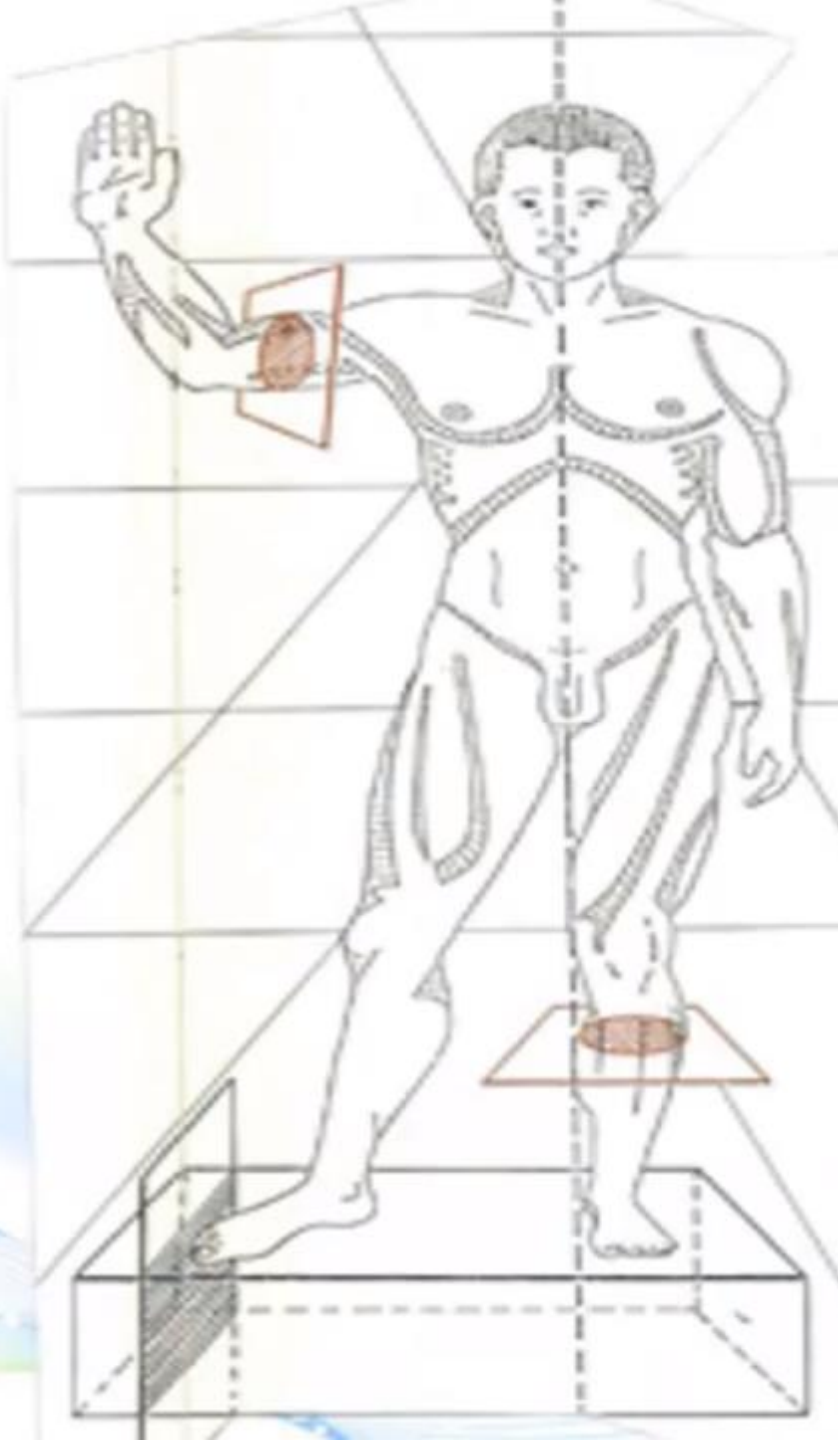
INFERIOR VENA CAVA



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Plan

I. INTRODUCTION

II. DESCRIPTIVE ANATOMY

III. ANATOMICAL RELATIONS

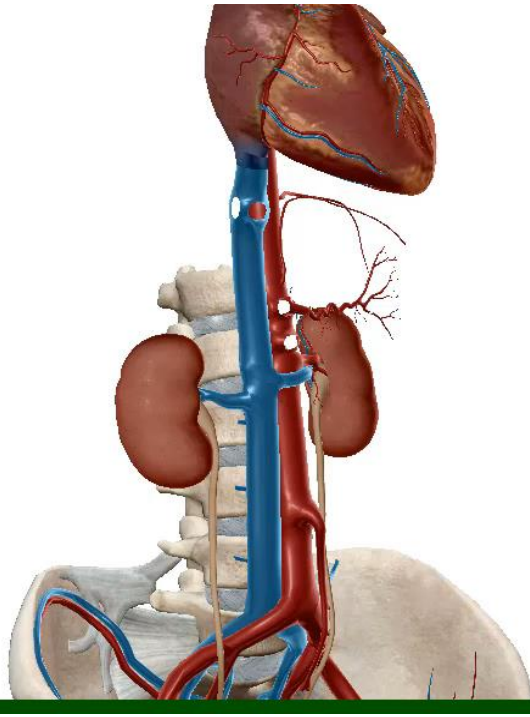
IV. COLLATERAL BRANCHES

V. ANASTOMOSES

VI. CLINICAL APPLICATIONS

VII. SURGICAL APPROACHES

VIII. CONCLUSION



I.INTRODUCTION

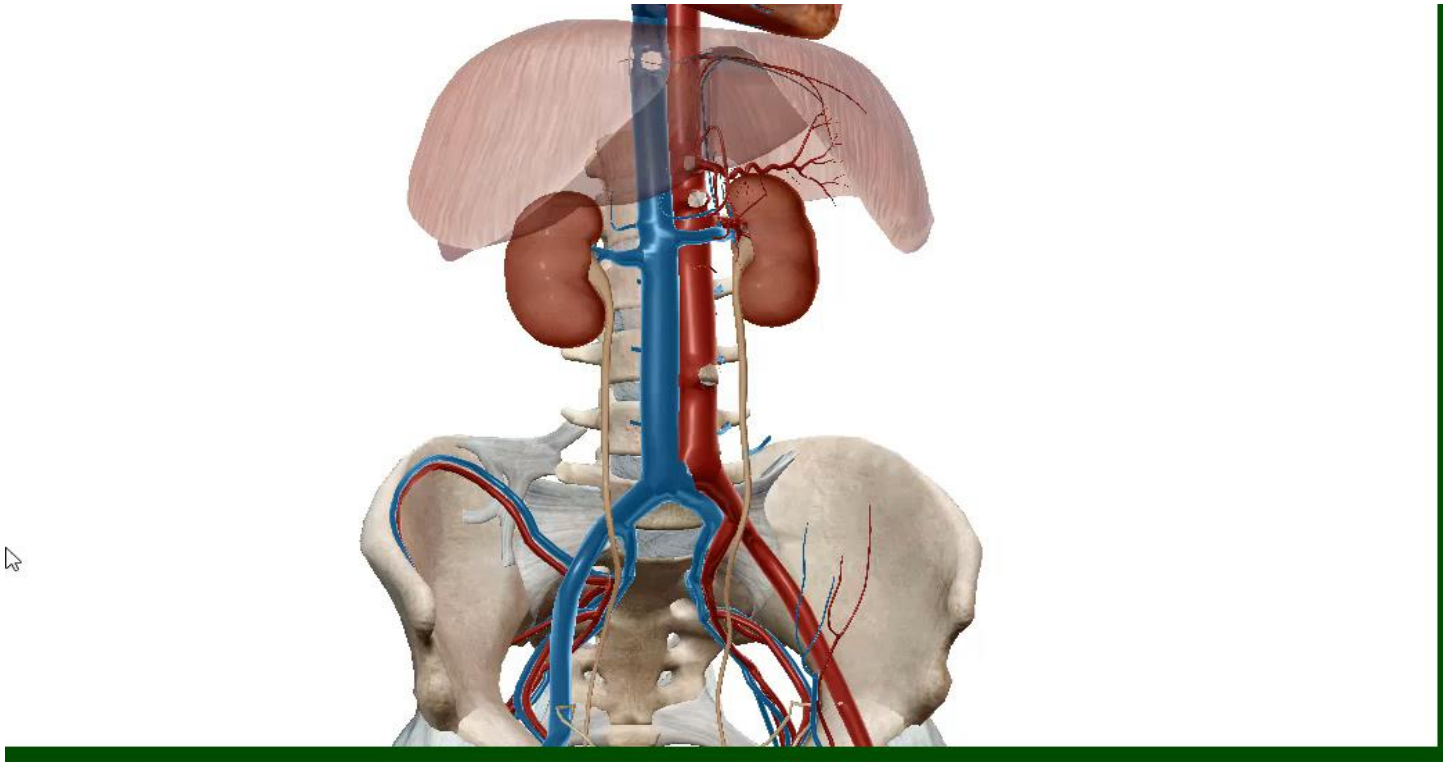
The inferior vena cava is the main trunk collecting all the venous blood from the subdiaphragmatic region, which it drains into the right atrium.

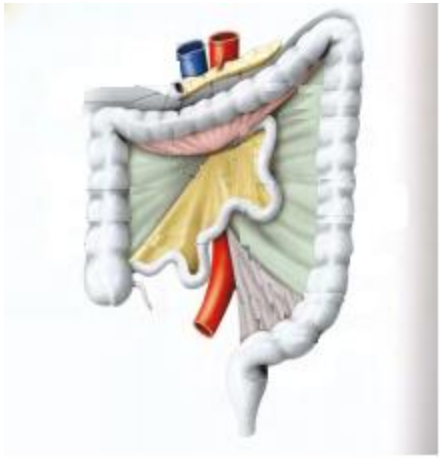
II.DESCRIPTIVE ANATOMY

ORIGIN: Located in the retroperitoneal space, it is formed by the union of the right and left common iliac veins at the right margin of L5.

COURSE: The inferior vena cava ascends through the retroperitoneal space of the abdominal cavity, along the right side of the lumbar spine.
It follows a vertical course up to L1, passes behind the liver, and at its terminal portion, it has a short intrapericardial thoracic course.

TERMINATION: It opens into the right posterior wall, after passing through the diaphragmatic orifice, at the level of T9.



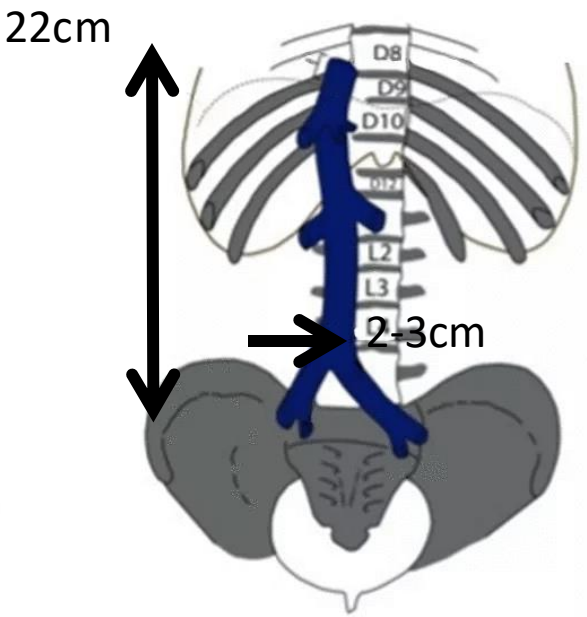


DIMENSIONS

- Length: 22 cm.
- Diameter: 2 to 3 cm.

- It ascends from bottom to top, with two dilatations:

- One above the entry of the renal veins,
- One above the entry of the hepatic veins.

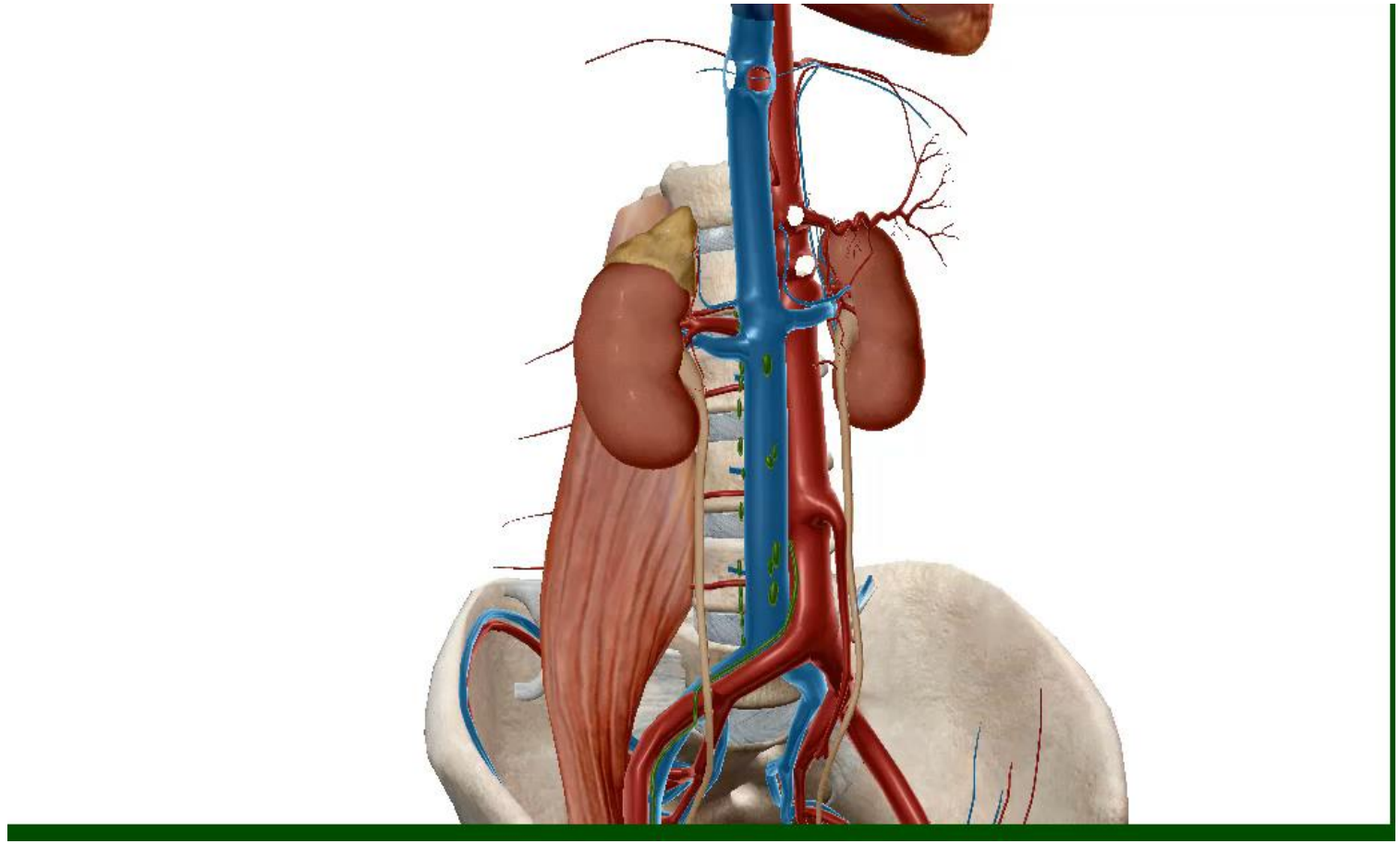


III. ANATOMICAL RELATIONS OF THE INFERIOR VENA CAVA

Relations in the abdomen:

Are accompanied by

- Pre-caval lymph nodes,
- Lateral-caval lymph nodes,
- Intermediate lumbar lymph nodes.



➢ **Posterior relations:**

- Bodies of lumbar vertebrae from L1 to L4,
- Psoas major muscle,
- Medial part of the right adrenal gland,
- The right lumbar arteries, right renal artery and the inferior phrenic arteries.

➢ **Anterior relations (from bottom to top):**

- Origin of the right common iliac artery.
- Root of the mesentery and its vessels,
- Right testicular or ovarian artery.
- Horizontal part of the duodenum.
- Head of the pancreas.
- Liver.

➢ **To the left:**
- Abdominal aorta.
- Caudate lobe of the liver.

➢ **To the right:**
- Ascending colon.
- Medial border of the right kidney.
- Right ureter.

Relations in the thorax:

It is a short 3 cm segment and is covered by the pericardium.

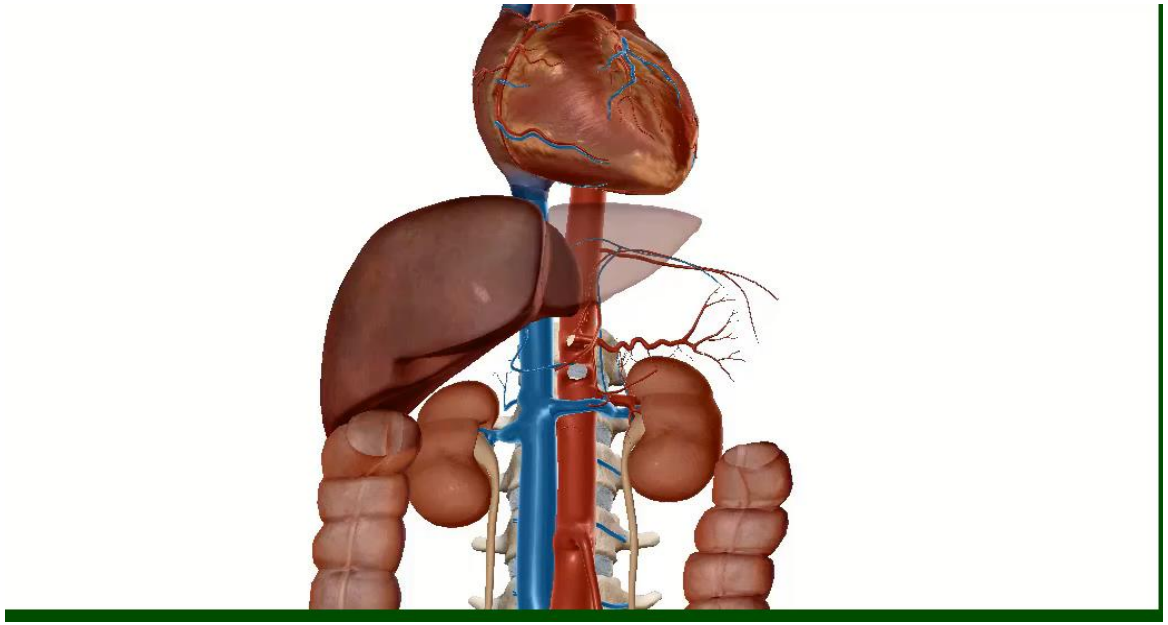
➢ **Anterior relations:**
- Right atrium.

➢ **Posterior relations:**
- To the right: the triangular ligament of the right lung
- To the left: the esophagus.

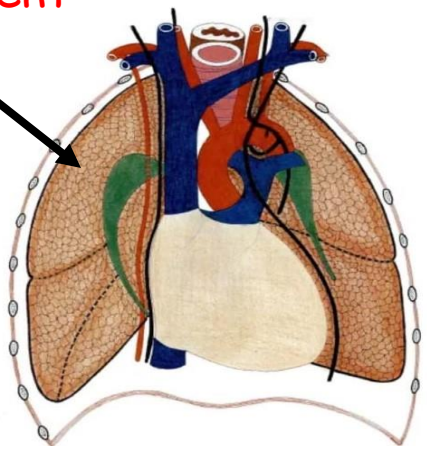
➢ **Lateral relations:**
- The right phrenic nerve.
- The right mediastinal pleura.
- The right lung.

Relations at the diaphragm:

-The inferior vena cava adheres to the margins of the diaphragm's foramen.



Triangular ligament



IV.COLLATERAL BRANCHES

1.Lumbar veins:

•Arise opposite the vertebral foramina

• Run transversely above the lumbar arteries.

2.Renal veins:

• Are located anterior to the arterial plane.

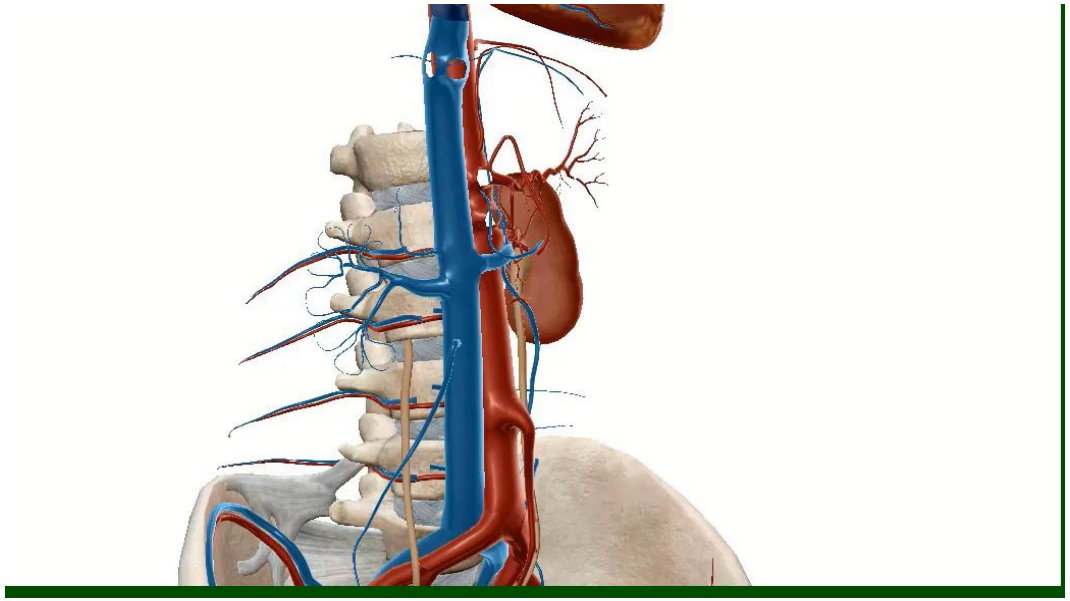
• The left renal vein is longer than the right.

• They pass in front the aorta and the superior mesenteric artery.

3.Middle suprarenal veins:

• The right suprarenal vein drains into the inferior vena cava.

• The left suprarenal vein drains into the left renal vein.



5.Hepatic veins (or suprahepatic veins):

• Drain blood from the liver into the inferior vena cava.

• Divided into the right and left hepatic veins.

• And the middle suprahepatic vein.

6.Inferior phrenic veins:

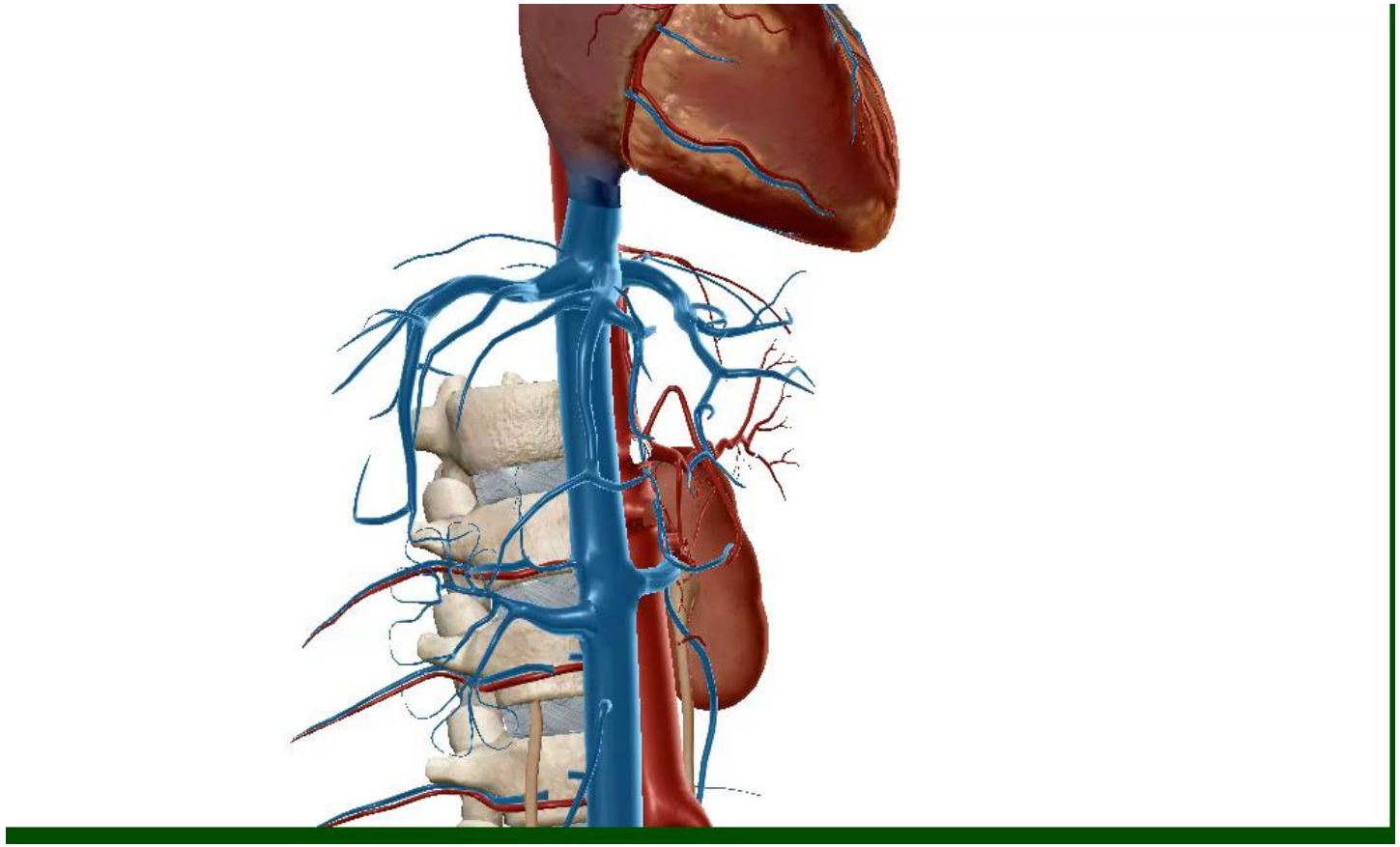
•Receive one or more inferior phrenic veins at the level of its diaphragmatic orifice.

7.Gonadal veins:

• Ascend laterally to the inferior vena cava.

• The right gonadal vein drains into the inferior vena cava.

• The left gonadal vein drains into the left renal vein.



V. ANASTOMOSES :

1. Porto-caval anastomoses

- Anastomoses in the cardia region.
- Anastomoses in the umbilical region : with the para-umbilical veins,
- Rectal anastomoses :with the superior hemorrhoidal veins,
- Porto-suprahepatic anastomoses,
- Peritoneal-parietal anastomoses.

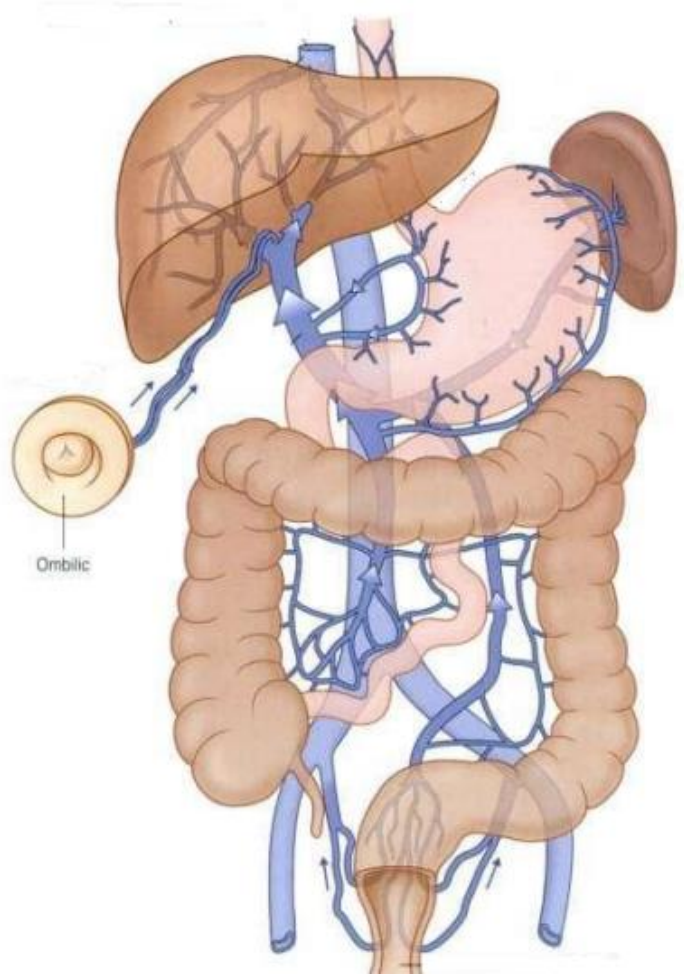


Diagram showing porto-caval anastomoses (According to Kamina)

2.Cavo-caval anastomoses:

- Anterior parietal system, formed by:
  - Epigastric veins.
  - Internal mammary veins.

- Lumbo-azygos system, formed by:
  - Ascending lumbar veins.
  - The right azygos vein,
  - The left hemi-azygos vein.

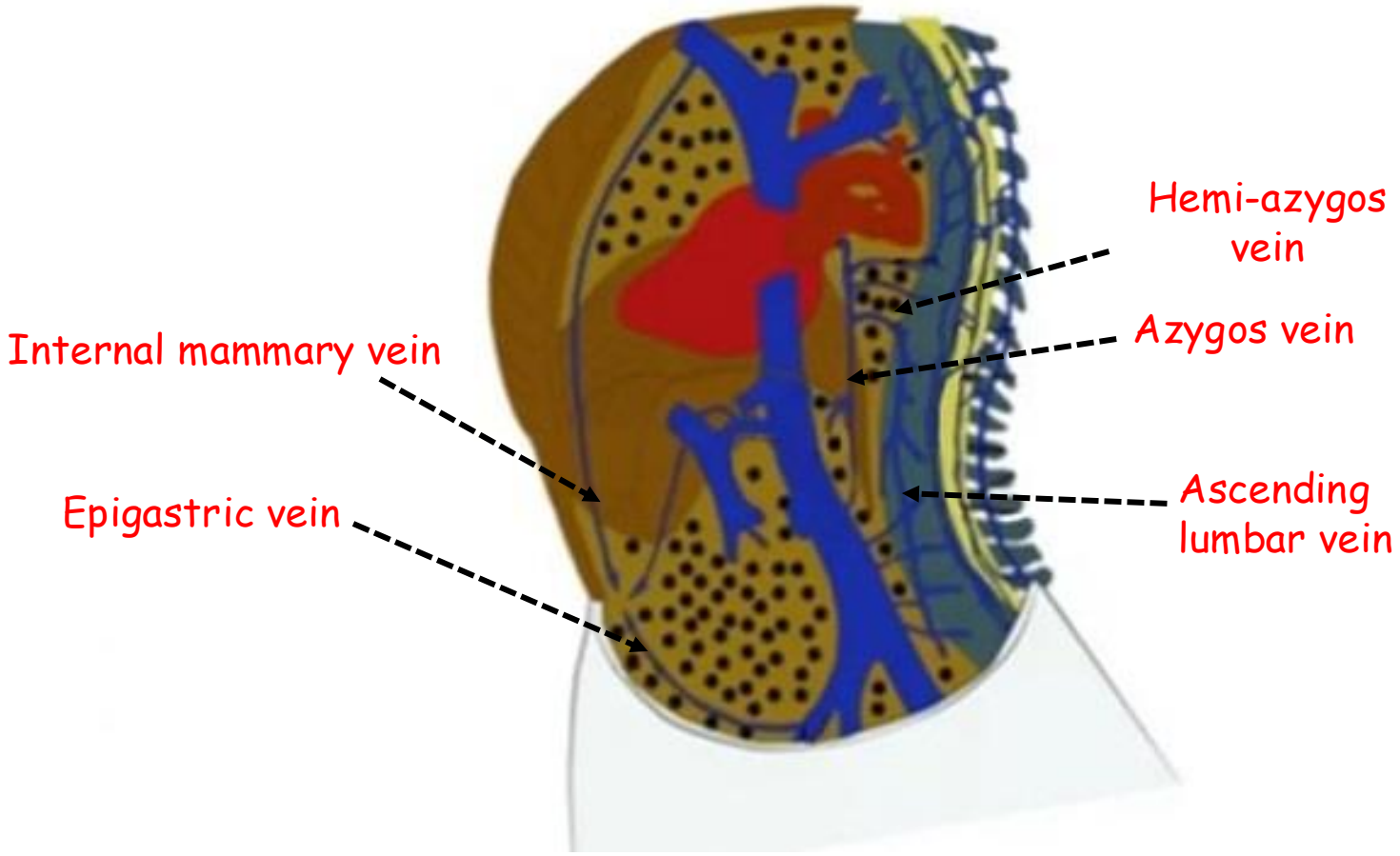


Diagram showing cavo-caval anastomoses

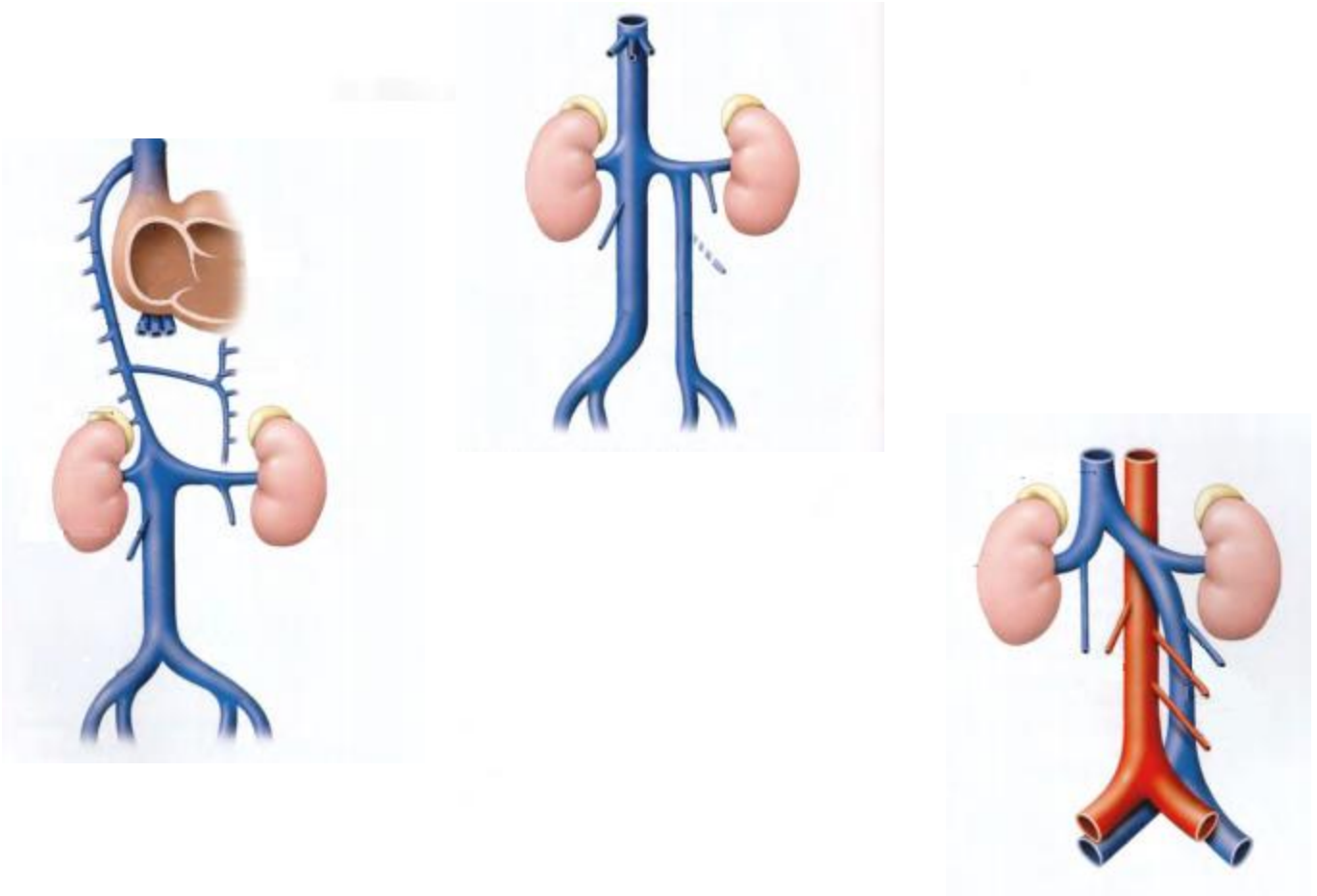
VI. CLINICAL APPLICATIONS

Variants of the inferior vena cava

- Inferior vena cava (IVC) variants are rare and usually have minimal clinical impact, but recognising them is important for avoiding diagnostic errors and planning interventions.

- Common variants include:

✓ **Double IVC**: Two parallel veins, often due to persistence of the left embryonic IVC.
✓ **Left-sided IVC**: The IVC lies on the left side of the spine instead of the right.
✓ **Absent IVC**: The IVC is missing, and blood drains through the azygos system.
✓ **Transposed IVC**: The IVC is abnormally positioned due to a congenital anomaly.



Diaphragm showing the different variants of the inferior vena cava according to Kamina.

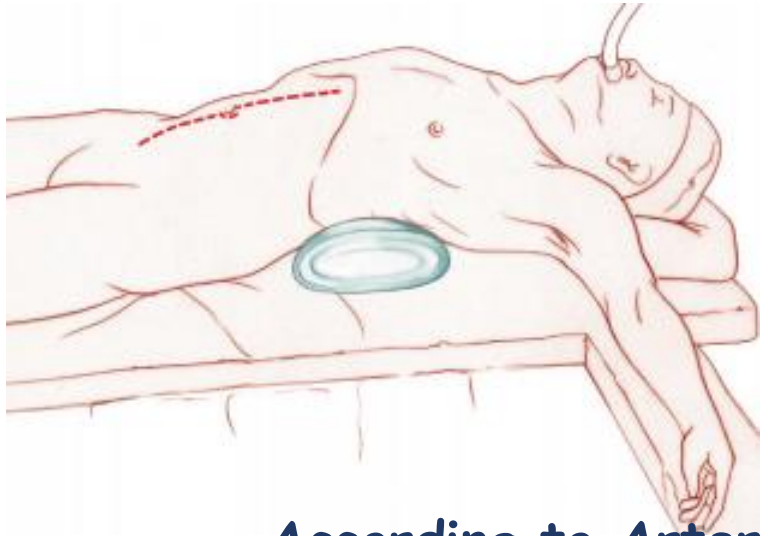
VII. SURGICAL APPROACHES

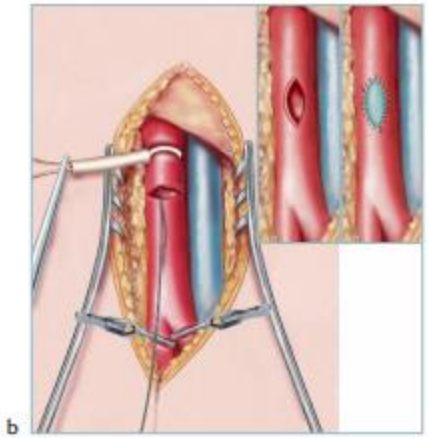
1.Median xiphopubic laparotomy:

The incision is made from the xiphoid process to just below the umbilicus.

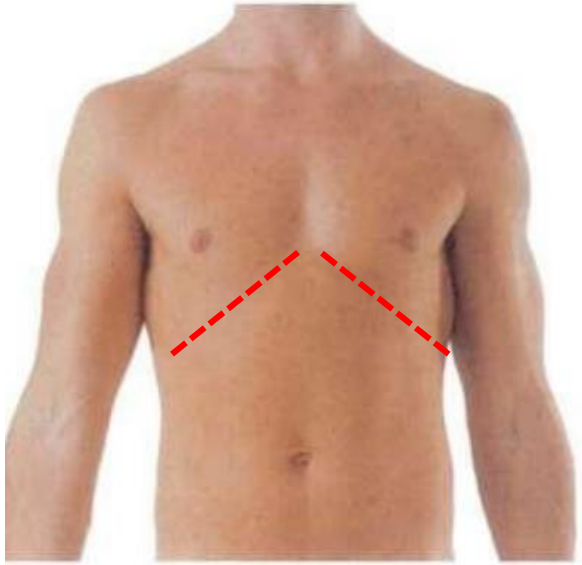
2.Bi-subcostal laparotomy:

The incision is made two finger widths below the costal margin. It can be extended with an incision along the midline up to the xiphoid process.





According to Arterial Surgeries



According to Netter's Clinical Anatomy

VIII. CONCLUSION:

The strategic anatomical position and close relationships of the inferior vena cava with major abdominal structures make it a key vessel in systemic circulation, with significant clinical and surgical implications.