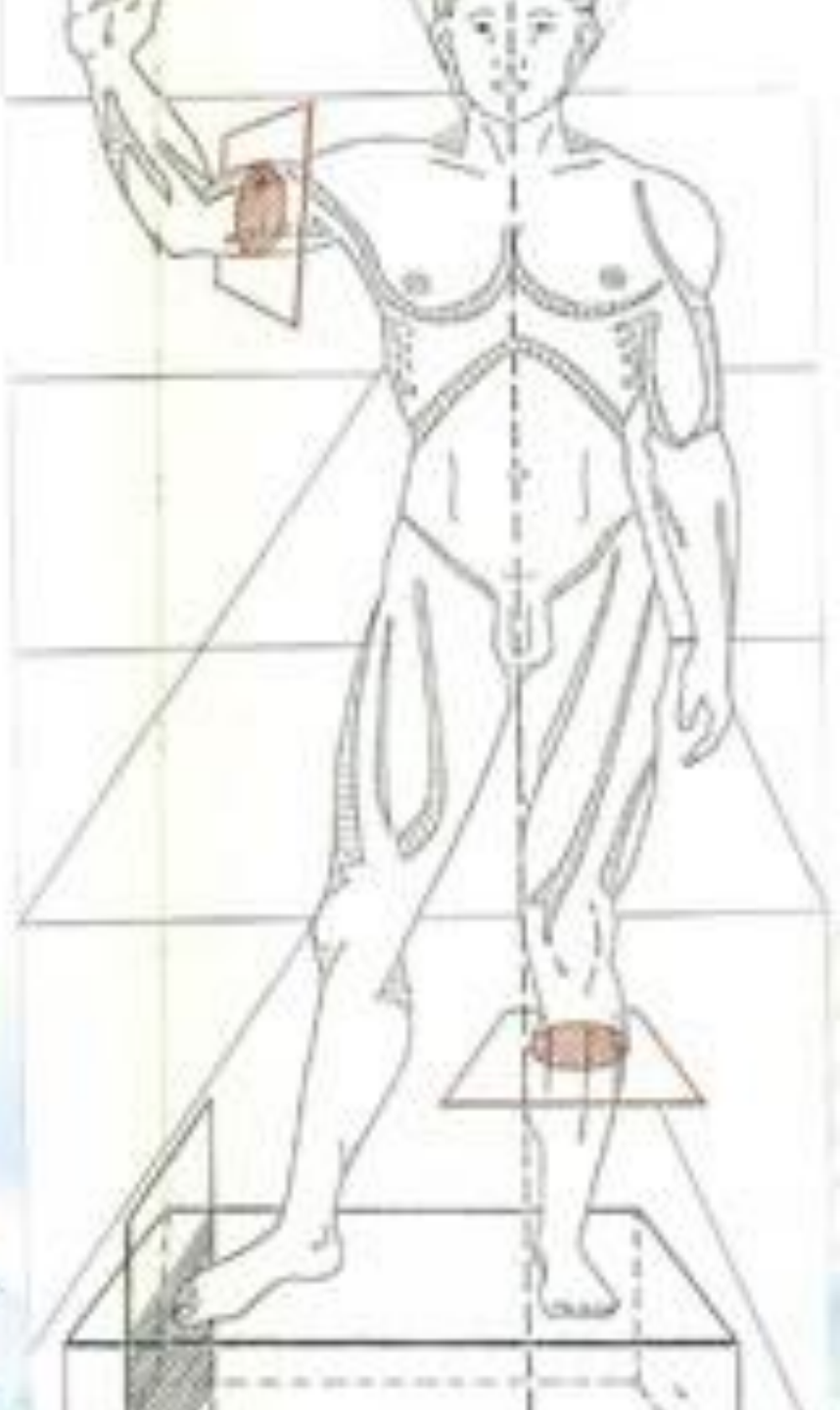
ABDOMINAL AORTA



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PLAN

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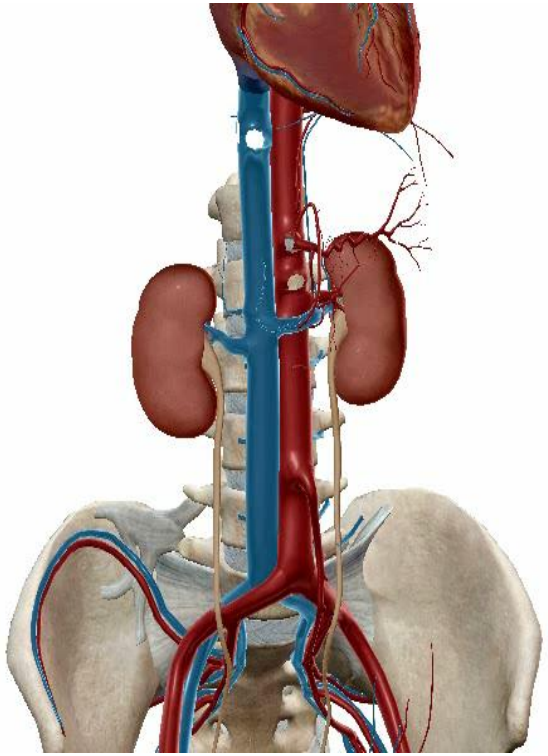
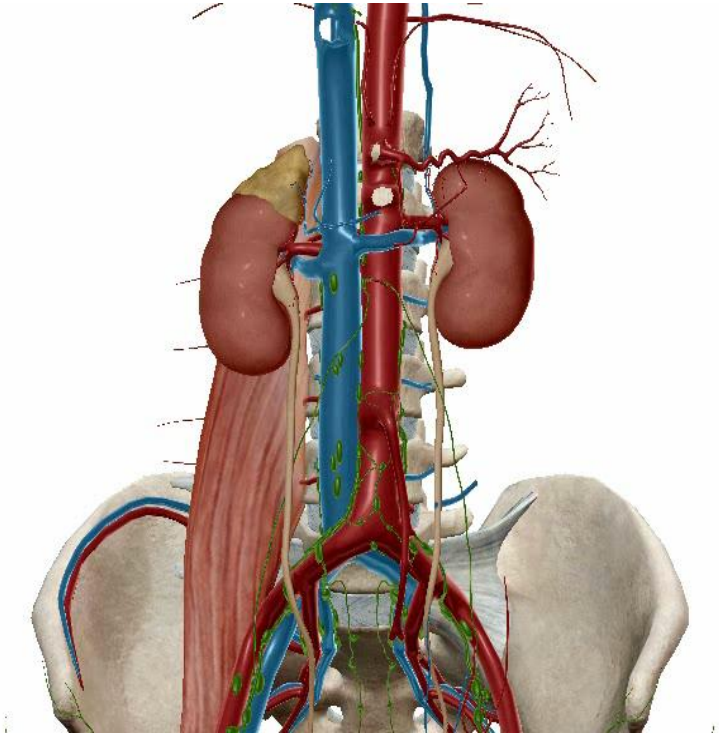


I – INTRODUCTION:

- The abdominal aorta is the terminal portion of the descending aorta located within the abdominal cavity.

- It serves both as a conduit artery for the lower limb and as a nutritive artery supplying most of the abdominal and pelvic organs.

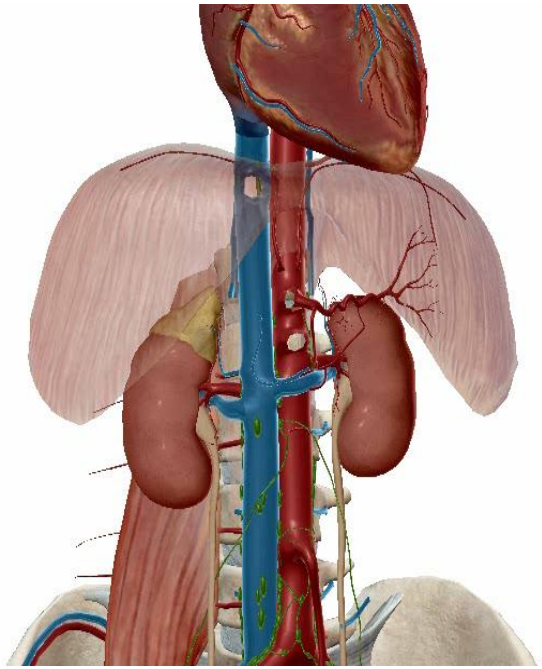


II – DESCRIPTIVE ANATOMY:

Origin - course

- The abdominal aorta originates at the level of the aortic hiatus, opposite the inferior border of the T12 vertebra.

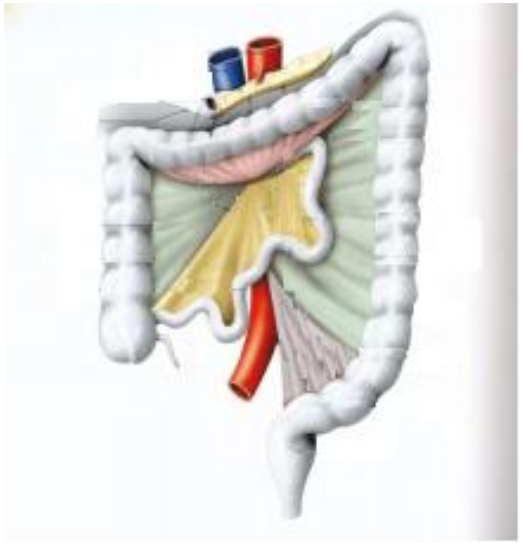
- It is located in the midline retroperitoneal space and descends vertically, slightly to the left of the midline.



Termination

- It terminates by dividing into three branches:
  - the right and left common iliac arteries,
  - and a small branch called the median sacral artery.

- The aortic bifurcation is located in front of the L4 vertebra or at the L4-L5 intervertebral disc.



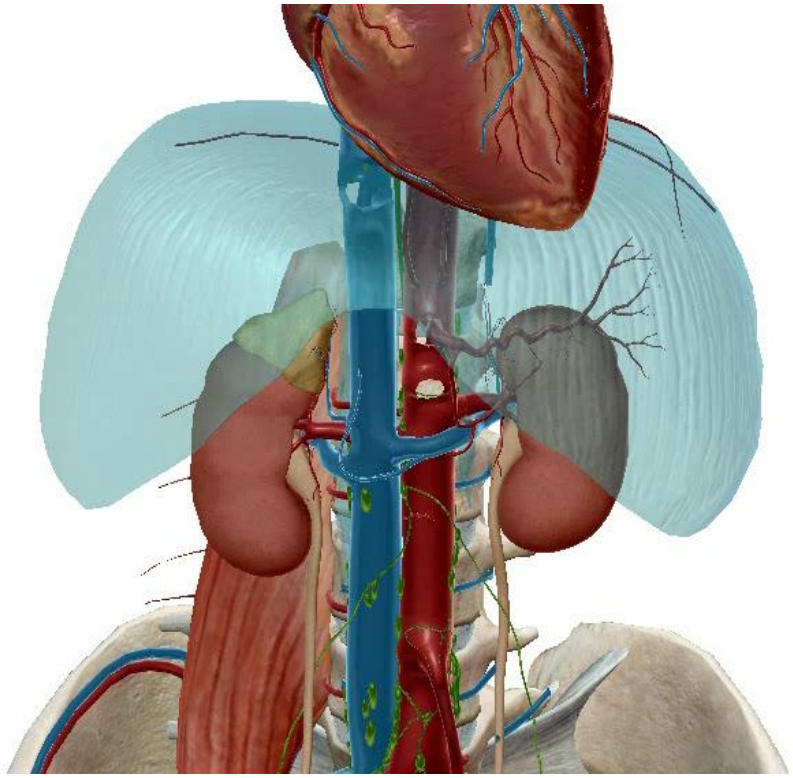
III – ANATOMICAL RELATIONS:

➢ At the aortic hiatus:

- **Posteriorly:**
  - The thoracic duct,
  - The medial root of the hemiazygos vein.

➢ In the abdomen:

- Along its course, it is accompanied by lumbar lymph nodes, classified as:
  - Pre-aortic,
  - Latero-aortic,
  - Post-aortic.



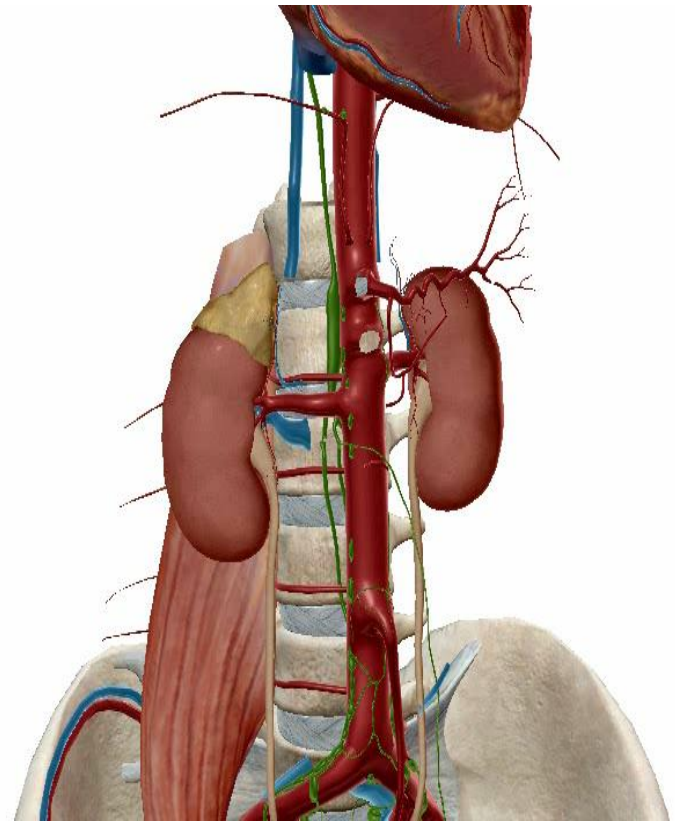
- **Anteriorly,** from top to bottom:
  - The body of the pancreas,
  - The horizontal portion of the duodenum,
  - The small intestinal loops.

- **Posteriorly:**

It lies against the lumbar vertebrae from L1 to L4, over which the lumbar veins run.

- **On the right side:**
  - The cisterna chyli,
  - The thoracic duct,
  - The right coeliac ganglion,
  - The azygos vein,
  - The inferior vena cava.

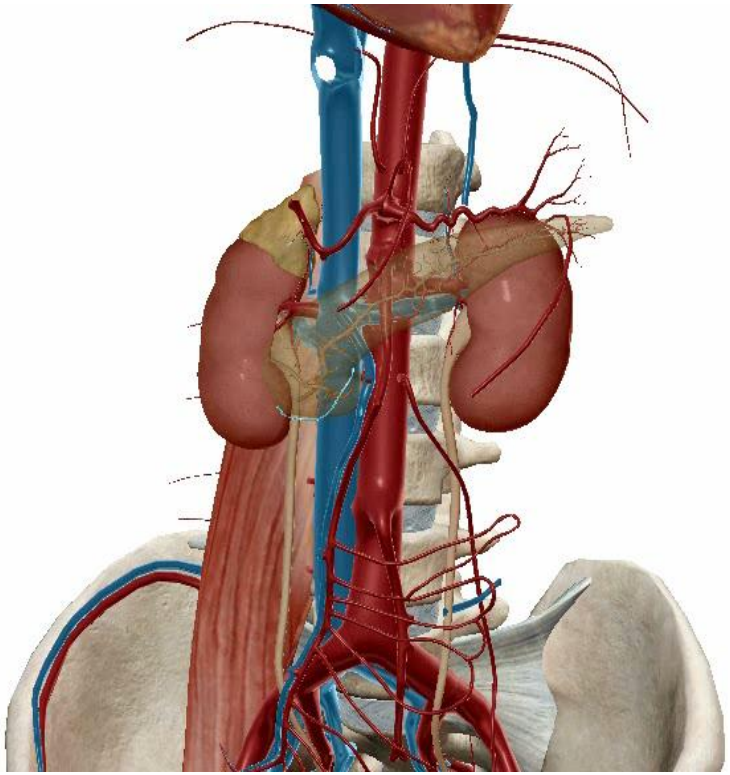
- **On the left side:**
  - The duodenojejunal flexure,
  - The sympathetic trunk.



IV – COLLATERAL BRANCHES:

They are divided into three paired and symmetrical groups:

- Parietal branches,
- Urogenital branches,
- Visceral branches (unpaired).



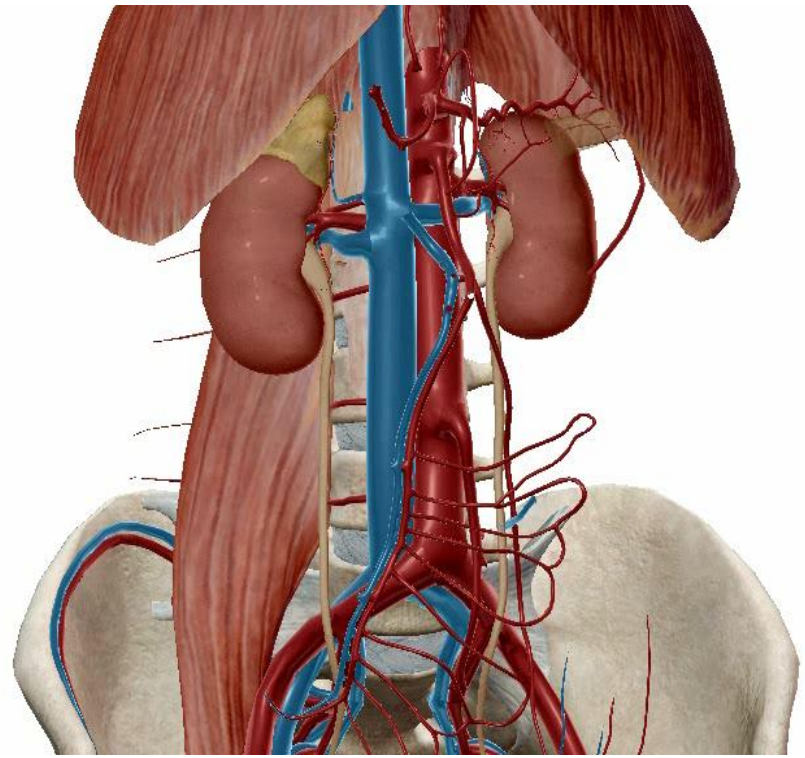
1. PARIETAL ARTERIES

❖ **Inferior phrenic arteries**

- These arise just below the aortic hiatus.
- They ascend in front of the diaphragmatic crura.
- And branch out beneath the diaphragm.

❖ Lumbar arteries

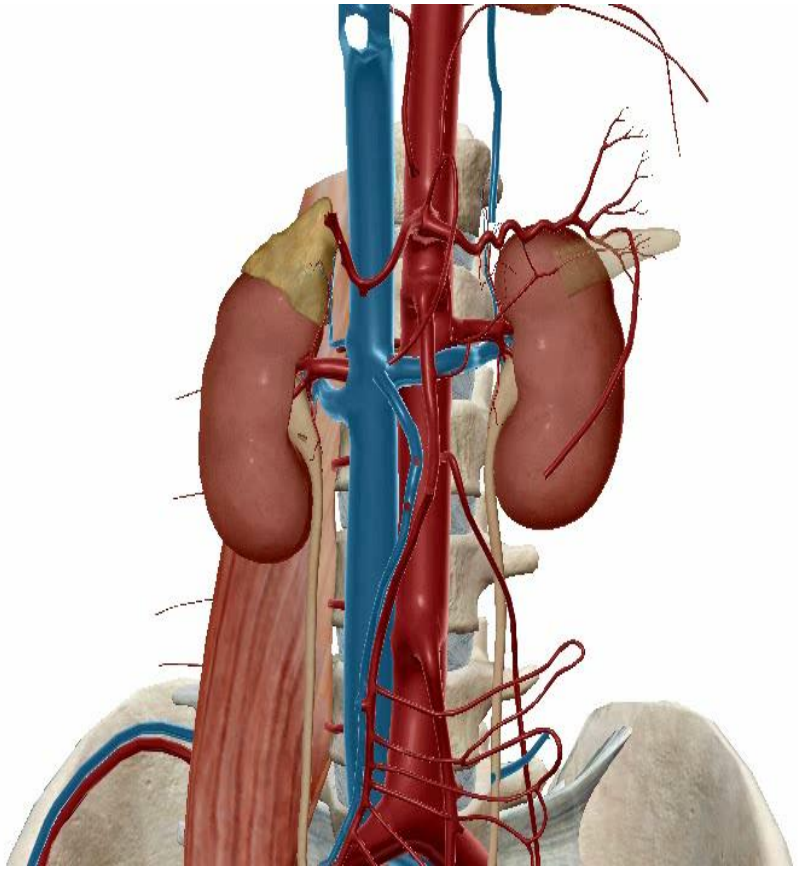
- There are four pairs.
- They originate from the posterior surface of the aorta, at the mid-level of the corresponding vertebral bodies.
- They extend laterally along the vertebral bodies.
- The right lumbar arteries pass behind the inferior vena cava and also posterior to the quadratus lumborum muscle.



2. UROGENITAL ARTERIES:

❖ Renal arteries

- These are the largest of the collateral branches.
- They arise from the lateral aspects of the aorta at the level of L1.
- They run obliquely downward and laterally toward the corresponding kidney.
- The right renal artery is longer than the left and passes behind the inferior vena cava.
- Before reaching the renal hilum, each renal artery divides into two branches:
  - An anterior (pre-pelvic) branch,
  - A posterior (retro-pelvic) branch.



❖ Gonadal arteries (testicular or ovarian)

- These originate from the anterolateral surfaces of the aorta, at the level of L2 or the L2 L3 disc.

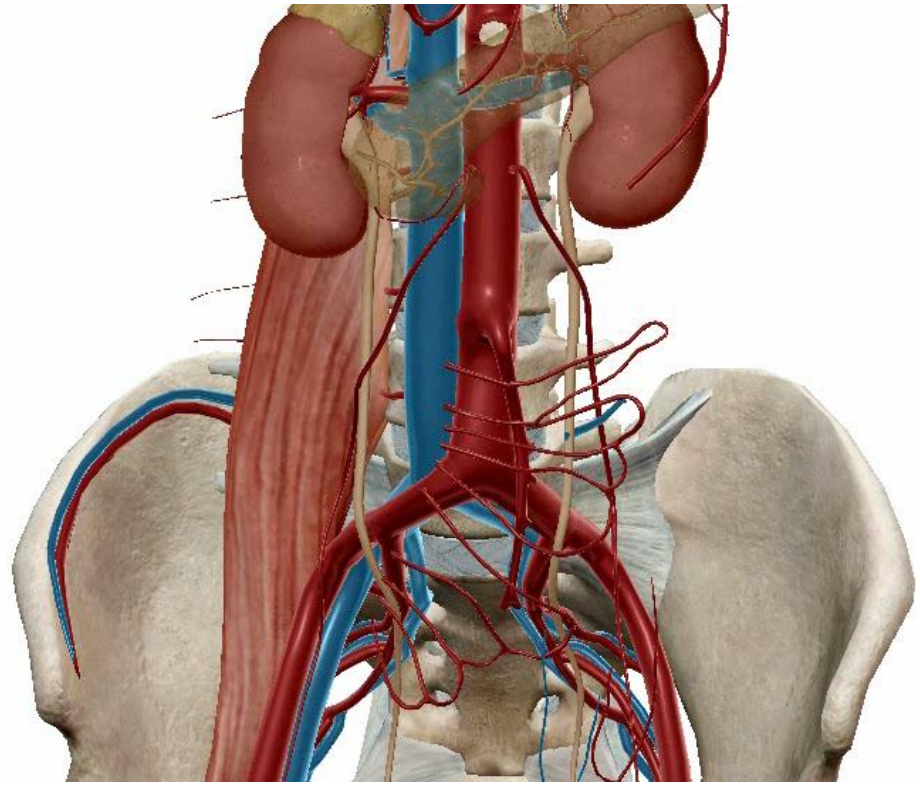
- The testicular artery descends through the lumbo-abdominal and pelvic regions.

- It traverses the inguinal canal, follows the spermatic cord, and ends at the upper pole of the testis.

- Where it ends in two branches:

  - A lateral branch,

  - A medial branch.

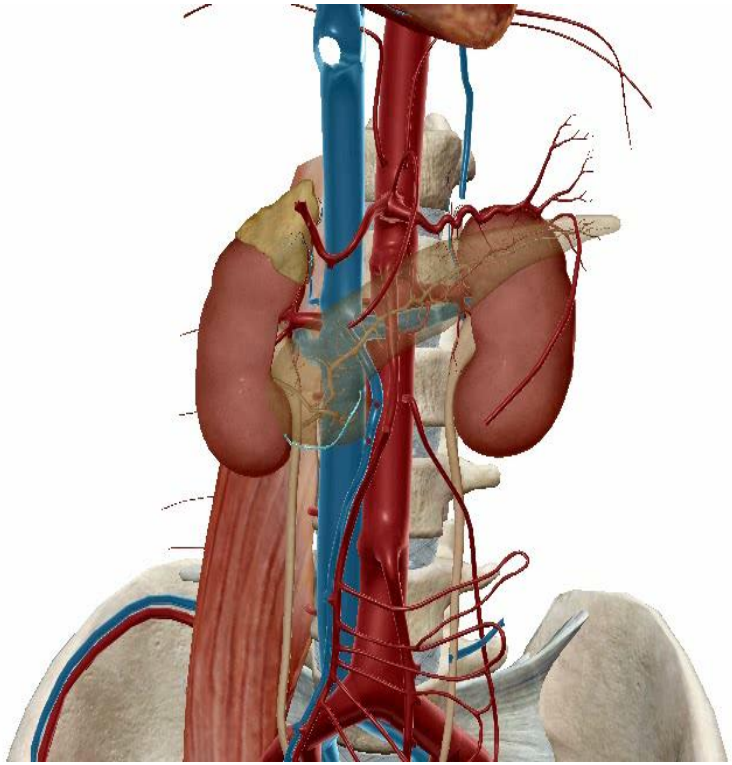


3. VISCERAL ARTERIES

❖ Celiac trunk

- It arises from the anterior surface of the aorta, at the level of the T12–L1 intervertebral disc, about 1 cm below the aortic hiatus.

- It descends obliquely downward and forward, reaching the upper border of the pancreas, where it divides into three terminal branches:
  - Common hepatic artery,
  - Left gastric artery,
  - Splenic artery.



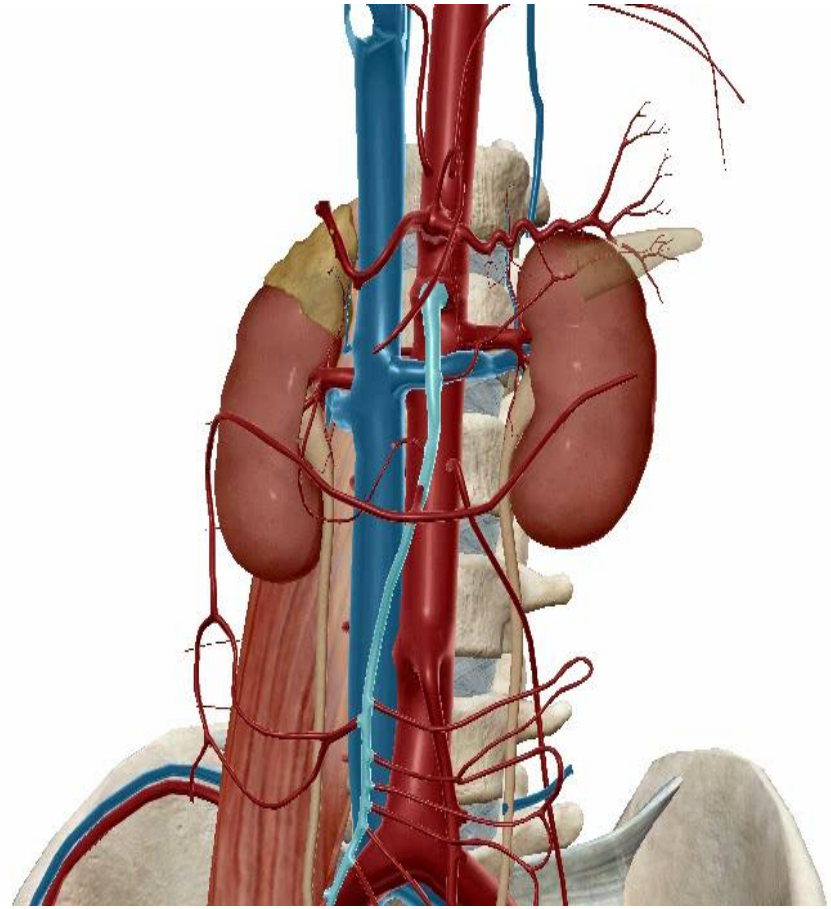
❖ Superior mesenteric artery

- It arises from the anterior surface of the aorta at the level of L1, just below the renal arteries.
- It descends vertically behind the pancreas and terminates near the jejunum.

- It is related to :
  - **Posteriorly:** the left renal vein,
  - **Anteriorly:** the body of the pancreas,
  - **To the right:** the inferior vena cava and superior mesenteric vein.

- **Collateral branches** include:
  - The inferior pancreaticoduodenal artery,
  - The jejunal arteries,
  - The right colic artery,
  - The middle colic artery.

- It supplies blood to the entire small intestine (except the proximal duodenum) and the right colon.



❖ Inferior mesenteric artery

- It arises from the anterior surface of the aorta at the level of the L3-L4 disc.

- It runs obliquely downward to the left toward the left common iliac vein, then turns vertically downward.

- It ends as the superior rectal artery.

- It is related to:

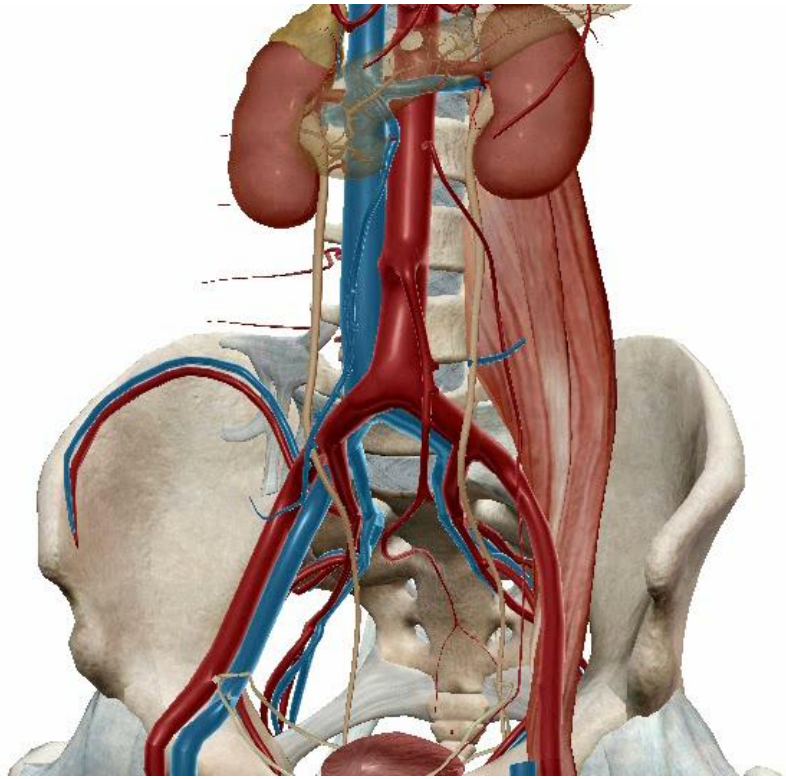
- **At its origin:**

✓ It is covered anteriorly by the horizontal part of the duodenum,
✓ crosses over the aorta,
✓ and the sympathetic trunk.

- **As it continues in the pelvis:**

✓ Medial to the left: the psoas muscle,
✓ Medial to the left; the ureter,
✓ To the left: the gonadal vessels.

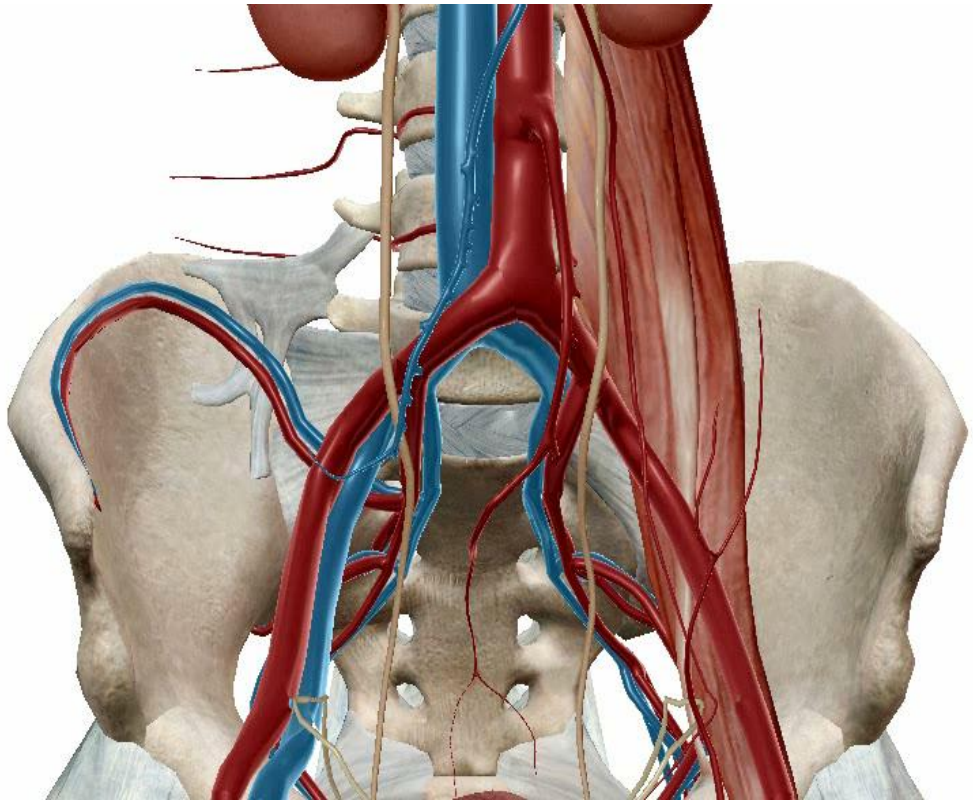
- It supplies the left colon and the pelvic rectum.



V – TERMINAL BRANCHES:

The abdominal aorta bifurcates into 3 branches at the level of L4:

- Two lateral branches: the common iliac arteries.
- One medial branch: the median sacral artery.



1. MEDIAN SACRAL ARTERY

- It arises from the posterior surface of the abdominal aorta.
- And it descends along the anterior surface of L5 and the sacrum.

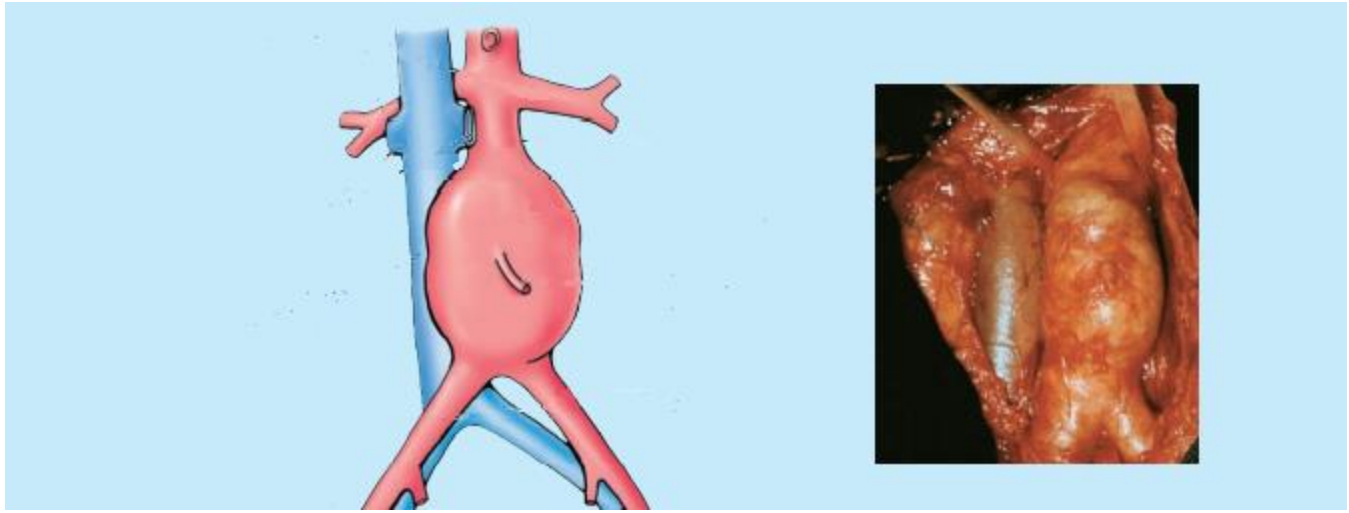
2. COMMON ILIAC ARTERIES

- These are primarily conduit arteries.
- They arise from the aortic bifurcation and are short and voluminous.
- They terminate by bifurcating into the internal and external iliac arteries, near the sacroiliac joint.

VI - CLINICAL APPLICATIONS:

❖ Abdominal aortic aneurysm :

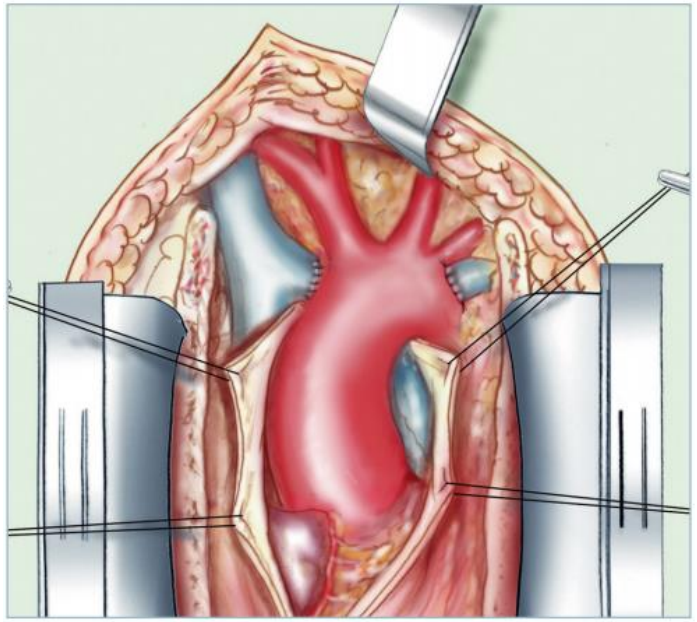
- An abdominal aortic aneurysm (AAA) is a localized dilation of the abdominal aorta, usually occurring below the renal arteries.
- It is often asymptomatic until it reaches a significant size.
- Risk factors include age, hypertension, smoking, and a family history of aneurysms.
- If left untreated, an AAA can rupture, leading to life-threatening internal bleeding.
- Surgical intervention, either through open repair or endovascular aneurysm repair (EVAR), is typically recommended when the aneurysm exceeds 5 cm in diameter, or if there is rapid enlargement or symptoms.

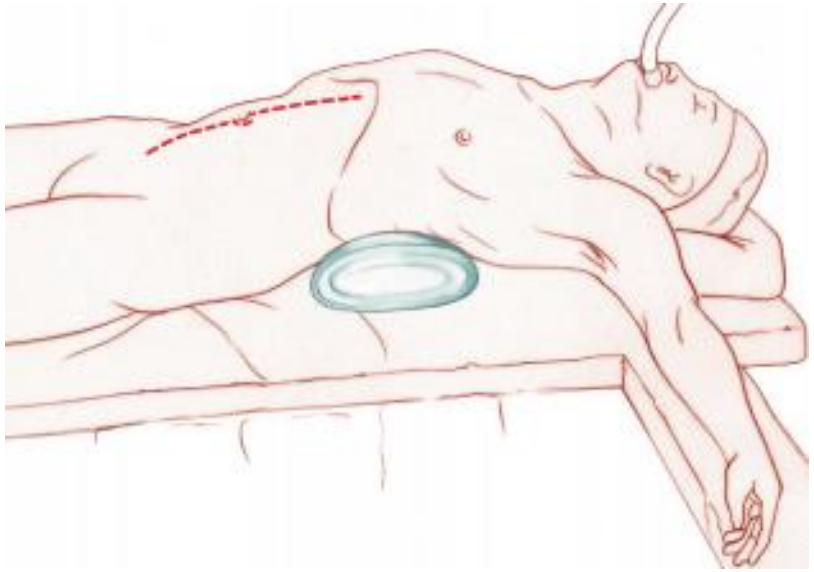


According to Clinically Oriented Anatomy

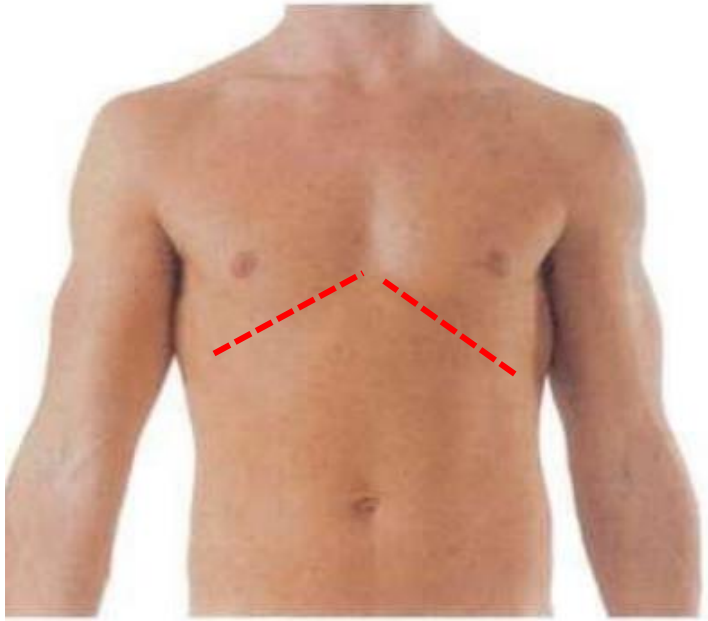
VII – APPROACH ROUTES:

Median xiphopubic laparotomy :
This is performed from the xiphoid process to the subumbilical region.





Bilateral subcostal laparotomy :
The incision is made two finger widths below the costal margin.



VII – CONCLUSION:

- The abdominal aorta is a vital artery that supplies blood to the abdominal organs, pelvis, and lower limbs.
- It is crucial for the distribution of oxygenated blood to these regions and is susceptible to various conditions such as aneurysms and occlusions.
- Early detection and surgical intervention are essential for preventing complications, especially in cases of aneurysms.
- Understanding the anatomy and function of the abdominal aorta is critical for both diagnostic and therapeutic purposes in clinical practice.