Semester 2

- Abdomen
- Pelvis & Perineum



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Authored by:

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A concept of: Snr. Prof. Muditha Vidanapathirana, Dean, Faculty of Medicine

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Message from the Vice Chancellor

Dear Students,

It is with immense pleasure that I offer my warm congratulations and genuine appreciation to the Faculty of Medicine, Uva Wellassa University of Sri Lanka, including Senior Professor Muditha Vidanapathirana, Dean of the Faculty of Medicine, for this outstanding initiative in publishing "Mastering Anatomy – Part II: A Comprehensive Guide to MCQs, Essays & OSPEs" successfully.

This book stands as an invaluable resource, providing substantial benefits not only for MBBS undergraduates of Uva Wellassa University of Sri Lanka, but also for medical students nationwide overall.

I encourage you to fully utilize the excellent resources created by the Faculty of Medicine to strengthen your academic journey. Resources like this guide can make your studies more focused, efficient, and truly rewarding overall experience.

Wishing you all the very best in your academic and professional endeavors.

Senior Professor Kolitha B. Wijesekara
B.Sc. (Hon.) (Peradeniya), M.Phil. (Peradeniya),
Dr. Sc. Agr. (Gottingen, Germany), M.Biol.
Vice Chancellor
Uva Wellassa University of Sri Lanka
06.01.2026

Message from the Head of the Department

Dear students,

As the Head of the Department of Anatomy, I am delighted to add my voice to this significant endeavor with the publication of "Mastering Anatomy–Part II: A Comprehensive Guide to MCQs, Essays, and OSPEs." This guide is not just a collection of questions; it is a carefully designed resource aimed at fostering a deep understanding of anatomical principles, which are essential for any aspiring medical professional.

The journey through medical education can be challenging, and our department is committed to providing you with the tools and knowledge necessary to thrive. This guide will serve as a vital companion in your studies, helping to bridge the gap between theoretical concepts and practical application.

I encourage you to engage with the content actively—utilize the detailed explanations and varied question formats to enhance your comprehension and critical thinking skills. Your success in mastering anatomy will lay the groundwork for your future clinical experiences and patient care.

I would like to express my gratitude to all the faculty members who contributed their time and expertise to create this resource. Together, we can inspire the next generation of medical practitioners.

May this guide empower you on your educational journey, and I wish you all the best in your studies and future careers in medicine.

Warm regards,

Dr. Lakmal Dissanayake
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ANATOMY PRACTICE MCQs (T/F & SBA)

(1) Abdomen

(2) Pelvis & Perineum

Abdomen Practice MCQs

(1) True or false regarding teeth?

(A) Incisors are used to chew food.
(B) Enamel is sensitive to pain.
(C) The last tooth to erupt is the third molar.
(D) Deciduous dentition contains 20 teeth.
(E) Dental caries is caused by bacterial action.

(2) What are the organs related to the anterior abdominal wall?

(A) Right hypochondrium – Gallbladder
(B) Left hypochondrium – Spleen
(C) Epigastric – Pancreas
(D) Umbilical – Duodenum
(E) Right lumbar – Caecum

(3) What structures pass through the transpyloric plane?

(A) Neck of pancreas
(B) Tip of the 10th rib
(C) Pelvis of the right kidney
(D) L1 vertebra
(E) Origin of the superior mesenteric artery

(4) True or false regarding the lesser omentum?

(A) Is attached superiorly to the porta hepatis and the fissure for the ligamentum venosum.
(B) Extends inferiorly as far as the transverse colon.
(C) Separates the lesser sac and the greater sac of the peritoneum.
(D) Forms part of the boundaries of the epiploic foramen.
(E) Embraces the portal vein.

(5) True or false regarding the abdominal oesophagus?

(A) Enters the abdomen between the right and left crus of the diaphragm.
(B) Is enveloped by peritoneum.
(C) Is closely related to both the anterior and posterior gastric nerves.
(D) Is closely related to the left lobe of the liver.
(E) Is surrounded by an external esophageal sphincter.

(6) What are the structures related to the stomach bed?

(A) Right crus of the diaphragm
(B) Splenic vein
(C) Left suprarenal gland
(D) Hepatic artery proper
(E) Hilum of the right kidney

(7) What are the structures that are crossed by the root of the mesentery?

(A) Aorta
(B) Inferior vena cava
(C) Right ureter
(D) Left psoas muscle
(E) 3rd part of the duodenum

(8) What are the characteristic features of the large intestine?

(A) Plicae circularis
(B) Taenia coli
(C) Appendices epiploicae
(D) Haustration
(E) Villous epithelium

(9) True or false regarding the celiac trunk?

(A) Arises at the level of the inferior border of the pancreas.
(B) Has three main branches.
(C) Is surrounded by a plexus of nerves.
(D) Supplies the foregut and structures derived from it.
(E) Supplies the lower esophagus.

(10) True or false regarding lymphoid tissue distribution in the gastrointestinal tract?

(A) Lymphoid aggregations are present in the ileum.
(B) Intestinal villi don't contain lymphoid follicles.
(C) Mucosa-associated lymphoid tissue is confined to the large intestine.
(D) Preaortic nodes receive lymph from all parts of the GI tract.
(E) Appendix contains lymphoid follicles.

(11) Which of these are the borders of Callot's triangle?

(A) Cystic duct
(B) Cystic artery
(C) Gall bladder
(D) Common hepatic artery
(E) Common bile duct

(12) True or false regarding the liver?

(A) Hepatocytes are derived from the septum transversum.
(B) Caudate lobe contains the 2nd segment.
(C) Bile canaliculi start from the space of Disse.
(D) Bleeding is stopped by compressing the free border of the lesser omentum.
(E) Upper margin of the right lobe is at the 3rd intercostal space.

(13) True or false regarding the pancreas?

(A) Developed from endoderm.
(B) Directly related to the lesser sac.
(C) Mainly supplied by the splenic artery.
(D) The tail of the pancreas is within the two levels of the gastrosplenic ligament.
(E) The pancreatic duct directly opens into the 2nd part of the duodenum.

(14) True or false regarding the spleen?

(A) It has a thin fibrous capsule.
(B) Its long axis corresponds to the 11th rib.
(C) It passes downward when it enlarges.
(D) Has no afferent lymphatics.
(E) The stomach is an anterior relation.

(15) True or false regarding the kidney?

(A) Pain from the kidney is referred to the scrotum.
(B) In a retrograde pyelogram, dye is injected into a peripheral vein.
(C) Hilum of the left kidney is at the level of the L2 vertebra.
(D) The right celiac plexus is separated from the right kidney by the peritoneum.
(E) It is polycystic when there is a congenital failure of fusion between mesodermal and endodermal elements.

(16) True or false regarding the right suprarenal gland?

(A) Is related to the bare area of the liver.
(B) Medulla of the gland secretes sex hormones.
(C) Is separated from the kidney by renal fascia.
(D) Veins drain into the IVC.
(E) Cortex is derived from mesoderm.

(17) True or false regarding the lumbar plexus?

(A) Is formed by the dorsal of upper lumbar nerves.
(B) Posterior to the quadratus lumborum muscle.
(C) Lateral cutaneous nerve of the thigh emerges from the lateral border of the quadratus lumborum.
(D) Nerves emerge on the anterior surface of the psoas.
(E) Obturator nerve emerges between the psoas and iliacus muscle.

(18) True or false regarding the posterior abdominal wall?

(A) The psoas muscle abducts the thigh at the hip joint.
(B) Costo-diaphragmatic pleura crosses the 12th rib.
(C) Iliacus is inserted into the lesser trochanter.
(D) Psoas abscess can extend to the upper part of the thigh.
(E) The sympathetic trunk lies in front of the IVC.

(19) A 54-year-old patient presents with the proforma ulcers in the anterior duodenal wall. What is the most probable site of collection of duodenal contents? (SBR)

(A) Right anterior sub phrenic space
(B) Right posterior sub phrenic space
(C) Lesser sac
(D) Left paracolic gutter
(E) Pouch of Douglas

(20) A 13-year-old boy was admitted to the emergency ward due to acute appendicitis. The on-call surgeon decided on an urgent appendicectomy. What is the most appropriate feature to identify the appendix? (SBR)

(A) Location in the right iliac fossa.
(B) Presence of mesentery.
(C) Absence of appendices epiploicae.
(D) Absence of haustrations.
(E) Convergence of Taenia Coli.

(21) A 60-year-old woman came to the physician with right hypochondriac pain and pain in the tip of the right shoulder. She was diagnosed with a right subphrenic abscess. How was the pain caused in the tip of the right shoulder? (SBR)

(A) Spreading of infection to the right shoulder.
(B) Same spinal segment supplies the tip of the right shoulder and the visceral peritoneum of the liver.
(C) Radiation of pain.
(D) The diaphragmatic part of the peritoneum and the tip of the shoulder share the same spinal cord segment.
(E) Autonomic supply to the liver is from the cervical segment.

(22) A 50-year-old man was diagnosed with portal hypertension and presented with blood-stained vomitus following a rupture of oesophageal varices. Which one of the following vein contributes to the oesophageal varices? (SBR)

(A) Hepatic vein
(B) Left gastric vein
(C) Left gastroepiploic vein
(D) Right gastric vein
(E) Short gastric vein

(23) A 60-year-old male patient with a history of constipation for 4 days came to the emergency department complaining of acute lower abdominal pain. His erect abdominal X-ray (anteroposterior view) showed a coffee bean appearance in the left iliac fossa. What is the most likely diagnosis? (SBR)

(A) Volvulus of the cecum
(B) Sigmoid volvulus
(C) Carcinoma of the rectosigmoid junction
(D) Mesenteric ischemia
(E) Colonic polyp

Pelvis and Perineum Practice MCQs

(24) Which of the following is/are correct about the inguinal canal?

(A) It lies just above the medial side of the inguinal ligament.
(B) Transmit the ilioinguinal nerve.
(C) The external oblique aponeurosis forms the superficial inguinal ring.
(D) The roof is formed by the transversus abdominis muscle.
(E) Deep ring is medial to the inferior epigastric artery.

(25) The female pelvis differs from the male pelvis in that?

(A) Iliac fossae are shallow.
(B) Transverse diameter of pelvic inlet lies closer to sacral promontory.
(C) The sacral concavity is deeper.
(D) Ischial tuberosities are greatly everted.
(E) Accommodate two fingers in the subpubic angle.

(26) True or false regarding the sacroiliac joint?

(A) It is a fibrous joint.
(B) Posterior relation is the sciatic nerve.
(C) Allows restricted gliding movement.
(D) Is behind the bifurcation of the common iliac vessels.
(E) Strengthened by neighboring muscles.

(27) What are the structures that pass through the horizontal plane that is drawn via the upper border of the pubic symphysis?

(A) Uterus
(B) Center of head of femur
(C) Ischial spine
(D) Tip of the greater trochanter
(E) Cervix of the uterus

(28) What are the contents of the deep perirenal pouch in females?

(A) Bartholin glands
(B) Pudendal nerves
(C) Perineal nerve
(D) Nerve to the obturator internus
(E) Internal pudendal artery

(29) Which of the following structures cross the ureter?

(A) 2nd part of the duodenum
(B) Genitofemoral nerve
(C) Internal iliac artery
(D) Root of the mesentery
(E) Inferior mesenteric vein

(30) True or false regarding the bladder and urethra?

(A) The base of the bladder is firmly attached to the underlying smooth muscle.
(B) The prostatic part of the urethra is lined by the urothelium.
(C) The membranous urethra may be damaged during cystoscopy examination.
(D) Ducts of the prostate gland drain into the prostate sinus.
(E) In the deep peroneal pouch urethra is enclosed by the external urethral sphincter.

(31) What are the supporters of the uterus?

(A) Broad ligament
(B) Cardinal ligament
(C) Levator ani muscle
(D) Uterosacral ligament
(E) Suspensory ligament of the ovary

(32) True or false regarding the cervix of the uterus?

(A) Cervix of the uterus lined by squamous stratified epithelium.
(B) Undergoes cyclical changes during the menstrual cycle.
(C) Contains acid mucous.
(D) Loss of the whole lining during menstruation.
(E) Have the same proportion of muscles as the body of the uterus.

(33) True and false regarding ovarian blood supply?

(A) Ovarian artery given as a branch of the anterior division of the internal iliac artery.
(B) Ovarian artery passing through the suspensory ligament of the ovary
(C) Ovarian artery supplies the uterine tube.
(D) Ovarian artery is an end artery.
(E) Right ovarian vein drains into the inferior vena cava.

(34) True or false regarding the prostatic venous plexus?

(A) Is located outside the true capsule of the prostate.
(B) Receives the deep dorsal vein of the penis.
(C) Have unidirectional valves.
(D) Drain reverses when the intra-abdominal pressure rises.
(E) Carcinoma can spread to the skull bones.

(35) True or false regarding the testis and scrotum?

(A) Testis drains into the deep inguinal nodes.
(B) The tunica albuginea encloses both testes in one cavity.
(C) Posterior cutaneous nerve of the thigh is sensory to the scrotum.
(D) The external pudendal artery supplies to scrotum.
(E) The dartos muscle lies in the deep fascia.

(36) True or false regarding the anal sphincters?

(A) The internal sphincter consists of smooth muscle.
(B) The external sphincter is supplied by the pudendal nerve.
(C) The external sphincter maintains fecal continence.
(D) The internal sphincter is relaxed by parasympathetic activity.
(E) The external sphincter is under voluntary control.

(37) True or false regarding the lower half of the anal canal?

(A) It contains columns.
(B) It contains a continuous muscle layer.
(C) Venous drainage is the internal pudendal vein.
(D) Contains longitudinal muscle.
(E) Lower part of the anal canal drains into superficial inguinal lymph nodes.

(38) True or false regarding the ischiorectal fossa?

(A) Obturator internus forms the medial wall.
(B) Communicate with the fossa of the opposite side behind the anal canal.
(C) Contain the inferior rectal nerve.
(D) Limit distension of the anal canal.
(E) More common in the abscess formation.

(39) Which nerve is blocked using anaesthetic agents during labour? (SBR)

(A) Obturator nerve
(B) Ilio inguinal nerve
(C) Pudendal nerve
(D) Genitofemoral nerve
(E) Sympathetic trunk

(40) A 70-year-old patient was suspected of having prostate cancer and complained of difficulty in urinating. What is the most likely structure involved? (SBR)

(A) Anterior lobe
(B) Prostatic Urethra
(C) Median lobe
(D) Posterior lobe
(E) Lateral lobe

(41) What is the structure that cannot be palpated in per vaginal digital examination? (SBR)

(A) Pouch of Douglus
(B) Ovary
(C) Cervix
(D) Pubic symphysis
(E) Fallopian tube

(42) A 65-year-old man was admitted to the surgical emergency after difficult urethral catheterization, complaining of swelling of the scrotum. Investigations show that he has urine extravasation in the lower urinary tract. What is the part most liable to get damaged, causing extraversation? (SBR)

(A) Neck of the bladder
(B) Prostatic urethra
(C) Membranous urethra
(D) Bulbo urethra
(E) Penile urethra

(43) What are the structures seen in a hysterosalpingogram? (SBR)

(A) Uterine tubes
(B) Uterine cavity
(C) Peroneal cavity
(D) a & b
(E) a, b & c

PRACTICE MCQs (T/F & SBA) ANSWERS

(1) Abdomen

(2) Pelvis & Perineum

Abdomen Practice MCQ Answers

(1)

(A) **F** - Cutting and biting.

(B) **F** - No innervation.

(C) **T** - The third molar (wisdom tooth) is typically the last tooth to erupt, usually between 17–25 years.

(D) **T** - Children's (deciduous/milk) dentition consists of 20 teeth:

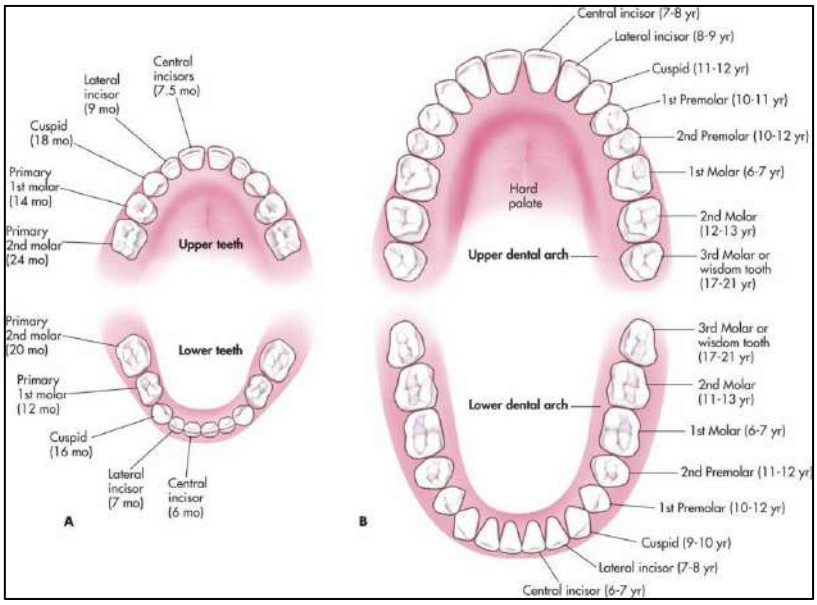
8 incisors

4 canines

8 molars

Deciduous dentition has no premolars.

(E) **T** - Dental caries results from acid-producing bacteria (e.g., *Streptococcus mutans*) acting on sugars and destroying enamel/dentin.



https://www.spadental.co.uk/blog/2018/11/deciduous-teeth/

(2)

(A) **T** - Right hypochondrium – Liver, gallbladder.

(B) **T** - Left hypochondrium – Spleen, left colic flexure.

(C) **T** - Epigastric region – Stomach, duodenum, pancreas.

(D) **T**

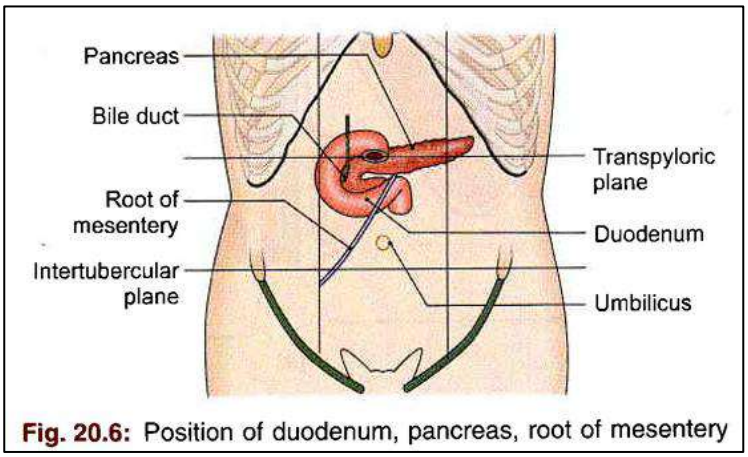


Fig. 20.6: Position of duodenum, pancreas, root of mesentery

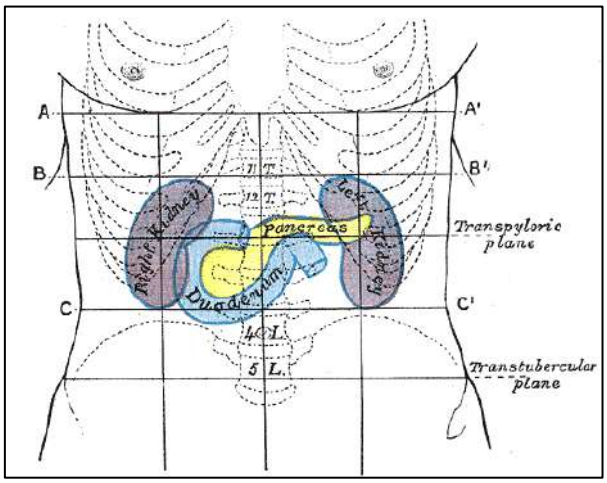
BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 285 – fig 20.6

(E) **F** - Right lumbar – Right kidney & ureter, ascending colon. Right iliac fossa – Caecum, vermiform appendix.

(3)

(A) **T**
(B) **F**
(C) **F**
(D) **T**
(E) **T**

The transpyloric plane usually lies at the level of the body of the 1st lumbar vertebra and meets the costal margins at the tips of the ninth costal cartilages. The hilum of both kidneys, the origin of the superior mesenteric artery, the termination of the spinal cord, the neck, adjacent body and head of the pancreas, and the confluence of the superior mesenteric vein and the splenic veins as they form the hepatic portal vein may all lie in this plane.



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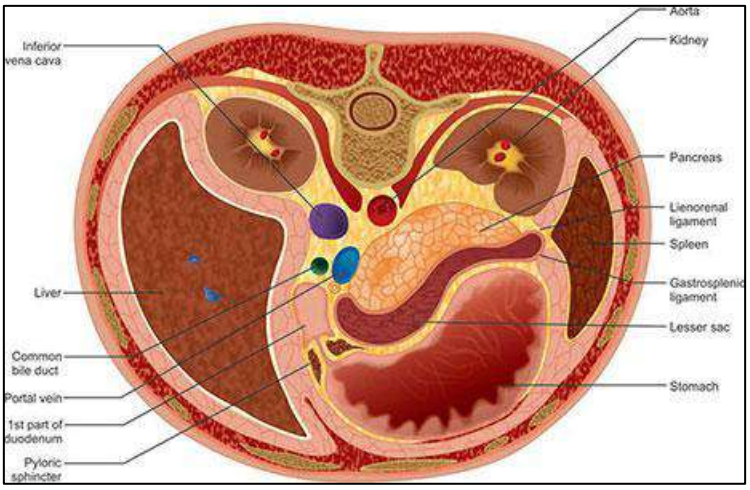

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(4)

(A) **T** - On the liver, the lesser omentum is attached in the depths of the fissure for the ligamentum venosum and around the margin of the porta hepatis.

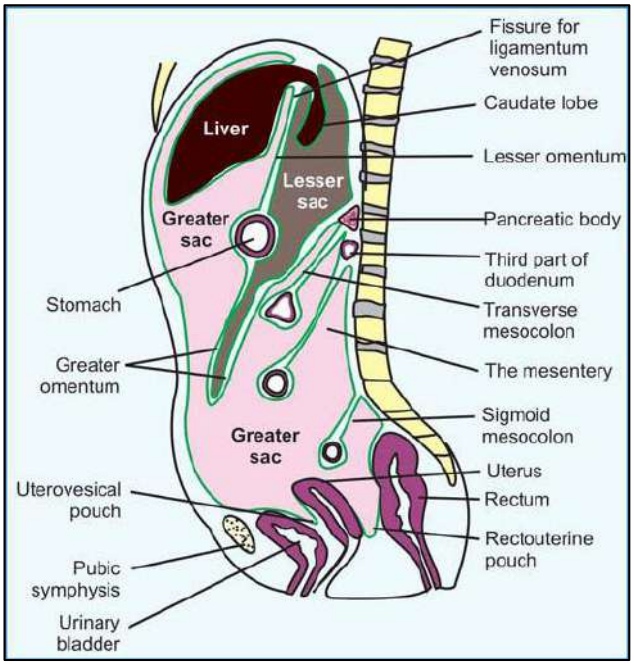
(B) **F** - The greater omentum overlies the transverse colon.

(C) **T**

(D) **T**

(E) **T**

The anterior margin of the epiploic foramen is formed by the portal vein, the proper hepatic artery, and the bile duct as they lie in the free edge of the lesser omentum.



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(5)

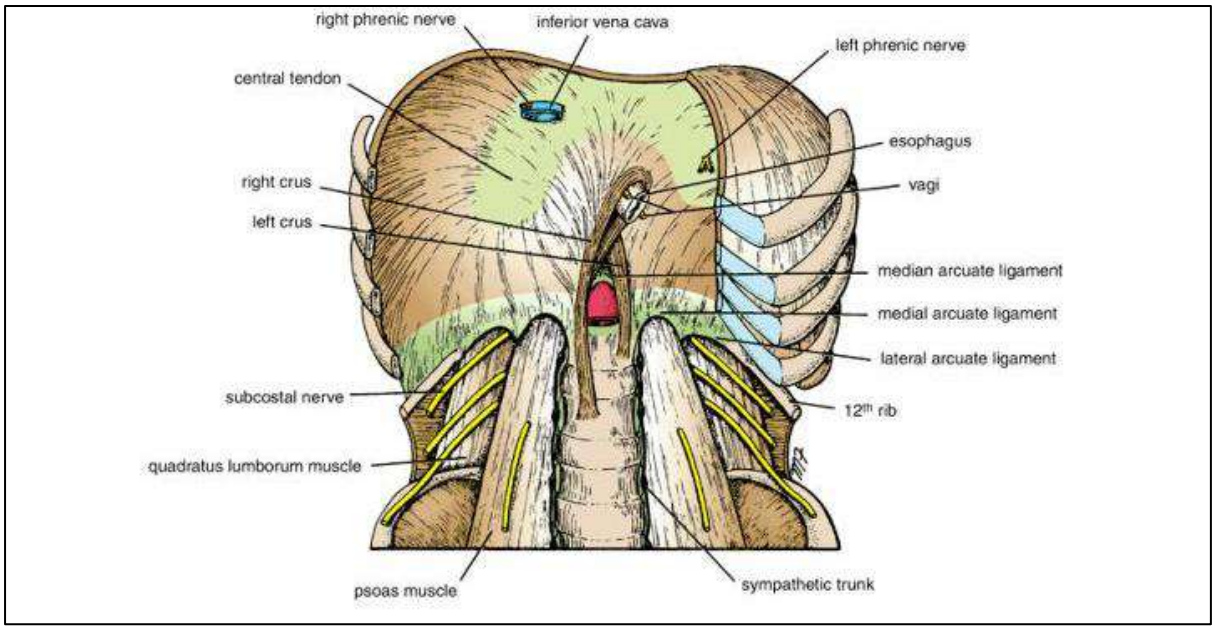
(A) **F** - The esophagus pierces the right crus of the diaphragm.

(B) **F** - Esophagus is covered by peritoneum on its anterior and left aspects.

(C) **T** - Anterior gastric nerve = anterior vagal trunk.
Posterior gastric nerve = posterior vagal trunk.
Both run along the oesophagus and continue onto the stomach.

(D) **T** - It grooves the left lobe of the liver.

(E) **F** - There is no anatomical sphincter at the lower end of the esophagus.



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(6)

(A) **F**

(B) **F** - Lies behind the pancreas.

(C) **T**

(D) **F**

(E) **F**

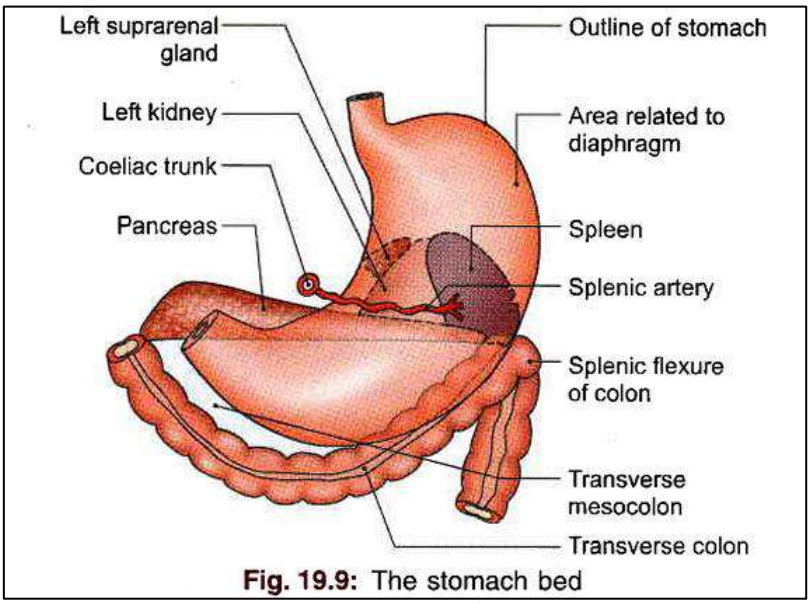


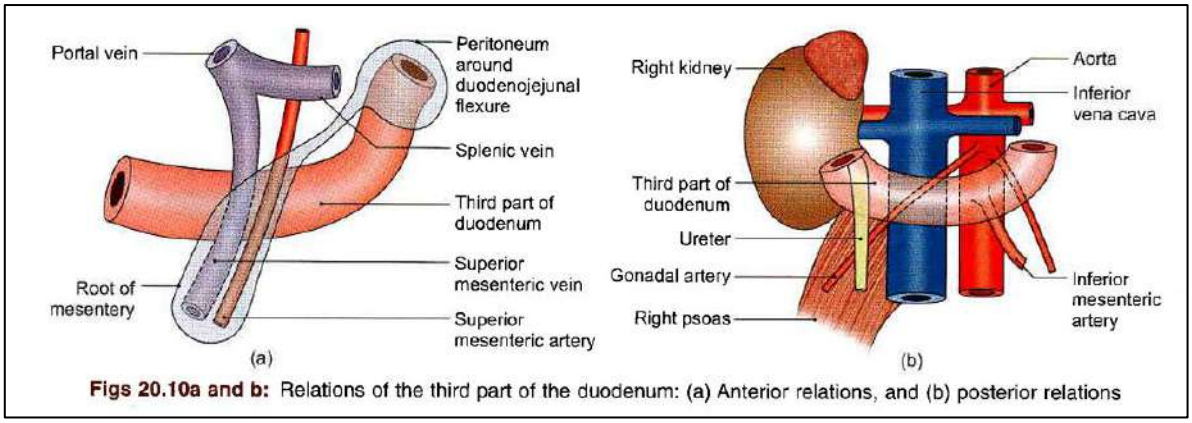
Fig. 19.9: The stomach bed

BD Chaurasia's Human Anatomy, vol 2- 7th edition – pg 276 – fig 19.9

(7)

(A) **T**
(B) **T**
(C) **T**
(D) **F**
(E) **T**

The root of the mesentery crosses the third part of the duodenum, abdominal aorta, inferior vena cava, right ureter, right psoas major muscle, and right gonadal artery.



Figs 20.10a and b: Relations of the third part of the duodenum: (a) Anterior relations, and (b) posterior relations

BD Chaurasia's Human Anatomy, vol 2- 7th edition – pg 288 – fig 20.10 a,b

(8)

(A) **F** - In the small intestine.
(B) **T**
(C) **T**
(D) **T**
(E) **F** - No villi.

Table 20.2: Differences between the small intestine and the large intestine

Feature	*Small intestine*	*Large intestine*
1. Appendices epiploicae	Absent	Present
2. Taeniae coli	Absent	Present
3. Sacculations	Absent	Present
4. Distensibility and diameter	Less distensibility and less diameter	More distensibility and more diameter
5. Fixity	Greater part is freely mobile	Greater part is fixed
6. Villi	Present	Absent
7. Transverse mucosal folds	Permanent	Obliterated when longitudinal muscle coat relaxes
8. Peyer's patches	Present in ileum	Absent
9. Common site for	a. Intestinal worms b. Typhoid c. Tuberculosis	a. *Entamoeba histolytica* b. Dysentery organisms c. Carcinoma
10. Effects of infection and irritation	Diarrhoea	Dysentery (Greek *bad intestine*)

BD Chaurasia's Human Anatomy, vol 2- 7th edition – pg 293 – table 20.2

(9)

(A) **F** - Arise at T12 level above the pancreas.
(B) **T** - Hepatic, splenic, left gastric arteries.
(C) **T** - Coeliac plexus surrounds it.
(D) **T** - It is the artery of the foregut and its derivatives, liver, pancreas, and spleen.
(E) **T** - Via left gastric artery.

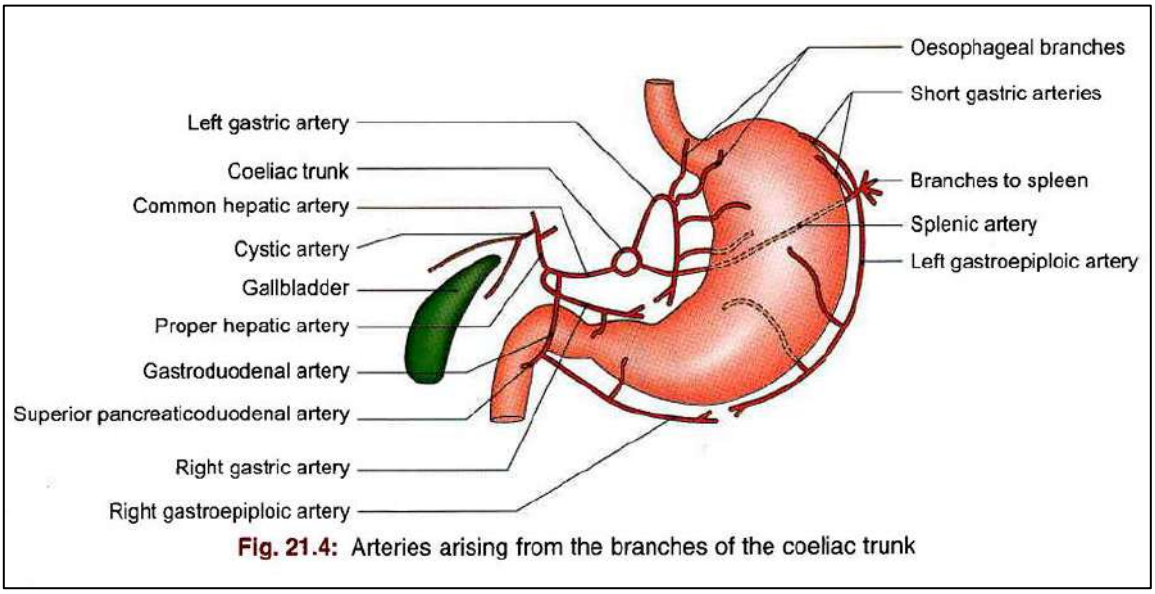


Fig. 21.4: Arteries arising from the branches of the coeliac trunk

BD Chaurasia's Human Anatomy, vol 2- 7th edition – pg 304 – fig 21.4

(10)

(A) **T** – But, almost absent in the jejunum.

(B) **T** - Intraepithelial lymphocytes present.

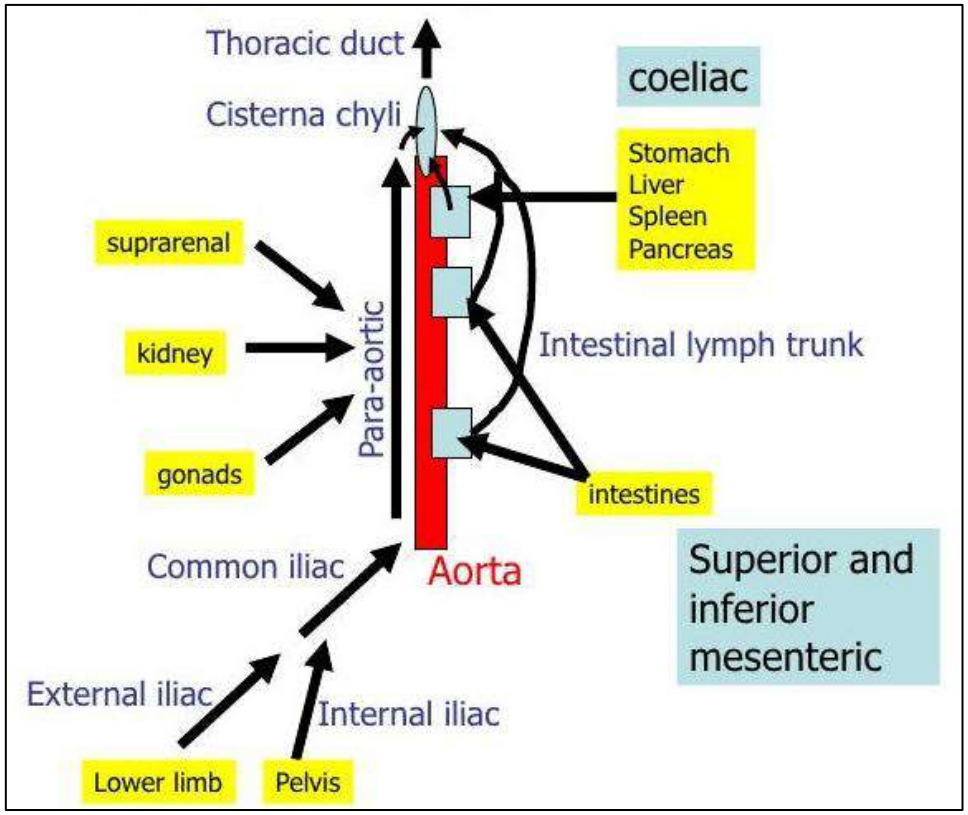
(C) **F**

(D) **T** - celiac, superior mesenteric, and inferior mesenteric nodes (all preaortic) drain to,

Foregut
Midgut
Hindgut

These three collectively drain the entire gastrointestinal tract.

(E) **T**



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(11)

(A) **T**

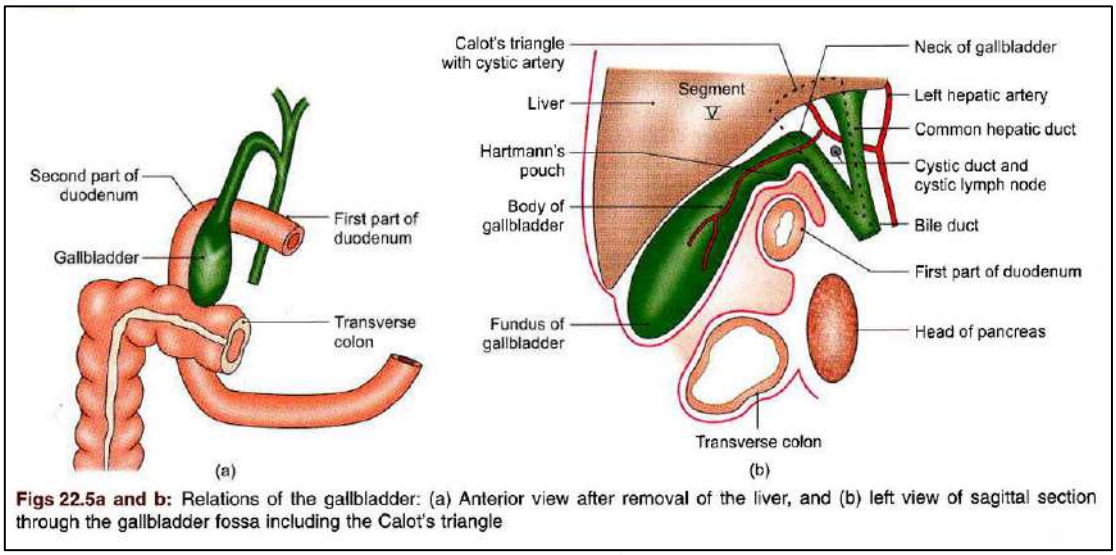
(B) **F**

(C) **F**

(D) **F**

(E) **F**

The triangle of Calot is an important landmark whose boundaries include the common hepatic duct medially, the cystic duct laterally, and the inferior edge of the liver superiorly.



Figs 22.5a and b: Relations of the gallbladder: (a) Anterior view after removal of the liver, and (b) left view of sagittal section through the gallbladder fossa including the Calot's triangle

BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 316 – fig 22.5 a

(12)

(A) **F** - Liver cords from the liver bud give rise to liver cells. Its hematopoietic cells, puffer cells, and connective tissue cells are derived from the mesoderm of the septum transversum.

(B) **F** - Segment I.

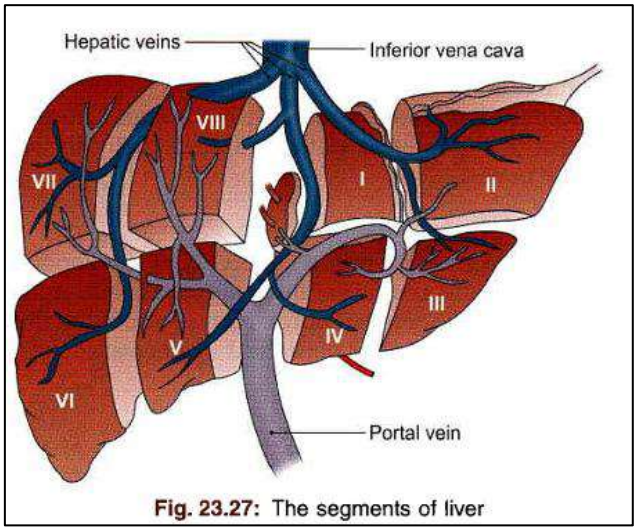


Fig. 23.27: The segments of liver

BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 336 – fig 23.27

(C) **T**

(D) **T** - Because at the free border of the lesser omentum, between two peritoneal layers hepatic artery, bile duct, portal vein pass into the liver. The liver receives blood from the hepatic artery and the portal vein. When the free border is compressed, both of these blood vessels become compressed and cause to prevent the blood flow into the liver.

(E) **F** - At the level of the 7th rib.

(13)

(A) **T**

(B) **T** - Anterior border of the pancreas forms a part of the posterior wall of the lesser sac.

(C) **T**

(D) **F** - Not gastrosplenic. Between the splenorenal ligaments.

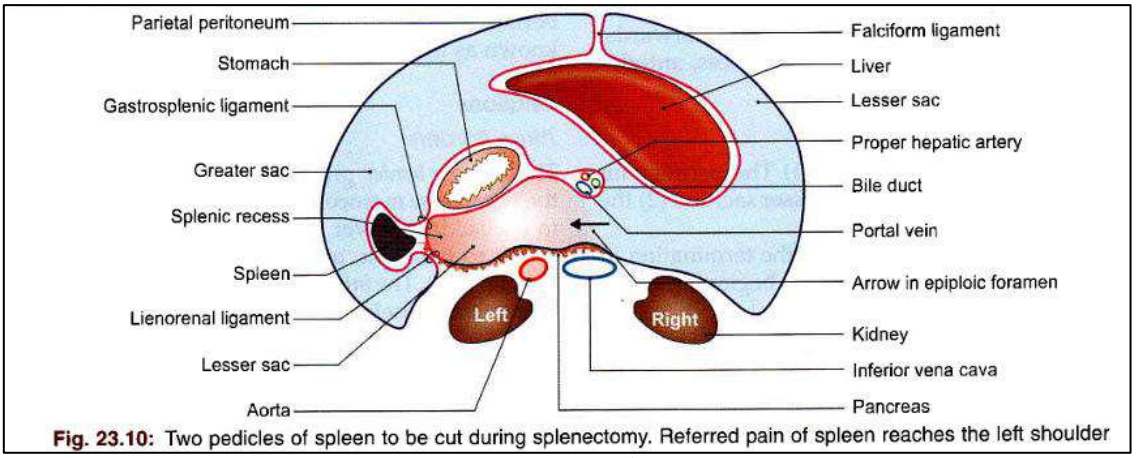


Fig. 23.10: Two pedicles of spleen to be cut during splenectomy. Referred pain of spleen reaches the left shoulder

BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 326 – fig 23.10

(E) **F**

(14)

(A) **T**

(B) **F** - 10th Rib.

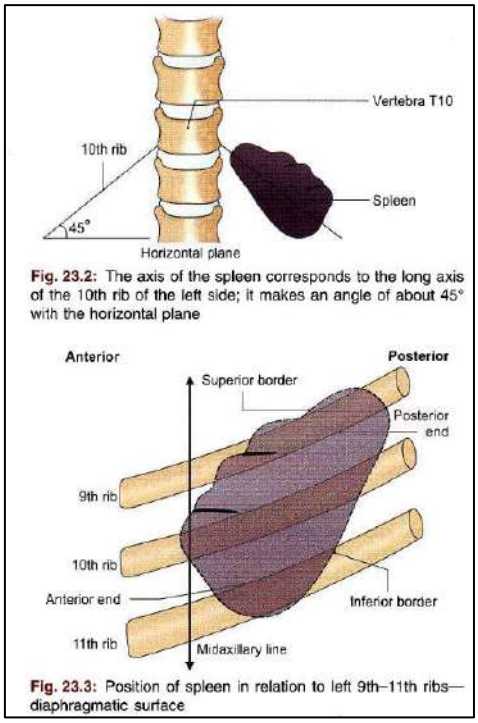


Fig. 23.2: The axis of the spleen corresponds to the long axis of the 10th rib of the left side; it makes an angle of about 45° with the horizontal plane

Fig. 23.3: Position of spleen in relation to left 9th–11th ribs—diaphragmatic surface

BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 323 – fig 23.2 & 23.3

(C) **T** - Extends downwards and medially.

(D) **T** - The lymph vessels emerge from the hilum and pass through a few lymph nodes along the course of the splenic artery and then drain into the celiac nodes.

(E) **T** - The stomach, tail of the pancreas, and left colic flexure. The left kidney lies along its medial border.

(15)

(A) **F** – In the kidney, visceral pain via T12 (least splanchnic). So, referred to T12 somatic area (groin and loin), scrotum somatic area is L1 (genitofemoral)

(B) **F** - Inject into the ureter.

(C) **F** - L1 / transpyloric plane.

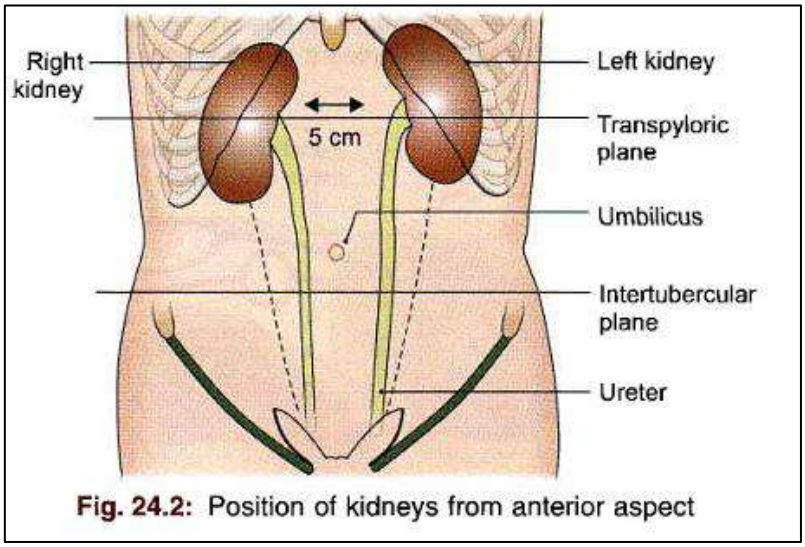


Fig. 24.2: Position of kidneys from anterior aspect

BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 342 – fig 24.2

(D) **F** - Both are retroperitoneal.

(E) **T** - It is a failure of union between the developing convoluted tubule and the collecting tubules. Convoluted tubules have a mesodermal and collecting tubules have an endodermal origin.

(16)

(A) **T**

(B) **F** - Sex hormone secreted by the cortex.

(C) **F** - Perirenal fat.

(D) **T** - Right - IVC / Left - renal vein.

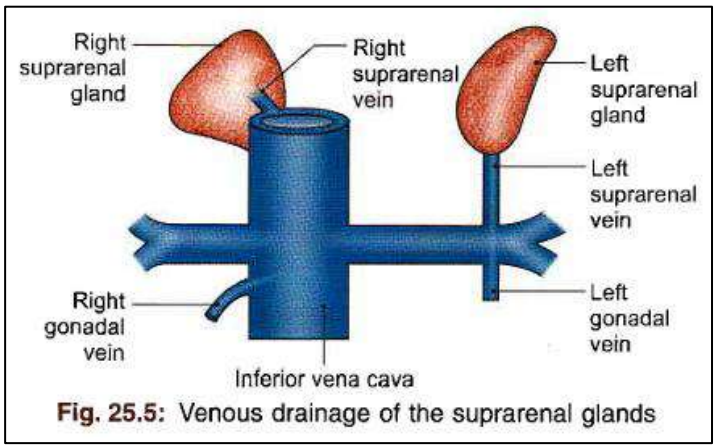


Fig. 25.5: Venous drainage of the suprarenal glands

BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 358 – fig 25.5

(E) **T**

(17)

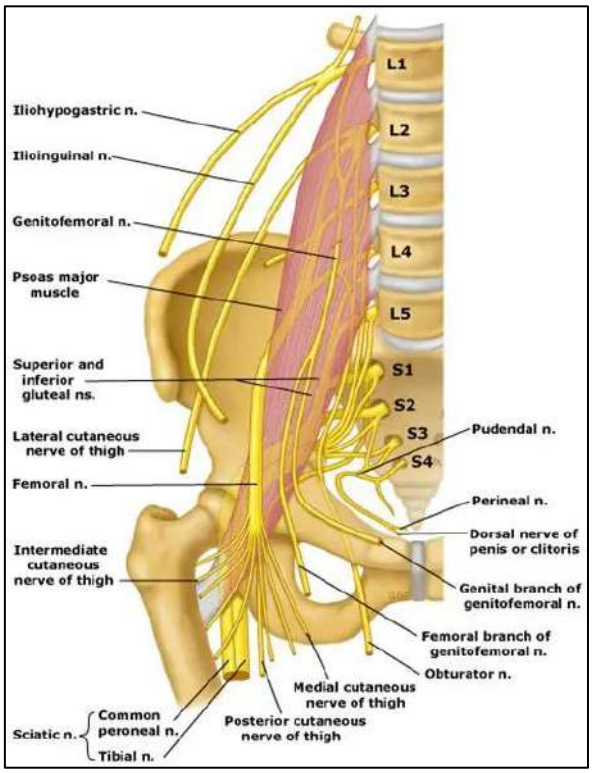
(A) **F**

(B) **F**

(C) **F** - The lateral cutaneous nerve of the thigh (L. 2, 3; dorsal divisions) emerges from the lateral border of the psoas above the iliac crest.

(D) **T** - The genitofemoral nerve (L. 1, 2; ventral divisions) passes forwards and emerges on the anterior surface of the psoas.

(E) **F** - The obturator nerve (L. 2, 3, 4; ventral divisions) leaves the medial border of the psoas on the base of the sacrum and enters the lesser pelvis.



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(18)

(A) **F** - flexes the thigh.

(B) **T**

(C) **T** - together with the psoas muscle.

(D) **T** - abscess tracks downward following the course of the psoas muscle and appears as a swelling in the upper part of the thigh below the inguinal ligament. (It may be mistaken for a femoral hernia.)

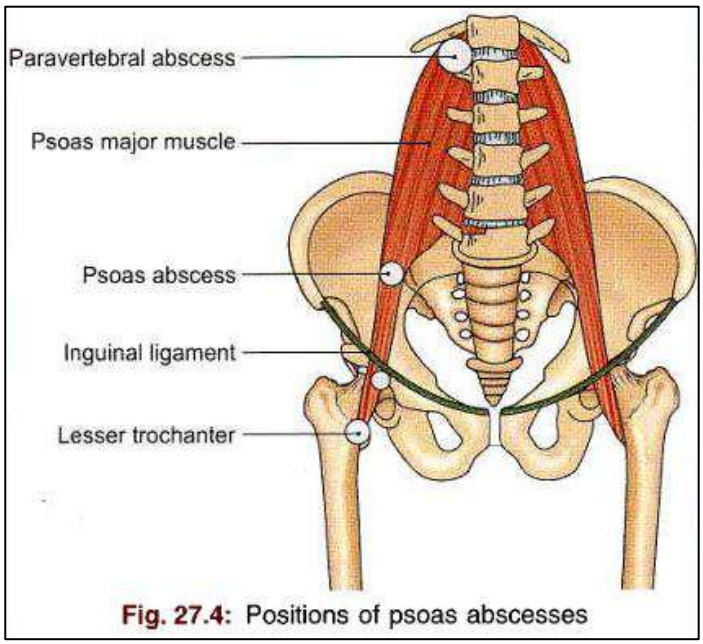


Fig. 27.4: Positions of psoas abscesses

BD Chaurasia's Human Anatomy vol 2- 6th edition – pg 343 – fig 27.4

(E) **F** - right - behind the right border of IVC - left border of the aorta.

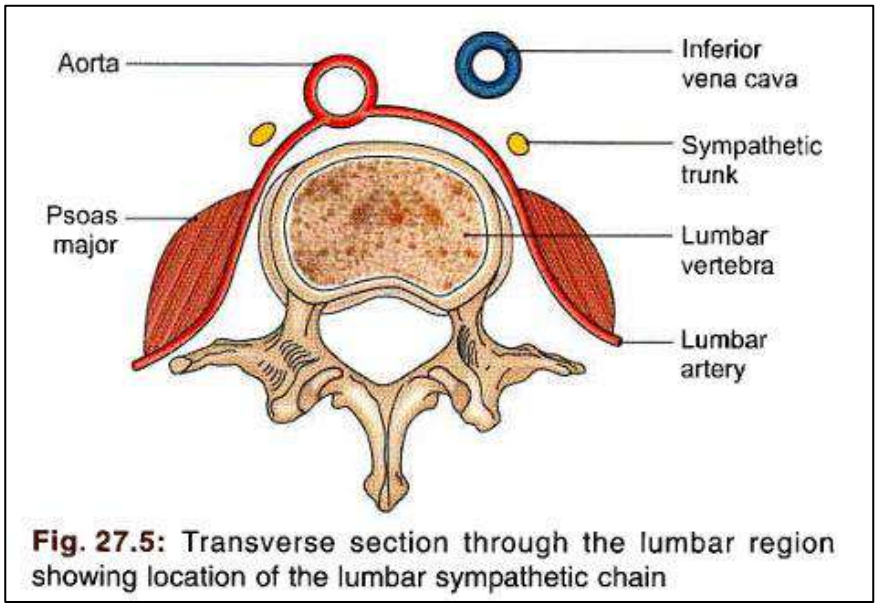
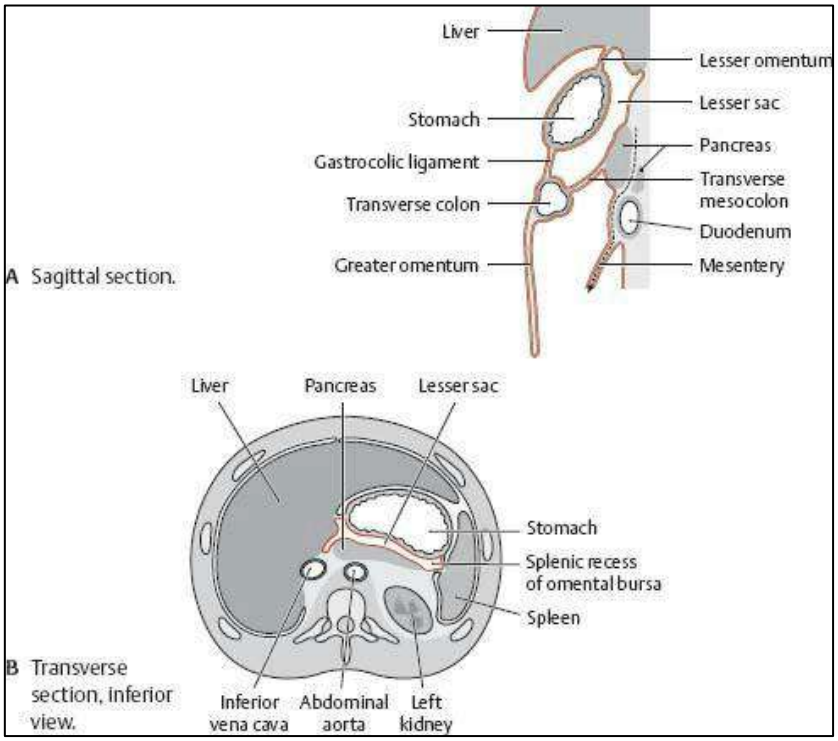


Fig. 27.5: Transverse section through the lumbar region showing location of the lumbar sympathetic chain

BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 374 – fig 27.5

(19) C

An ulcer of the anterior wall of the first inch of the duodenum may perforate into the upper part of the greater sac, above the transverse colon. Greater sac connects with the lesser sac through the epiploic foramen. So that duodenal contents can pass to the lesser sac.



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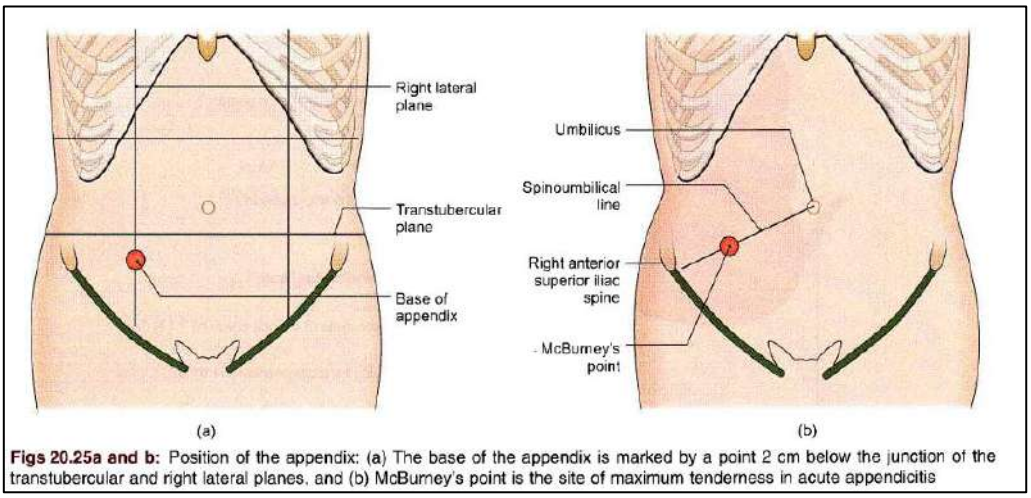
(20) E

There are three taeniae coli, anterior, posteromedial and posterolateral, which converge towards the base of appendix to merge with the uniform longitudinal muscle coat of the appendix. This is the basis of locating the appendix during surgery by tracing the anterior taenia coli to the appendicular base.

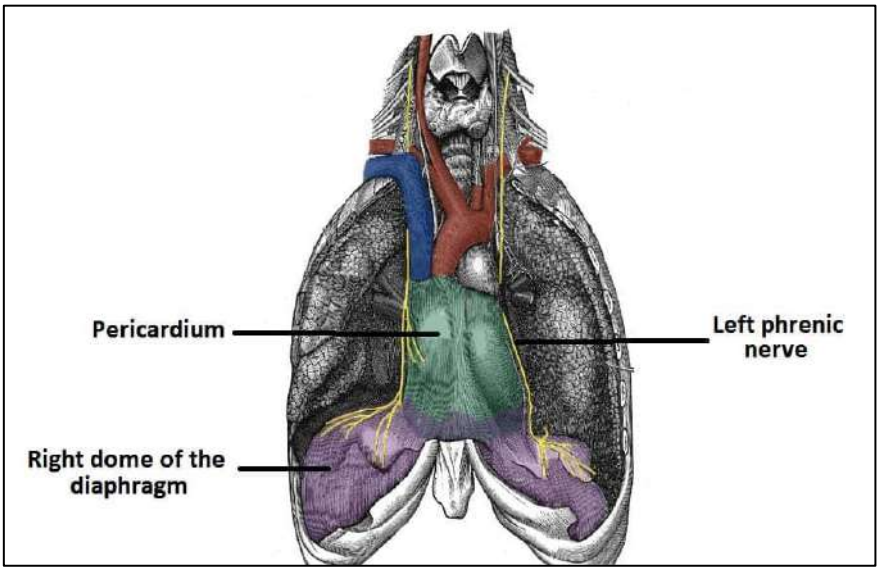


Figs 20.25a and b: Position of the appendix: (a) The base of the appendix is marked by a point 2 cm below the junction of the transtubercular and right lateral planes, and (b) McBurney's point is the site of maximum tenderness in acute appendicitis

BD Chaurasia's Human Anatomy vol 2- 6th edition – pg 297 – fig 20.25 a & b

(21) D

Phrenic nerve and supraclavicular nerves have common spinal segments.



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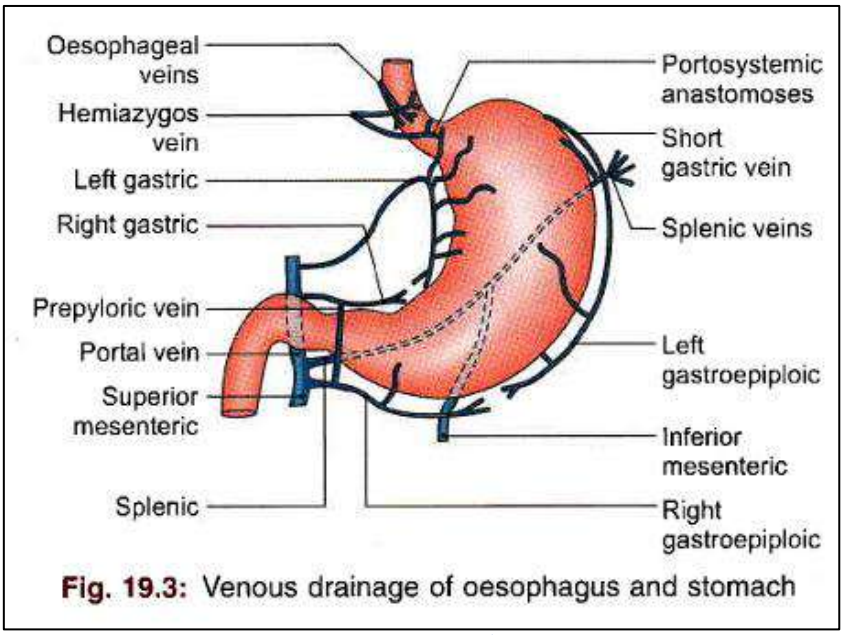
(22) B

In portal hypertension, azygos (systemic) and left gastric (portal) venous tributaries distend into large collateral channels, esophageal varices, which may then rupture with severe hemorrhage.

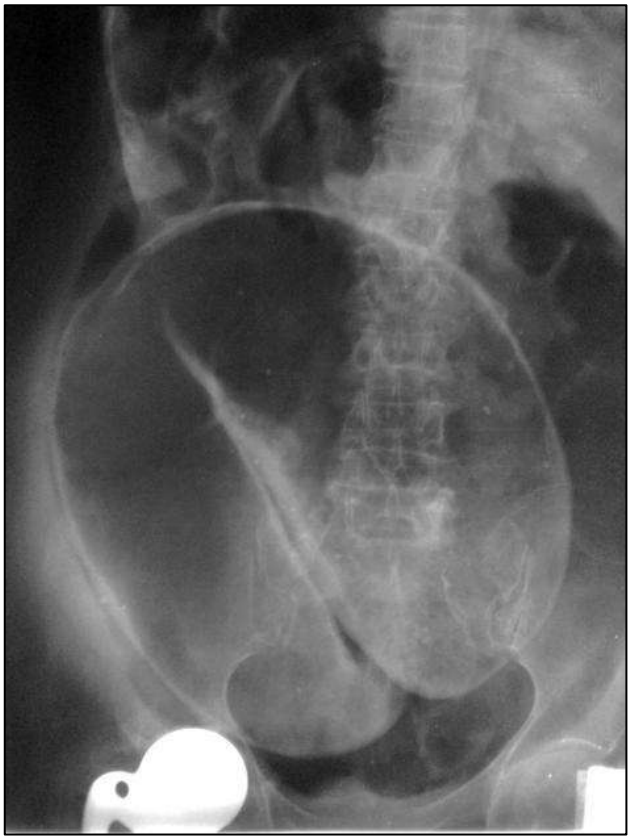


BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 274 – fig 19.3

(23) B

Coffee bean sign: classic X-ray feature of sigmoid volvulus. The “bean” shape is formed by the twisted loop of the sigmoid colon filled with gas. The apex of the “bean” points toward the right upper quadrant. (Typical for sigmoid volvulus.)

Cecal volvulus usually shows a kidney-shaped distended cecum on X-ray, often in the mid-abdomen or right side, not the left iliac fossa.



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Pelvis & Perineum MCQ Answers

(24)

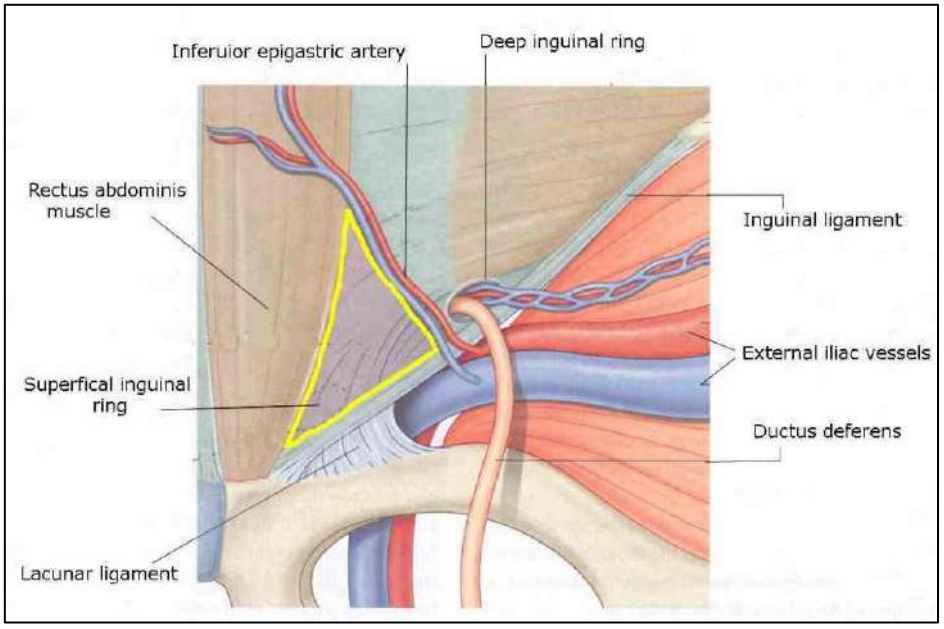
(A) **F** - It passes downwards and medially from the internal to the external inguinal rings and lies parallel to, and immediately above, the inguinal ligament.

(B) **T** - In the male, the inguinal canal transmits the spermatic cord and the ilio-inguinal nerve. In females, it transmits only the round ligament of the uterus together with the ilio-inguinal nerve.

(C) **T** - Superficial inguinal ring is a triangular gap in the external oblique aponeurosis.

(D) **T** - Roof is formed by arching fibers of internal oblique and transversus abdominis muscles.

(E) **F** - Deep inguinal ring is an opening in the fascia transversalis, 1.2cm above the mid inguinal point and immediately lateral to the inferior epigastric artery.



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(25)

(A) **F** - Females got a shallow false pelvis.

(B) **T**

(C) **F** - Sacral concavity in females is shallow.

(D) **T** - Males inverted and females everted.

(E) **F** - Subpubic angle – corresponds to the angle between the fully extended thumb and the index finger.

The sacrum shows a number of important sex differences. These are as follows.

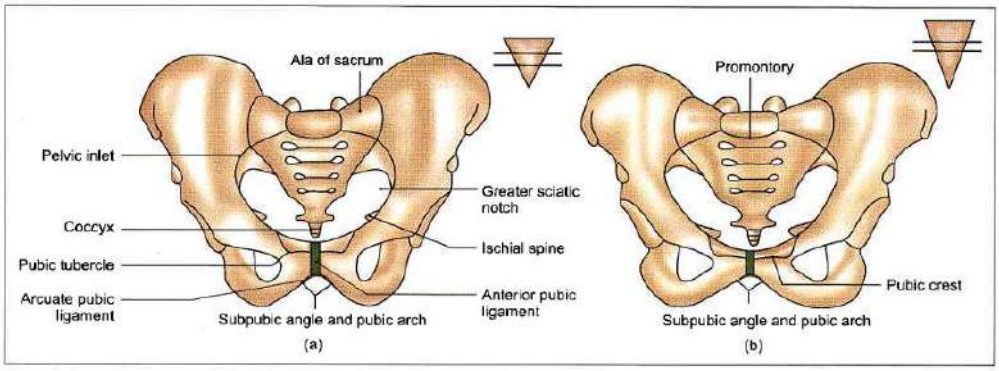
- The relationship of the length and breadth of the sacrum can be expressed quantitatively by using the sacral index which is calculated as:

$$\frac{\text{Breadth across the base} \times 100}{\text{Length from promontory to apex}}$$

The male sacrum is longer and narrower than in the female. The average sacral index is about 105 in the male and about 115 in the female.

- The width of the body of first sacral vertebra is greater than that of each ala in the male. In female, two are equal.
- The dorsal concavity of auricular surface is less marked in male. In both, the auricular surface extends on to upper three sacral vertebrae.

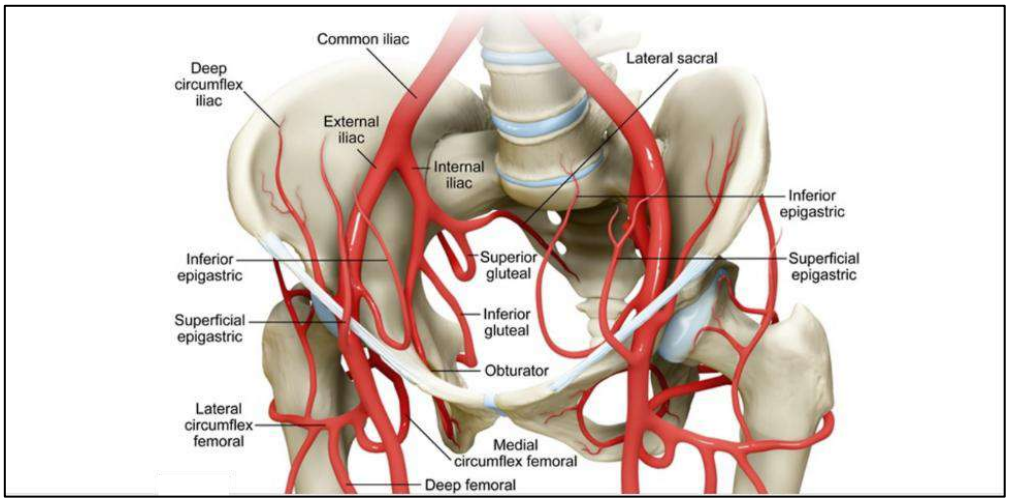
- The concavity on the ventral aspect of sacrum is more uniform, and is shallower in males. In females, the concavity is irregular especially between S1 and S2 and between S3 and S4.
- The sacrovertebral angle is more prominent in the female and the downward direction of the pelvic surface is greater than in the male. The size of pelvic cavity is more in females.



Figs 15.14a and b: Anterior view of (a) a male pelvis, and (b) a female pelvis
BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 213 – fig 15.14 a & b

(26)

(A) **F** - Sacroiliac joint is strong synovial joint.
(B) **F** - Sciatic nerve is an inferior relation of sacroiliac joint.
(C) **T** - small but limited amount of movement is possible.
(D) **T** - Each common iliac artery ends at the pelvic inlet in front of the sacroiliac joint by dividing into the external & internal iliac arteries.
(E) **T** - Posteriorly joint is covered by the erector spinae & gluteus maximus muscles.



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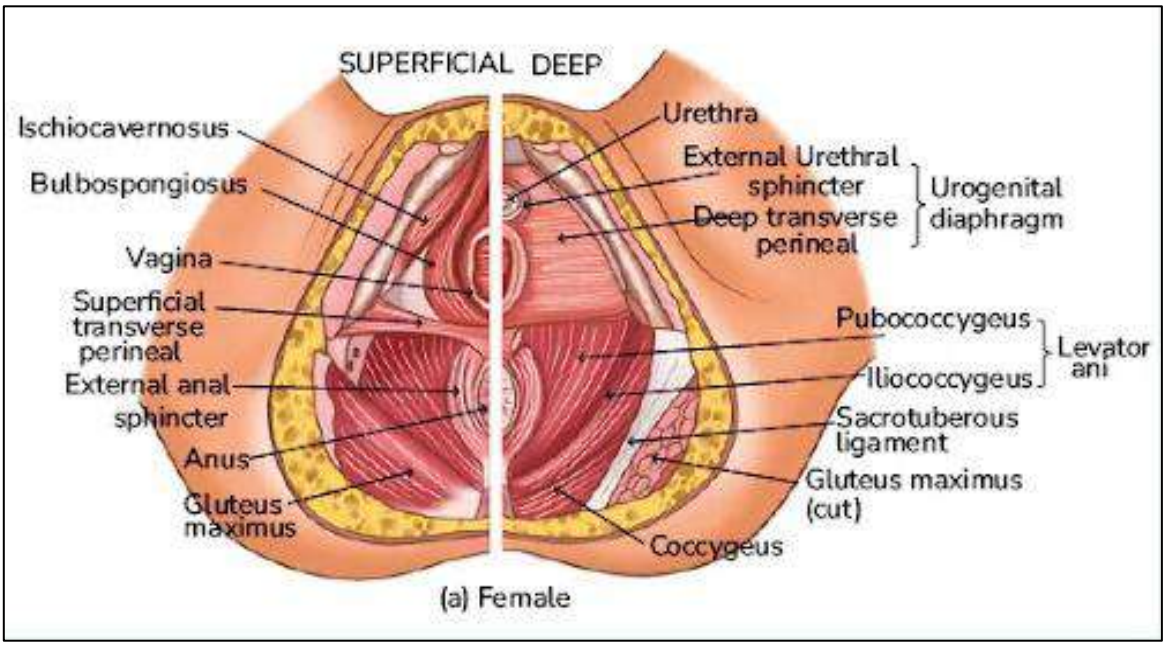
(27)

(A) **F**
(B) **T**
(C) **T**
(D) **T**
(E) **F**

(28)

(A) **F** - Bartholin / Greater vestibular glands→ in superficial perineal pouch.
(B) **T** - Pudendal nerve's largest branch→ Perineal nerve is in both deep and superficial perineal pouches.
(C) **T**
(D) **F** - goes through the greater sciatic foramen.
(E) **T** - in both deep and superficial pouches.



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(29)

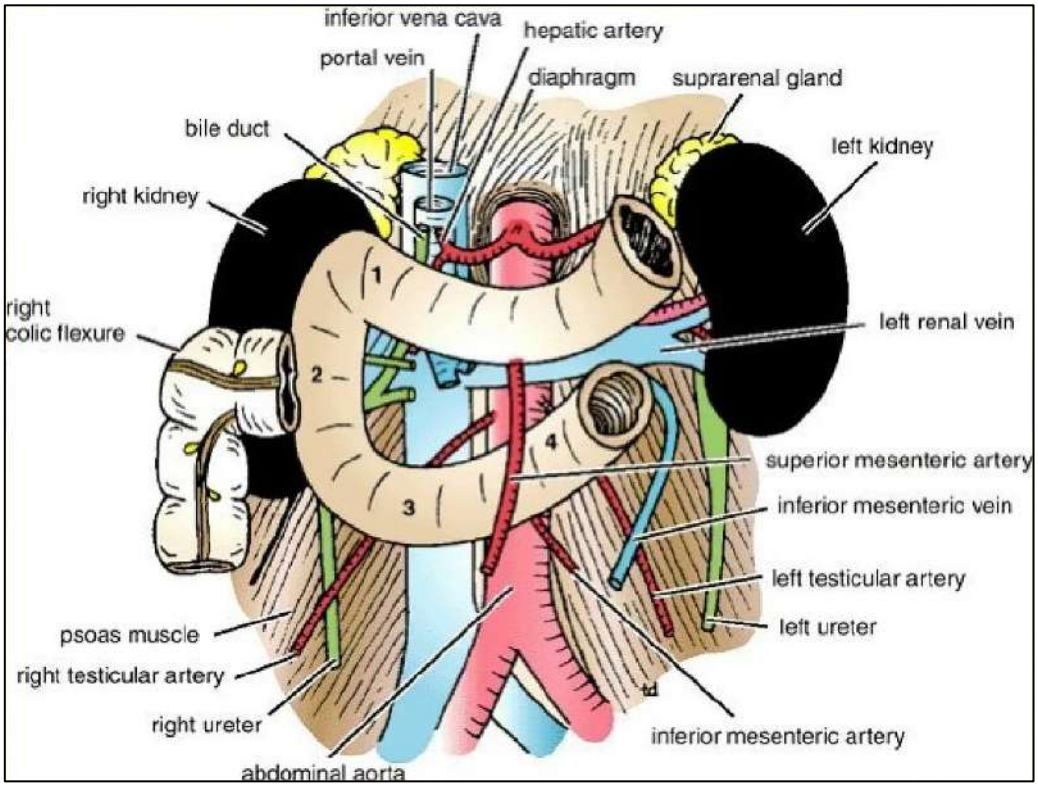
(A) **F** - 3rd part

(B) **F** - Genitofemoral nerve is crossed by ureter.

(C) **F**

(D) **T**

(E) **F**



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(30)

(A) **T** - In trigone, submucosa is absent and mucosa is firmly attached to underlying muscle layer.

(B) **T** - Urothelium is transitional epithelium. Prostatic urethra above the level of entry of ejaculatory ducts.

(C) **T** - Cystoscopy is used to examine the interior of the bladder with the help of a cystoscope passed through urethra. Membranous urethra is the least dilatable part of urethra. Therefore, it can be damaged during cystoscopy.

(D) **T** - On the posterior wall of prostatic urethra, there is a median ridge called urethral crest with grooves on each side called prostatic sinus. Ducts of prostate glands open into prostatic sinus.

(E) **T** - Membranous urethra is in the deep perineal pouch and is surrounded by external urethral sphincter (sphincter urethrae).

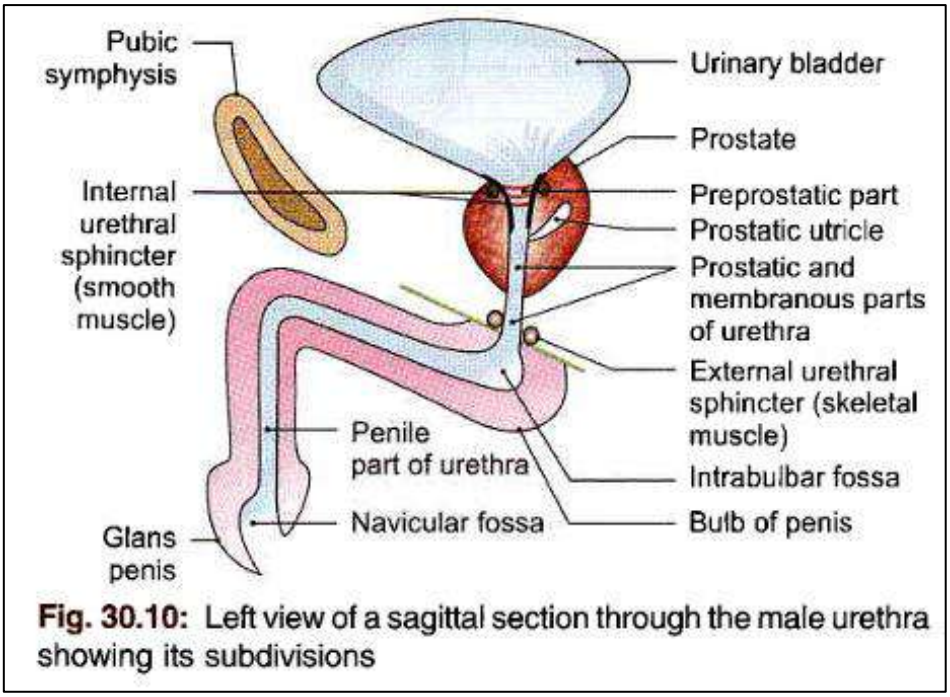


Fig. 30.10: Left view of a sagittal section through the male urethra showing its subdivisions

BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 408 – fig 30.10

(31)

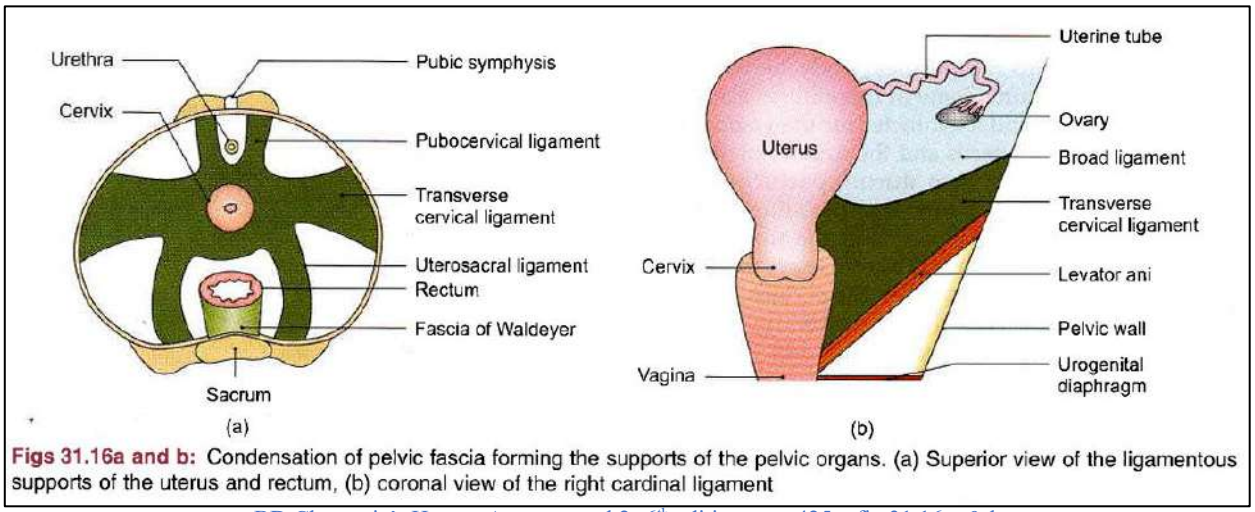
(A) **T** - poor support.

(B) **T** - cardinal/ lateral cervical/ transverse cervical ligament → lateral stability to cervix.

(C) **T** - muscles of pelvic diaphragm→ support vagina, indirectly holds up cervix.

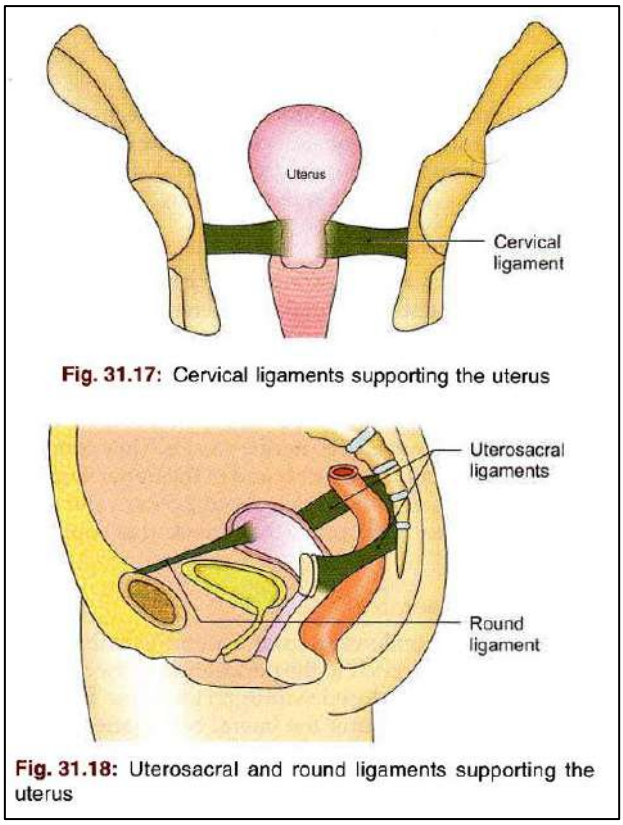
(D) **T** - keep the cervix pulled back against the forward pull of round ligament.

(E) **F** - contain ovarian vessels and nerves.



Figs 31.16a and b: Condensation of pelvic fascia forming the supports of the pelvic organs. (a) Superior view of the ligamentous supports of the uterus and rectum, (b) coronal view of the right cardinal ligament

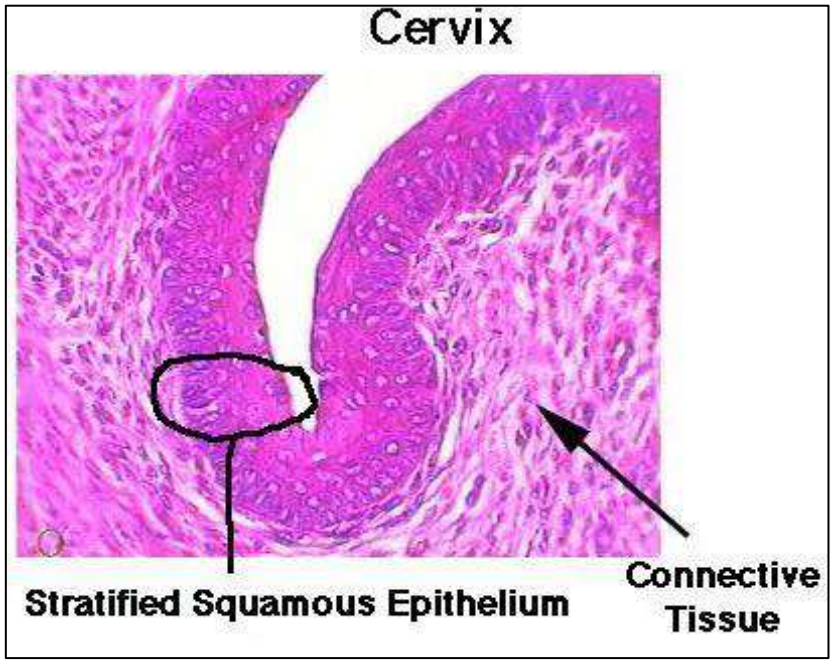
BD Chaurasia's Human Anatomy vol 2- 6th edition – pg 425 – fig 31.16 a & b



BD Chaurasia's Human Anatomy vol 2- 6th edition – pg 425 – fig 31.17 ,31.18

(32)

(A) **T** - Endocervix lined by simple tall columnar mucus-secreting epithelium. Ectocervix lined by stratified non-keratinized squamous epithelium.



https://ansci.wisc.edu/jjp1/ansci_repro/lab/lab5_09/histology/cervix2(let).jpg

(B) **F** - Does not show periodic changes.
(C) **T** - The cervical glands are branched tubular in type and secrete mucus with high content of fructose.
(D) **F** - Does not show periodic changes.
(E) **F** - The content in muscle fibers diminishes caudally.

(33)

(A) **F** - Ovarian artery is a direct branch of the aorta.
(B) **T** - Ovarian artery passes through the suspensory ligament of ovary.
(C) **T** - Blood vessels of the uterine tube - ovarian vessels and Uterine vessels.
(D) **F** - Ovarian artery is not an end artery. It anastomoses with the uterine artery.
(E) **T** - Right ovarian vein drains into the Inferior Vena Cava. The left ovarian vein drains into the Left Renal Vein.

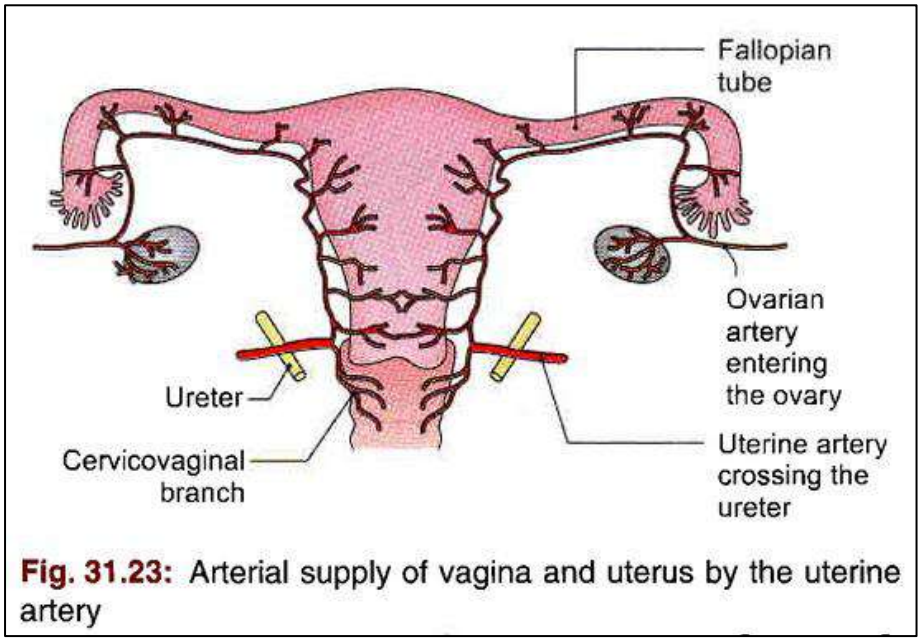


Fig. 31.23: Arterial supply of vagina and uterus by the uterine artery

BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 428 – fig 31.27

(34)

(A) **T** - Prostatic venous plexus lies between the true & false capsules.
(B) **T** - It receives the deep dorsal vein of the penis & numerous vesical veins & drains into the internal iliac veins.
(C) **F** - They are valveless.
(D) **T**
(E) **T** - Cancer cells can enter the skull by floating up the valveless prostatic & vertebral veins.

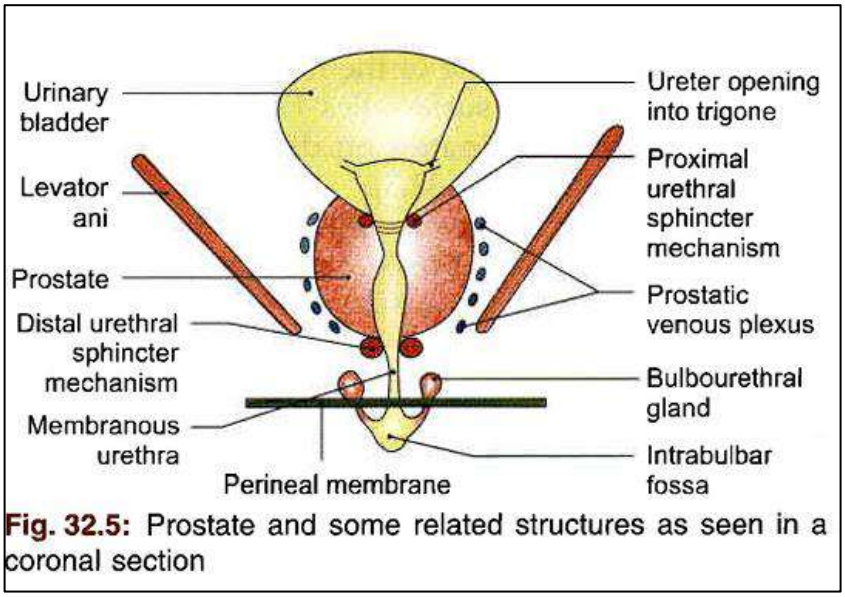


Fig. 32.5: Prostate and some related structures as seen in a coronal section

BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 436 – fig 32.6

(35)

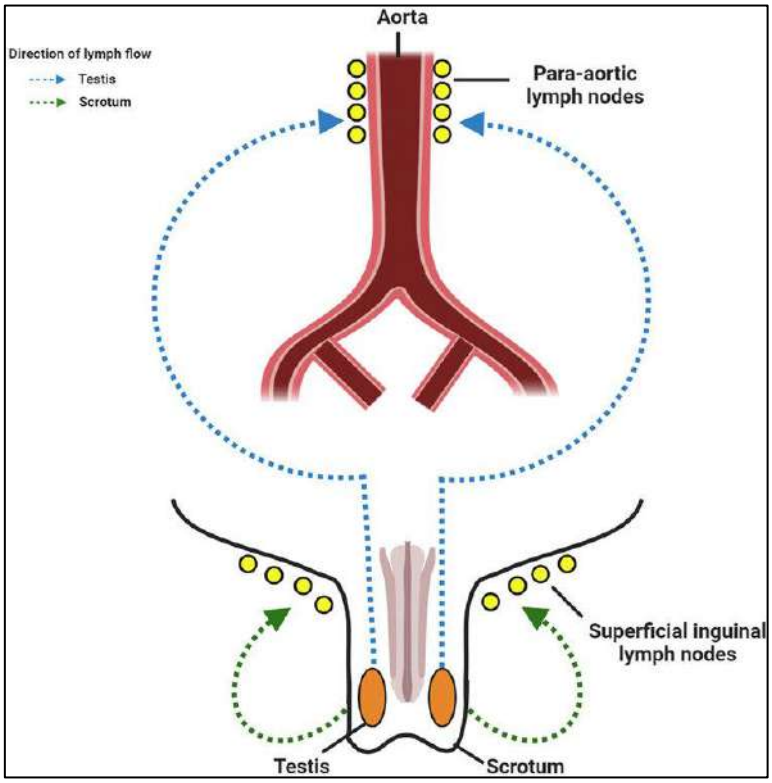
(A) **F** - para-aortic lymph nodes at the level of renal vessels.

(B) **F** - The scrotum is divided by a septum into right and left compartments, but this septum is incomplete superiorly, so extravasations of fluid into this sac are always bilateral.

(C) **T** - anterior one third by the ilioinguinal and genital branch of the genitofemoral nerve. posterior two-thirds by the perineal branch of the posterior cutaneous nerve of the thigh and the posterior scrotal nerve.

(D) **T**

(E) **F** - superficial fascia of the abdomen is replaced by the dartos muscle in the scrotum.



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(36)

(A) **T** - Thickened downward continuation of the inner circular muscle of the rectum - internal anal sphincter.

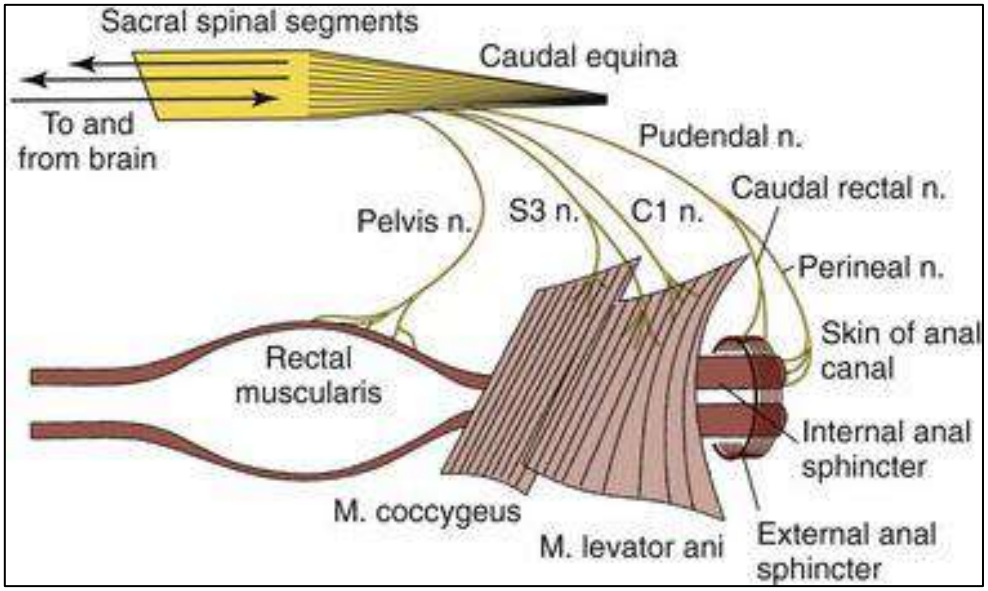
(B) **T**

(C) **T** - Factors affecting normal anal continence,

- Contraction of puborectalis
- External anal sphincter
- Maintenance of angle between rectum and anal canal
- Mucosal cushion in the anal canal Internal sphincter can only maintain continence if there is no distension by faeces.

(D) **T**

(E) **T**



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(37)

(A) **F** - Upper half of the anal canal contains columns.

(B) **T** - Longitudinal muscle layer arranged as taenia coli in the large intestine, except rectum and anal canal.

(C) **T** - Venous drainage is to the inferior rectal vein, a tributary of the internal pudendal true vein.

(D) **T** - Same as in the upper part of the intestinal tract.

(E) **T**

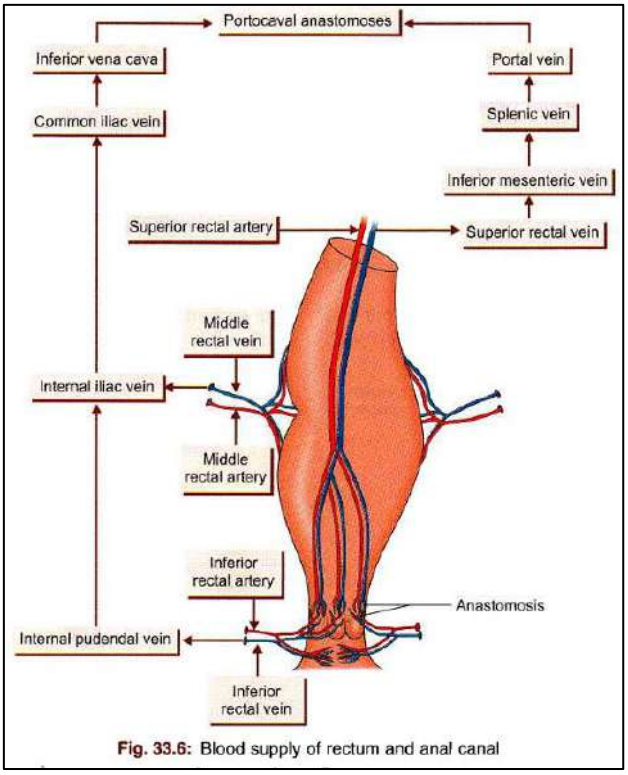


Fig. 33.6: Blood supply of rectum and anal canal

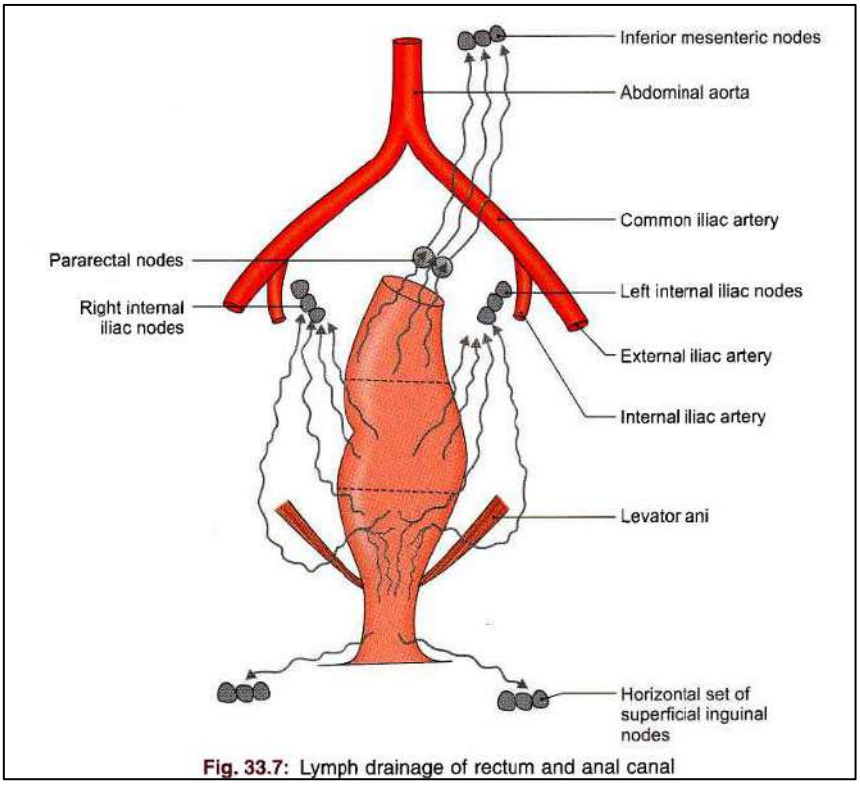


Fig. 33.7: Lymph drainage of rectum and anal canal

BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 445,446 – fig 33.6, 33.7

(38)

(A) **F** - It forms the lateral wall.
(B) **T** - Infection in one may therefore pass to the other.
(C) **T** - It contains the inferior rectal nerve, which is a branch of the pudendal nerve.
(D) **F** - It allows the distension of the anal canal.
(E) **T** - The proximity to the anal canal makes them particularly vulnerable to infection.

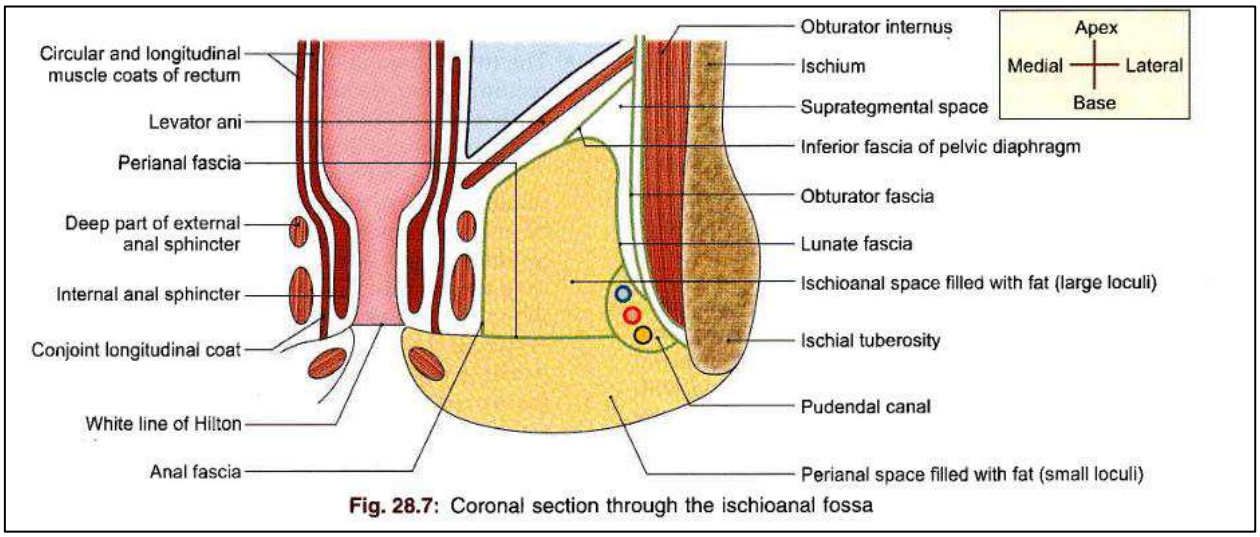
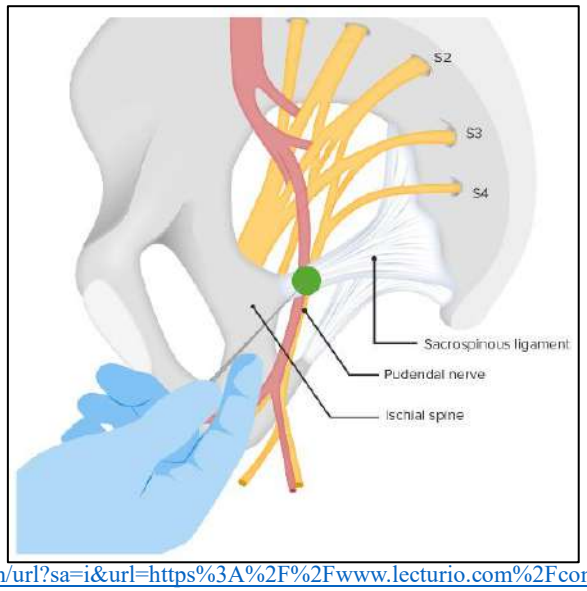


Fig. 28.7: Coronal section through the ischioanal fossa

BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 384 – fig 28.7

(39) C

Pudendal nerve arises from the ventral rami of S2, S3 and S4 segments of spinal cord. It is the nerve of the perineum. It supplies all the muscles of the perineal spaces, including most of the skin and mucous membrane of the perineum. S it is blocked by an anaesthetic agent given above the ischial tuberosity.



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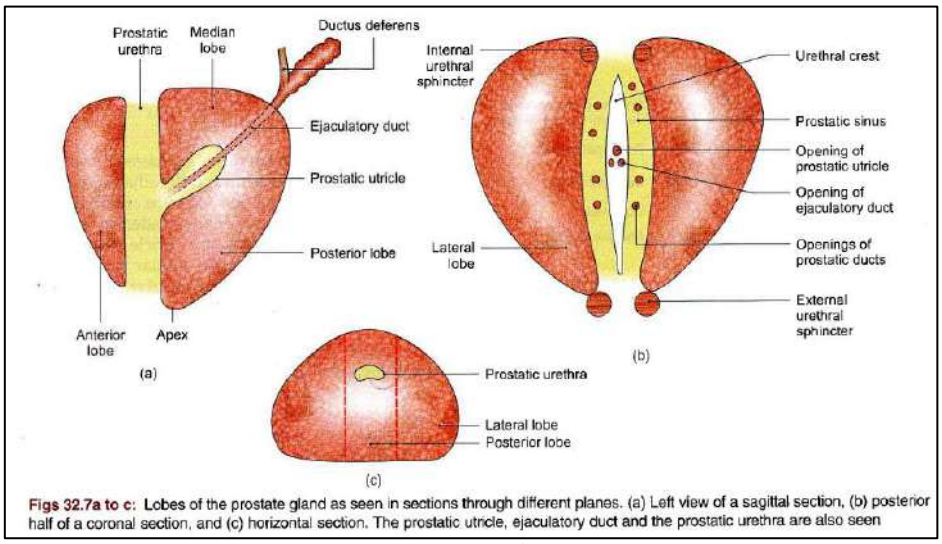
(40) C

Median lobe of the gland enlarges upwards and encroaches within the sphincter vesicae, located at the neck of the bladder. The leakage of urine into the prosthetic urethra causes an intense reflex desire to micturition. The enlargement of the median lobe produces elongation and distortion of the urethra. So that the patient experiences difficulty in passing urine.



Figs 32.7a to c: Lobes of the prostate gland as seen in sections through different planes. (a) Left view of a sagittal section, (b) posterior half of a coronal section, and (c) horizontal section. The prostatic utricle, ejaculatory duct and the prostatic urethra are also seen

BD Chaurasia's Human Anatomy vol 2- 6th edition – pg 403– fig 32.7 a - c

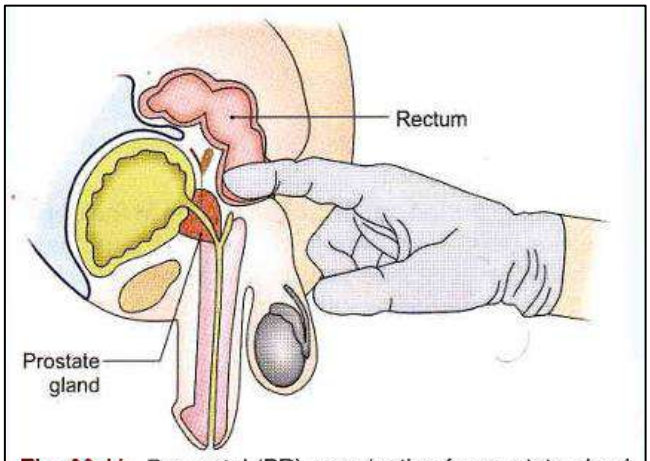


Fig. 32.11: Per rectal (PR) examination for prostate gland

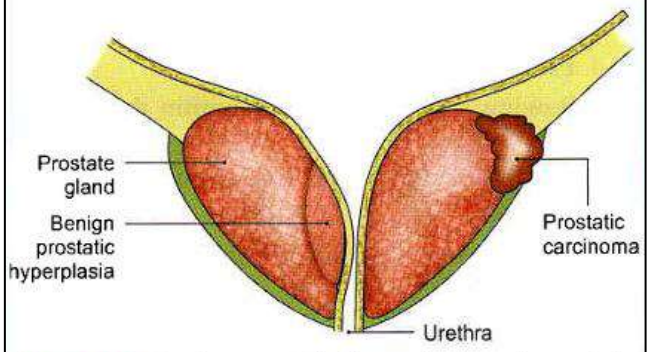


Fig. 32.12: Benign prostatic hyperplasia and prostatic carcinoma

BD Chaurasia's Human Anatomy vol 2- 6th edition – pg 405 – fig 32.11 , 32.12

(41) E

Vaginal Examination

Inspection: The Vagina is first inspected at the introitus by separating the labia minora with the left hand. Next, the speculum examination is done to inspect the cervix and vaginal vault, and to take the vaginal swab.

Palpation of the pelvic organs can be done by a per vaginal (PV) digital examination.

With the examining fingers, one can feel:

- Anteriorly, the urethra, bladder, and pubic symphysis;
- Posteriorly, the rectum and pouch of Douglas;
- Laterally, the ovary, tube, lateral pelvic wall, thickened ligaments, and ureters; and
- Superiorly, the cervix.

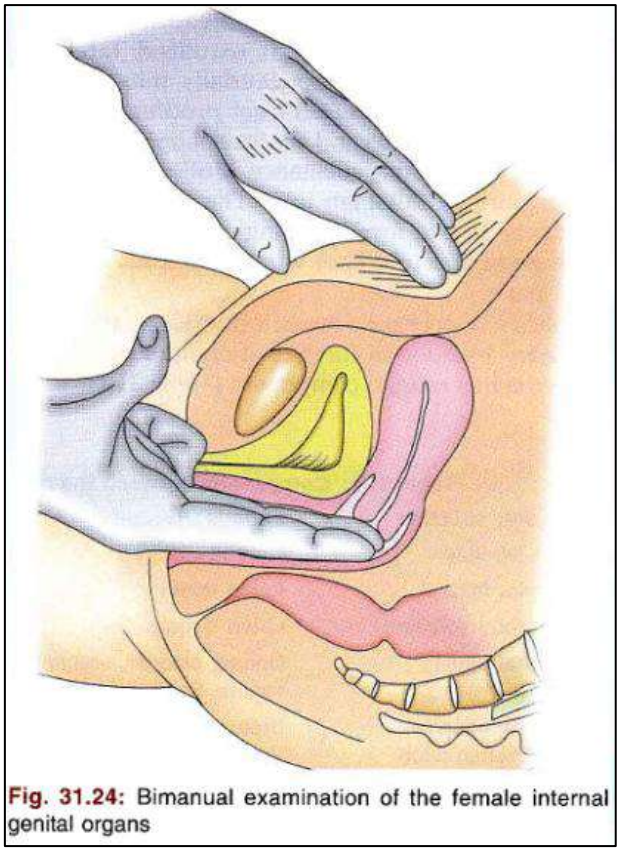


Fig. 31.24: Bimanual examination of the female internal genital organs

BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 429 – fig 31.29

(42) E

The uterine cavity, the lumen of the cervical canal, and the different parts of the uterine tubes can be visualized in hysterosalpingography. The patency of these structures is demonstrated by the entrance into the peritoneal cavity of some of the opaque medium.

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(43) D

The commonest site of rupture is within the bulb of the penis, just below the perineal membrane. The urine extravasation into the superficial perineal pouch and then passes forward over the scrotum beneath the membranous layer of superficial fascia.

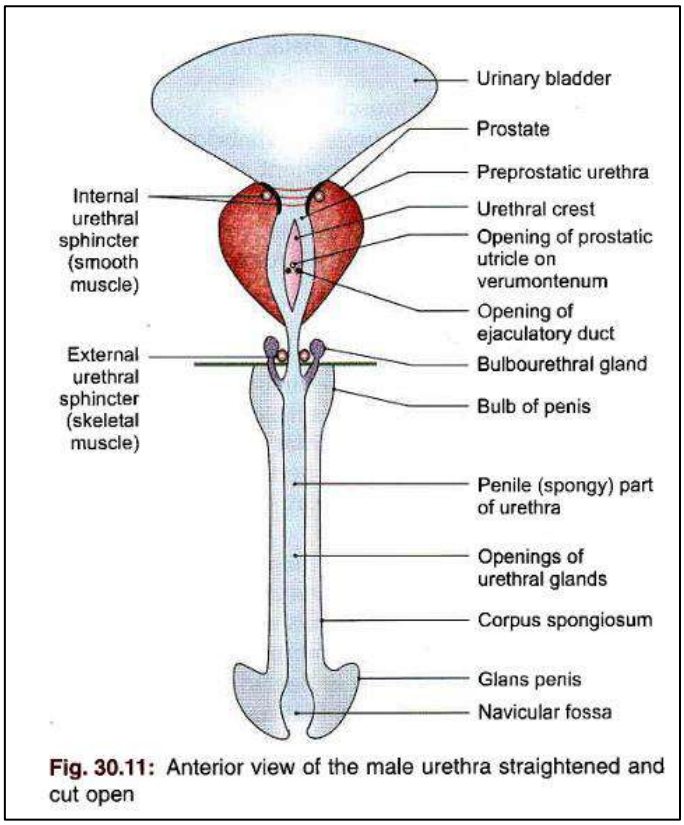


Fig. 30.11: Anterior view of the male urethra straightened and cut open

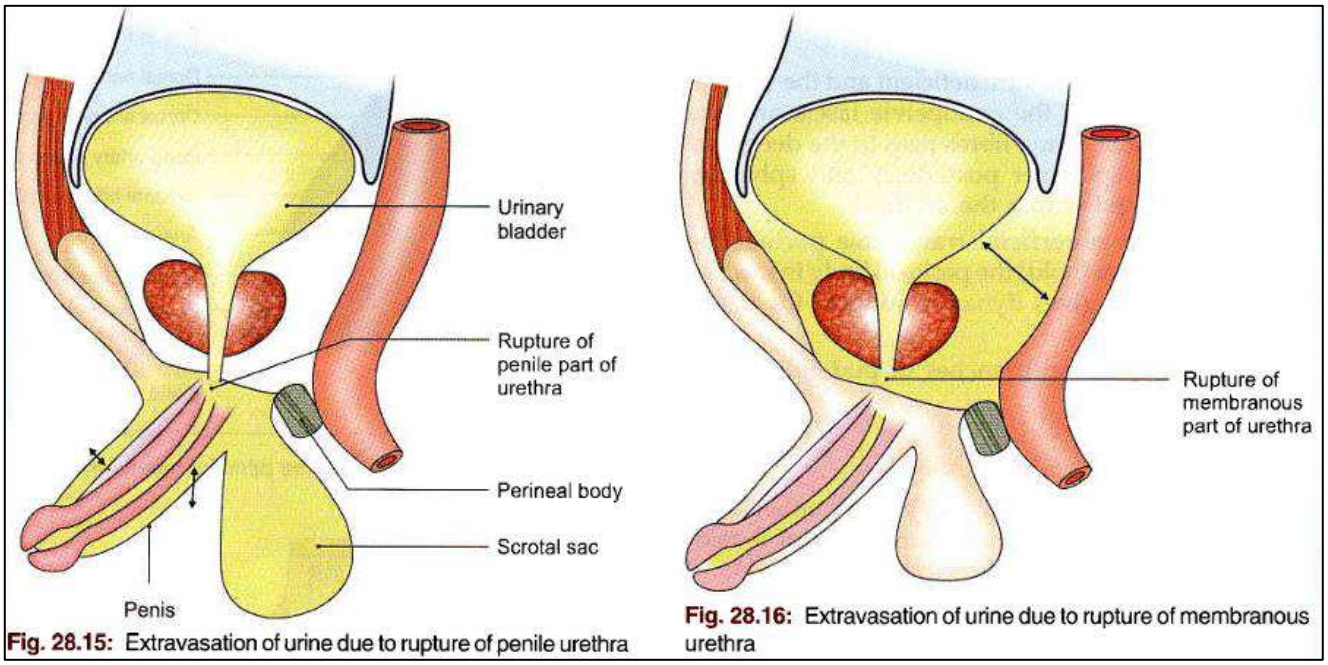


Fig. 28.15: Extravasation of urine due to rupture of penile urethra

Fig. 28.16: Extravasation of urine due to rupture of membranous urethra

BD Chaurasia's Human Anatomy vol 2- 7th edition – pg 409, 391– fig 30.11, 28.15, 28.16

CAT 2 SGD QUESTIONS & ANSWERS

SGD 01 – GI Tract (I)

(1) Describe the structural adaptations of the small intestinal mucosa that help to perform its functions. (60 marks)

(2) State the anatomical basis for the following.
(2.1) Diverticulosis. (20 marks)
(2.2) Feeding tubes are inserted into the left hypochondriac region of a patient. (20 marks)

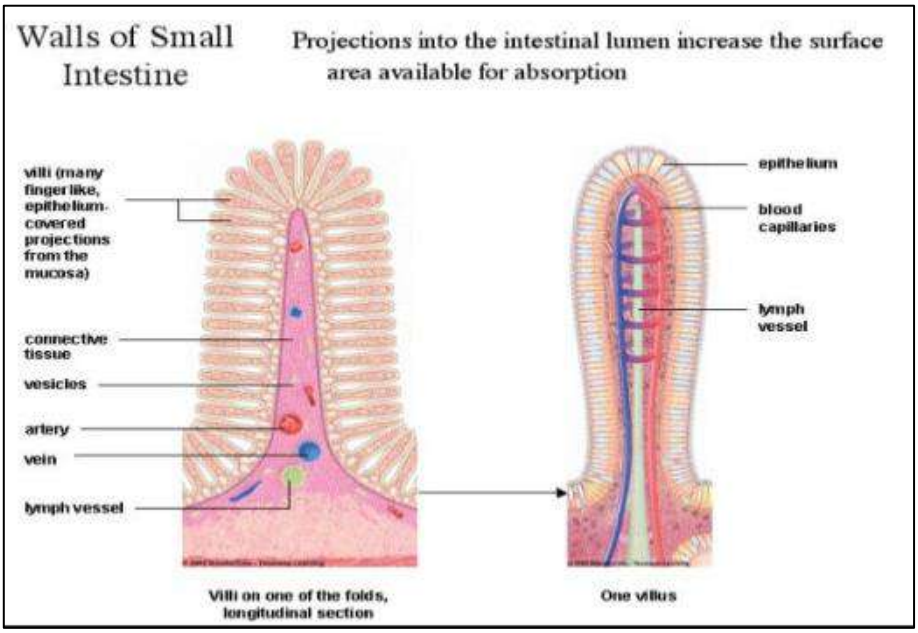
(3)
(3.1) Draw a labelled line diagram to illustrate the arterial supply of the stomach. (60 marks)
(3.2) State the structures supplied by the coeliac trunk. (40marks)

Answers

(1) Describe the structural adaptations of the small intestinal mucosa that help to perform its functions.

The main function of the small intestine is the absorption of digested nutrients. To a lesser extent, some digestion also occurs on the membrane of the intestinal cells. Since the function of the small intestine is absorption, the small intestinal mucosa is adapted for absorption. The small intestinal mucosa and submucosa are thrown into folds known as plicae circulares. The plica circulares have the finger-like projection known as villi. The epithelium coating the villi contains cells known as enterocytes, which have microvilli on their luminal surfaces, thus increasing surface area for effective absorption. The enterocytes on the epithelium are simple columnar epithelium. Since there is only a single layer, the distance to travel nutrients is reduced greatly, thus increasing absorption. Also, enterocytes contain a basal nucleus and zymogen granules, which contain brush border enzymes for digestion. The epithelium also contains goblet cells, which secrete mucus to reduce friction in the lumen.

The intraepithelial lymphocytes serve a protective function. In between the villi crypts of Lieberkühn may be seen. These contain Paneth cells which secrete defensins, lysozyme, and phospholipase an important in defense & provide the first line defense in the small intestine. The neuroendocrine cells secrete hormones needed to promote digestion and absorption, such as serotonin, etc. Also, at the back of the crypts, there are stem cells to produce new enterocytes, the cell turnover occurring every 3-5 days. In the middle of the villus, the lamina propria contains the villous plexus of blood vessels for effective absorption and transport of nutrients except lipid digestion products. Also, it contains lacteal important to absorb and transport lipid digestion products. It may also contain plasma cells that secrete IgA into the lumen by transcytosis through the enterocytes and perform a defense function.



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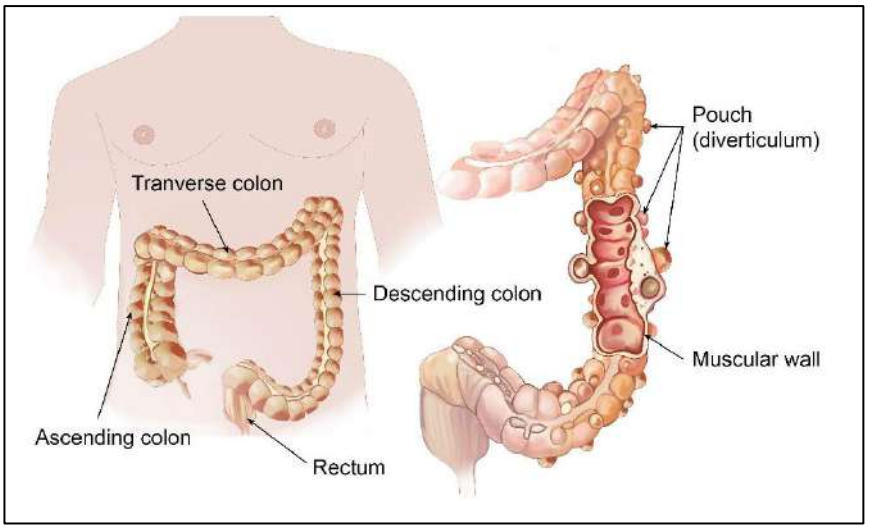
(2) State the anatomical basis for the following.

(2.1) Diverticulosis.

Diverticulosis is a condition where bulbous pouches of peritoneum that are distended with fat, known as appendices epiploicae, project in places from the serous coat. Blood vessels supplying them perforate the muscle wall, and through these vascular perforations, the mucous membrane can herniate. Inflammation of this mucosal hernia is known as diverticulitis.



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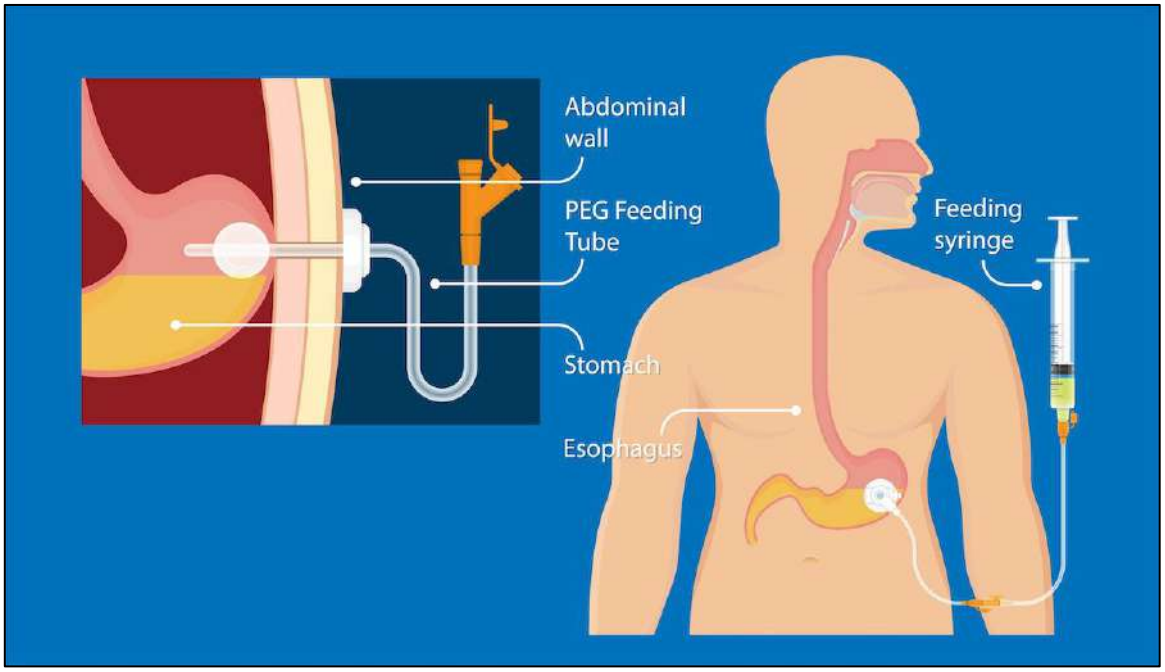
(2.2) Feeding tubes are inserted into the left hypochondriac region of a patient.

The stomach is mainly located in the left hypochondriac, epigastric, and umbilical regions. In the left hypochondriac region, where the stomach lies just behind the anterior abdominal wall, a feeding tube is inserted into the stomach by gastrotomy. It is done in patients who cannot ingest food orally.



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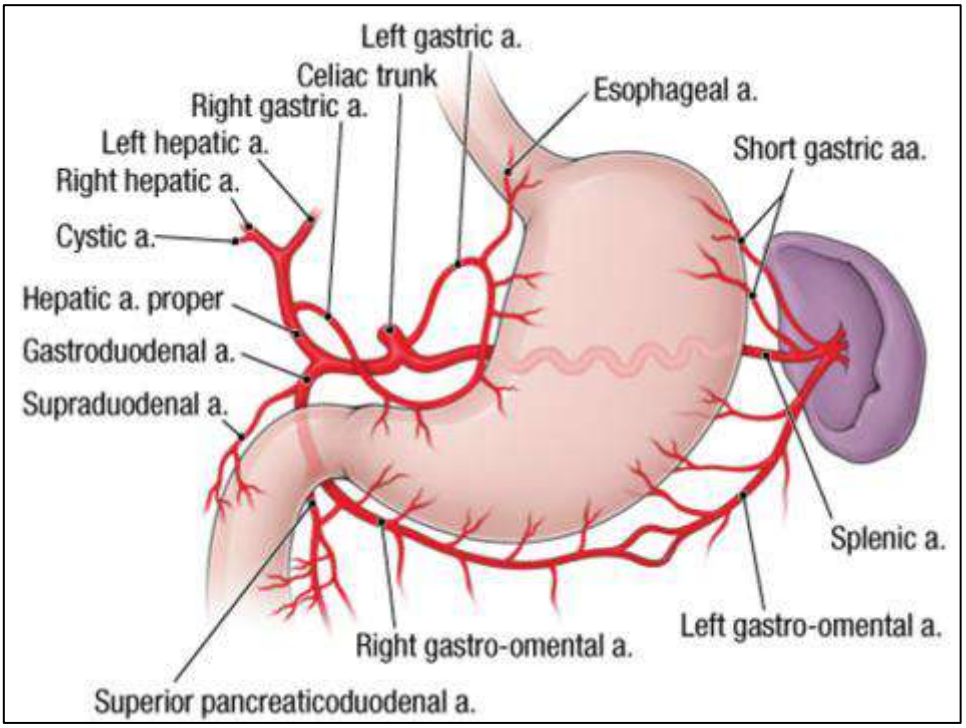
(3)

(3.1) Draw a labelled line diagram to illustrate the arterial supply of the stomach.



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(3.2) State the structures supplied by the coeliac trunk.

Lower esophagus
Stomach
Spleen
Pancreatic head
Liver
Gall bladder
Duodenum

SGD 02 – GI Tract (II)

(1) Describe the anatomical basis of the following.
  (1.1) Pain from the appendix is referred to the peri-umbilical region. (25 marks)
  (1.2) Hernia in a 1-year-old child. (25 marks)
  (1.3) Compression of the free margin of the epiploic foramen to arrest bleeding from the liver during surgery. (25 marks)
  (1.4) Dilated veins around the umbilicus (caput medusae) in cirrhosis. (25marks)

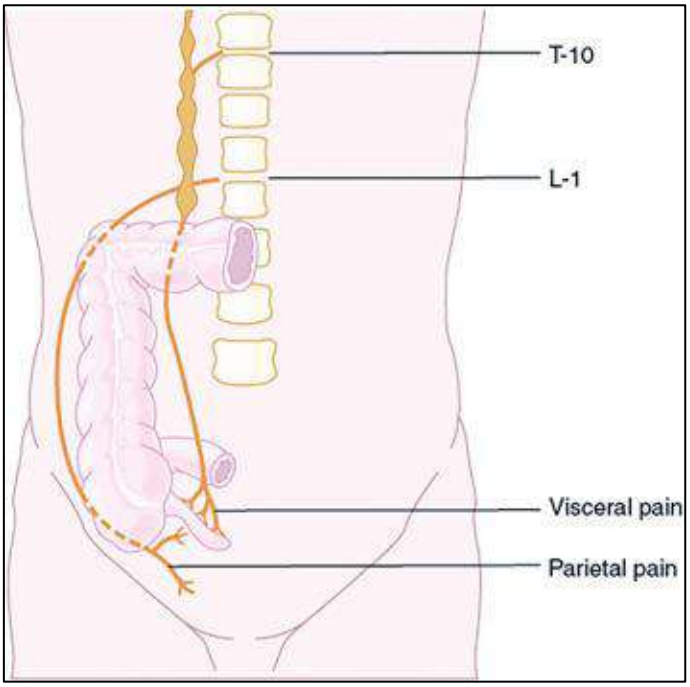
(2) Describe the arterial supply of the large intestine. (100 marks)

Answers

(1) Describe the anatomical basis of the following.

(1.1) Pain from the appendix is referred to the peri-umbilical region.

The appendix lies in the right iliac region. It is a visceral organ. Visceral pain is poorly localized & tends to be referred to someplace other than the site of origin. The appendix is supplied by the T10 spinal nerve. It is way in taking afferents; these impulses spill over into the T10 dermatome where the umbilicus is situated. So, the referred pain of appendicitis initially is referred to the umbilical region.



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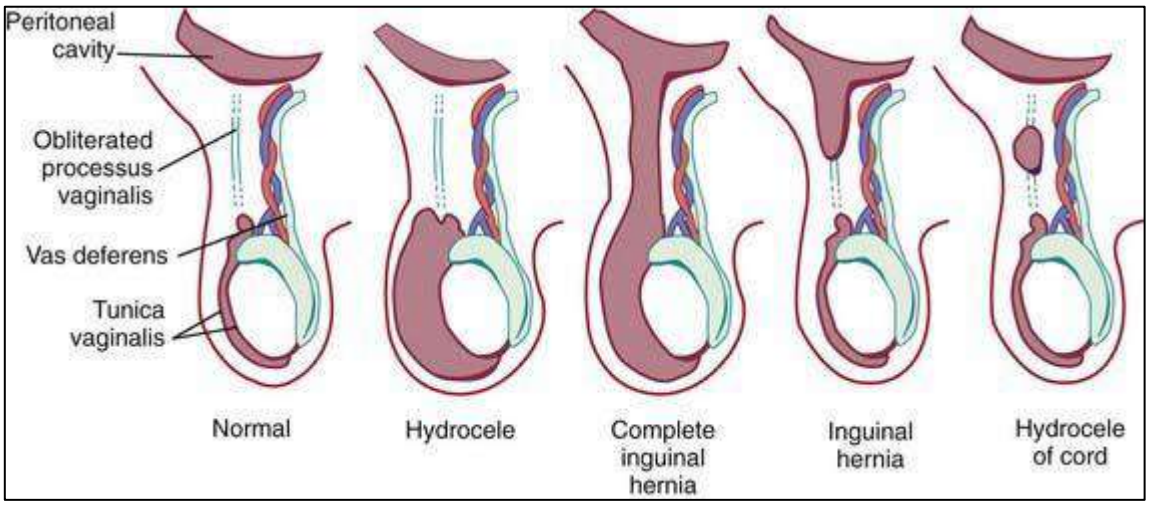
(1.2) Hernia in a 1-year-old child.

In embryonic life, we have a peritoneal outpouching known as the processus vaginalis, which extends through the inguinal canal into the scrotum. Normally, this is obliterated in later life. But in some cases, mostly in young children, the processus vaginalis becomes patent & persistent, allowing the pathway of abdominal viscera to herniate into the scrotum. This is known as an indirect hernia because it travels lateral to the inferior epigastric artery through the deep ring.



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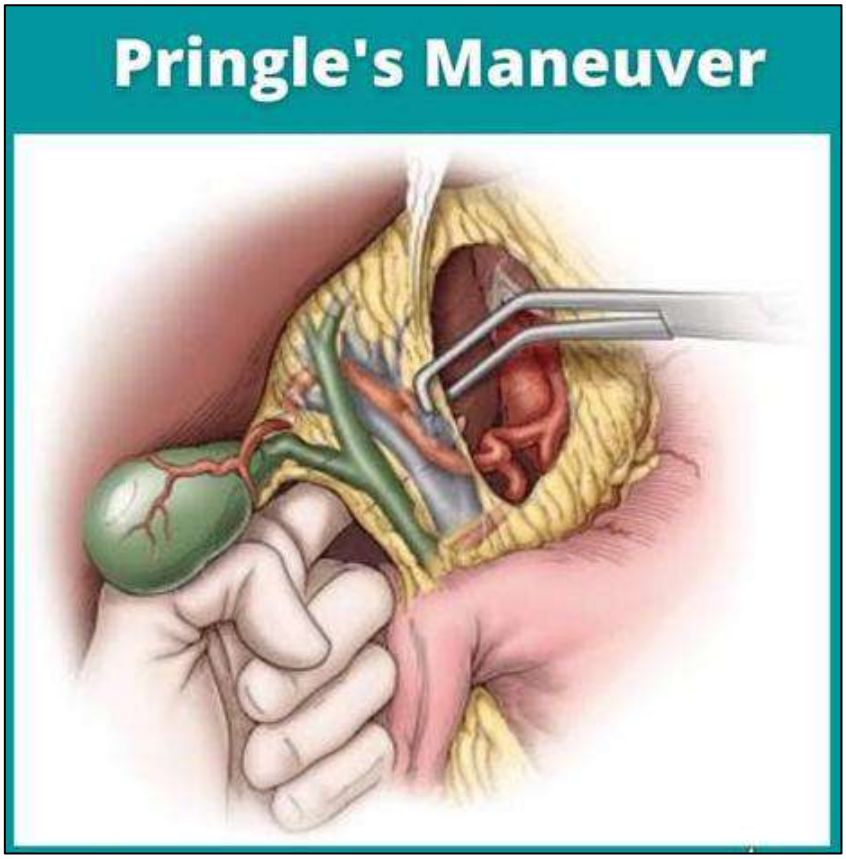
(1.3) Compression of the free margin of the epiploic foramen to arrest bleeding from the liver during surgery.

The epiploic foramen is formed by the free border of the lesser omentum. Between the two layers at this free border is the common bile duct, common hepatic artery proper & beneath them, the portal vein. When an artery or vein is damaged, it can give rise to severe bleeding. By compressing this border (known as the Pringles maneuver), the hepatic artery & portal vein will be compressed, preventing further passage of blood to the liver & stopping the bleeding.



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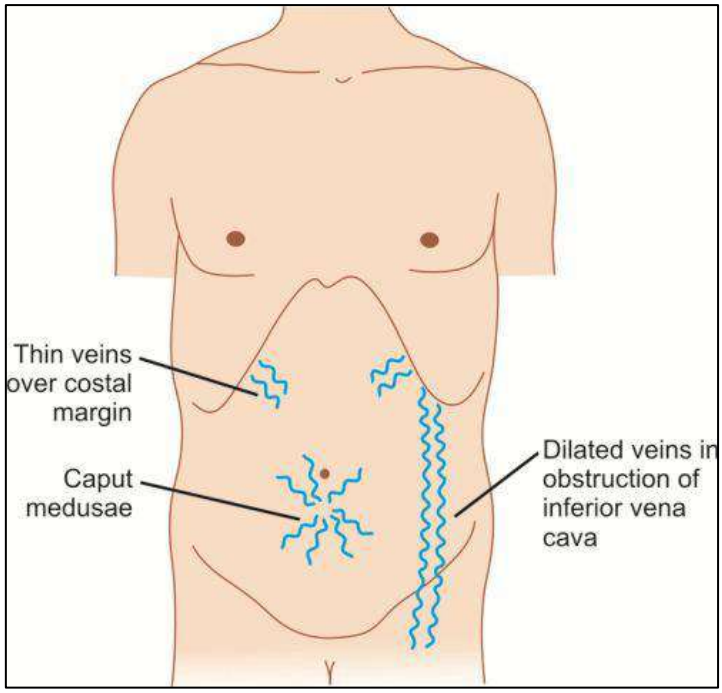
(1.4) Dilated veins around the umbilicus (caput medusae) in cirrhosis.

In some places in the human body, there exist portocaval anastomoses, anastomoses between the portal and inferior vena cava veins. One such site is the paraumbilical region. Where portal branches anastomose with the Paraumbilical branches to the superficial veins of the anterior abdominal wall. Those are situated radially from the umbilicus. In cirrhosis, the liver becomes inflamed, causing portal hypertension. This causes blood to be deviated into the vena caval veins which are situated superficially, causing them to dilate, giving rise to caput medusae.



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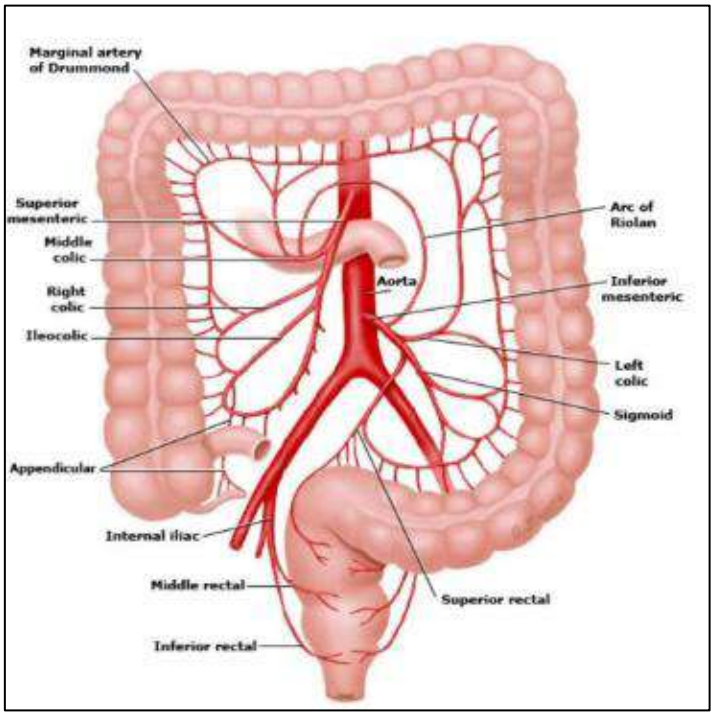
(2) Describe the arterial supply of the large intestine.

The large intestine extends from the caecum to the anal canal. It develops from the midgut and hindgut, so it is supplied by both superior and inferior mesenteric arteries. The superior mesenteric artery gives the ileocolic, right colic, and middle colic arteries. The ileocolic artery gives superior and inferior branches. The inferior branch gives anterior and posterior caecal arteries which supply the respective surfaces of the caecum, the appendicular artery, which supplies the appendix and ileal branch which supplies the distal ileum and anastomoses with the termination of the superior mesenteric artery. The superior branch anastomoses with the descending branch of the right colic artery. The ascending branch of the right colic anastomoses with the right branch of the middle colic artery. The right colic artery supplies the ascending colon. The middle colic also gives a left branch, which anastomoses with the ascending branch of the left colic artery, a branch of the inferior mesenteric artery. The middle colic artery supplies the transverse colon. The inferior mesenteric artery has 2 branches: the left colic sigmoidal arteries and it continues beneath the pelvic brim as the superior rectal artery. The left colic gives an ascending branch and descending branch which anastomoses with the first sigmoidal artery. The left colic supplies the descending colon. The distal sigmoidal arteries anastomose with the first superior rectal branch. The sigmoidal arteries supply the sigmoidal colon. The superior rectal branch of the inferior mesenteric supplies the proximal rectum and anastomoses with the inferior rectal (and sometimes middle rectal) from the internal ileac artery. Together they supply the distal rectum and anal canal.



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SGD 3 – Liver & Pancreas

(1)
- (1.1) What is a liver segment? (40 marks)
- (1.2) Draw and label the liver segments. (60 marks)

(2) Draw and label the immediate structures related to the pancreas. (100 marks)

(3) Explain the anatomical basis of the following.
- (3.1) Peptic ulcer in the posterior wall of the 2nd and 3rd part of the duodenum can cause internal hemorrhage. (50 marks)
- (3.2) Acute pancreatitis causes accumulation of inflammatory fluid in the lesser sac. (50 marks)

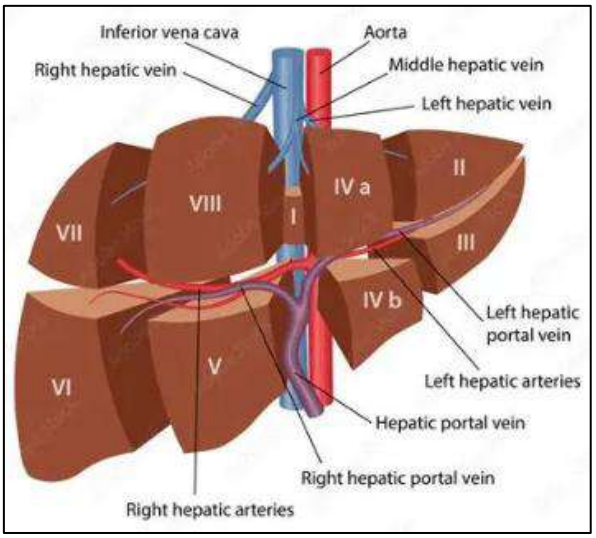
Answers

(1)

(1.1) What is a liver segment?

Liver segment is a wedge-shaped functionally independent segment that has its own dual vascular inflow, biliary drainage, and lymphatic drainage provided by a single segmental branch of the portal vein, hepatic artery, and a bile duct entering at its apex, which is directed towards the porta hepatis. The liver is divided into segments numbered in Roman numerals I to VIII.

(1.2) Draw and label the liver segments.



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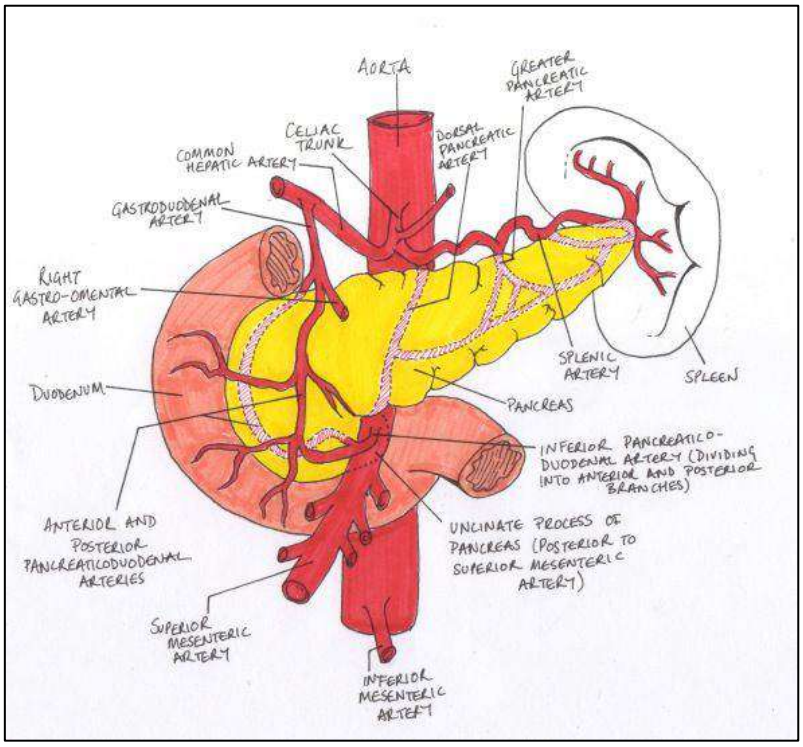
(2) Draw and label the immediate structures related to the pancreas.



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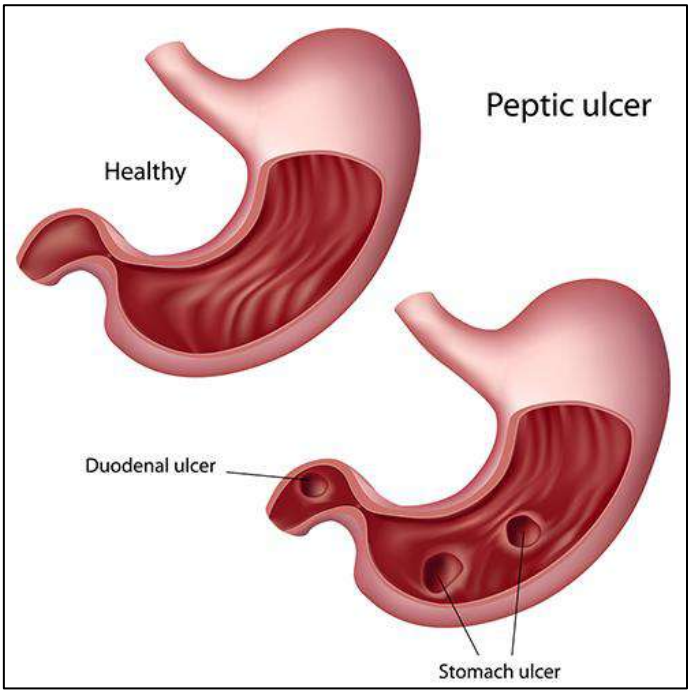
(3) Explain the anatomical basis of the following.

(3.1) Peptic ulcer in the posterior wall of 2nd and 3rd part of duodenum can cause internal hemorrhage.

Gastric contents empty into the duodenum. Therefore, increased acid secretion associated with infection of Helicobacter pylori can cause peptic ulcers in the duodenum, which can erode the wall. The 2nd part of the duodenum is posteriorly related to the right renal vein, and the 3rd part is posteriorly related to the inferior vena cava and the descending aorta. Peptic ulcers in the 2nd and 3rd parts of the duodenum can erode into posteriorly related vessels, causing internal hemorrhage.



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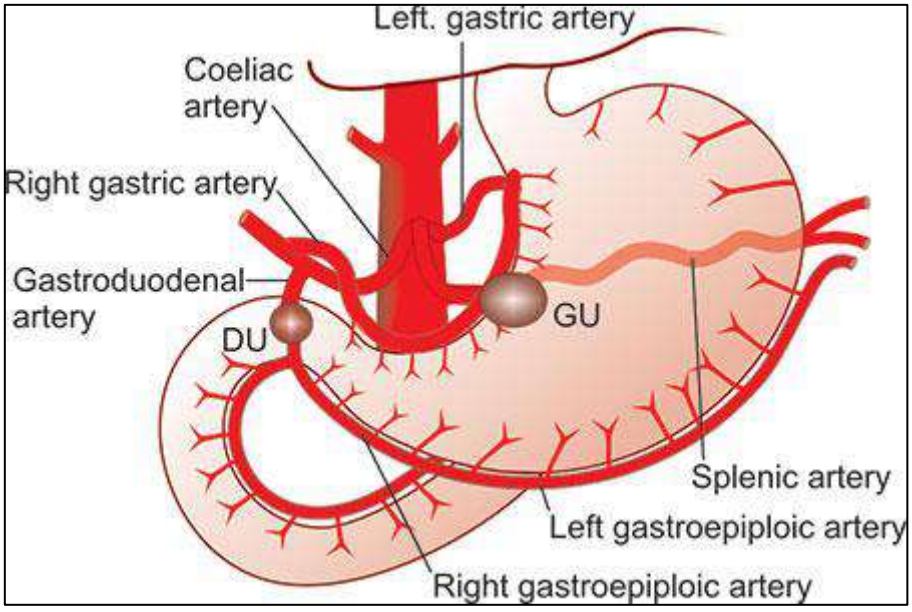

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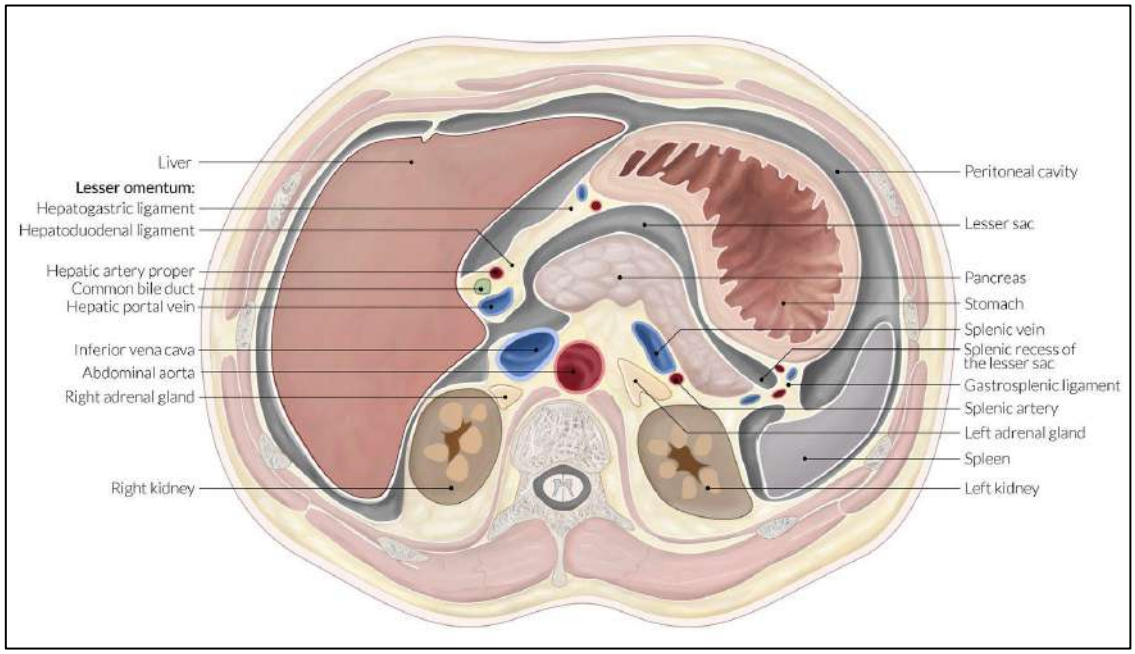
(3.2) Acute pancreatitis causes the accumulation of inflammatory fluid in the lesser sac.

The lesser sac is a pouch lying between the lesser omentum and the peritoneum over the posterior aspect of the stomach anteriorly, and peritoneum over the pancreas and other retroperitoneal structures in the region, transverse colon, and transverse mesocolon (Inferiorly closed off due to fusion of anterior and posterior layers of greater omentum). Due to inflammation of the pancreas, which can spread into the posterior wall of the lesser sac, causing damage that leads to the accumulation of inflammatory fluid in the lesser sac.



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SGD 4 – Kidney & Ureter

(1)

(1.1) What are the anterior relations of the kidney? (12 marks)

(1.2) What are the bony landmarks to identify the pathway of the ureter in a radiograph? (12 marks)

(1.3) Draw a labelled diagram of the structure of the nephron. (30 marks)

(1.4) Using lines and labels, explain the blood supply to the kidney. (30 marks)

(1.5) What are the histological differences between DCT and PCT? (8 marks)

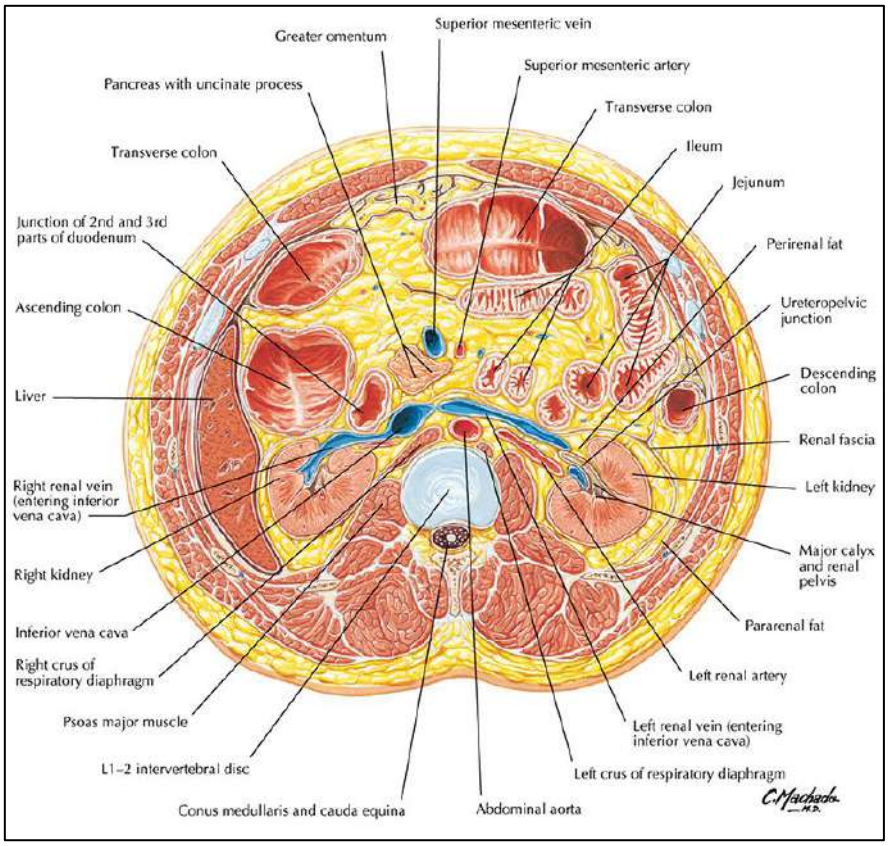
(1.6) What are the components of the juxtaglomerular apparatus? (8 marks)

Answers

(1)

(1.1) What are the anterior relations of the kidney?

Right -liver, hepatic flexure, right suprarenal gland, duodenum, small intestine.
Left – stomach, spleen, left suprarenal gland, pancreas, splenic flexure, small intestine (jejunum).



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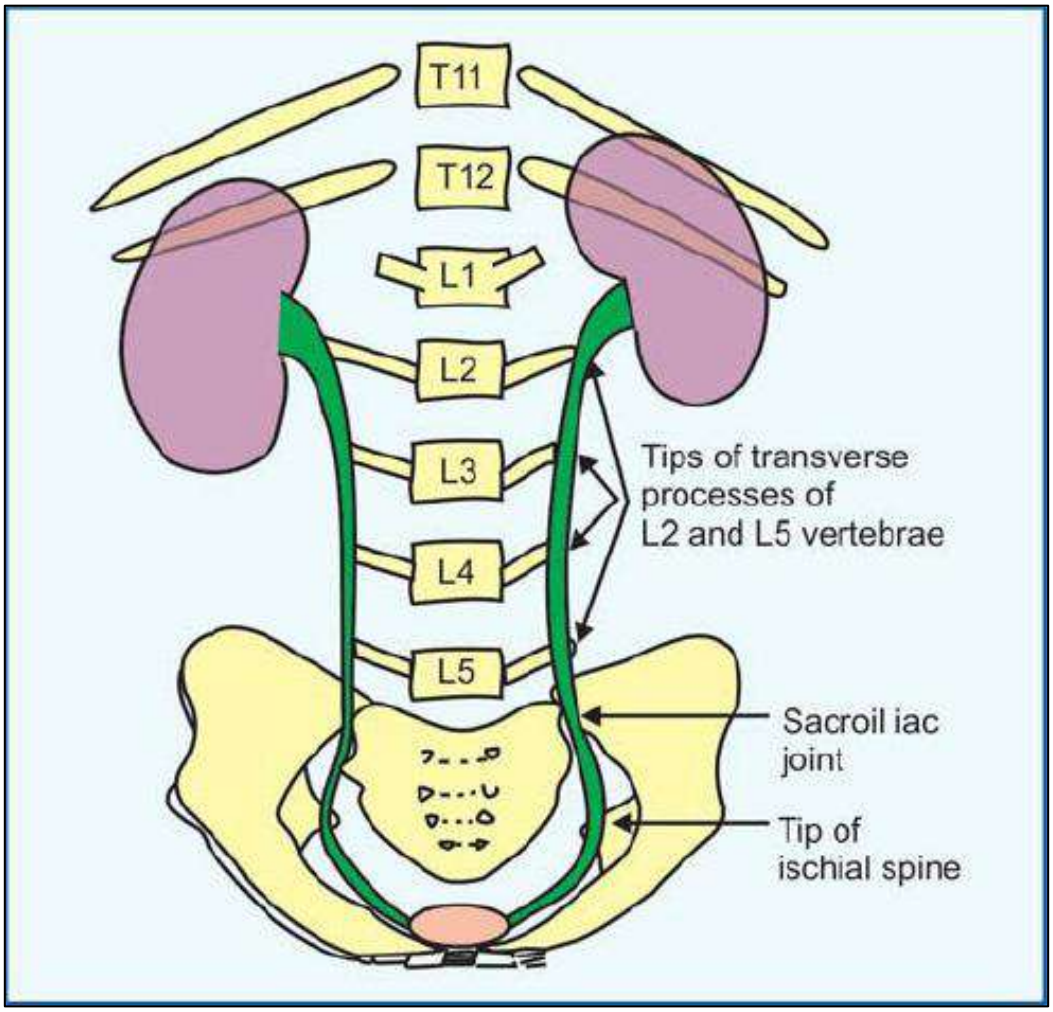
(1.2) What are the bony landmarks to identify the pathway of the ureter in a radiograph?

The tips of the transverse processes L2, L3, L4 & L5 ischial spine turn forward.



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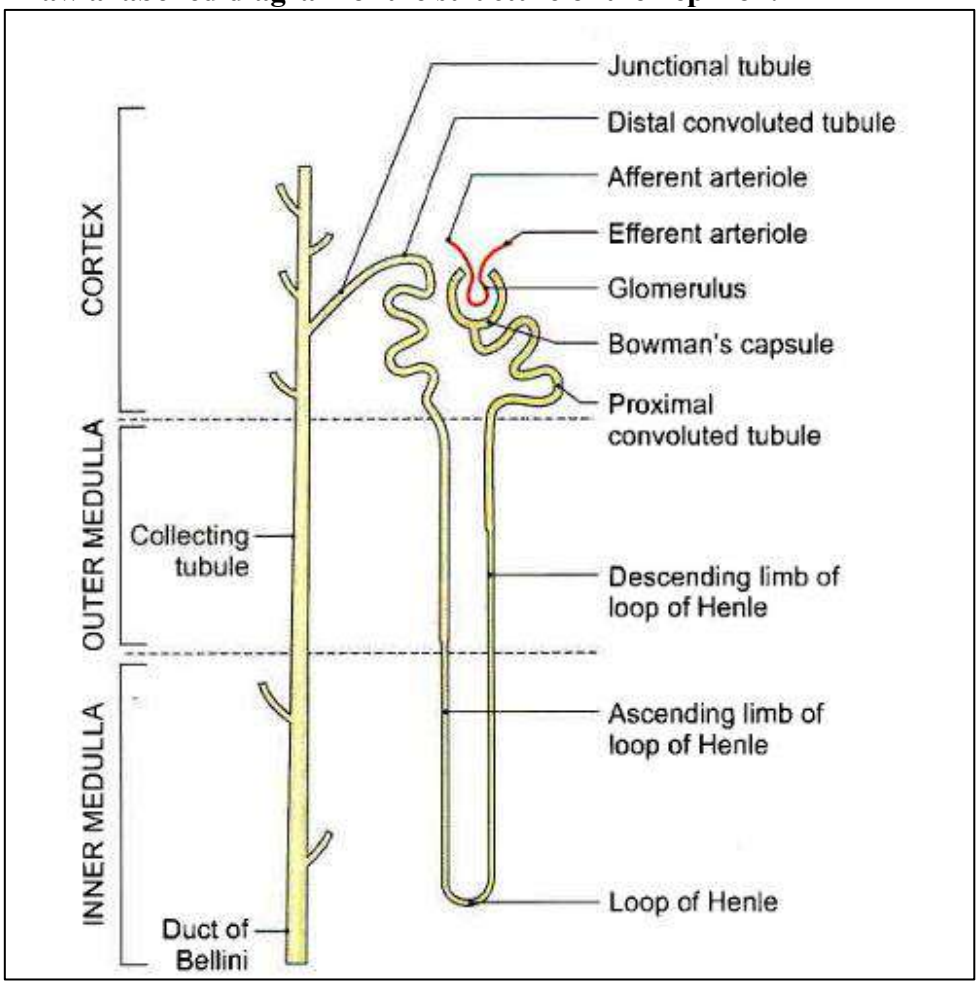
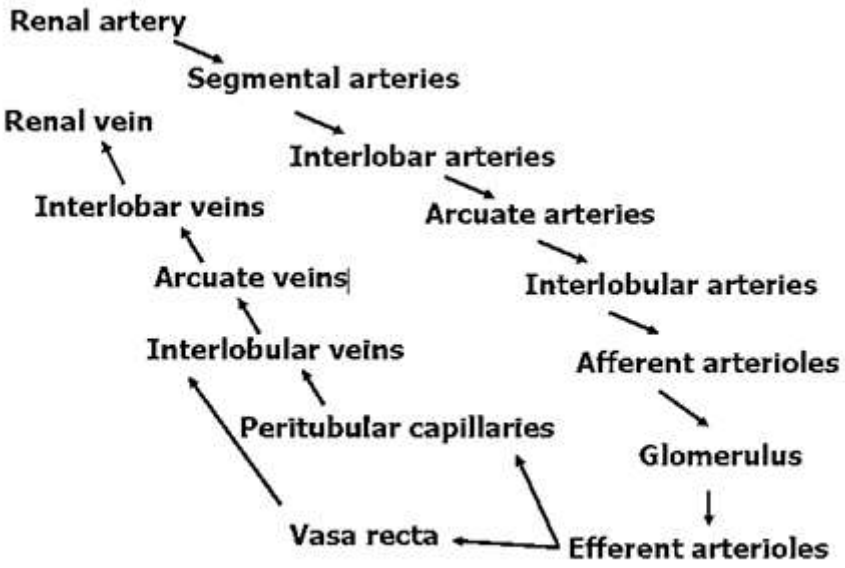
(1.3) Draw a labelled diagram of the structure of the nephron.



BD Chaurasia 7th Edition – vol 2- pg 345 – fig 24.8a

(1.4) Using lines and labels, explain the blood supply to the kidney.



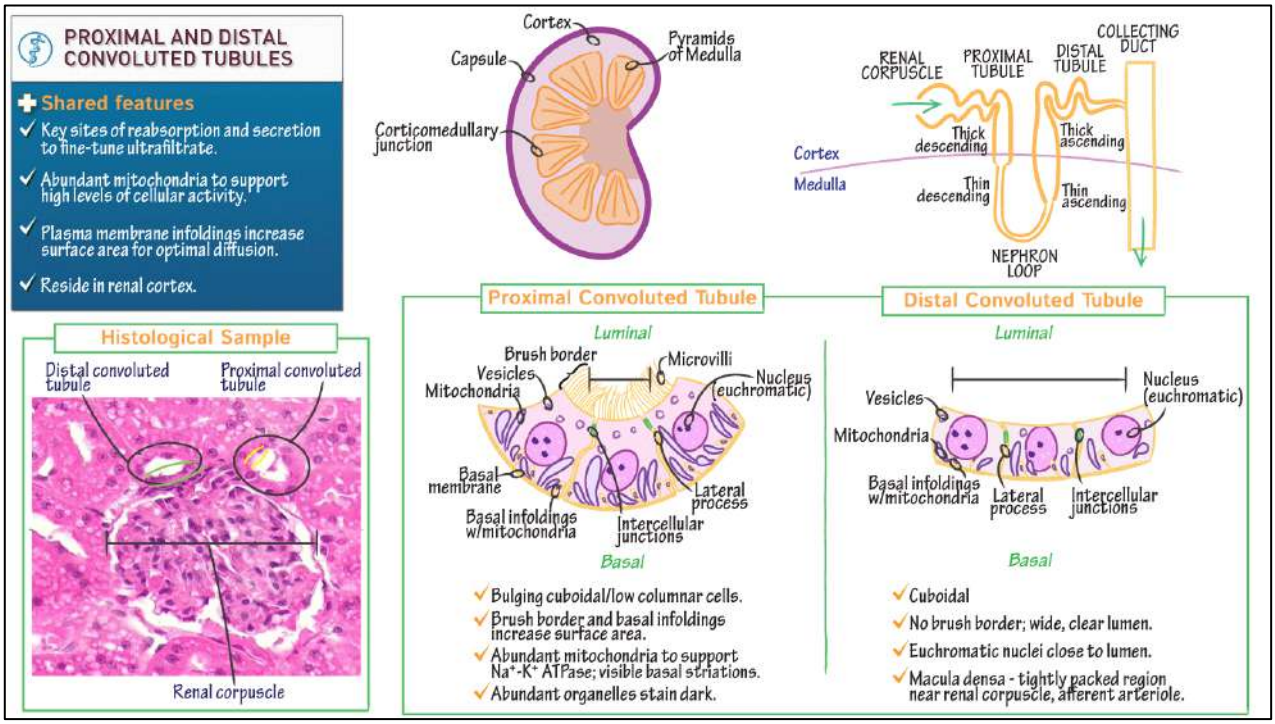
(1.5) What are the histological differences between DCT and PCT?

DCT

- In a cross-section lumen is clear (No microvilli in the luminal surface).
- Cells appear brownish pink (because of the abundance of mitochondria).

PCT

- Lumen is not clear (Microvilli in the luminal surface).
- Cells are pale (less abundant).



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(1.6) What are the components of the juxtaglomerular apparatus?

Macula densa
Juxtaglomerular cells
Lasis cells

SGD 5 – Female Reproductive Organs

(1) Describe the anatomical basis of the following.

(1.1) During surgical removal of the uterus, the uterine arteries were ligated. Following surgery, there was no urine output. Ultrasound scan of the abdomen revealed dilated ureters with an empty bladder. (50 marks)

(1.2) During a vaginal delivery, the doctor palpated the ischial spine through the vagina with the index and middle fingers and injected a local anaesthetic agent to achieve perineal anaesthesia. This was repeated on both sides. (50 marks)

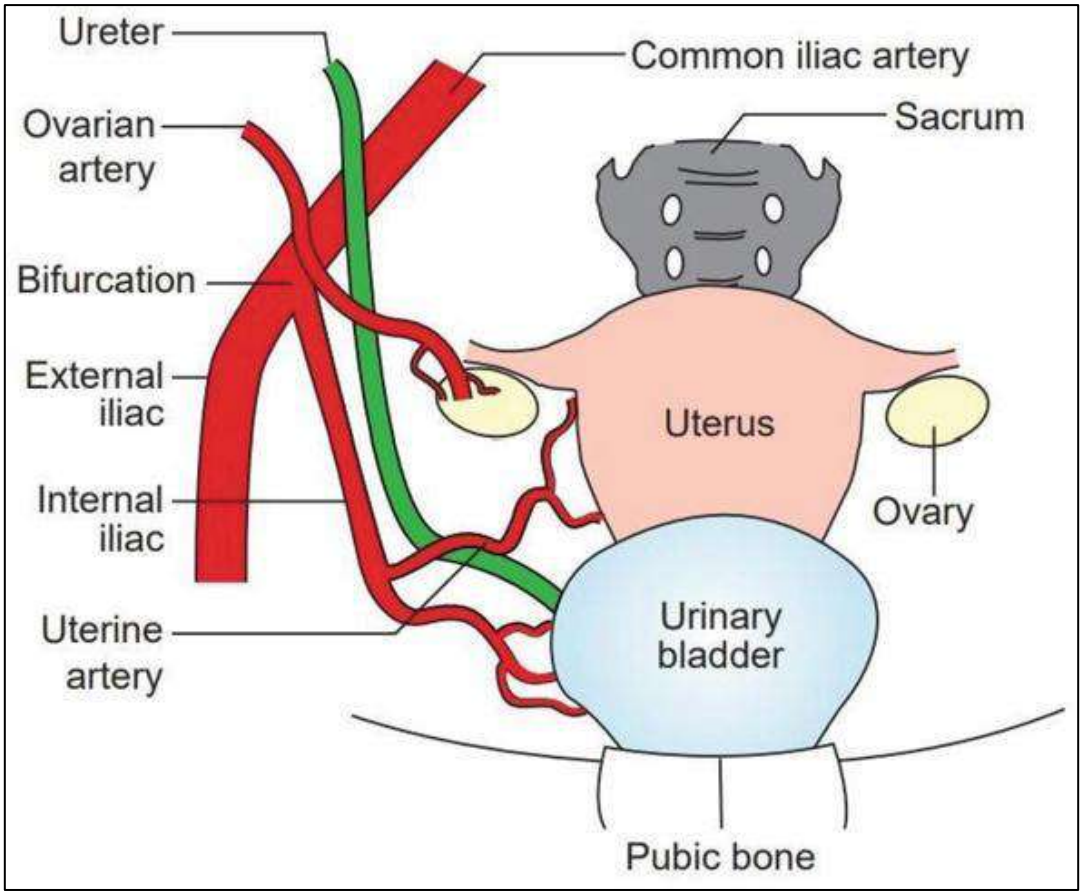
Answers

(1) Describe the anatomical basis of the following.

(1.1) During surgical removal of the uterus, the uterine arteries were ligated. Following surgery, there was no urine output. Ultrasound scan of the abdomen revealed dilated ureters with an empty bladder.

The surgical removal of the uterus is known as hysterectomy. In this procedure, the broad ligament, the uterine tubes, ovaries, and uterus are removed. The blood supply of the uterus is from the uterine artery. It passes forward from the internal iliac artery and then reaches the uterus by passing medially on the pelvic floor at the base of the broad ligament. At the level of the internal os (2 cm superior to the ischial spine), the artery crosses above the ureter at right angles to reach the cervix.

During hysterectomy, the uterine arteries must be ligated to prevent blood loss. Because of a surgical error, the ureters can be ligated along with the arteries. As the ureters carry urine from the kidney to the bladder, ligation of the ureter impairs this procedure, causing urine to accumulate in the ureters, resulting in their dilation. Since urine does not reach the bladder, it remains empty.



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(1.2) During a vaginal delivery, the doctor palpated the ischial spine through the vagina with the index and middle fingers and injected a local anaesthetic agent to achieve perineal anaesthesia. This was repeated on both sides.

The pudendal nerve is the main innervation of the perineum. It arises as the lower main division of the sacral plexus and leaves the pelvis through the greater sciatic foramen below the piriformis muscle and crosses the dorsum of the ischial spine, and travels through the lesser sciatic foramen into the perineum.

The nerve then travels in the lateral wall of the ischial anal fossa and lies within the pudendal canal.

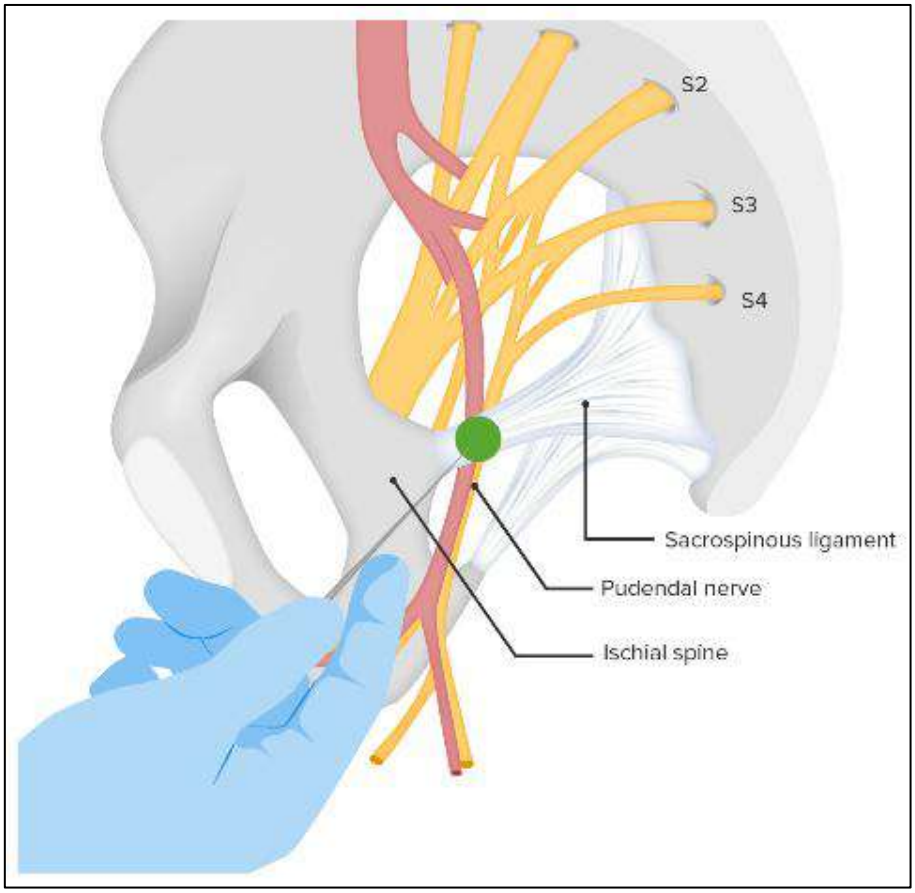
Here, it gives off the inferior rectal nerve and then divides into the perineal nerve and the dorsal nerve of the clitoris.

The inferior rectal nerve innervates the external anal sphincter and perineal skin.

The perineal nerve supplies the sphincter urethrae, ischiocavernosus, bulbospongiosus, superficial and deep transverse perineal muscles, and skin of the posterior aspect of the vulva.

The dorsal nerve of the clitoris supplies the dorsal aspect of the clitoris and vulva.

Therefore, injecting a local anesthetic at the ischial spine causes anesthesia of pudendal nerve which in turn causes anesthesia of the above-mentioned structures, giving rise to perineal anesthesia of the respective half of the perineum.
Repetition on both sides gives full anesthesia of the whole perineum, enabling the carrying out of surgical procedures.



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SGD 6 – Male Reproductive Organs

(1)

(1.1) Draw and label a line diagram of a longitudinal section of a testis to illustrate its components. (35 marks)

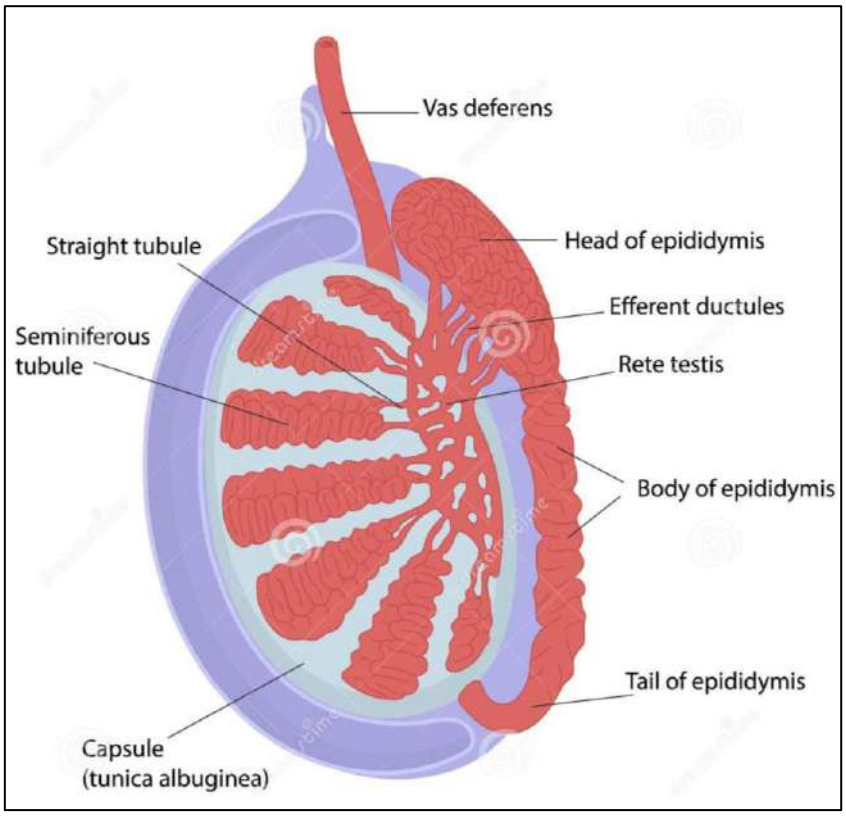
(1.2) List the components of the spermatic cord. (35 marks)

(1.3) A person with a tumor of the left testis presents with a mass on the posterior abdominal wall. Describe the anatomical basis for this. (30 marks)

Answers

(1)

(1.1) Draw and label a line diagram of a longitudinal section of a testis to illustrate its components.



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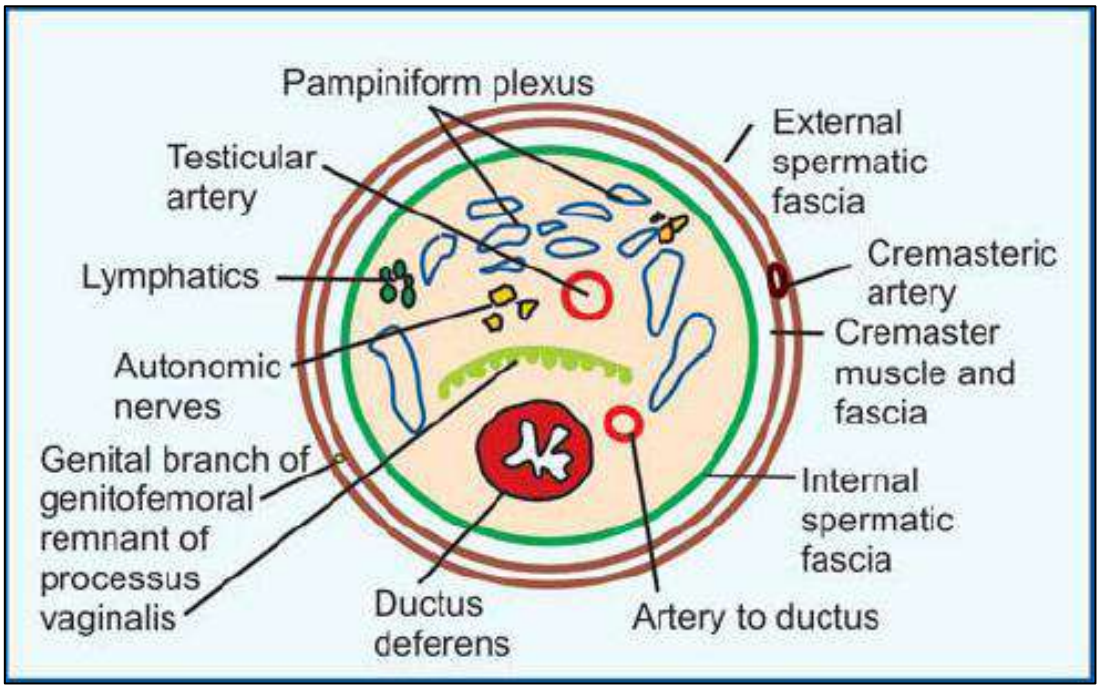
(1.2) List the components of the spermatic cord.

Ductus deferens
Testicular artery
Artery to ductus
Cremasteric artery

Pampiniform plexus
Lymphatics
Genital branch of the genitofemoral nerve
Sympathetic twigs
Processus vaginalis



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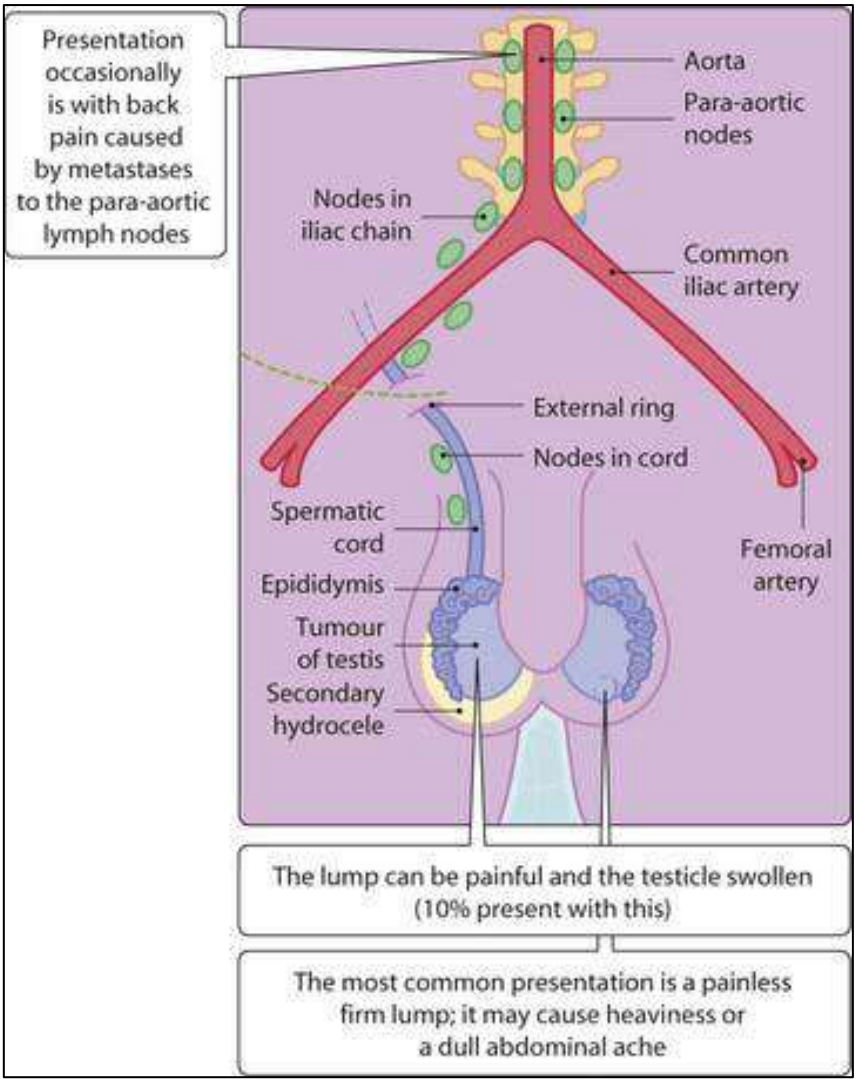
(1.3) A person with a tumor of the left testis presents with a mass on the posterior abdominal wall. Describe the anatomical basis for this.

Tumors of the testes cause the malignancy to spread through the lymphatics to the lymph nodes. Lymphatics from the testes run back with the testicular artery to paraaortic nodes lying alongside the aorta in the posterior abdominal wall at the level of origin of the testicular arteries (L2 vertebra), just above the umbilicus. Therefore, para-aortic lymph nodes enlarge at the L2 level & present as a mass in the posterior abdominal wall.



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CONTINUOUS ASSESSMENTS (CAT – 2) (BATCH 2) MOCK EXAM MCQs

(1) A 2-day-old newborn male is cyanotic after attempts to swallow milk result in the collection of the milk in his mouth. After 2 days, he develops aspiration pneumonia. A tracheoesophageal fistula is suspected. Which of the following structures has most likely failed to develop properly? (SBR)

(A) Esophagus
(B) Trachea
(C) Tongue
(D) Tracheoesophageal septum
(E) Pharynx

(2) A 23-year-old woman is admitted with severe abdominal pain, nausea, and vomiting. History taking shows that the pain is severe and has been constant for 4 days. The pain began in the epigastric region and radiated bilaterally around the chest to just below the scapulae. Currently the pain is localized in the right hypochondrium. A CT scan examination reveals calcified stones in the gallbladder. Which of the following nerves carries the afferent fibers of the referred pain? (SBR)

(A) Greater thoracic splanchnic nerves
(B) Dorsal primary rami of intercostal nerves
(C) Phrenic nerves
(D) Vagus nerves
(E) Pelvic splanchnic nerves

(3) A 32-year-old man is admitted to the emergency department with groin pain. Examination reveals that the patient has an indirect inguinal hernia. Which of the following nerves is compressed by the herniating structure in the inguinal canal to give the patient pain? (SBR)

(A) Iliohypogastric
(B) Lateral femoral cutaneous
(C) Ilioinguinal
(D) Subcostal
(E) Pudendal

(4) During a scheduled laparoscopic cholecystectomy in a 47-year-old female patient, the resident accidentally clamped the hepatoduodenal ligament instead of the cystic artery. Which of the following vessels would most likely be occluded in this iatrogenic injury? (SBR)

(A) Superior mesenteric artery
(B) Proper hepatic artery
(C) Splenic artery
(D) Common hepatic artery
(E) Inferior vena cava

(5) A 15-year-old woman is brought to the hospital with fever, nausea, and diffuse paraumbilical pain, which later becomes localized in the lower right quadrant. An appendectomy procedure is begun with an incision at McBurney's point. Which of the following landmarks best describes McBurney's point? (SBR)

(A) The midpoint of the inguinal ligament in line with the right nipple.
(B) Two thirds of the distance from the umbilicus to the anterior superior iliac spine.
(C) A line that intersects the upper one third of the inguinal ligament.
(D) A line that intersects the lower third of the inguinal ligament, about 2 cm from the pubic tubercle.
(E) One third of the distance from the anterior inferior iliac spine to the umbilicus.

(6) A 44-year-old man is admitted to the emergency department with excessive vomiting and dehydration. Radiologic images demonstrate that part of the bowel is being compressed between the abdominal aorta and the superior mesenteric artery, the so-called "nutcracker syndrome." Which of the following intestinal structures is most likely being compressed? (SBR)

(A) Second part of duodenum
(B) Transverse colon
(C) Third part of duodenum
(D) First part of duodenum
(E) Jejunum

(7) During the surgical repair of a perforated duodenal ulcer in a 47-year-old male patient, the gastroduodenal artery is ligated. A branch of which of the following arteries will continue to supply blood to the pancreas in this patient? (SBR)

(A) Inferior mesenteric artery
(B) Left gastric artery
(C) Right gastric
(D) Proper hepatic
(E) Superior mesenteric

(8) A 34-year-old man is undergoing an emergency appendectomy. After the appendectomy has been performed successfully, the patient undergoes an exploratory laparoscopy. Which of the following anatomic features are the most useful to distinguish the jejunum from the ileum? (SBR)

(A) Jejunum has thinner walls compared with the ileum.
(B) Jejunum has less mesenteric fat compared with the ileum.
(C) Jejunum has more numerous vascular arcades compared with the ileum.
(D) Jejunum has more numerous lymphatic follicles beneath the mucosa compared with the ileum.
(E) Jejunum has fewer villi compared with the ileum.

(9) A 48-year-old man is admitted to the hospital with severe abdominal pain. Radiologic examination reveals a tumor in the tail of the pancreas. A diagnostic arteriogram shows that the tumor has compromised the blood supply to another organ. Which of the following organs is most likely to have its blood supply compromised by this tumor? (SBR)

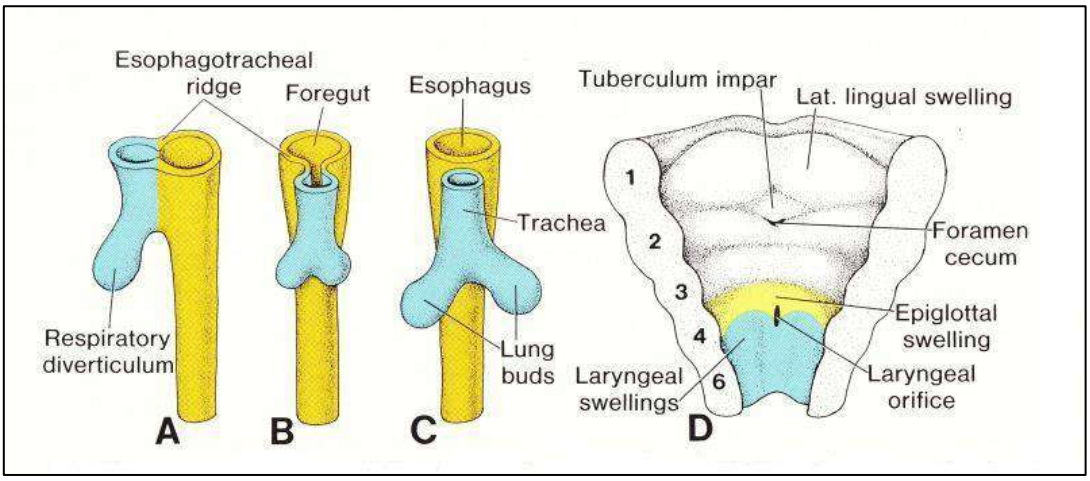
(A) Duodenum
(B) Gallbladder
(C) Kidney
(D) Liver
(E) Spleen

(10) The vomitus of a 5-day-old infant contains stomach contents and bile. The vomiting has continued for 2 days. Radiographic examinations reveal stenosis of the fourth part of the duodenum. The child cries almost constantly, appearing to be hungry all of the time, yet does not gain any weight. Which of the following developmental conditions will most likely explain the symptoms? (SBR)

(A) Patent bile duct
(B) Duodenal stenosis
(C) Hypertrophied pyloric sphincter
(D) Atrophied gastric antrum
(E) Tracheoesophageal fistula

CONTINUOUS ASSESSMENTS (CAT – 2) (BATCH 2) MOCK EXAM MCQ ANSWERS

(1) D



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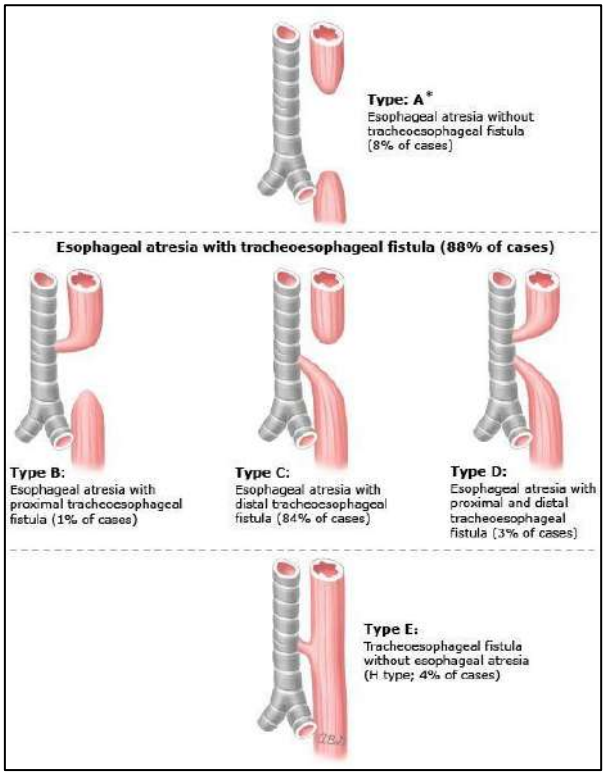

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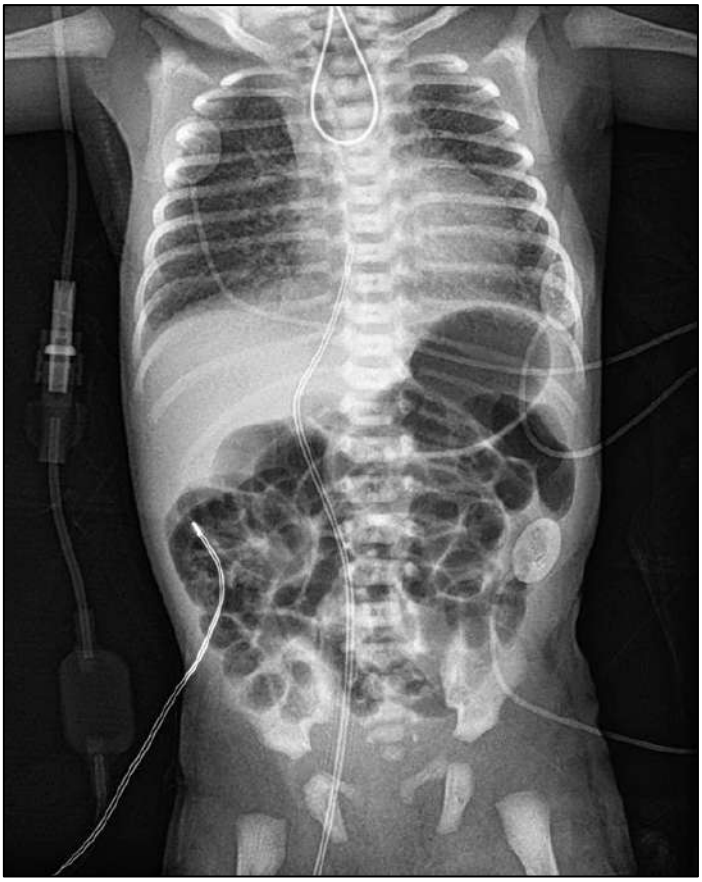

Chest radiograph in an infant with esophageal atresia and tracheoesophageal fistula.
https://pediatricsurgerykhonkaen.blogspot.com/2020/03/esophageal-atresia.html

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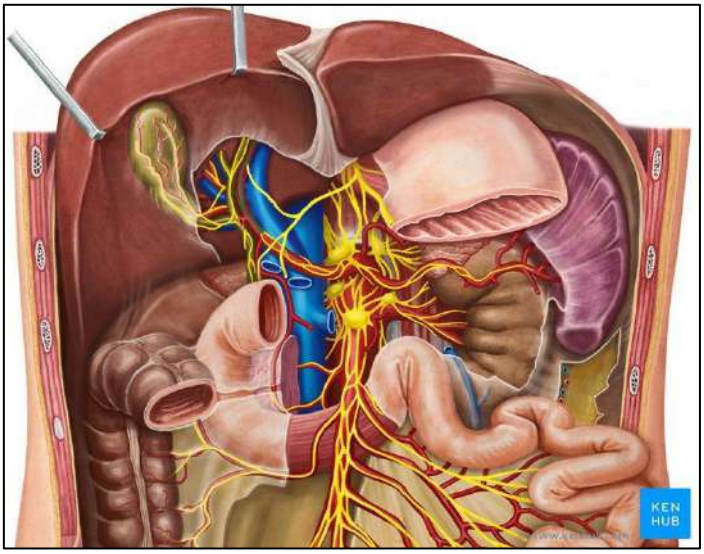

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Innervation of the Gall Bladder

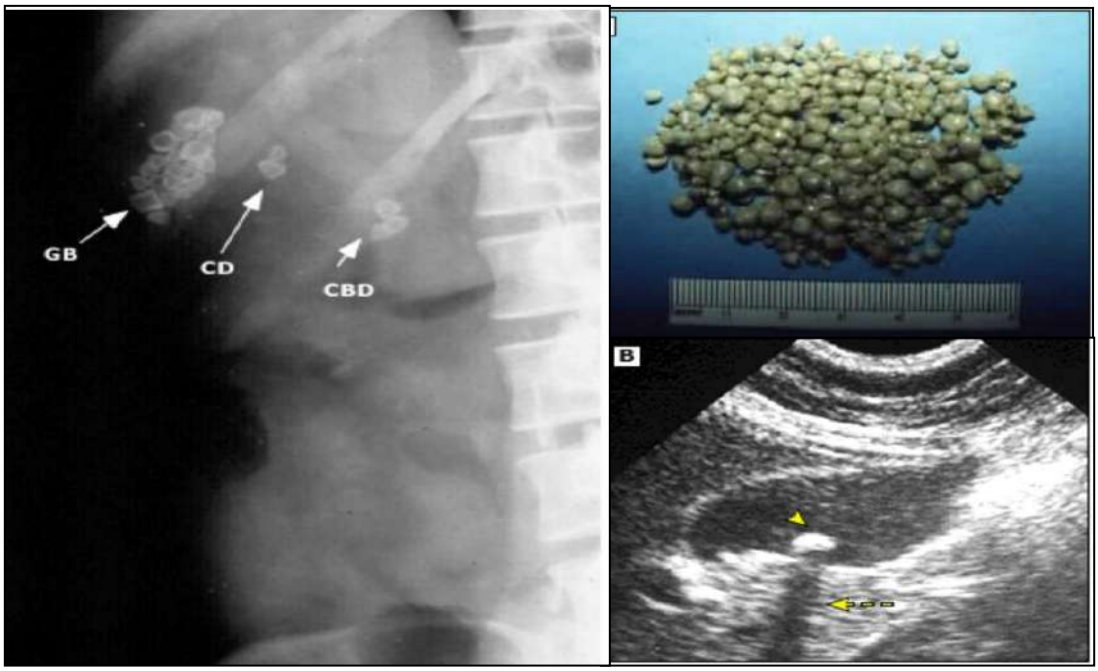
The gallbladder and the extrahepatic biliary tree are innervated by branches from the hepatic plexus.

Gallbladder contraction occurs in response to cholecystokinin (CCK) and parasympathetic (vagal) stimulation. Postganglionic sympathetic nerve fibres from the coeliac and superior mesenteric ganglia are inhibitory to gallbladder smooth muscle.
Sympathetic afferents from the gallbladder convey pain sensation; they travel with the greater and lesser splanchnic nerves and have their cell bodies in the T7–9 spinal cord segments.

Visceral pain from the gallbladder is referred to the right hypochondrium and epigastrium and may radiate around the back below the right scapula.

Inflammation of the parietal peritoneum overlying the gallbladder produces localized right upper quadrant pain. A diverse range of neurotransmitters has been identified within intrinsic neurons of the gallbladder.

Gallstones



http://drwerner.webseiten.cc/fileadmin/Dokumente/Gallenblasenpolypen.pdf

Complications

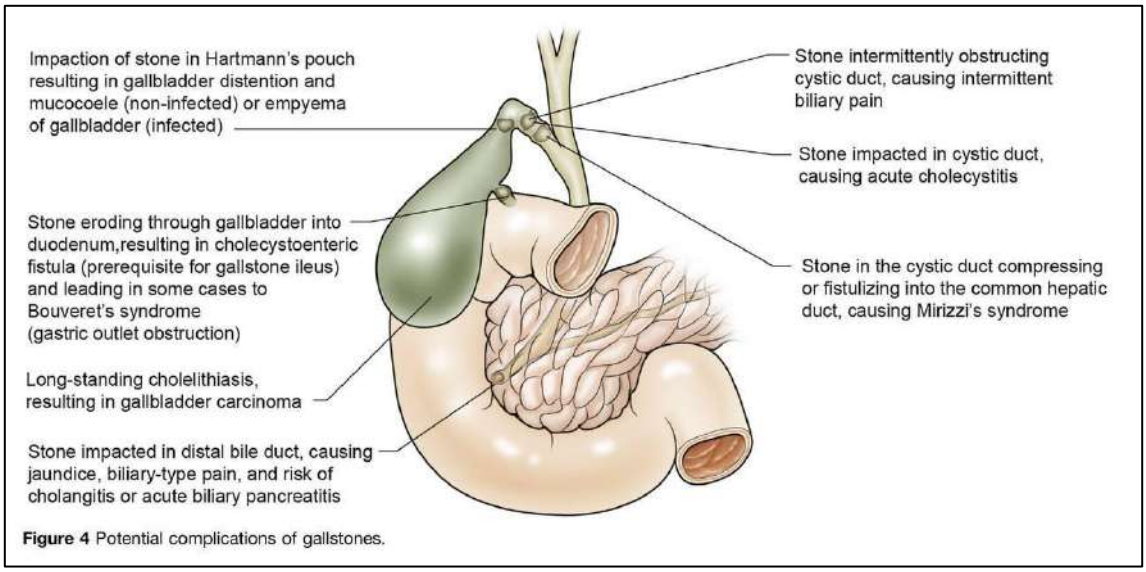


Figure 4 Potential complications of gallstones.

https://www.sciencedirect.com/science/article/pii/S0263931920301174

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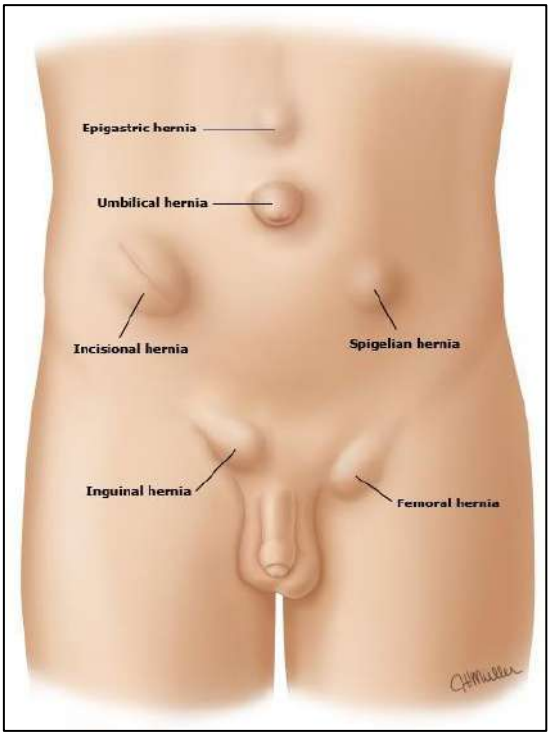

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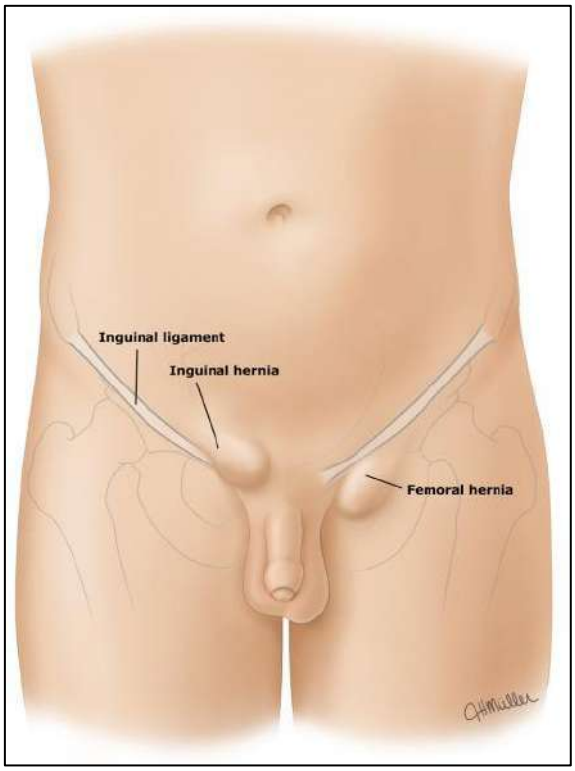
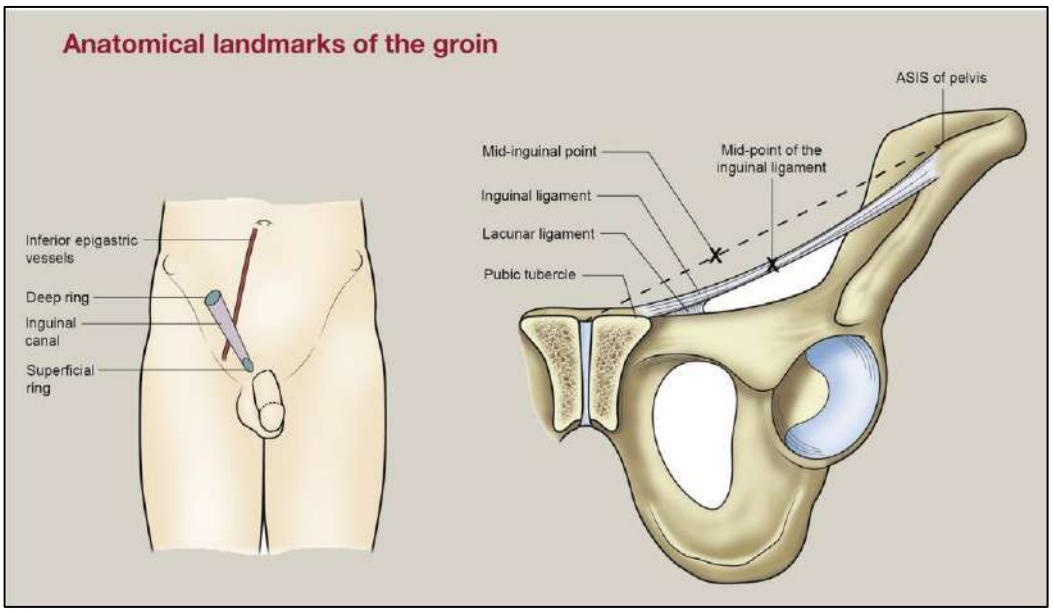
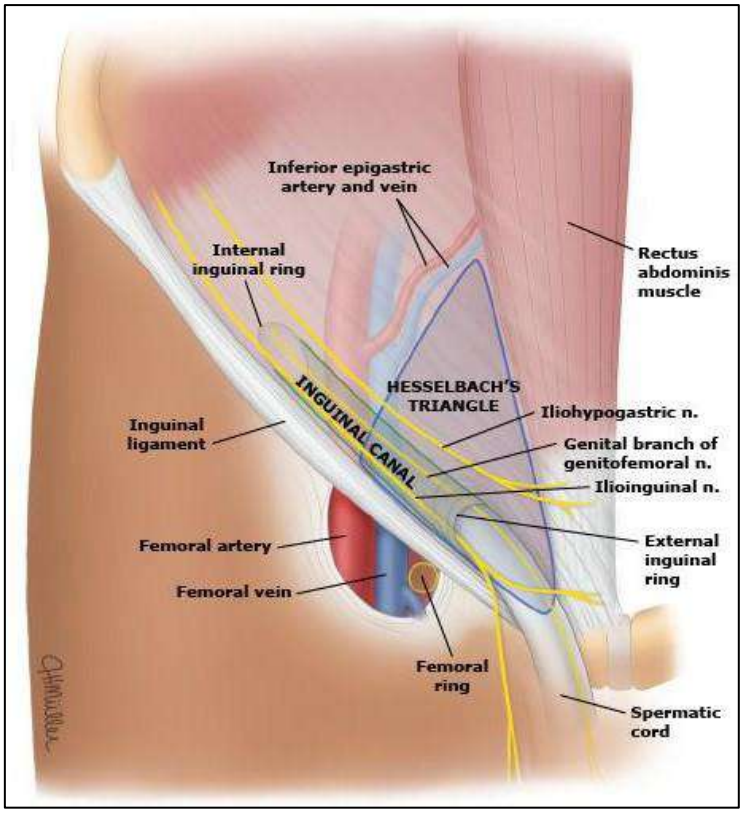


https://virginiacommonsense.com/femoral-hernia/



https://www.sciencedirect.com/science/article/pii/S0263931920302623



https://www.google.com/url?sa=i&url=https%3A%2F%2Fmedizzy.com%2Ffeed%2F39841054&psig=AOvVaw3Qc7UVKkMVBuYBaWXBAi43&ust=1766548299223000&source=images&cd=vfe&opi=89978449&ved=0CBEQjRxqFwoTCLj7hLrn0pEDFQAAAAAdAAAAABAE

(4) B

Hepatoduodenal Ligament

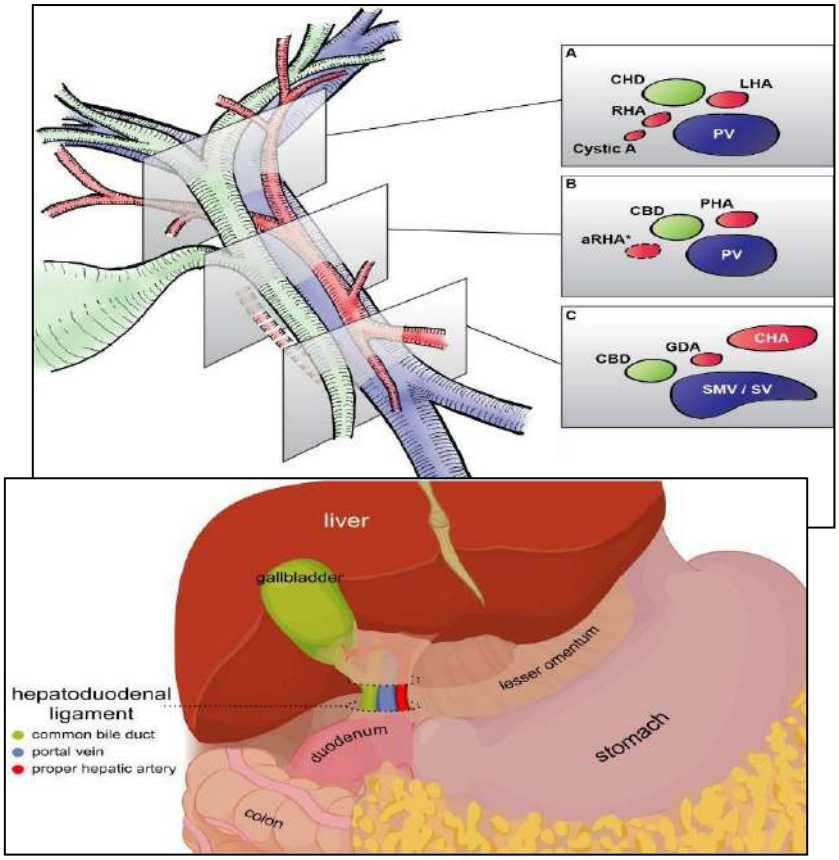
The hepatoduodenal ligament is a thick anatomical structure wrapped in the peritoneum that constitutes part of the lesser omentum.

The hepatoduodenal ligament runs from the porta hepatis to the proximal 2 cm of the duodenum.

The hepatic artery proper, common bile duct, and portal vein run through the ligament near its free edge to reach the liver.

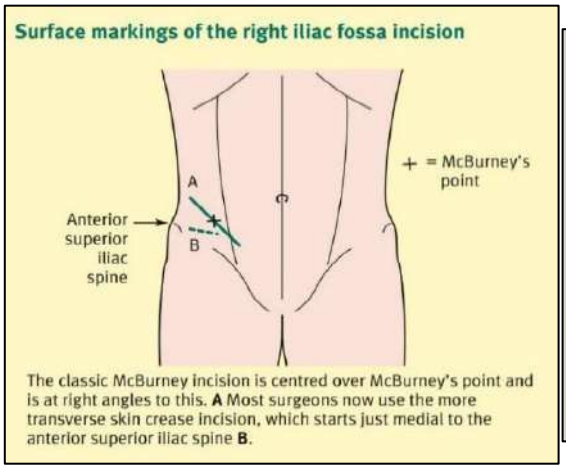
These 3 structures are often referred to as the portal triad.

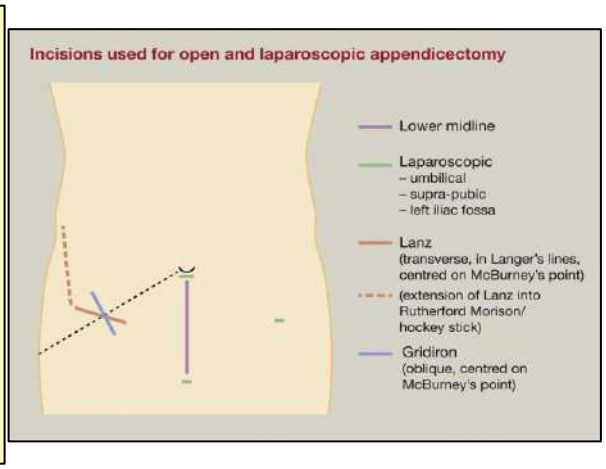
It is an important pathway of inflammatory and neoplastic disease between the stomach, retroperitoneum, and the porta hepatis through mechanisms such as direct invasion and lymphatic extension. For example, cancer from the pancreas and colon can spread to the nodes surrounding the superior mesenteric artery and eventually travel up the lymphatic channels in the hepatoduodenal ligament of the liver. Lymphatic fluid can also travel from the liver and biliary system to lymph nodes adjacent to the duodenum and pancreas, spreading the disease to the retroperitoneum.



http://medbox.iiab.me/kiwix/wikipedia_en_medicine_2019-12/A/Hepatoduodenal_ligament

(5) B





https://www.surgeryjournal.co.uk/article/S0263-9319(08)00164-6/fulltext

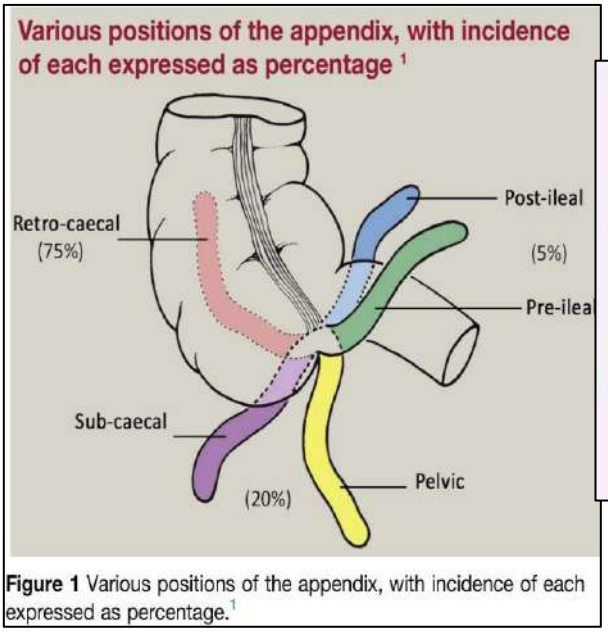
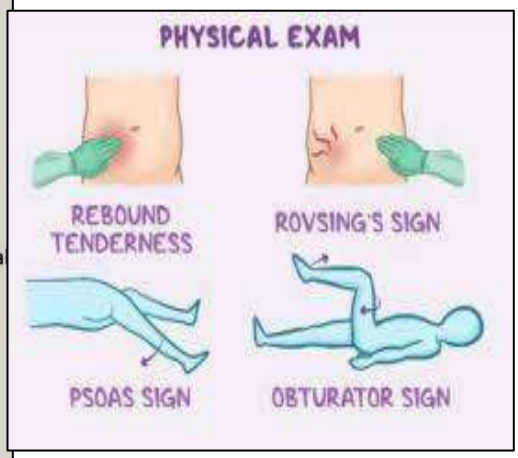
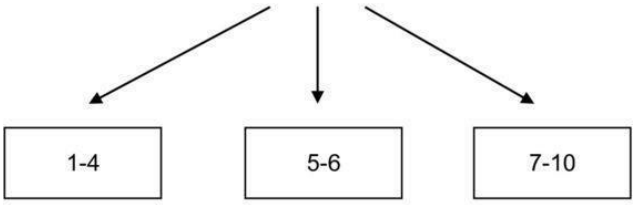


Figure 1 Various positions of the appendix, with incidence of each expressed as percentage.[1]



https://www.sciencedirect.com/topics/medicine-and-dentistry/vermiform-appendix

Alvarado score	
Feature	**Score**
Migration of pain	1
Anorexia	1
Nausea	1
Tenderness in right lower quadrant	2
Rebound pain	1
Elevated temperature	1
Leucocytosis	2
Shift of white blood cell count to the left	1
Total	**10**



https://www.researchgate.net/figure/Alvarado-Score-Criteria-and-Scoring-Range-Classification_fig1_330703130

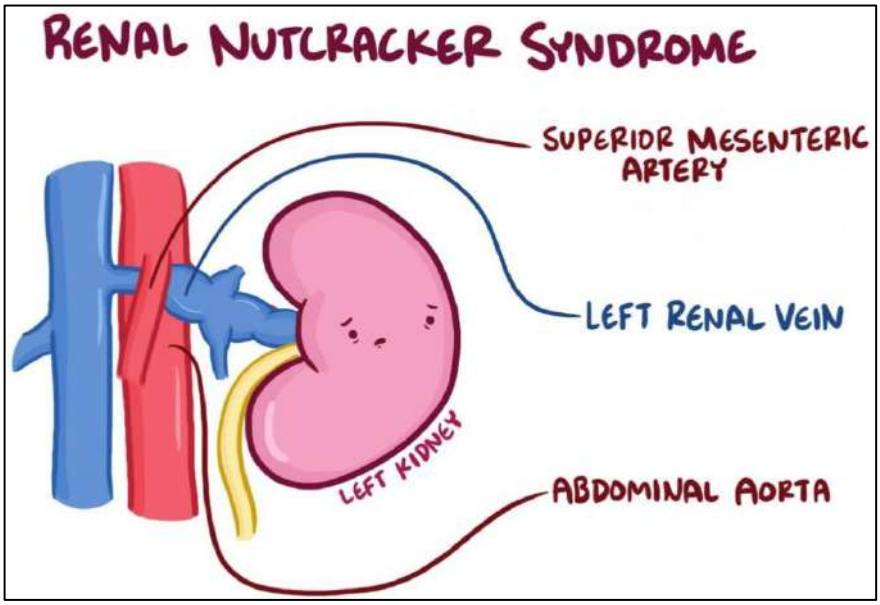
Figure 2 Leonid Rogozov performing an auto-appendicectomy in 1961. (From Rogozov L. Auto-appendectomy in the Antarctic, a case report. Rogozov, *Brit Med J* 2009; **339**: 1421–2. With permission from BMJ Publishing Group Limited.)

(6) C

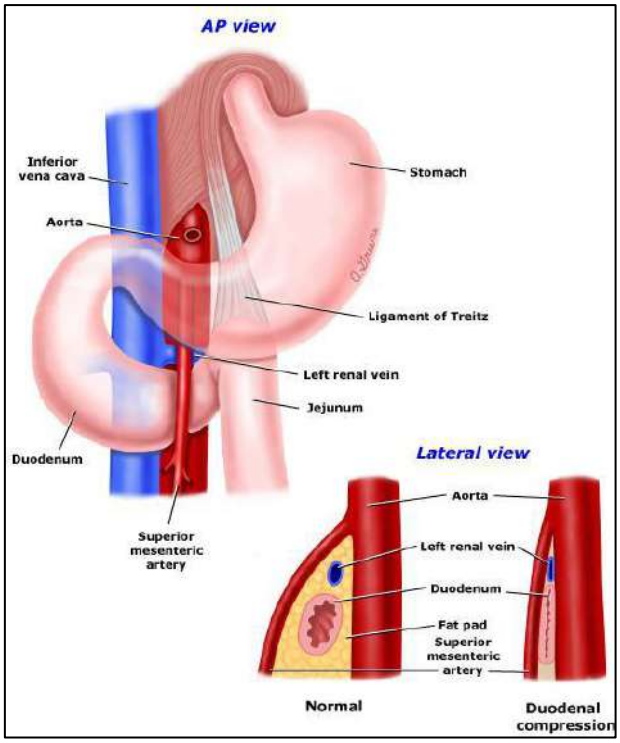
Nutcracker syndrome (NCS) is the condition of extrinsic compression of the left renal vein (LRV) from the narrowing of the aorto-mesenteric angle.

The third portion of the duodenum can also be compressed at this location, causing superior mesenteric artery syndrome (SMAS).

Both syndromes are reportedly rare and often improve after conservative management.

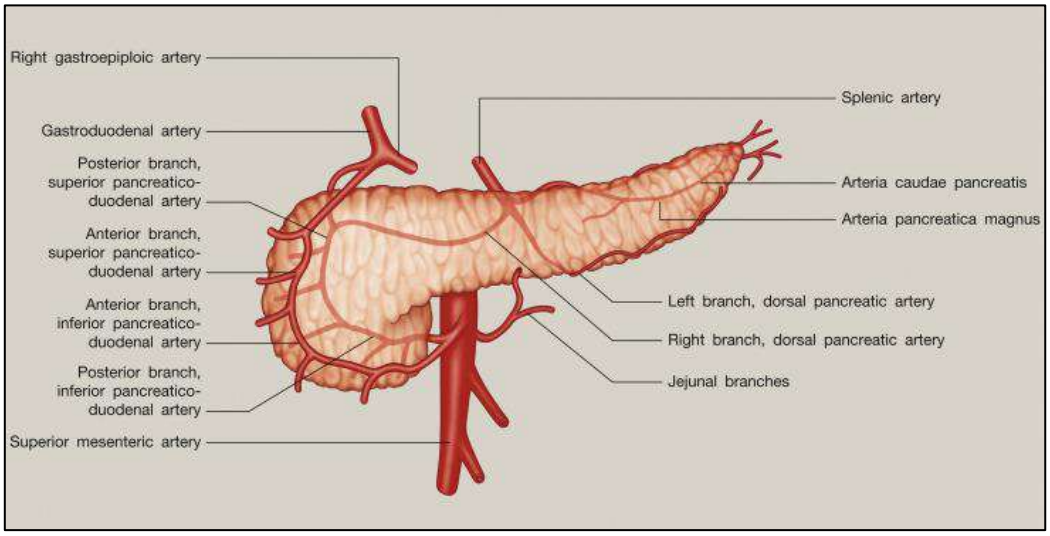


https://www.osmosis.org/video/Nutcracker_syndrome

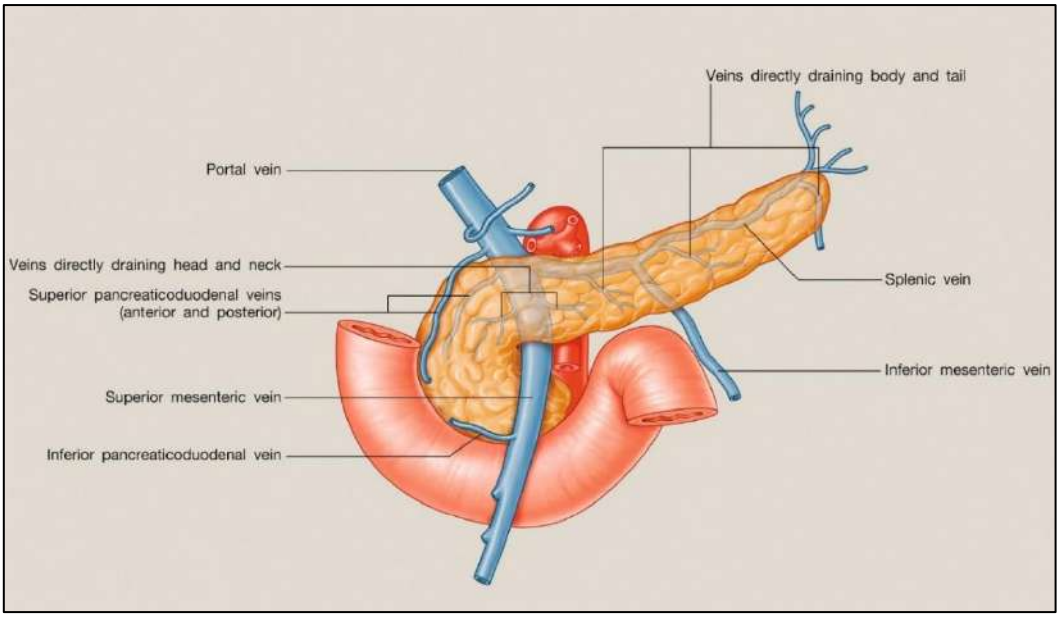


https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.researchgate.net%2Ffigure%2FSuperior-mesenteric-artery-SMA-syndrome-The-superior-mesenteric-artery-arises-from-the_fig5_311862660&psig=AOvVaw08F2CFRqahl5E0-qB72o_l&ust=1766549222358000&source=images&cd=vfe&opi=89978449&ved=0CBEQjRxqFwoTCMibjevq0pEDFQAAAAAdAAAAABAE

(7) E

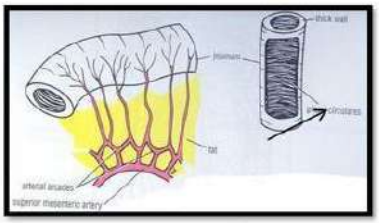


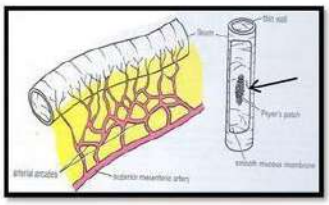
https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.surgeryjournal.co.uk%2Farticle%2FS0263-9319%252824%252900192-3%2Ffulltext&psig=AOvVaw0ZuB4vJ7eH_zbhLvEH8A4b&ust=1766549300490000&source=images&cd=vfe&opi=89978449&ved=0CBEQjRxqFwoTCIiL1pPr0pEDFQAAAAAdAAAAABAE



https://www.sciencedirect.com/science/article/pii/S0263931916300011

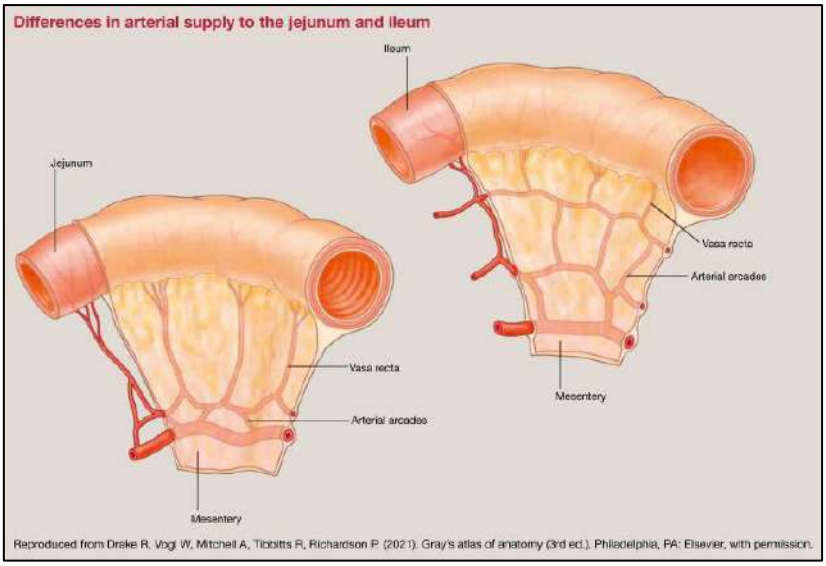
(8) B





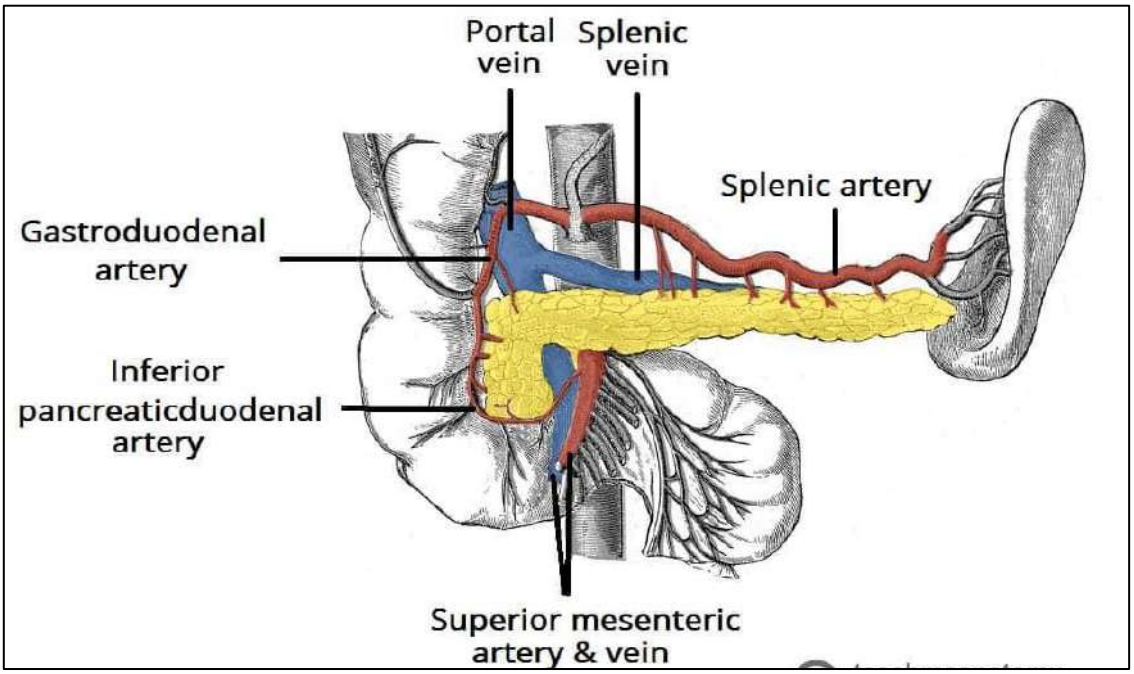
	JEJUNUM	ILEUM
LENGTH	Shorter (proximal 2/5) of SI	Longer (distal 3/5) of SI
DIAMETER	Wider	Narrower
WALL	Thicker (more plicae circulares)	Thinner (less plicae circulares)
APPEARANCE	Dark red (more vascular)	Light red (less vascular)
VESSELS	High & Less arcades (long terminal branches)	Low & More arcades (short terminal branches
MESENTERIC FAT	Small amount & away from intestinal border	Large amount & close to intestinal border
LYMPHOID TISSUE	Few aggregations	Numerous aggregations (Peyer's patches)

https://www.openmed.co.in/2021/02/anatomical-differences-between-jejunum.html

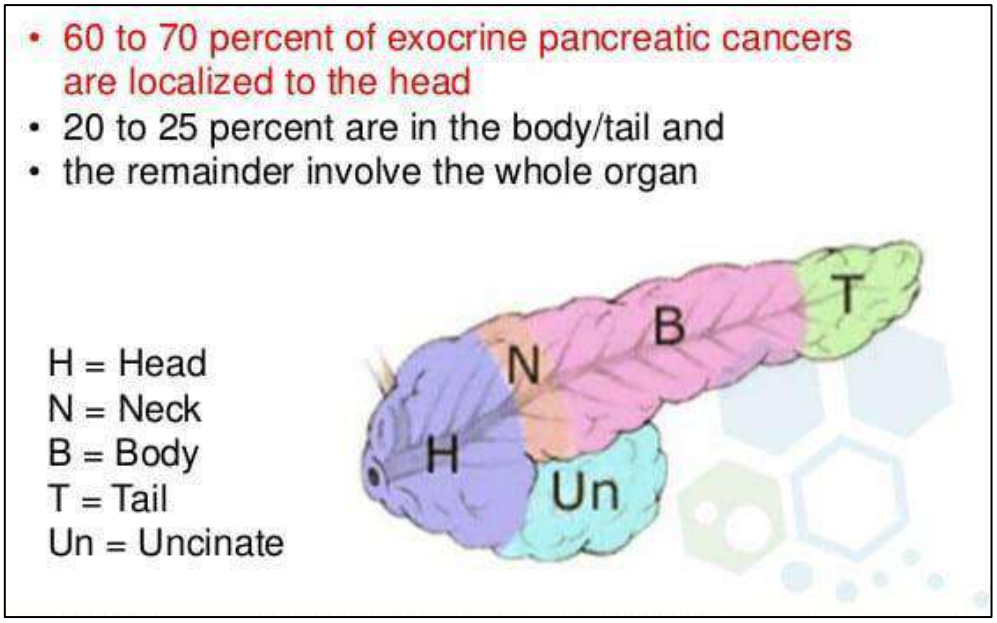


https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.sciencedirect.com%2Ftopics%2Fmedicine-and-dentistry%2Fjejunum-ulcer&psig=AOvVaw34EAUNghUF2NH6Qrk65Dxy&ust=1766549601621000&source=images&cd=vfe&opi=89978449&ved=0CBEQjRxqFwoTCMCJ25_s0pEDFQAAAAAdAAAAABAE

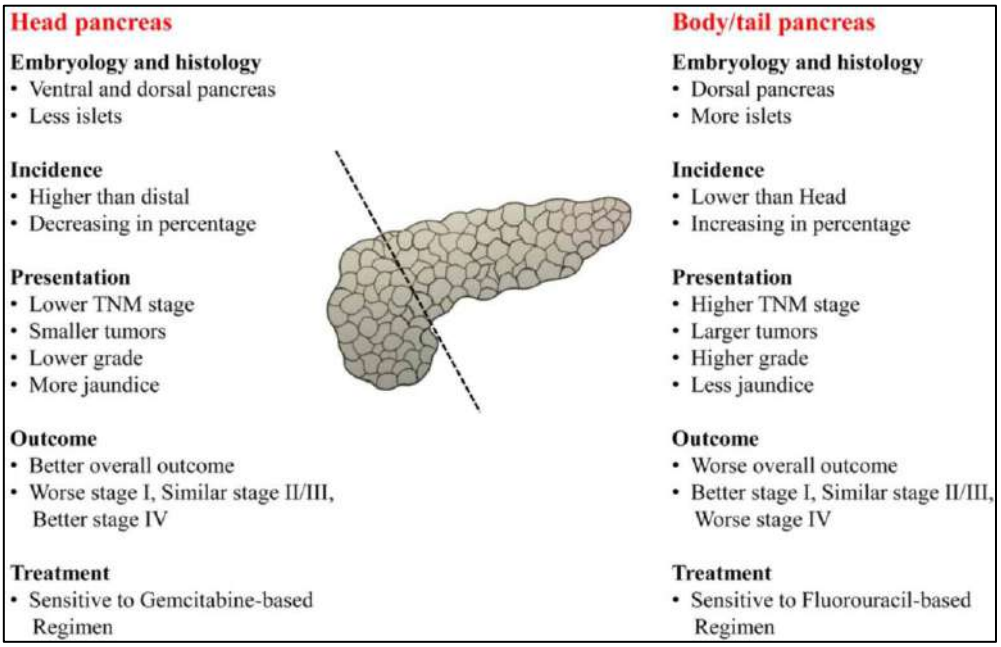
(9) E



https://teachmeanatomy.info/abdomen/viscera/pancreas/



https://stemcellthailand.org/oncology/pancreas-cancer-treatment/

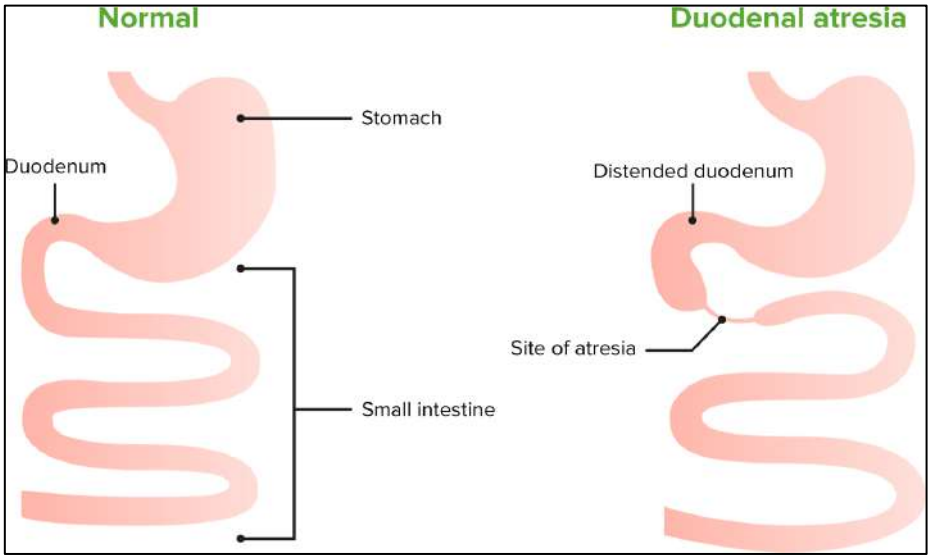


https://www.spandidos-publications.com/10.3892/etm.2020.8795

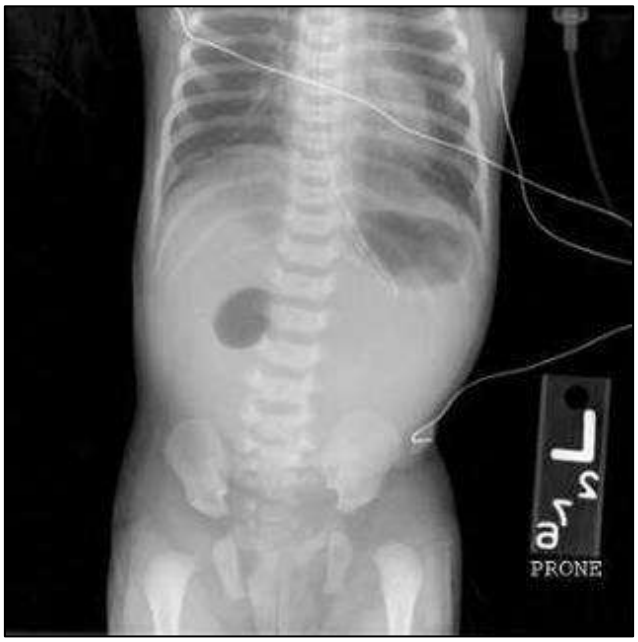
(10) B

Arteria = Closed or absent.

Stenosis = Narrowed.

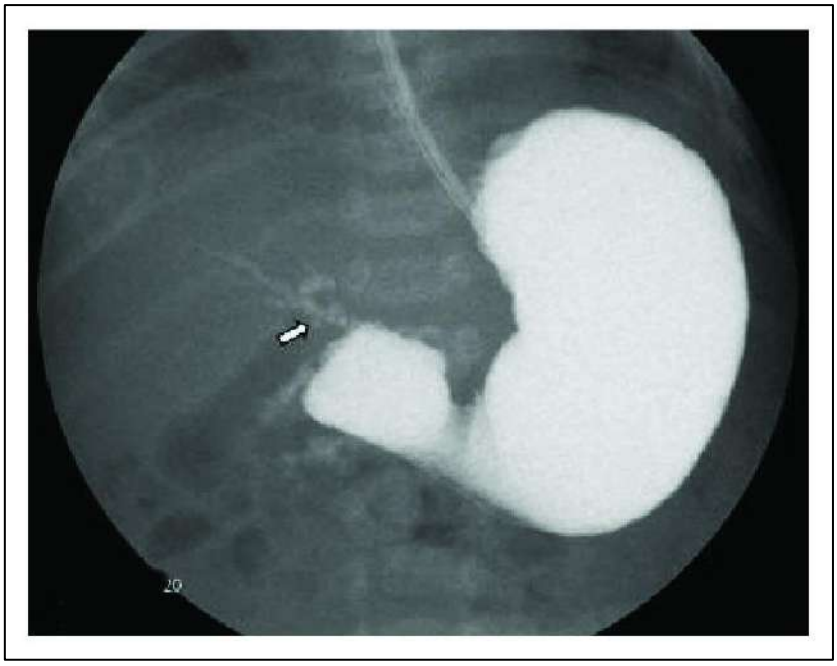


https://www.lecturio.com/concepts/congenital-duodenal-obstruction/



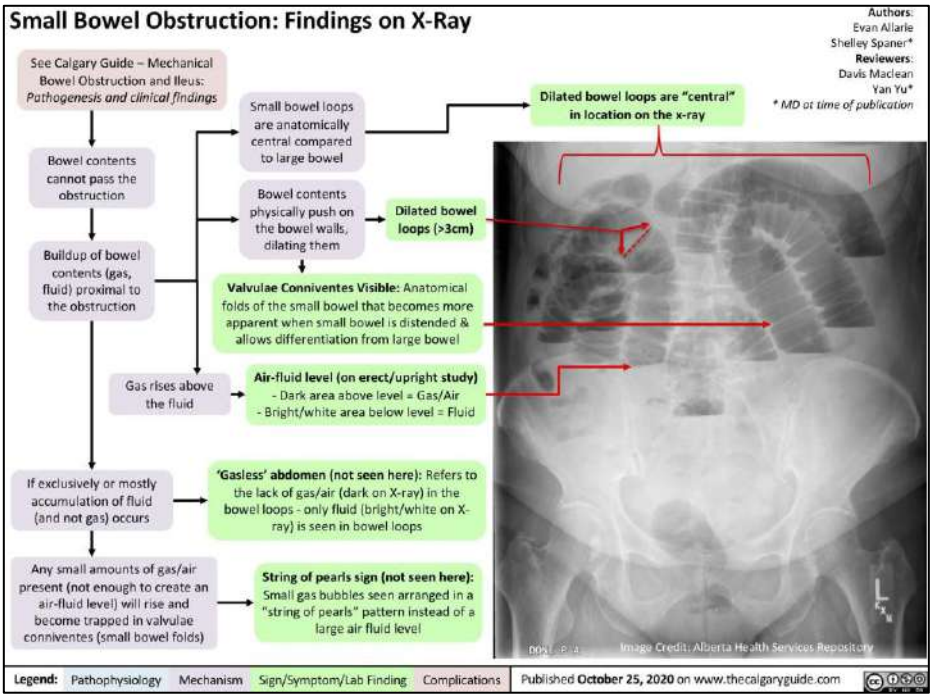
Plain radiograph of an infant with duodenal atresia.

https://www.cram.com/flashcards/paediatrics-1544771

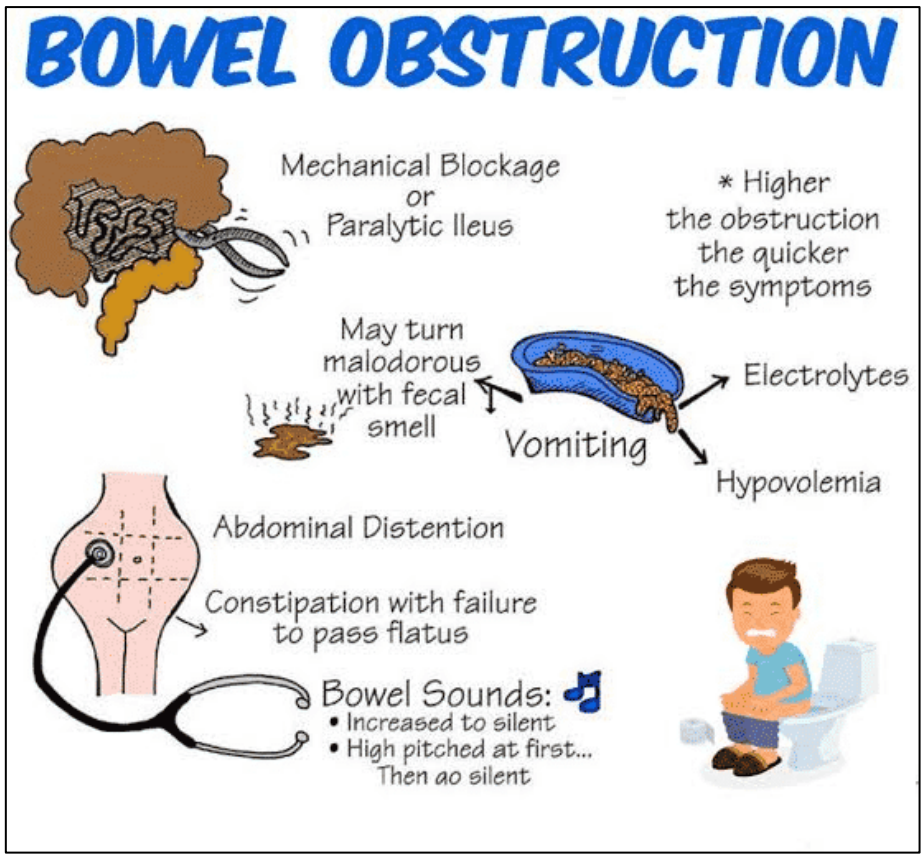


Contrast study in duodenal atresia.

https://www.google.com/url?sa=i&url=https%3A%2F%2Fembryology.med.unsw.edu.au%2Fembryology%2Findex.php%3Ftitle%3DFile%3ADuodenal_atresia_01.jpg&psig=AOvVaw0OLABgfAWjs571SmUFU_Gy&ust=1766550120525000&source=images&cd=vfe&opi=89978449&ved=0CBUQjRxqFwoTCPjNwJ3u0pEDFQAAAAAdAAAAABAE



https://www.google.com/url?sa=i&url=https%3A%2F%2Fcalgaryguide.ucalgary.ca%2Fsmall-bowel-obstruction-findings-on-x-ray%2F&psig=AOvVaw1CoI8O_nIboEkv8WvMd2eN&ust=1766550224906000&source=images&cd=vfe&opi=89978449&ved=0CBEQjRxqFwoTCKjS4sfu0pEDFQAAAAAdAAAAABAE



https://www.drvpareek.com/intestinal-obstruction-presentation-and-treatment/

CONTINUOUS ASSESSMENTS (CAT - 2) (BATCH 1) PAPERS

CAT – 2
(BATCH 1)
MCQs

Uva Wellassa University

UVA WELLASSA UNIVERSITY
FACULTY OF MEDICINE
Continuous assessment 02
March 2025
2023/2024(01st)
Batch ANATOMY
Multiple Choice Questions (MCQ) paper

Time 9.00 am — 11.00 am (02 hours) Date of the exam:
Index (MED) Number:

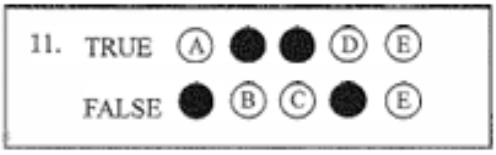
Please read the following instructions before marking responses on your answer sheets

1. Check that your question paper has total of 6 pages including the front page, which you are reading now.
2. A single answer sheet is provided. Please write your index number in the given space.
3. Read each question carefully before answering.
4. Mark the correct response as a **heavy black mark filling the relevant circle completely,** using a black lead pencil (6B or above grade).
5. Mark no stray marks on the answer sheet. In case of an error, erase cleanly.
6. Your final answer should be a densely colored circle through which the underlying letter is not visible.
7. Marking using any other method (e.g., mark the circle with a cross) is not valid.

TEN (10) TRUE/FALSE TYPE QUESTIONS (Questions 1-10/Page 2-3)

1. Mark whether each response is true or false.
2. Given below is an example of how to mark a true/false type question.

11. Woman has
    A. one ovary
    B. one nose
    C. two ears
    D. one eye
    E. two hairs



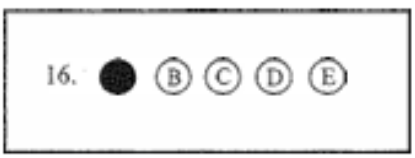
A correct response will get +1 mark
An incorrect response will get -1 mark
No response will get zero mark
Negative marks will not be carried over

TEN (10) SINGLE BEST CHOICE TYPE QUESTIONS (Questions 11-20/ Page 4-6)

1. Mark the best response. Only one response per question should be marked.
2. If you mark the correct response, you will get the full marks for the question.
3. If you mark an incorrect response, fail to mark any response, select more than one response, or mark your response unclearly, you will not receive any marks for that question.
4. Given below is an example of how to mark a single best response type question.

16. Speaking is a unique ability observed in humans. Which of the following body parts is primarily used for speech production?

A. Tongue
B. Hand
C. Feet
D. Ear
E. Nose



Question numbers 01 to 10 are True or False type questions. Mark your answer for each of the 5 responses (A to E).

1. True/False regarding the development of the gut and abdominal viscera?
   A. The cecal bud is the last to retract from herniated intestinal loops.
   B. The duodenojejunal flexure derives from the foregut.
   C. The pectinate line demarcates the endodermal and ectodermal regions of the anal canal.
   D. The spleen develops in the ventral mesogastrium.
   E. The stomach rotates 90 ° clockwise around its longitudinal axis.

2. True/False regarding the development of the hepatobiliary system?
   A. Kupffer cells derive from neural crest cells.
   B. The hepatic diverticulum, which gives rise to the liver, arises from the midgut.
   C. The hepatic sinusoids are initially formed by the invasion of blood vessels from the fetal umbilical vein.
   D. The septum transversum forms the lesser omentum.
   E. The ductus venosus is a remnant of the embryonic vitelline vein.

3. True/False regarding the right kidney?
   A. Its longitudinal axis is parallel to the lateral border of the psoas major muscle.
   B. It forms the posterior boundary of the hepatorenal recess.
   C. The right hilum is posterior to the 2‘d part of the duodenum.
   D. The right renal vein is longer than the left renal vein.
   E. The superior borders of the right and left kidneys are at the same level.

4. True/False regarding the male reproductive system?
   A. The bulbourethral glands open into the prostatic urethra.
   B. The prostate gland is located superior to the urinary bladder.
   C. The seminal vesicles contribute the majority of the semen volume.
   D. The testicular artery anastomoses with the artery of the vas deferens.
   E. The was deferens crosses the ureter near the bladder.

5. True/False regarding the ovary?
   A. The ovary lies in a fossa between the external and internal iliac vessels.
   B. The ligament of the ovary is a remnant of the gubernaculum.
   C. The Pouch of Douglas lies anterior to the uterus.
   D. The tunica albuginea is a dense fibrous layer providing structural support.
   E. The suspensory ligament of the ovary contains the ovarian artery and vein.

6. True/False regarding female pelvic anatomy?
   A. Ampulla is the longest part of the Fallopian tube.
   B. The ovary is attached to the pelvic wall by the ovarian ligament.
   C. Peritoneal reflection from the posterior surface of the uterus is in relation to the posterior fornix of the vagina.
   D. Round ligaments terminate in the mons pubis.
   E. Ureter lies superior to the uterine artery

7. True/False regarding the liver?
   A. The caudate lobe is situated between the inferior vena cava and the ligamentum venosum.
   B. The liver is divided into four anatomical lobes.
   C. The liver is primarily drained by the right and left hepatic veins.
   D. The porta hepatis is located on the posterior surface of the liver.
   E. The right lobe of the liver is separated from the left lobe by the falciform ligament.

8. True/False regarding the pancreas?
   A. Its endocrine functions are primarily carried out by the islets of Langerhans.
   B. The exocrine portion of the pancreas secretes insulin and glucagon.
   C. The islets of Langerhans are primarily located in the tail of the pancreas
   D. The pancreatic duct drains the exocrine secretions from the pancreas into the duodenum.
   E. The ventral bud forms the tail of the pancreas.

9. True/False regarding the inguinal canal?
   A. The conjoined tendon strengthens the medial part of the posterior wall.
   B. Deep ring is a defect in the tranversalis fascia.
   C. Ilioinguinal nerve enters the canal through the deep ring.
   D. The internal oblique contributes to form the anterior wall, roof and conjoint tendon.
   E. It is a site for an ectopic testis.

10. True/False regarding the rectum?
    A. In a normal male person, the posterior surface of the prostate can be palpated by a finger passed per rectum.
    B. Lymphatics from the lower half of the rectum pass to the inferior mesenteric nodes.
    C. The perineal body with levator ani form the main supports of rectum.
    D. Sacculations are absent in the rectum.
    E. The upper one-third of the rectum is covered with peritoneum in front and on the sides.

Questions number 11 to 20 are Single Best Response (SBR) type. Select the best response to each question.

11. A 55-year-old male patient presented to the surgical unit with a right-sided direct inguinal hernia. During surgery, the inguinal canal was opened. Which of the following intraoperative observations correctly describes the anatomy of the above scenario?
    A. The hernia enters the canal through the deep ring.
    B. The hernia pushes the conjoint tendon to appear at the superficial ring.
    C. The hernial sac is inside the spermatic cord.
    D. The hernial sac is lateral to the inferior epigastric artery.
    E. The neck of the hernia is inferolateral to the pubic tubercle.

12. A 45-year-old male presented to the emergency department with right-sided severe flank pain radiating to the groin. Imaging confirmed a 6mm stone located at the pelvic brim, causing partial obstruction of the ureter. Which of the following anatomical structures compresses the ureter at this location, leading to the obstruction?
    A. Caecum
    B. Iliac vessels
    C. Inferior vena cava
    D. Right testicular vein
    E. Vas deferens

13. A 60-year-old male presented with symptoms of weight loss, fatigue, and changes in bowel habits. Colonoscopy revealed a malignant tumor in the mid-descending colon. Contrast. CT abdomen revealed enlarged lymph nodes along its arterial supply. Which of the following arteries supply this part of the colon?
    A. Ilio-colic artery
    B. Left colic artery
    C. Middle colic artery
    D. Right colic artery
    E. Superior mesenteric artery

14. A 28-year-old woman underwent an episiotomy during childbirth. The incision was made to widen the vaginal opening and prevent severe perineal tearing (episiotomy). Which of the following structures is most likely at risk during an episiotomy, particularly in the case of a mediolateral incision?
    A. External anal sphincter
    B. Ischiocavernosus muscle
    C. Pudendal nerve
    D. Rectal mucosa
    E. Vaginal artery

15. A 2-day-old baby presented with recurrent choking episodes while breastfeeding, with milk coming out through the nose. Vital signs and physical examination of the baby at birth were reported as normal. An attempt to insert a nasogastric tube (NG tube) was unsuccessful. What is the most timely congenital abnormality of this baby?
    A. Annular pancreas
    B. Esophageal atresia
    C. Hypertrophic pyloric stenosis
    D. Omphalocele
    E. Tracheal stenosis

16. A 48-year-old male underwent laparoscopic cholecystectomy for symptomatic cholelithiasis. During the procedure, the surgeon ensured that the anatomical boundaries of Calot's triangle were visualized and dissected within, to avoid damage to surrounding structures. Which of the following anatomical structures is outside the boundaries of Calot's triangle?
    A. Common bile duct
    B. Common hepatic duct
    C. Cystic artery
    D. Cystic duct
    E. Right hepatic artery

17. A 35-year-old woman underwent a hysterectomy for uterine fibroids. During the procedure, the surgeon carefully identified the uterine artery to avoid injury to a closely related structure. Which of the following is the most important anatomical relation of the uterine artery that the surgeon must consider?
    A. The vaginal artery at the level of the internal os of the cervix.
    B. The ureter near the lateral fornix of the vagina.
    C. The uterine artery is located within the mesosalpinx.
    D. The internal iliac artery.
    E. The ovarian artery within the broad ligament.

18. A 60-year-old male presented to the surgical clinic with complaints of a painful swelling at the anal margin for the past three days. He had no history of rectal bleeding. On examination, a tender, bluish swelling was noted at the anal verge. The surgeon explained that the condition arose from thrombosis of a vein located below the pectinate line. Which of the following veins is primarily involved in this condition?
    A. Inferior mesenteric vein
    B. Inferior rectal vein
    C. Internal pudendal vein
    D. Middle rectal vein
    E. Superior rectal vein

19. A 45-year-old male presented with severe, constant pain in the flank and lower back that radiates towards the groin. On examination, there was tenderness in the costovertebral angle and a palpable mass in the femoral region. His blood pressure was elevated, and laboratory tests revealed an elevated white blood cell count and elevated creatinine levels. A CT scan revealed a retroperitoneal abscess located near the kidney. Which anatomical structure is most likely to be involved by the abscess?
    A. Abdominal aorta
    B. Iliacus muscle
    C. Inferior vena cava
    D. Psoas major muscle
    E. Quadratus lumborum muscle

20. A 45-year-old male presented to the emergency department with severe abdominal pain, fever, and signs of peritonitis. He had a history of chronic NSAID use. Upper GI endoscopy revealed a perforated peptic ulcer in the posterior wall of the duodenum. Which of the following arteries is most likely involved in the bleeding associated with the perforation?
    A. Celiac trunk
    B. Common hepatic artery
    C. Gastroduodenal artery
    D. Right gastric artery
    E. Right gastroepiploic artery

CAT – 2
(BATCH 1)
SEQs

Continuous Assessment

March 2025

2023/2024 (Batch 1) ANATOMY

Structured Essay Question (SEQ) Paper

(1 hour)

(1) A 72-year-old Id woman with a medical history of hypertension and diabetes mellitus presented to the hospital with sudden-onset lower abdominal pain, bloating. and bloody diarrhea. The pain was localized to the left lower quadrant. On examination, she had a low-grade fever, tenderness in the left lower abdomen. and signs of mild dehydration. A CT scan of the abdomen showed bowel wall thickening and fat stranding sigmoid colon. and there was evidence of decreased vascular enhancement in the region. The attending physician suspects ischaemic colitis.

(1.1) Describe the arterial blood supply of the large intestine. (50 Marks)
(1.2) What are the watershed areas of the large intestine and outline their clinical importance? (30 Marks)
(1.3) List four key anatomical features that distinguish the secondary retroperitoneal colon from other parts of the colon. (20 marks)

(Total 100 Marks)

(2) A 28-year-old woman presented to the gynecology clinic with primary amenorrhea (absence of menstruation) and difficulty in conceiving. Her medical history was otherwise unremarkable, and she had normal secondary sexual characteristics (e.g., breast development, pubic hair growth). On ultrasound scan, her uterus appeared rudimentary and fallopian tubes were underdeveloped. This clinical presentation raised suspicion of a Müllerian duct anomaly, which may be linked to improper development of the Müllerian system during embryogenesis.

(2.1) Briefly describe the embryological development of the Müllerian system in Females. (30 Marks)

(2.2) Explain the process of sexual differentiation and the role of hormones (e.g., estrogen, anti-Mullerian hormone) in the development of the Müllerian system. (30 marks)
(2.3) Outline the blood supply of uterus and fallopian tubes with clinical implications. (40 Marks)

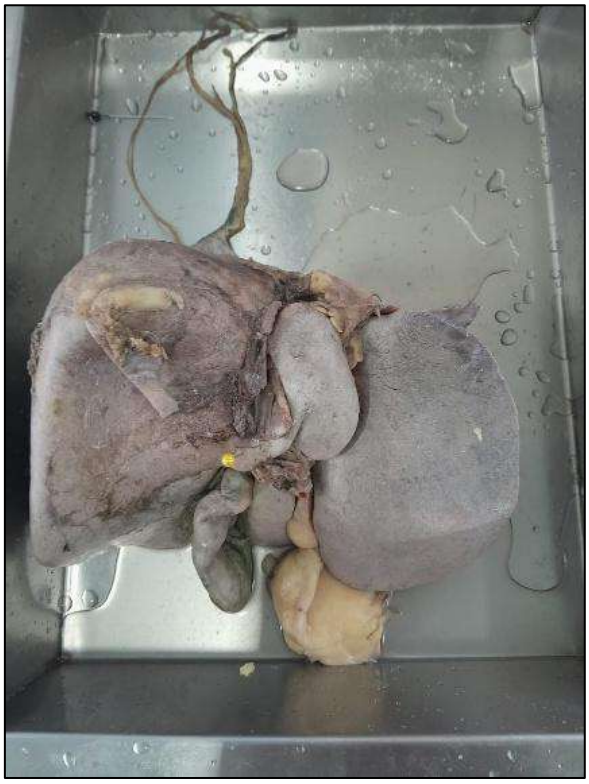
(Total 100 Marks)

CAT – 2
(BATCH 1)
OSPE

(1) A 55-year-old male presents with progressive jaundice, pale stools, and dark urine for the past two weeks. He also complains of generalized itching and weight loss. On examination, he has yellowish sclera, and right upper quadrant tenderness. A gallstone was suspected on the structure pointed by pink coloured pin.

(A) Identify structure precisely.

(2)



(A) Identify the structure precisely.
(B) Name the anatomical window which it makes the superior boundary of.

(3) A 25-year-old male is brought to the emergency department after a motorbike accident. He complains of severe left upper abdominal pain. On examination, he is pale, tachycardic, and hypotensive. Abdominal examination reveals tenderness in the left upper quadrant. FAST (Focused Assessment with Sonography for Trauma) reveals free fluid in the peritoneal cavity, and X-ray Chest shows left lower rib fracture. The organ shown was injured.

(A) Identify the structure pointed by the pink pin precisely.

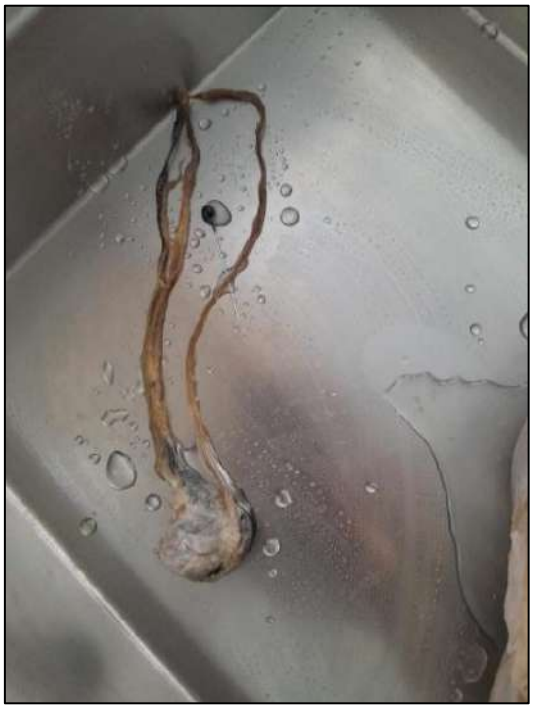
(4)

(A) Identify the structure lying on the black pin.
(B) Name the clinically important reflex related to it.

(5)

(A) Identify precisely.
(B) Name its embryological origin.

(6)



(A) Identify the structure precisely.
(B) Name its embryological origin.

(7)

(A) Identify the structure precisely.
(B) Name the important step that occurs in it.

(8)

(A) Identify the structure pointed by the green pin.
(B) What artery does it anastomose with from the thoracic wall?

(9) Name the arteries pointed by,

(A) blue pin -
(B) Purple pin -

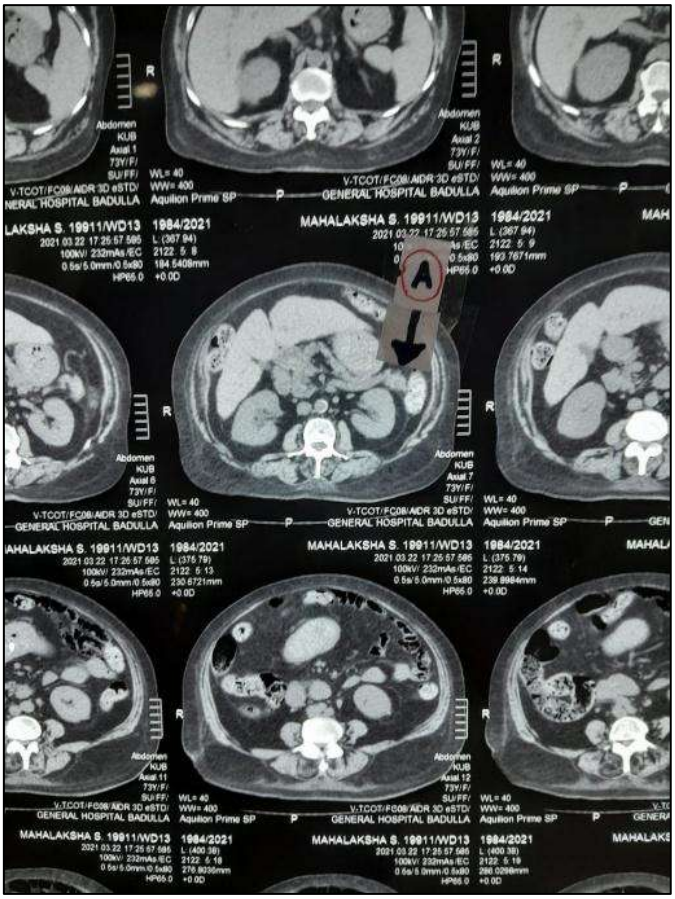
(10)

(A) Name the joint pointed by A.
(B) Name the joint type of A.

(11) A 40-year-old male presents to the surgical clinic with a swelling in the right groin that has been gradually increasing in size over the past 6 months. The swelling becomes more prominent when he stands or coughs and disappears when he lies down. On examination, a cough impulse is positive, and the swelling is reducible.

(A) Identify structure A.
(B) On examination, the lump was above and medial to A, Identify the lump.

(12) A 50-year-old male, a chronic alcoholic, presents with recurrent upper abdominal pain radiating to the back for the past year. The pain worsens after meals and partially relieves when he leans forward. He has experienced unintentional weight loss and fatty, foul-smelling stools. A pathology in the organ marked by A of this Computed Tomogram (CT) was identified.

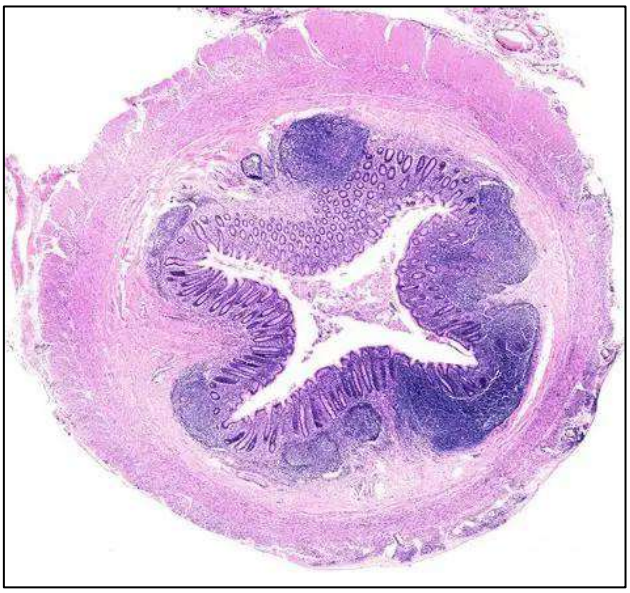


(A) Identify organ A.

(13) A 65-year-old male presents to the emergency department with progressive abdominal distension, colicky abdominal pain, and absolute constipation for the past 3 days. On examination, his abdomen is grossly distended.

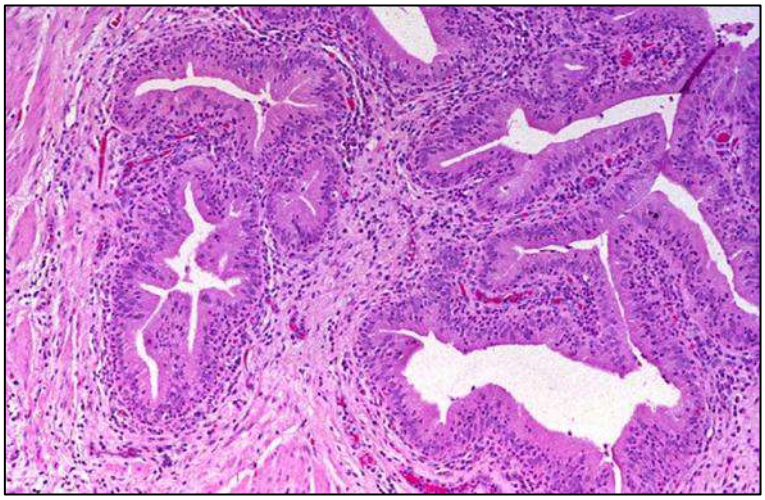
(A) Identify structure A of this Supine abdominal X-ray.
(B) State two external features of it.

(14) A 15-year-old male presents to the emergency department with acute abdominal pain starting in the periumbilical region and then shifting to the right lower quadrant. The pain has been worsening over the past 12 hours. She also complains of nausea, vomiting, and loss of appetite. On examination, she has tenderness at the Right iliac fossa with guarding. The organ shown in the slide was inflamed.



(A) Identify the organ shown in the slide.

(15)



(A) Identify the structure shown in the slide.
(B) What epithelium is its cavity lined with?

CONTINUOUS ASSESSMENTS (CAT - 2) (BATCH 1) ANSWERS

CAT – 2
(BATCH 1)
MCQ
ANSWERS

(1) T F T F T

(2) F F F F F

(3) T T T F F

(4) F F T T T

(5) T T F T T

(6) T F T T F

(7) T T T T T

(8) T F T T F

(9) T T F T T

(10) T F T T T

(11) B

(12) B

(13) B

(14) C

(15) B

(16) E

(17) B

(18) B

(19) D

(20) C

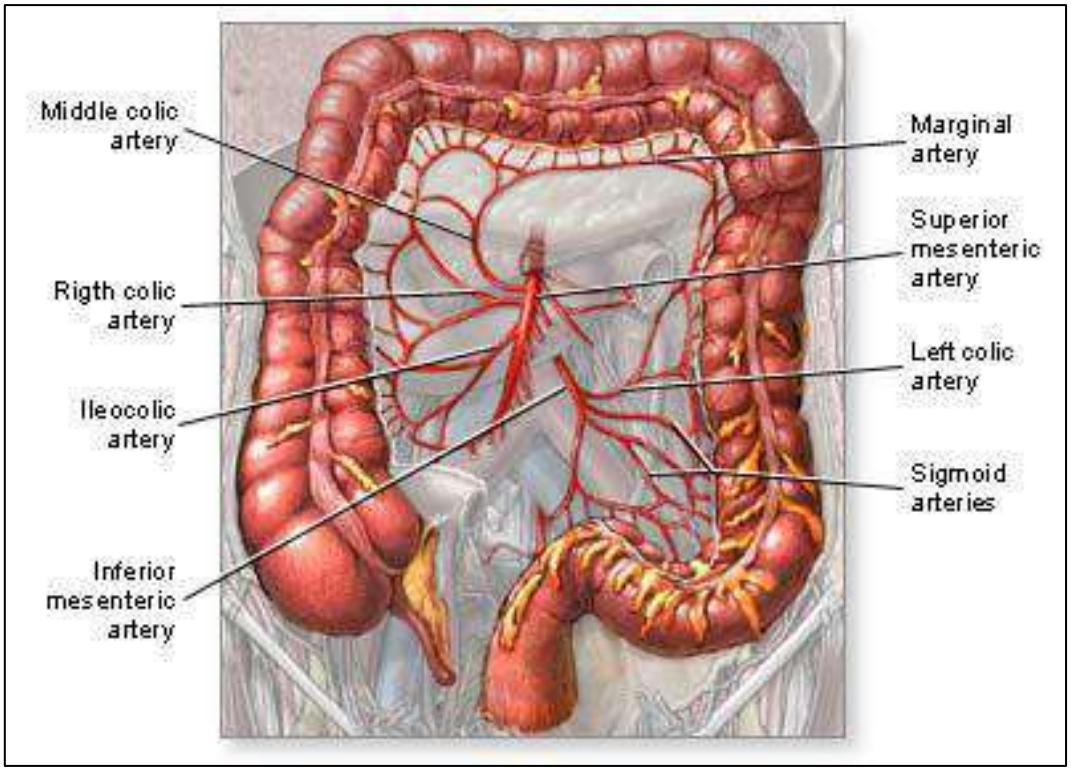
CAT – 2
(BATCH 1)
SEQ
ANSWERS

1) **A 72-year-old Id woman with a medical history of hypertension and diabetes mellitus presented to the hospital with sudden-onset lower abdominal pain, bloating and bloody diarrhea. The pain was localized to the left lower quadrant. On examination, she had a low-grade fever and tenderness in the left lower abdomen. and signs of mild dehydration. A CT scan of the abdomen showed bowel wall thickening and fat stranding sigmoid colon. and there was evidence of decreased vascular enhancement in the region. The attending physician suspects ischaemic colitis.**

(1.1) Describe the arterial blood supply of the large intestine.

The arterial supply of the large intestine is derived predominantly from two unpaired visceral branches of the abdominal aorta, namely the superior mesenteric artery and the inferior mesenteric artery. The superior mesenteric artery supplies the midgut-derived portion of the large intestine, which includes the caecum, appendix, ascending colon, and the proximal two-thirds of the transverse colon. Its principal branches to the large intestine are the ileocolic artery, which supplies the caecum, appendix, and terminal ileum; the right colic artery, which supplies the ascending colon; and the middle colic artery, which supplies the proximal part of the transverse colon. These branches form arterial arcades and contribute to a continuous arterial channel along the mesenteric border of the colon known as the marginal artery.

The inferior mesenteric artery supplies the hindgut-derived portion of the large intestine, which includes the distal one-third of the transverse colon, descending colon, sigmoid colon, and the upper part of the rectum. Its main branches are the left colic artery, which supplies the distal transverse colon and descending colon; the sigmoid arteries, which supply the sigmoid colon; and the superior rectal artery, which represents the terminal continuation of the inferior mesenteric artery and supplies the upper rectum. Along the length of the colon, the branches of the superior and inferior mesenteric arteries anastomose to form the marginal artery of Drummond, which provides an important collateral circulation between the midgut and hindgut territories. The rectum receives additional arterial supply from the middle rectal artery, a branch of the internal iliac artery, and the inferior rectal artery, a branch of the internal pudendal artery, supplementing the superior rectal artery.

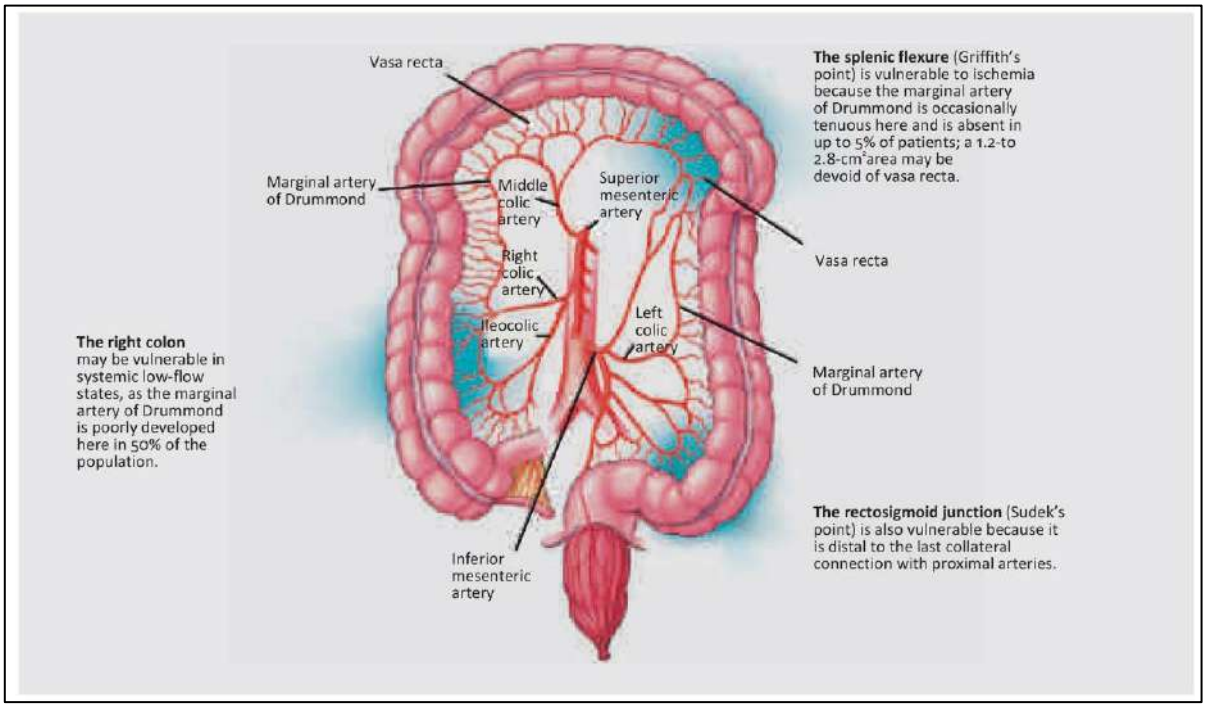


https://medlineplus.gov/ency/imagepages/8831.htm

(1.2) What are the watershed areas of the large intestine and outline their clinical importance?

Watershed areas of the large intestine are regions located at the junctions between two major arterial territories where the blood supply is relatively poor and therefore particularly vulnerable to ischaemia. The most important watershed area is the splenic flexure of the colon, also known as Griffith's point, where the terminal branches of the middle colic artery from the superior mesenteric artery meet the ascending branch of the left colic artery from the inferior mesenteric artery. Because of this tenuous arterial supply, the splenic flexure is the most common site involved in ischaemic colitis.

Another important watershed area is the rectosigmoid junction, referred to as Sudeck's point, where the last sigmoid artery anastomoses with the superior rectal artery. In conditions such as systemic hypotension, atherosclerosis, cardiac failure, or following surgical ligation of the inferior mesenteric artery, these watershed zones are especially prone to inadequate perfusion. Clinically, ischaemia in these regions may result in abdominal pain, mucosal necrosis, and bloody diarrhoea, explaining the predilection of ischaemic colitis for the left side of the colon, particularly in elderly patients with vascular disease.



https://www.researchgate.net/figure/Marginal-artery-of-Drummond_fig2_343350835

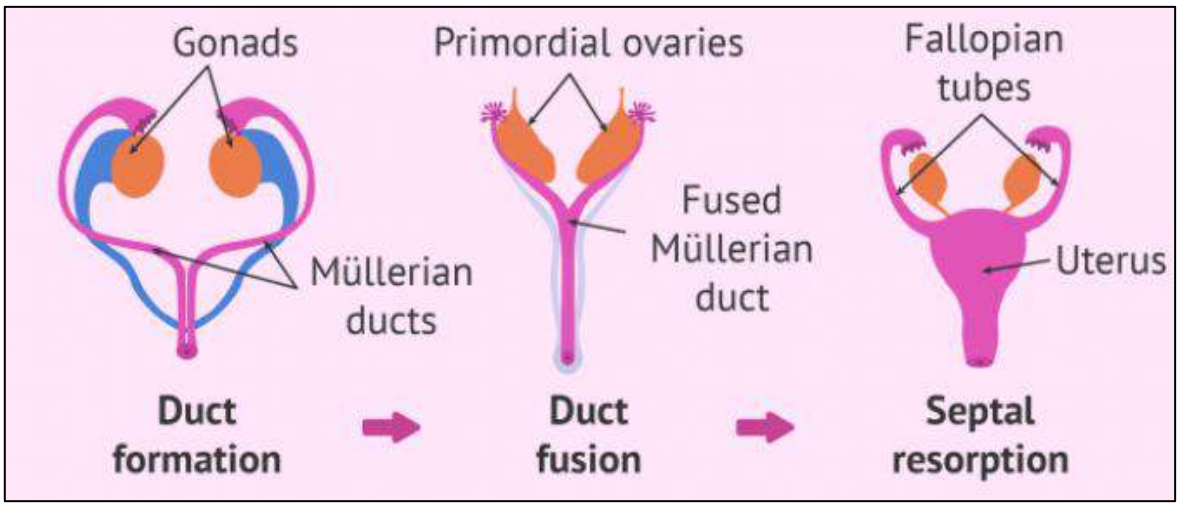
(1.3) List four key anatomical features that distinguish the secondary retroperitoneal colon from other parts of the colon.

The ascending and descending parts of the colon are classified as secondarily retroperitoneal because they are intraperitoneal during early development but later lose their mesocolon due to fusion with the posterior abdominal wall. As a result, these segments lack a mesocolon in the adult and are fixed in position. Their posterior surfaces are bare and lie directly against the posterior abdominal wall, while only their anterior and lateral surfaces are covered by peritoneum. Owing to this partial peritoneal covering and absence of a mesentery, the ascending and descending colon show limited mobility when compared with the transverse and sigmoid colon, which remain intraperitoneal and mobile. These anatomical features are of clinical importance, as the fixed position and relatively limited collateral circulation of these segments predispose them to ischaemic injury during states of reduced blood flow.

(2) A 28-year-old woman presented to the gynecology clinic with primary amenorrhea (absence of menstruation) and difficulty in conceiving. Her medical history was otherwise unremarkable, and she had normal secondary sexual characteristics (e.g., breast development, pubic hair growth). On ultrasound scan, her uterus appeared rudimentary and fallopian tubes were underdeveloped. This clinical presentation raised suspicion of a Müllerian duct anomaly, which may be linked to improper development of the Müllerian system during embryogenesis.

(2.1) Briefly describe the embryological development of the Müllerian system in females.

The Müllerian system, also known as the paramesonephric duct system, develops during the sixth week of intrauterine life from the intermediate mesoderm. In the female embryo, the paramesonephric ducts arise as paired longitudinal invaginations of the coelomic epithelium on the lateral aspect of the mesonephric ridge. Each duct consists of three parts: a cranial vertical part, a horizontal part that crosses the mesonephric duct, and a caudal vertical part. The cranial ends remain open and later form the abdominal ostia of the uterine tubes. The caudal parts of the two paramesonephric ducts migrate medially and fuse in the midline to form the uterovaginal primordium. This fused portion gives rise to the uterus, cervix, and the upper part of the vagina, while the unfused cranial portions form the fallopian tubes. The surrounding mesenchyme differentiates into the myometrium and connective tissue of the uterus. Failure of normal development, fusion, or canalization of the Müllerian ducts results in a spectrum of Müllerian duct anomalies, such as uterine agenesis or hypoplasia, which may present clinically as primary amenorrhea and infertility**.**



https://www.slideshare.net/slideshow/uterine-abnormality-and-displacement-ppt-pptx/272655587

(2.2) Explain the process of sexual differentiation and the role of hormones (e.g., estrogen, anti-Mullerian hormone) in the development of the Müllerian system.

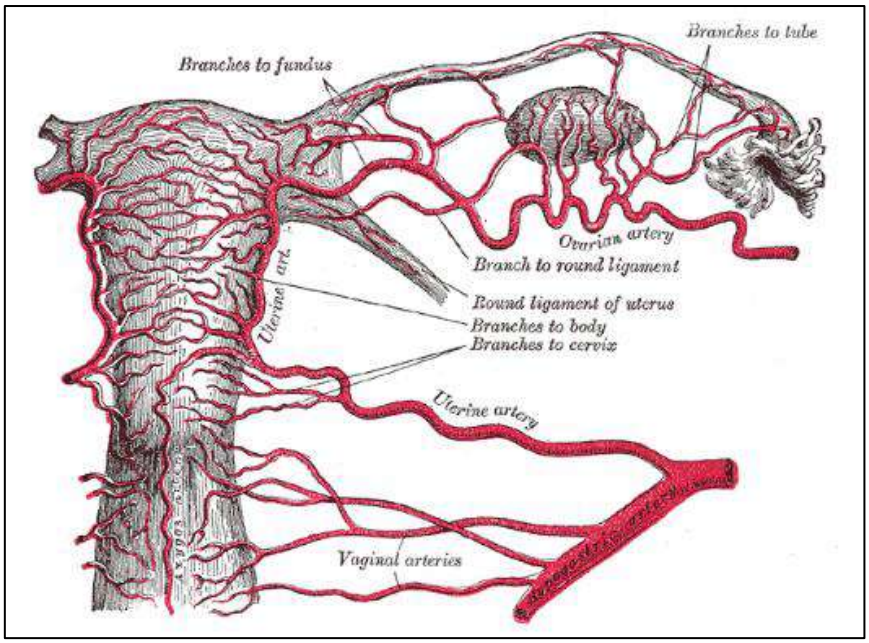
Sexual differentiation of the reproductive system depends on the chromosomal sex of the embryo and the hormonal environment during early development. In genetic females (46, XX), the absence of the Y chromosome results in the absence of the testis-determining factor. Consequently, the gonads differentiate into ovaries, and there is no secretion of anti-Müllerian hormone. In the absence of anti-Müllerian hormone, the paramesonephric ducts persist and develop into the female internal genital organs, including the fallopian tubes, uterus, cervix, and upper vagina. Estrogen produced by the developing ovaries plays a crucial role in the further differentiation, growth, and maturation of the Müllerian structures, as well as in the development of secondary sexual characteristics. At the same time, the lack of significant androgen secretion leads to regression of the mesonephric (Wolffian) ducts. Thus, normal

development of the Müllerian system in females depends primarily on the absence of anti-Müllerian hormone and the presence of estrogen. Any disruption in this hormonal balance or in ductal responsiveness may result in abnormal Müllerian development, as seen in conditions presenting with a rudimentary uterus and infertility.

(2.3) Outline the blood supply of the uterus and fallopian tubes with clinical implications.

The uterus receives its main arterial supply from the uterine artery, which arises from the anterior division of the internal iliac artery. The uterine artery runs medially within the base of the broad ligament, crosses superior to the ureter near the cervix, and ascends along the lateral margin of the uterus. It supplies branches to the cervix and body of the uterus and divides into ascending and descending branches. The ascending branch supplies the body and fundus of the uterus and anastomoses with the ovarian artery, while the descending branch supplies the cervix and upper vagina. Venous drainage occurs through a uterine venous plexus, which drains into the internal iliac veins. The fallopian tubes receive blood supply from both the uterine and ovarian arteries. The tubal branches of the uterine artery supply the medial two-thirds of the tube, while branches from the ovarian artery, which arises directly from the abdominal aorta, supply the lateral one-third.

These vessels anastomose within the mesosalpinx to form an arterial arcade along the tube. Venous blood from the tubes drains into the uterine and ovarian veins. Clinically, this rich anastomotic blood supply is important in maintaining tubal viability and explains the potential for significant hemorrhage in ectopic pregnancies or pelvic surgeries. Knowledge of the close relationship between the uterine artery and the ureter is crucial during hysterectomy to prevent ureteric injury. Compromise of the uterine or tubal blood supply may also adversely affect fertility and implantation.



https://radiopaedia.org/cases/vascularisation-of-the-female-reproductive-system-grays-illustration

CAT – 2
(BATCH 1)
OSPE
ANSWERS

(1) Major duodenal papilla

(A) Identify structure precisely.

Major duodenal papilla.

(2) Caudate process of the liver

(A) Identify the structure precisely.

Caudate process of the liver.

(B) Name the anatomical window which it makes the superior boundary of.

Foramen of Winslow/Epiploeic foramen.

(3) Spleen Hilum

(A) Identify the structure pointed to by the pink pin precisely.

Hilum of spleen.

(4) Genitofemoral nerve

(A) Identify the structure lying on the black pin.

Genitofemoral Nerve.

(B) Name the clinically important reflex related to it.

Cremasteric reflex.

(5) Bladder trigone

(A) Identify precisely.

Trigone of the bladder.

(B) Name its embryological origin.

Mesonephric ducts.

(6) Ductus deferens

(A) Identify the structure precisely.

Ductus deferens.

(B) Name its embryological origin.

Mesonephric ducts.

(7) Female Reproductive system

(A) Identify the structure precisely.

Ampulla of the fallopian tube.

(B) Name the important step that occurs in it.

Fertilization.

(8) Inferior Epigastric Artery

(A) Identify the structure pointed by the green pin.

Inferior epigastric artery

(B) What artery does it anastomose with from the thoracic wall?
Internal Thoracic Artery

(9) Branches of the Aorta
Name the arteries pointed by the blue pin (A), the Purple pin (B).

(A) Internal Iliac Artery
(B) Superior Vesical Artery

(10) Pubic Symphysis
(A) Name the joint pointed by A.
Pubic symphysis

(B) Name the joint type of A.
Secondary Cartilaginous

(11) Pubic tubercle
(A) Identify structure A.
Pubic tubercle

(B) On examination, the lump was above and medial to A, Identify the lump.
Inguinal hernia

(12) CT –Pancreas
(A) Identify organ A.
Pancreas

(13) X-Ray – Transverse colon
(A) Identify structure A of this Supine abdominal X-Ray.
Transverse Colon.

(C) State two external features of it.
Appendices Epiploicae, Taenia Coli.

(14) Appendix
(A) Identify the organ shown in the slide.
Vermiform Appendix
Gall bladder

(A) Identify the structure shown in the slide.
Gall bladder.

(B) What epithelium is its cavity lined with?
Simple columnar epithelium.

CONTINUOUS ASSESSMENTS (CAT - 2) (BATCH 2) PAPERS

CAT – 2
(BATCH 2)
MCQs

Uva Wellassa University

UVA WELLASSA UNIVERSITY
FACULTY OF MEDICINE
Continuous assessment 02
June 2025
2024/2025(02nd)
Batch ANATOMY
Multiple Choice Questions (MCQ) paper

Time 9.00 am — 11.00 am (02 hours) Date of the exam:
Index (MED) Number:

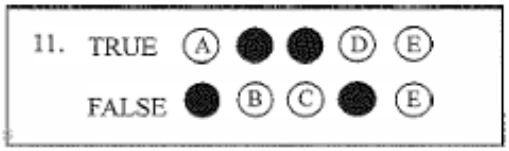
Please read the following instructions before marking responses on your answer sheets

1. Check that your question paper has total of 6 pages including the front page, which you are reading now.
2. A single answer sheet is provided. Please write your index number in the given space.
3. Read each question carefully before answering.
4. Mark the correct response as a **heavy black mark filling the relevant circle completely,** using a black lead pencil (6B or above grade).
5. Mark no stray marks on the answer sheet. In case of an error, erase cleanly.
6. Your final answer should be a densely colored circle through which the underlying letter is not visible.
7. Marking using any other method (e.g., mark the circle with a cross) is not valid.

TEN (10) TRUE/FALSE TYPE QUESTIONS (Questions 1-10/Page 2-3)

1. Mark whether each response is true or false.
2. Given below is an example of how to mark a true/false type question.

11. Woman has
    A. one ovary
    B. one nose
    C. two ears
    D. one eye
    E. two hairs



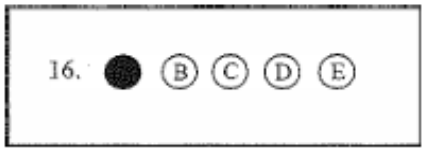
A correct response will get +1 mark
An incorrect response will get -1 mark
No response will get zero mark
Negative marks will not be carried over

TEN (10) SINGLE BEST CHOICE TYPE QUESTIONS (Questions 11-20/ Page 4-6)

1. Mark the best response. Only one response per question should be marked.
2. If you mark the correct response, you will get the full marks for the question.
3. If you mark an incorrect response, fail to mark any response, select more than one response, or mark your response unclearly, you will not receive any marks for that question.
4. Given below is an example of how to mark a single best response type question.

16. Speaking is a unique ability observed in humans. Which of the following body parts is primarily used for speech production?

A. Tongue
B. Hand
C. Feet
D. Ear
E. Nose



Questions no. 1-10 are True or False type questions. Mark your answer for each of the five responses. (A to E)

1. True or False regarding the blood supply of the alimentary tract?
   A. Right gastric artery supplies the lower esophagus.
   B. Short gastric arteries supply the fundus of the stomach.
   C. The gastroduodenal artery is posterior to the first part of the duodenum.
   D. The marginal artery of Drummond supplies the jejunum and ileum.
   E. Inferior mesenteric artery supplies Meckel's diverticulum.

2. True or False regarding the anterior relations of the abdominal aorta?

   A. Uncinate process of the pancreas
   B. Third part of the duodenum
   C. Root of the mesentery
   D. Left renal vein
   E. Splenic vein

3. True or False regarding the structures comprising the stomach bed?

   A. Left crus of the diaphragm
   B. Upper part of left kidney
   C. Left suprarenal gland
   D. Head of pancreas
   E. Left colic flexure

4. True or False regarding the urinary bladder?

   A. It is completely covered by the peritoneum.
   B. Ureters open into the superolateral angles of trigone.
   C. Pelvic splanchnic nerves stimulate contraction of the internal sphincter.
   D. Median umbilical ligament arises from the apex.
   E. It is lined by the transitional epithelium.

5. True or False regarding the posterior abdominal wall?

   A. The psoas major muscle inserts into the greater trochanter of the femur.
   B. Quadratus lumborum extends from the iliac crest to the 12th rib.
   C. Lumbar plexus lies anterior to the psoas major muscle.
   D. Iliohypogastric and ilioinguinal nerves arise from L1.
   E. Inferior vena cava lies to the left of the abdominal aorta.

6. True or False regarding the Uterus?

   A. It is normally anteverted and anteflexed.
   B. The broad ligament is a primary supporting structure.
   C. The round ligament passes through the deep inguinal ring.
   D. Cervix is supplied mainly by the internal pudendal artery.

E. Lymph from the fundus drains to superficial inguinal nodes.

7. True or False regarding the liver?

A. The quadrate lobe is functionally part of the right hepatic lobe.
B. Hepatic veins drain directly into the inferior vena cava.
C. Ligamentum venosum is a remnant of the umbilical vein.
D. Gallbladder fossa separates the right lobe from the quadrate lobe.
E. The right hepatic duct drains both right and left lobes.

8. True or False regarding the kidneys?

A. The right kidney is related anteriorly to the Morrison's pouch.
B. Left renal vein passes anterior to the superior mesenteric artery.
C. Renal artery divides into segmental branches after entering the hilum.
D. Ureter arises anterior to the renal vessels.
E. Perinephric fat is enclosed by the fibrous capsule.

9. True or False regarding the development of the hepatobiliary system?

A. Liver develops from an endodermal outgrowth of the midgut.
B. Hepatic cords are derived from the mesoderm of the septum transversum.
C. The bile duct and gallbladder develop from the caudal part of the hepatic diverticulum.
D. Hematopoietic function of the liver begins by the 6th week of development.
E. Bile enters the duodenum only after birth.

10. True or False regarding the urethra?

A. The navicular fossa is the dilated distal part of the spongy urethra.
B. Bulbourethral glands open into the prostatic urethra.
C. External urethral sphincter is innervated by the pudendal nerve.
D. Posterior urethral injuries occur with pelvic fractures.
E. Membranous urethra is surrounded by the corpus spongiosum.

Questions no. 11-20 are Single Best Answer (SBA) type questions.

Select the best response to each question.

11. A 45-year-old man presents with flank pain radiating to the groin. Non-contrast CT scan reveals a renal calculus lodged at the ureteropelvic junction. Which of the following correctly describes the anatomical position of this junction?

    A. At the inferior pole of the kidney.
    B. At the point of origin of the ureter.
    C. At the point where the ureter enters the urinary bladder wall.
    D. Between the renal pelvis and the major calyces.
    E. Where the ureter crosses the pelvic brim at the sacroiliac joint.

12. A 3-year-old boy is brought to the clinic with painless rectal bleeding. A technetium-99m scan reveals an ectopic focus of gastric mucosa in the distal ileum, about 60 cm proximal to the ileocecal junction. Persistence of which embryological structure results in this condition?

    A. Allantois
    B. Cloacal membrane
    C. Dorsal mesogastrium
    D. Urachus
    E. Vitelline duct

13. A 55-year-old man undergoes retroperitoneal surgery for a left renal mass. Postoperatively, he complains of weakness in thigh adduction and numbness of the medial aspect of the left thigh. Which nerve of the lumbar plexus was most likely injured during this surgery?

    A. Femoral nerve
    B. Genitofemoral nerve
    C. Iliohypogastric nerve
    D. Lateral femoral cutaneous nerve
    E. Obturator nerve

14. A 2-year-old boy presents with an empty right scrotum. Ultrasound reveals the testis located just above the deep inguinal ring. Which of the following structures is responsible for guiding the testis into the scrotum during development?

    A. Cremasteric muscle
    B. Dartos fascia
    C. Gubernaculum
    D. Processus vaginalis
    E. Tunica albuginea

15. While performing an exploratory laparotomy in a patient with suspected bowel obstruction, the surgeon identified a herniation of bowel lateral to the inferior epigastric vessels and above the inguinal ligament. These boundaries defined the hernia as,

    A. Direct inguinal hernia
    B. Femoral hernia
    C. Indirect inguinal hernia
    D. Paraumbilical hernia
    E. Umbilical hernia

16. A 28-year-old man presents after a straddle injury from a fall. He has painful swelling in the perineum and blood at the external urethral meatus. Imaging studies suggest extravasation of urine confined to the region between the perineal membrane and Colles' fascia. Which anatomical space is primarily involved?

    A. Deep perineal pouch
    B. Ischiorectal fossa
    C. Pelvic cavity
    D. Retroperitoneal space
    E. Superficial perineal pouch

17. A 45-year-old man accidentally swallows a chicken bone. A barium swallow shows that it is lodged in the thoracic esophagus at the T4 vertebral level. Which of the following structures causes constriction of the esophagus at this level?

    A. Aortic arch
    B. Azygos vein
    C. Left atrium of the heart
    D. Pulmonary trunk
    E. Right bronchus

18. A 2-day-old newborn presents with bilious vomiting and upper abdominal distension. A prenatal ultrasound had shown polyhydramnios. A plain abdominal X-ray reveals a "double bubble" sign with gas in the stomach and proximal duodenum, but no distal gas. Which of the following best explains the embryological cause of this condition?

    A. Abnormal rotation of the hindgut.
    B. Failure of duodenal recanalization.
    C. Failure of midgut rotation.
    D. Malformation of the dorsal mesogastrium.
    E. Persistence of the vitelline duct.

19. A 62-year-old man presents with painless jaundice, dark urine, and pale stools. Imaging studies show a mass in the head of the pancreas compressing the common bile duct. During surgery, the surgeon notes a major vein immediately posterior to the pancreatic head. Which of the following structures is most likely compressed posteriorly by the tumor?

    A. Inferior vena cava
    B. Left renal vein
    C. Portal vein
    D. Splenic vein
    E. Superior mesenteric vein

20. A 28-year-old woman presented with lower abdominal pain and vaginal bleeding. Ultrasound scan reveals a gestational sac implanted in the ampullary region of the fallopian tube. During laparoscopic surgery, care must be taken to avoid injury to nearby vascular structures. Which of the following arteries primarily supplies the fallopian tube and is at risk during surgical management?

    A. Inferior mesenteric artery
    B. Ovarian artery
    C. Round ligament artery
    D. Superior vesical artery
    E. Uterine artery

CAT – 2
(BATCH 2)
SEQs

Continuous Assessment

NOVEMBER 2025

2024/2025 (Batch 2) ANATOMY

Structured Essay Question (SEQ) Paper

(1) A 60-year-old male patient presents with altered bowel habits, tenesmus, and bleeding per rectum for 3 months. He has severe back pain and bilateral sciatica of one week's duration. Digital examination of the rectum revealed an irregular growth in the rectum with contact bleeding. Colonoscopy confirmed a rectal growth. Biopsy from the growth revealed an adenocarcinoma. Magnetic resonance imaging (MRI) showed that growth possibly involves the presacral fascia. A lesion in the left lobe of the liver, suggestive of metastasis, and enlarged lymph nodes were also noted.

(1.1) Describe the relations of the rectum and explain the anatomical basis of advanced rectal cancer-causing back pain and sciatica. (40 Marks)

(1.2) Outline the blood supply of the rectum and route of liv er metastasis in this case. (40 Marks)

(1.3) Outline the lymphatic drainage of the rectum and lymph node involvement in this case. (20 Marks)

(100 Marks)

(2) A 52-year-old woman presents with painful jaundice and right upper quadrant discomfort. Imaging studies reveal a stone lodged in the distal common bile duct (CBD). The patient is planned for endoscopic or surgical removal of the stone.

(2.1) Describe the development of the extrahepatic bile ducts from the embryonic foregut. (30 Marks)

(2.2) Describe the relations of the common hepatic duct, cystic duct, and common bile duct. (40 Marks)

(2.3) Outline the arterial supply to the extrahepatic biliary system with its clinical significance. (30 Marks)

(100 Marks)

CAT – 2
(BATCH 2)
OSPE

(1)

A 20-year bike rider had a fracture of the colored area following a road traffic accident.

(A) Identify the area colored.

(B) Name two related structures.

(2)

(A) Identify the tissue.

(B) Mention two special features.

(3)

(A) Identify the tissue.
(B) Mention the structure indicated.

(4)

40 y male is undergoing inguinal hernial repair.
(A) Identify the structure indicated by the pin.
(B) Mention its relation to the deep inguinal ring.

(5)

A 30-year-old female patient is undergoing a perineal surgery with regional anesthesia.

(A) Identify the structure pierced by the pin.

(B) Mention its origin.

(6)

A 65-year-old male patient underwent Whipple's procedure. The surgeon noted an abnormality in this region.

(A) Identify the structure pierced by the pin.

(B) Mention two important posterior relations.

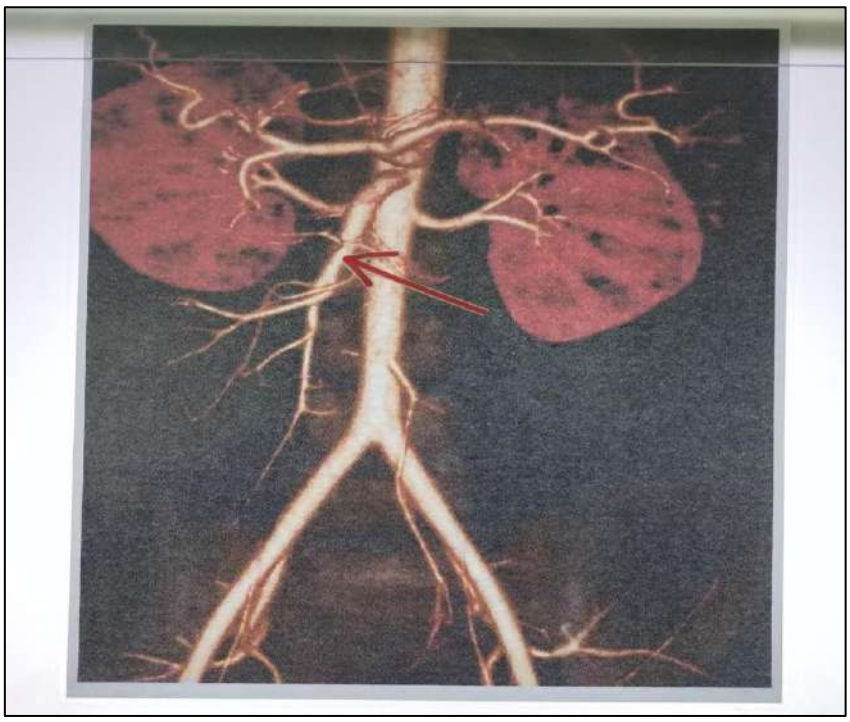
(7)

30-year-old male patient admitted with haemorragic shock following a road traffic accident. This organ was found to be damaged during laparotomy.

(A) Identify the part precisely, pierced by the pin.

(B) Mention the foramen that includes this structure as the superior boundary.

(8)



A 30-year-old live kidney donor underwent this angiogram.

(A) Identify the structure.

(B) Mention the level of origin.

(9)

A 40-year-old male patient was admitted following a fall from 20 feet. Focused assessment with sonography in trauma (FAST) revealed fluid accumulation in this region.

(A) Identify the space indicated by the arrow.

(B) Mention two important relations.

(10)

A 60-year-old male presented with a loin mass and hematuria. A CT scan of the abdomen suspected a carcinoma spreading to this structure.

(A) Identify the structure.

(B) Name two structures that join this here.

CONTINUOUS ASSESSMENTS (CAT - 2) (BATCH 2) ANSWERS

CAT – 2
(BATCH 2)
MCQ
ANSWERS

(1) F T T F F

(2) T T T T T

(3) T T T F T

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(7) F T F T F

(8) T T T F F

(9) F F T T T

(10) T F T T F

(11) B

(12) E

(13) E

(14) C

(15) C

(16) E

(17) A

(18) B

(19) C

(20) B

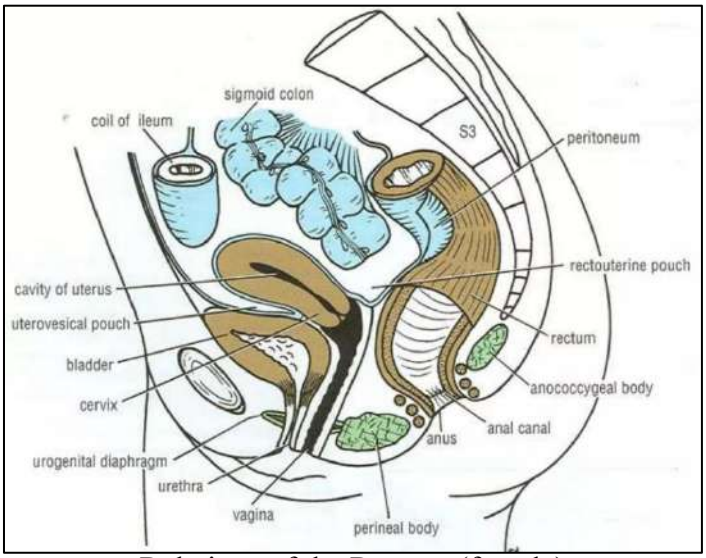
CAT – 2
(BATCH 2)
SEQ
ANSWERS

(1) A 60-year-old male patient presents with altered bowel habits, tenesmus, and bleeding per rectum for 3 months. He has severe back pain and bilateral sciatica of one week's duration. Digital examination of the rectum revealed an irregular growth in the rectum with contact bleeding. Colonoscopy confirmed a rectal growth. Biopsy from the growth revealed an adenocarcinoma. Magnetic resonance imaging (MRI) showed that growth possibly involves the presacral fascia. A lesion in the left lobe of the liver, suggestive of metastasis, and enlarged lymph nodes were also noted.

(1.1) Describe the relations of the rectum and explain the anatomical basis of advanced rectal cancer-causing back pain and sciatica.

The rectum is the terminal part of the large intestine, measuring about 12–15 cm in length. It extends from the rectosigmoid junction at the level of the third sacral vertebra to the anorectal junction. Posteriorly, the rectum is related to the concavity of the sacrum and coccyx, from which it is separated by the presacral fascia, presacral venous plexus, and middle sacral vessels. Closely related posterior structures also include the sympathetic nerves and the sacral plexus.Anterior relations of the rectum differ in the two sexes. In males, the upper part of the rectum is related anteriorly to the rectovesical pouch of peritoneum, urinary bladder, seminal vesicles, ampullae of the vas deferens, and the prostate gland, these structures being separated from the rectum by the rectovesical (Denonvilliers') fascia. In females, the anterior relations include the rectouterine pouch (pouch of Douglas), cervix of the uterus, and the posterior wall of the vagina. Laterally, the rectum is related to the pelvic walls, levator ani muscles, pelvic fascia, and important neurovascular structures, including the pelvic autonomic plexuses.

In advanced carcinoma of the rectum, the tumor may spread posteriorly beyond the rectal wall to infiltrate the presacral fascia and the sacrum. Involvement of the sacral periosteum and sacral nerve roots produces deep, dull pain in the lower back. Further extension to the sacral plexus or involvement of nerve roots contributing to the sciatic nerve leads to radiating pain along the course of the sciatic nerve, resulting in sciatica. Thus, back pain and sciatica in advanced rectal cancer are anatomically explained by invasion or compression of the sacrum, sacral nerve roots, and pelvic neural plexuses situated posterior and lateral to the rectum.



Relations of the Rectum (female)

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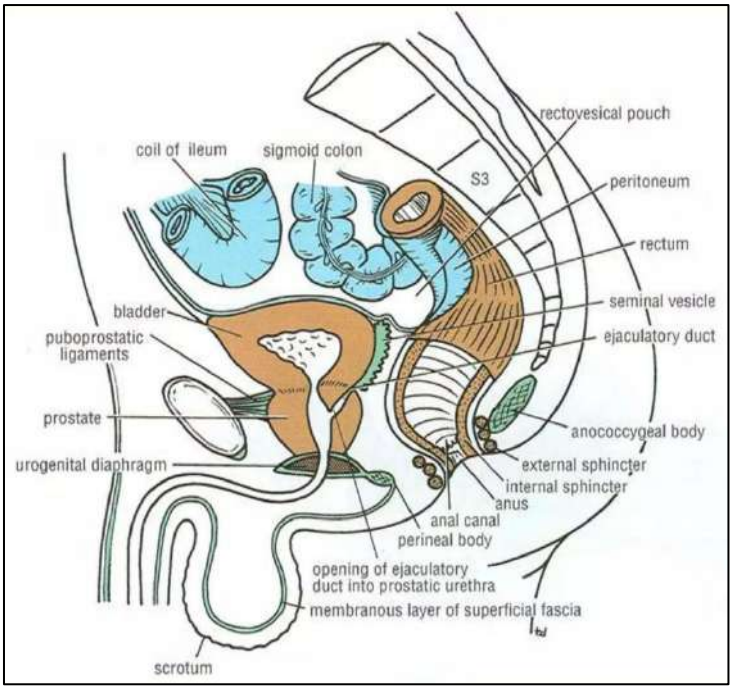


Relations of the Rectum (female)

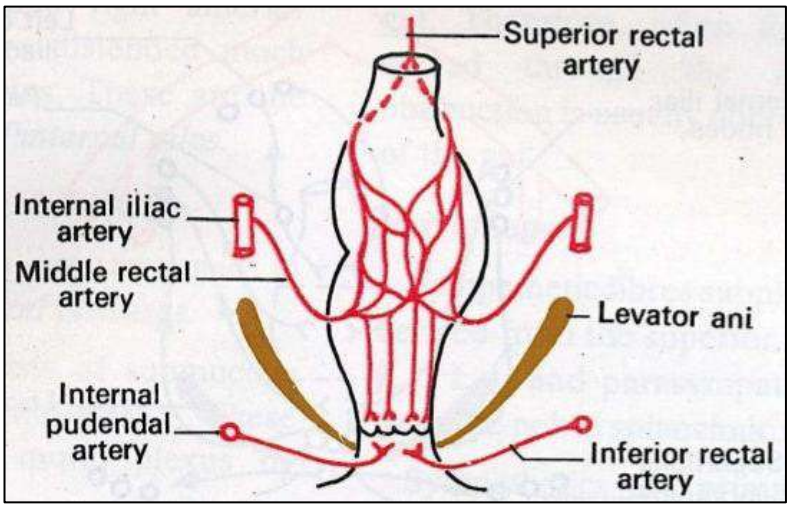
https://image.slidesharecdn.com/rectum-221118094243-af334cdd/75/Anatomy-of-Rectum-pptx-18-2048.jpg

(1.2) Outline the blood supply of the rectum and the route of liver metastasis in this case.

The rectum has a rich arterial supply derived from three main sources. The superior rectal artery, which is the continuation of the inferior mesenteric artery, supplies the upper part of the rectum. The middle rectal arteries, branches of the internal iliac arteries, supply the middle part of the rectum. The inferior rectal arteries, branches of the internal pudendal arteries, supply the lower part of the rectum and the anal canal above the pectinate line. These arteries anastomose freely with each other within the rectal wall, providing an extensive vascular network.

Venous drainage of the rectum occurs through a corresponding venous plexus. The superior rectal vein drains blood from the upper part of the rectum into the inferior mesenteric vein, which ultimately joins the portal vein and drains into the liver. The middle and inferior rectal veins drain the middle and lower parts of the rectum into the internal iliac veins and then into the inferior vena cava, forming part of the systemic venous circulation. Thus, the rectum represents an important site of porto-systemic anastomosis.

In carcinoma of the rectum, especially when the upper rectum is involved, malignant cells commonly spread through the superior rectal vein into the portal venous system. From the inferior mesenteric vein, tumor emboli pass into the portal vein and are carried to the liver, where they lodge in hepatic sinusoids and form secondary deposits. Therefore, liver metastasis in rectal cancer is anatomically explained by venous spread through the portal circulation, particularly via the superior rectal vein.



Blood supply of the rectum

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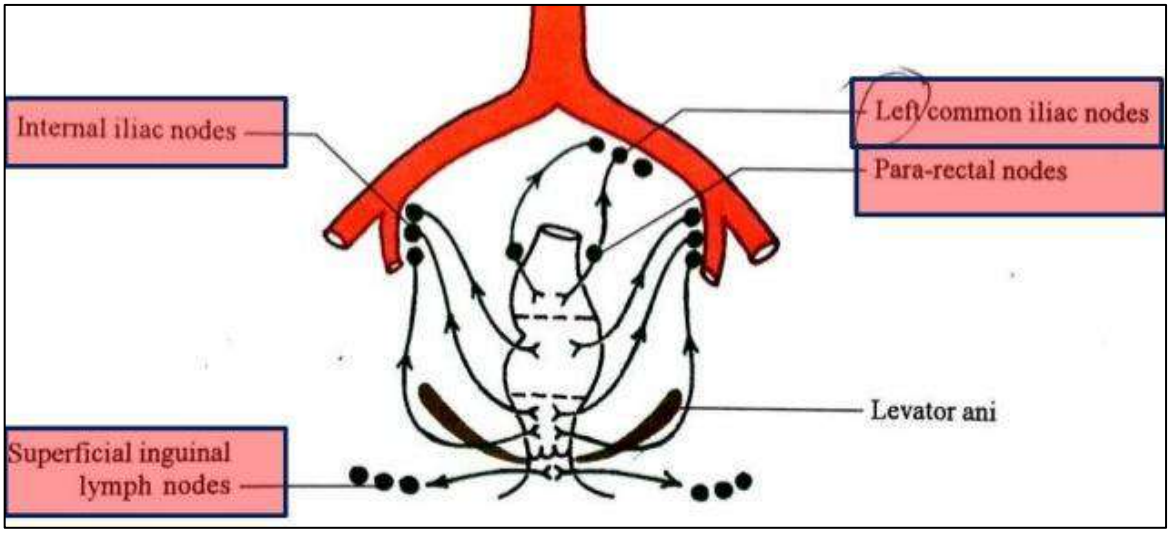
(1.3) Outline the lymphatic drainage of the rectum and lymph node involvement in this case.

The lymphatic drainage of the rectum follows its arterial supply and is divided according to the level of the rectum.

Lymphatics from the upper part of the rectum drain mainly along the superior rectal vessels to the pararectal nodes, then to the inferior mesenteric lymph nodes, and finally to the preaortic nodes. Lymph from the middle part of the rectum drains along the middle rectal vessels to the internal iliac lymph nodes. The lower part of the rectum drains primarily to the internal iliac nodes, with some lymph passing to the sacral lymph nodes.

In carcinoma of the rectum, lymphatic spread occurs in an orderly manner along these drainage pathways. Tumors of the upper rectum commonly metastasize first to the pararectal and inferior mesenteric lymph nodes, whereas tumors involving the middle and lower rectum spread to the internal iliac and sacral lymph nodes. In advanced cases, lymphatic spread may extend to higher nodal groups, including the common iliac and para-aortic lymph nodes.



https://image.slidesharecdn.com/rectumanalcanaldr-170213132616/95/rectum-anal-canal-35-638.jpg?cb=1486992777

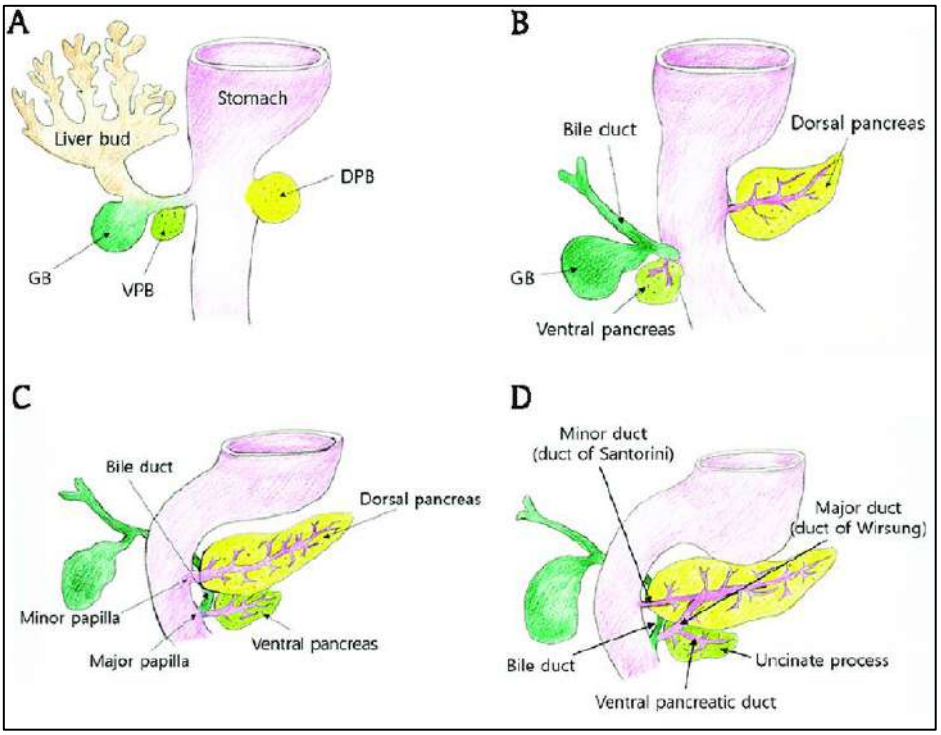
(2) A 52-year-old woman presents with painful jaundice and right upper quadrant discomfort. Imaging studies reveal a stone lodged in the distal common bile duct (CBD). The patient is planned for endoscopic or surgical removal of the stone.

(2.1) Describe the development of the extrahepatic bile ducts from the embryonic foregut.

The extrahepatic biliary apparatus develops from the endodermal lining of the embryonic foregut. During the fourth week of intrauterine life, a ventral diverticulum known as the hepatic diverticulum arises from the distal part of the foregut. This diverticulum grows into the septum transversum and soon divides into two parts.

The cranial part of the hepatic diverticulum forms the liver parenchyma and the intrahepatic bile ducts, while the caudal part gives rise to the extrahepatic bile ducts and the gallbladder. The stalk of the hepatic diverticulum connecting it to the foregut elongates and differentiates to form the common bile duct. A small outgrowth from this stalk forms the cystic diverticulum, which gives rise to the gallbladder and cystic duct.

Initially, the lumen of the bile ducts is obliterated due to rapid epithelial proliferation. Subsequently, recanalization occurs, restoring patency of the ducts. Failure of proper recanalization may lead to congenital anomalies such as biliary atresia or stenosis. The distal end of the common bile duct opens into the second part of the duodenum, often in association with the pancreatic duct, forming the hepatopancreatic ampulla.
Thus, the extrahepatic bile ducts originate from the foregut endoderm and develop in close association with the liver and pancreas.



https://www.researchgate.net/publication/334097782/figure/download/fig1/AS:774823760375815@1561743788499/Illustration-of-the-normal-development-of-the-pancreas-A-B-Dorsal-pancreatic-bud.png

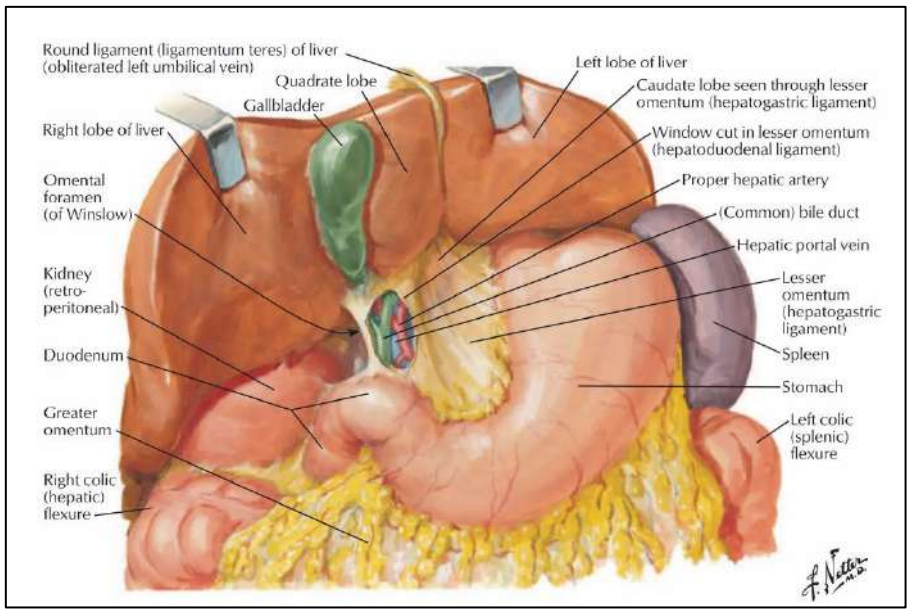
(2.2) Describe the relations of the common hepatic duct, cystic duct, and common bile duct.

The common hepatic duct is formed by the union of the right and left hepatic ducts at the porta hepatis. It lies within the free margin of the lesser omentum, specifically in the hepatoduodenal ligament. Anteriorly, it is related to the peritoneum and the anterior abdominal wall. Posteriorly, it is related to the portal vein. On its left side lies the hepatic artery. These three structures together form the classic arrangement within the portal triad.

The cystic duct arises from the neck of the gallbladder and joins the common hepatic duct to form the common bile duct. It runs downward, backward, and to the left. The cystic duct lies in close relation to the cystic artery and lymph node of Lund. The spiral folds within its lumen, known as the spiral valve of Heister, help keep the duct patent.

The common bile duct (CBD) is formed by the union of the common hepatic duct and cystic duct. It is about 7–8 cm long and has four parts. The supraduodenal part lies in the right free margin of the lesser omentum, anterior to the portal vein and to the right of the hepatic artery. The retroduodenal part passes posterior to the first part of the duodenum. The pancreatic part runs in a groove on the posterior surface of the head of the pancreas or may be embedded within it. The intraduodenal part passes obliquely through the wall of the second part of the duodenum and opens at the major duodenal papilla, usually after joining the pancreatic duct.

These relations are clinically important because stones lodged in the distal CBD may compress the pancreas or duodenum, leading to obstructive jaundice and pancreatitis, and they determine the approach during surgical or endoscopic procedures.



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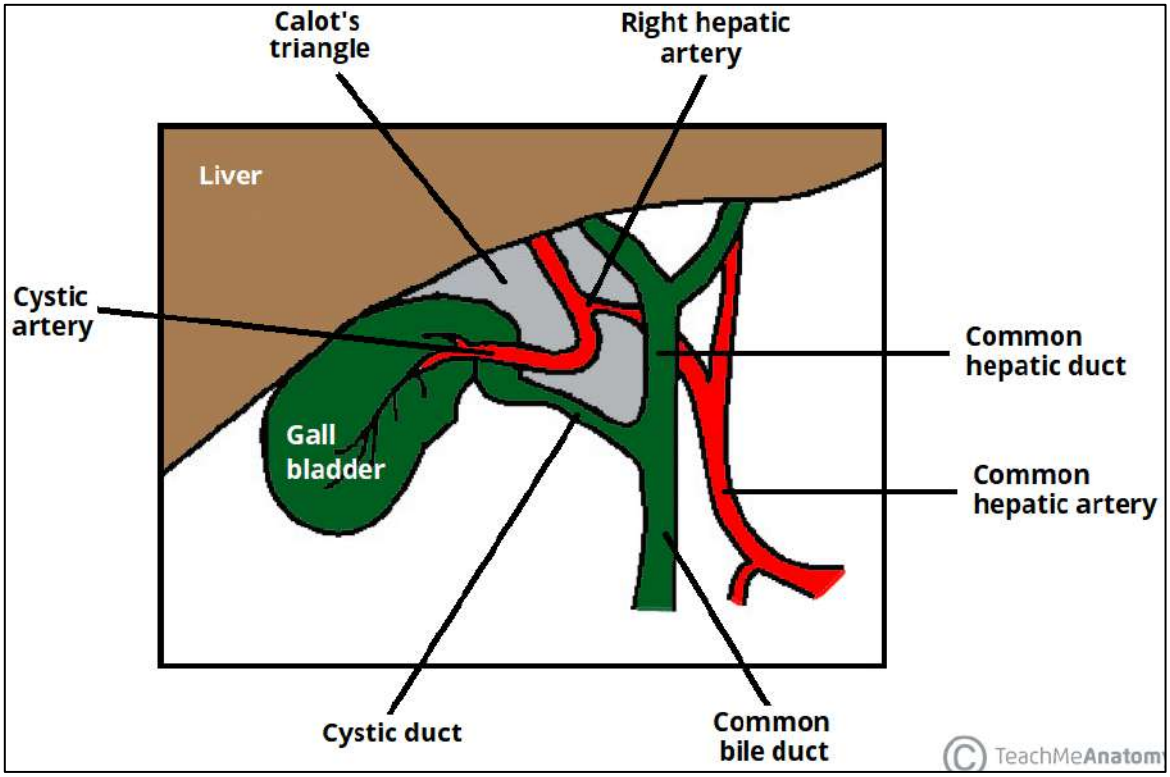
(2.3) Outline the arterial supply to the extrahepatic biliary system with its clinical significance.

The arterial supply of the extrahepatic biliary system is derived mainly from branches of the hepatic artery, which is a branch of the coeliac trunk. The cystic artery, usually a branch of the right hepatic artery, supplies the gallbladder and cystic duct. It typically passes through Calot's triangle, bounded by the cystic duct, common hepatic duct, and the inferior surface of the liver.

The common hepatic duct and common bile duct receive arterial branches from the right hepatic artery, gastroduodenal artery, posterior superior pancreaticoduodenal artery, and retroduodenal branches. These arteries form a longitudinal arterial plexus along the bile ducts, ensuring a rich blood supply.

Clinically, this arterial pattern is highly variable, and accidental injury to the cystic artery or hepatic artery during cholecystectomy may lead to ischemia or necrosis of the bile ducts, resulting in biliary strictures. Inflammation or surgical damage to these vessels can compromise blood flow to the CBD, predisposing to bile leakage and postoperative complications.
Therefore, a thorough knowledge of the arterial supply of the extrahepatic biliary system is essential during surgical and endoscopic procedures involving the biliary tract.



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CAT – 2 (BATCH 2) OSPE ANSWERS

(1) Ala of the sacrum is demonstrated.
A 20-year-old bike rider had a fracture of the coloured area following a road traffic accident.

(A) Identify the area coloured.
Ala of the sacrum

(B) Name two related structures.
Common iliac artery/vein/vessels.
Lumbosacral trunk/L5 nerve root, Obturator nerve, Iliolumbar artery, Sympathetic trunk

(2) Appendix – histology

(A) Identify the tissue.
Appendix/ Vermiformis appendix.

(B) Mention two special features.

(3) Pancreatic islets are indicated.

(A) Identify the tissue.
Pancreas

(B) Mention the structure indicated.
Islets of Langerhans

(4) CT abdomen is given with the indicated hepatorenal pouch.
A 40-year-old male patient was admitted following a fall from 20 feet. Focused assessment with sonography in trauma (FAST) revealed fluid accumulation in this region.

(A) Identify the space indicated by the arrow.
Hepatorenal pouch, Morrison's pouch

(B) Mention two important relations.
Liver / Right lobe of the liver(anterior)
Kidney/ upper part of the kidney (posterior)
Foramen of Winslow (medial)
Right paracolic gutter (lateral)

(5) Abdominal aortogram is demonstrated. Superior mesenteric artery is indicated. 30-year-old live kidney donor underwent this angiogram.

(A) Identify the structure.
Superior mesenteric artery

(B) Mention the level of origin.
L1 /first lumbar vertebral body/vertebra (trans pyloric plane)

(6) Left renal vein is demonstrated. (at the level of suprarenal and gonadal vessels). A 60-year-old male patient presented with a loin mass and haematuria. CT scan of the abdomen suspected a carcinoma spreading to this structure.

(A) Identify the structure.
Left renal vein

(B) Name two structures join this here.
Left suprarenal /adrenal vein
Left testicular/ovarian/gonadal vein

(7) Head of the pancreas is demonstrated.
A 65 male patient underwent Whipple's procedure. The surgeon noted an abnormality in this region.

(A) Identify the structure pierced by the pin.
Head of the pancreas

(B) Mention two important posterior relations.
Inferior vena cava
Right renal vein/artery /vessels
Terminal part of left renal vein
Bile duct/common bile duct
Arterial arcades of superior and inferior pancreatico duodenal arteries

(8) Inferior epigastric artery is demonstrated.
A 40-year-old male is undergoing inguinal hernial repair.

(A) Identify the structure indicated by the pin.
Inferior epigastric artery

(B) Mention its relation to the deep inguinal ring.
Medial to the deep inguinal ring/ deep inguinal ring is lateral.

(9) The caudate process of the liver is demonstrated.

A 30-year-old male patient was admitted with haemorragic shock following a road traffic accident. This organ was found to be damaged during laparotomy.

(A) Identify the part precisely, pierced by the pin.
Cuadate process of the liver

(B) Mention the foramen which includes this structure as the superior boundary.
Epiploic foramen/ foramen of Winslow

(10) The pudendal nerve is demonstrated.
A 30-year-old female patient is undergoing a perineal surgery with regional anaesthesia.

(A) Identify the structure pierced by the pin.
Pudendal nerve

(B) Mention its origin.
Ventral rami of second, third, and fourth sacral spinal nerves/S2,3,4 (Sacral plexus)

MESSAGE OF THE DEAN

As the Dean of the Uva Wellassa Medical Faculty, it is with deep pride and sincere enthusiasm that I introduce to you "Mastering Anatomy–Part II: A Comprehensive Guide to MCQs, Essays, and OSPEs." This publication marks an important milestone in our continued dedication to improving the educational experience of students.

In the constantly advancing field of medicine, a strong understanding of Physiology remains fundamental to future achievements. This guide has been carefully developed to provide you with an extensive resource that not only addresses a broad spectrum of question formats including MCQs, essays, and OSPEs but also delivers detailed answers and explanations to strengthen learning.

The purpose of this book is to provide you with essential tools required to perform well in examinations and to enhance your understanding of anatomical concepts. We are confident that this guide will function as a valuable companion in your academic journey, providing clarity, confidence, and a solid framework for studies.

I convey my sincere appreciation to faculty members and contributors who have committed their knowledge and effort to bring this resource to fruition. It is our wish that you will regard this guide as a source of guidance and motivation as you progress through medical education.

Wishing you continued success in your studies and future medical profession career.

Sincerely,

Senior Professor Muditha Vidanapathirana,
MBBS (Col), DLM, MD, MA (SJP), FFFLM (UK)
Dean,
Faculty of Medicine,
Uva Wellassa University of Sri Lanka

Rs. 1500/-

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