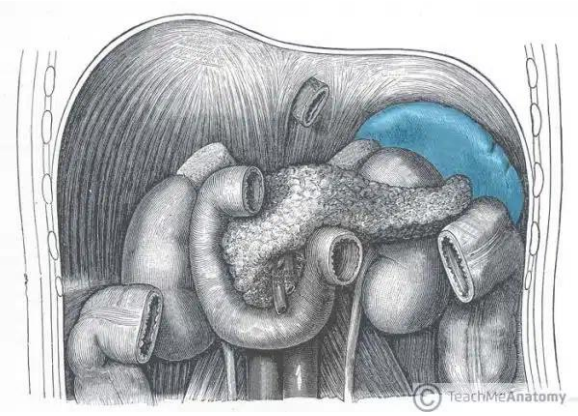
KARNATAKA RADIOLOGY EDUCATION PROGRAM

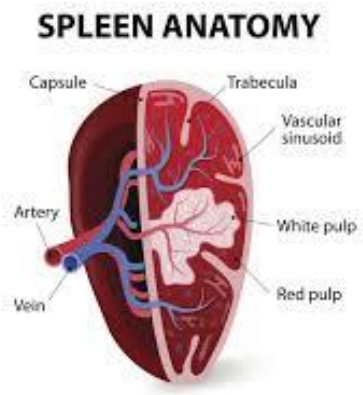
Spleen Anatomy and applied radiology -1

The spleen is an organ located in the upper left abdomen, and is roughly the size of a clenched fist. In the adult, the spleen functions mainly as a blood filter, removing old red blood cells. It also plays a role in both cell-mediated and humoral immune responses.

Here's a more detailed breakdown of the spleen's anatomy:

- **Location: Situated in the left upper quadrant of the abdomen, beneath the diaphragm and above the stomach.**





- **Size: Approximately 12 cm (about 5 inches) long.**
- **Structure: The spleen is composed of two main types of tissue:**
    - **White Pulp: Contains lymphocytes and macrophages, which play a role in immune function.**
    - **Red Pulp: Contains blood sinusoids and splenic cords, where blood is filtered and old red blood cells are removed.**

The spleen has a slightly oval shape. It is covered by a weak capsule that protects the organ while allowing it to expand in size.

The outer surface of the spleen can be anatomically divided into two:

Diaphragmatic surface – in contact with diaphragm and ribcage.

Visceral surface – in contact with the other abdominal viscera.

It has anterior, superior, posteromedial and inferior borders. The posteromedial and inferior borders are smooth, whilst the anterior and superior borders contain notches.

Anatomical Relations

It lies in close proximity to other structures in the abdomen:

Anterior	Posterior	Inferior	Medial
• Stomach	• Diaphragm • Left lung • Ribs 9-11	• Left colic flexure (splenic flexure)	• Left kidney • Tail of the pancreas

- ## Ligaments:

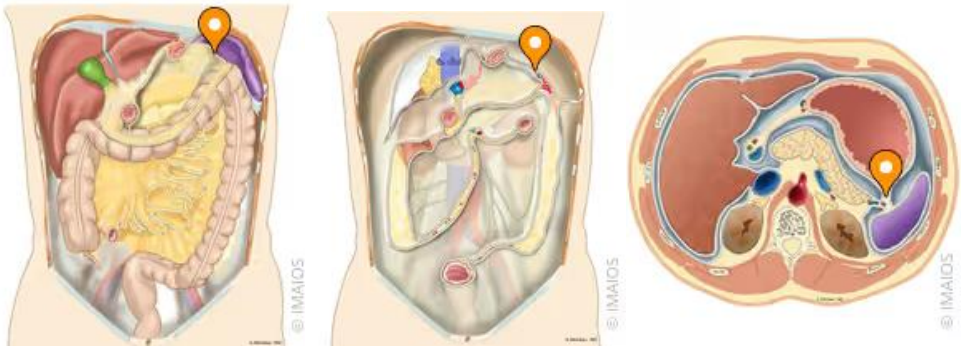
The spleen is attached to surrounding organs by several ligaments:

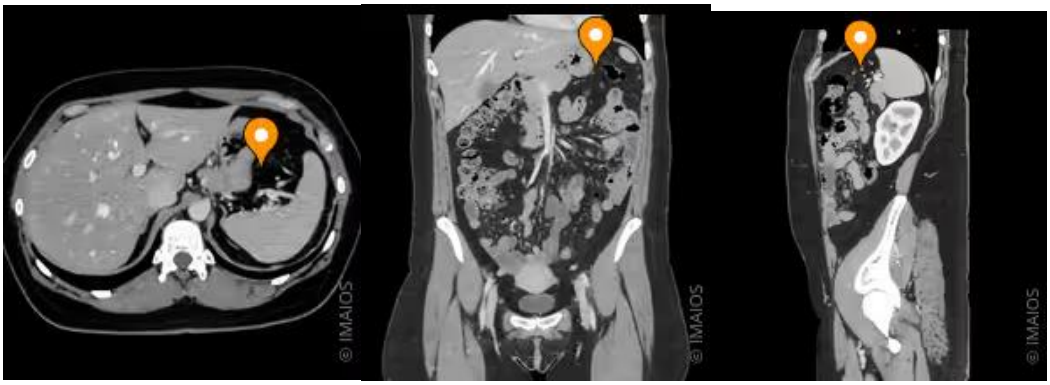
- **Gastrosplenic ligament: Connects the spleen to the stomach.**

  The gastrosplenic ligament (gastrolienal ligament) is a peritoneal ligament that connects the greater curvature of the stomach to the hilum of the spleen. It is a part of the greater omentum.

  The gastrosplenic ligament contains the short gastric vessels and the left gastroomental (gastroepiploic) artery.

  This ligament plays a crucial role in maintaining the anatomical relationship between the stomach and the spleen.

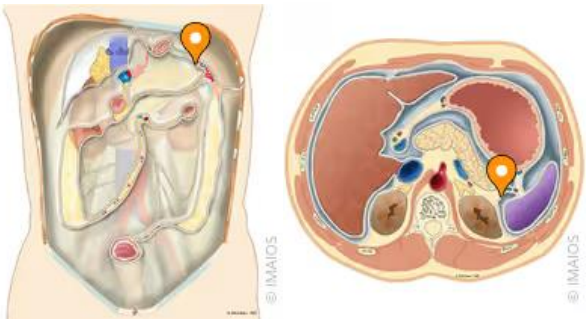




- **Splenorenal ligament: Connects the spleen to the kidney**.

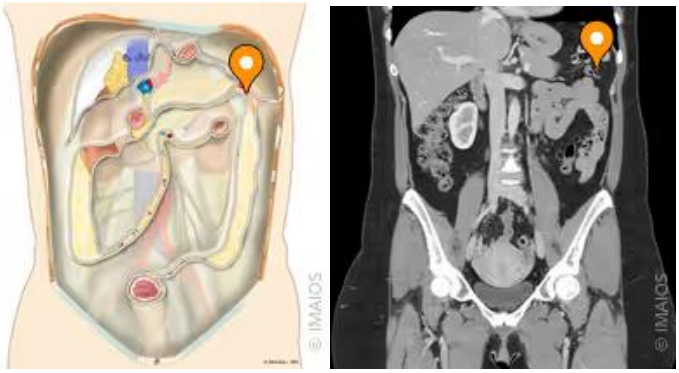
  The splenorenal ligament (or lienorenal ligament), is derived from the peritoneum, where the wall of the general peritoneal cavity comes into contact with the omental bursa between the left kidney and the spleen; the lienal vessels (splenic artery and vein) pass between its two layers. It contains the tail of the pancreas, the only intraperitoneal portion of the pancreas, and splenic vessels.

  It is a part of the greater omentum.



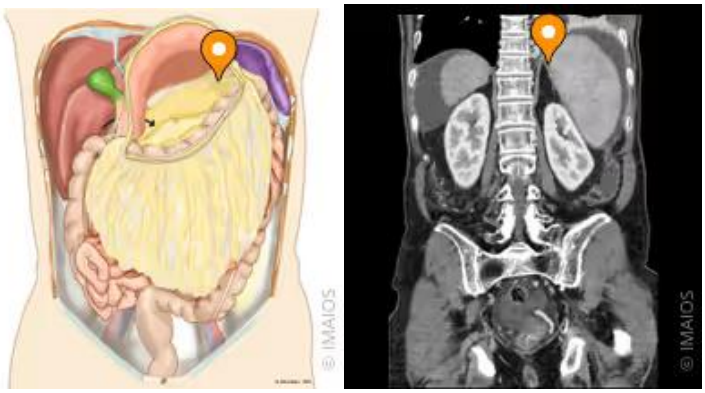
- **Colicosplenic ligament: Connects the spleen to the colon.**

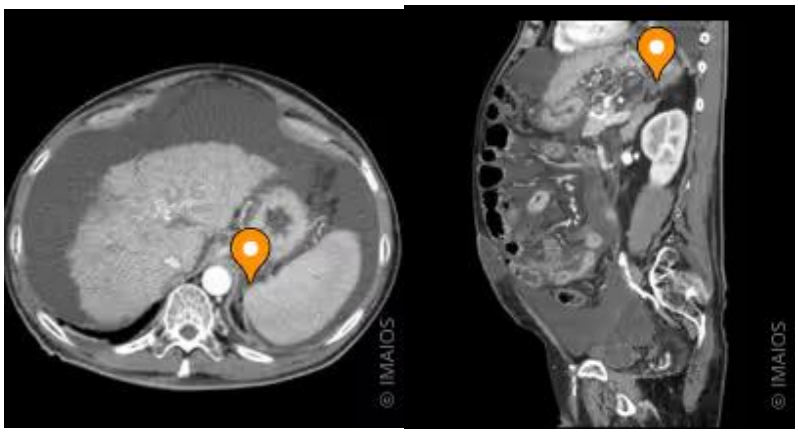
  The splenocolic ligament is a peritoneal ligament connecting the splenic capsule to the transverse colon. Made of visceral peritoneum, it is a component of the greater omentum.



- **Phrenocolic ligament: Connects the spleen to the diaphragm.**

The phrenosplenic ligament (lienophrenic ligament or phrenicolienal ligament) is a double fold of peritoneum that connects the thoracic diaphragm and spleen.The phrenicolienal ligament is part of the greater omentum.



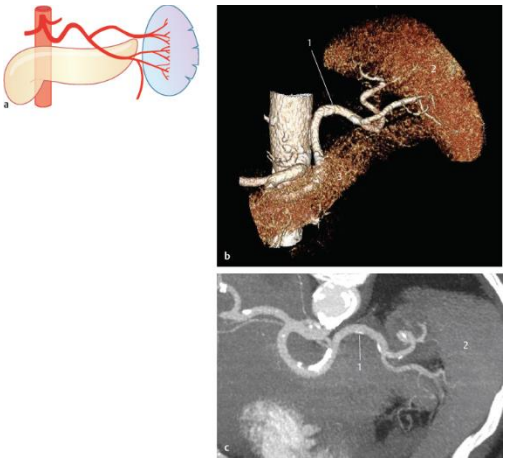


- **Functions:**
    - **Blood Filtration: The spleen filters blood, removing old or damaged red blood cells and storing blood.**
    - **Immune Function: The spleen contains white blood cells that help fight infections.**
    - **Blood Cell Storage: The spleen stores a reserve of blood cells, including red blood cells, white blood cells, and platelets.**

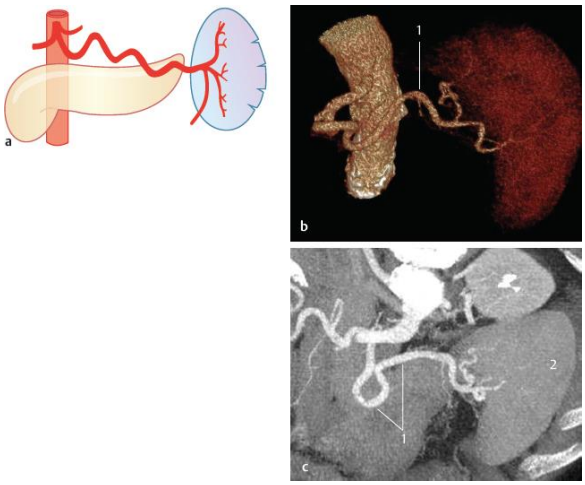
Vasculature

The spleen is a highly vascular organ. It receives most of its arterial supply from the splenic artery. This vessel arises from the coeliac trunk, running laterally along the superior aspect of the pancreas, within the splenorenal ligament. As the artery reaches the spleen, it branches into five vessels – each supplying a different part of the organ.

These arterial branches do not anastomose with each other – giving rise to vascular segments of the spleen. This enables a surgeon to remove one of these segments without affecting the others (a procedure known as a subtotal splenectomy).



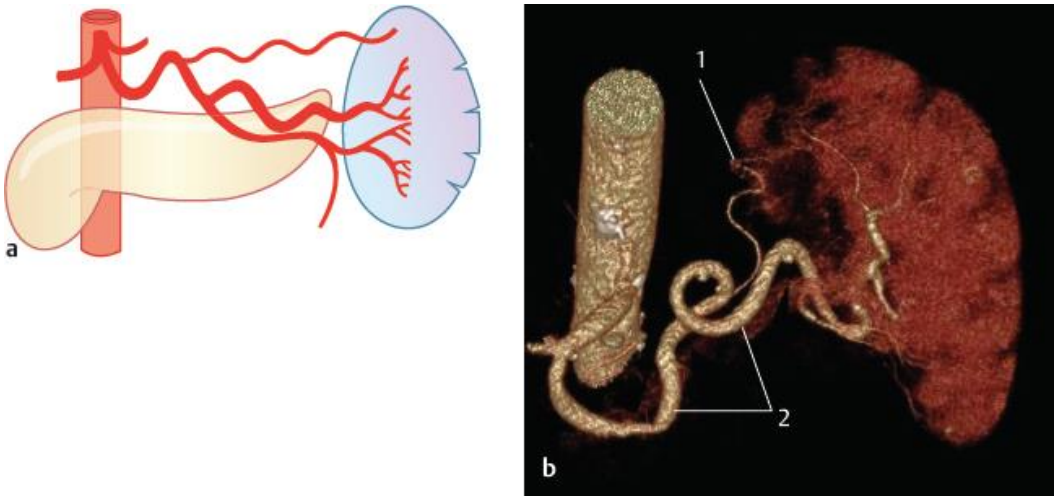
Remote from the hilus (distributed type) (70%). Schematic (a), coronal VR CT (b), and axial MIP CT (c). 1 Splenic artery; 2 spleen; 3 pancreas.



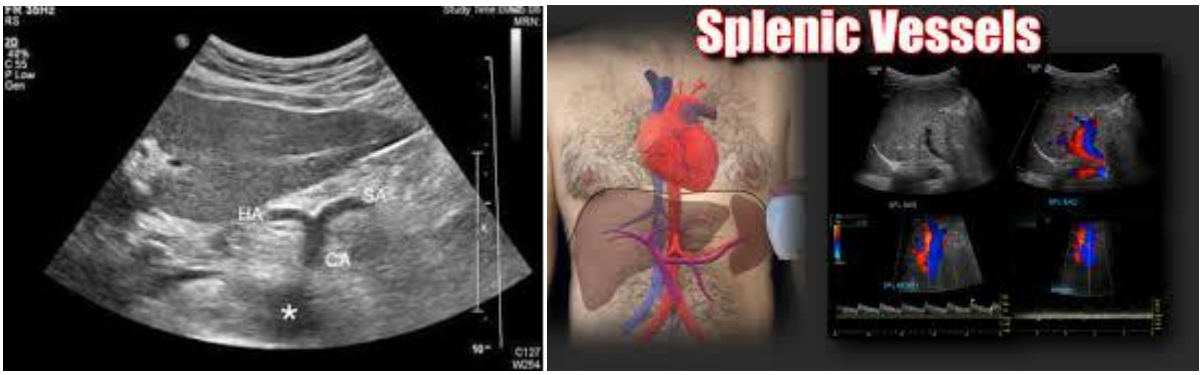
Near the hilus (magistral type) (30%). Schematic (a), coronal VR CT (b), and axial oblique MIP CT (c). 1 Splenic artery; 2 spleen

Polar Arteries

Important branches of the splenic artery are the short gastric arteries and the left gastroepiploic artery . Arteries to the cranial or caudal pole of the spleen originate from the main splenic artery or the superior or inferior terminal branches. In rare instances, the upper polar arteries arise from the aorta, the left gastric artery, a pancreatic artery, or even a mesenteric artery.



Upper polar artery (65%). Schematic (a) and coronal VR CT (b). 1 Upper polar artery; 2 splenic artery.


HA
SA
CA
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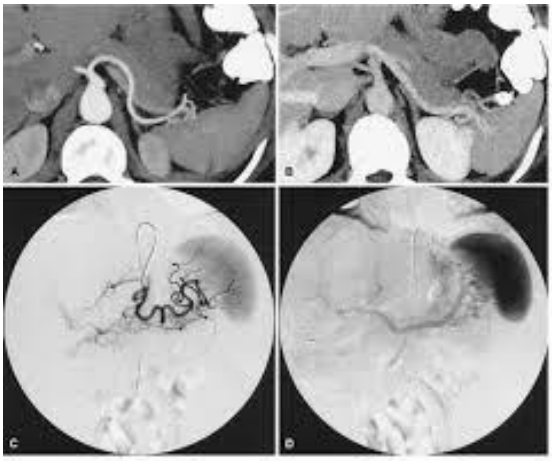
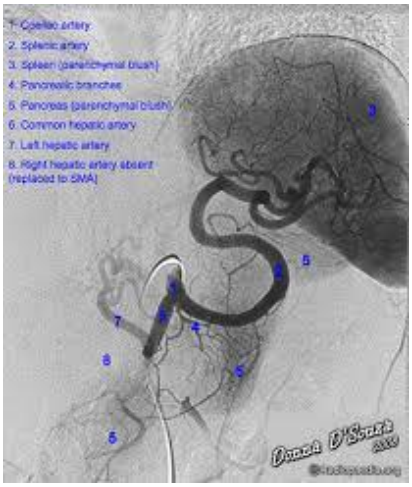
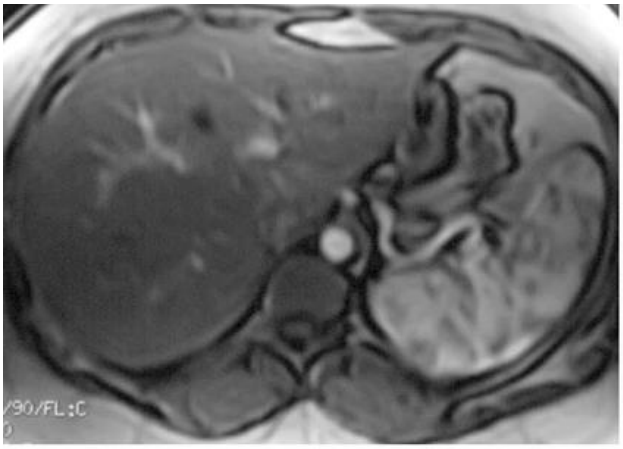
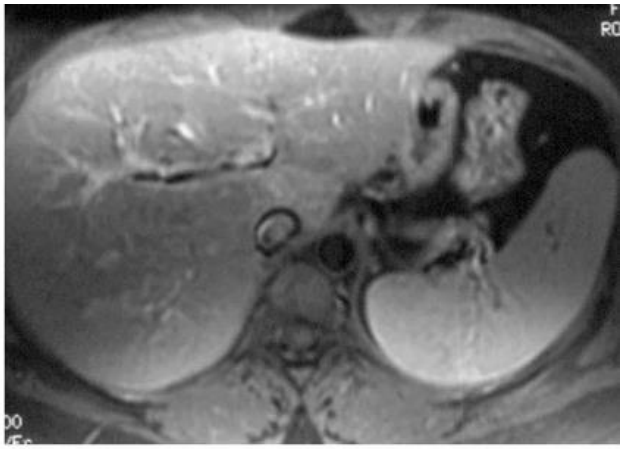
Splenic Vessels




1. Coeliac artery
2. Splenic artery
3. Spleen (parenchymal blush)
4. Pancreatic branches
5. Pancreas (parenchymal blush)
6. Common hepatic artery
7. Left hepatic artery
8. Right hepatic artery absent (replaced to SMA)

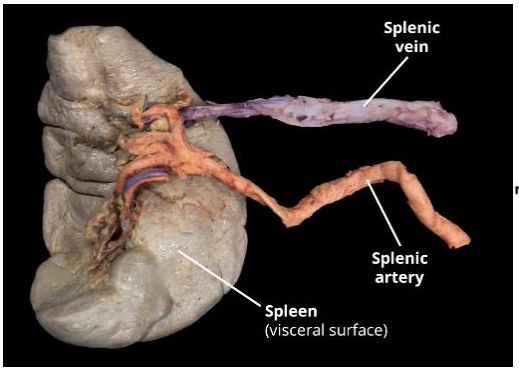


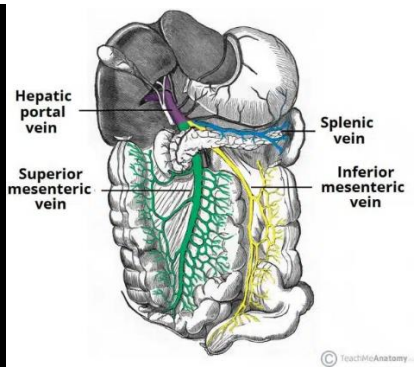
a.

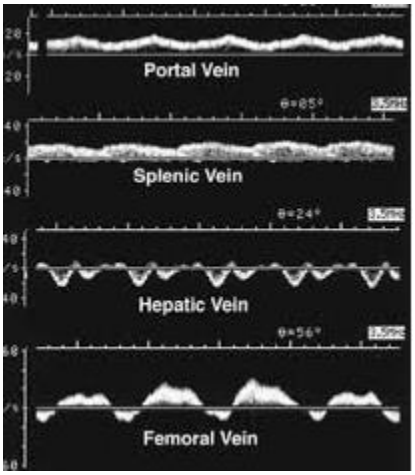


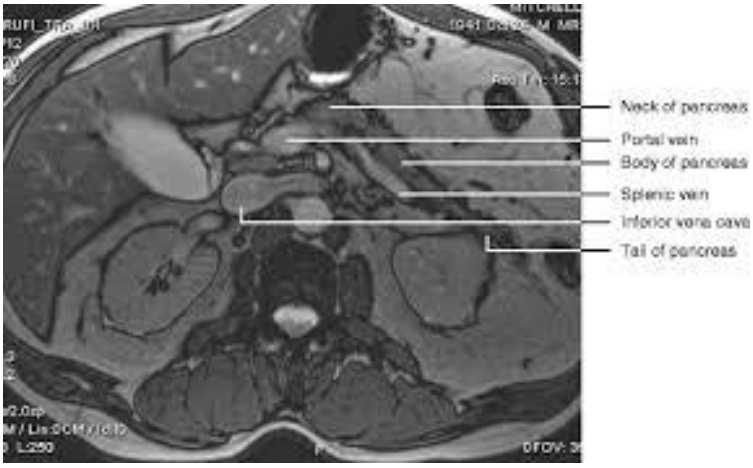
b.

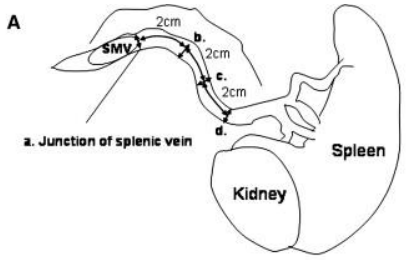
Venous drainage occurs through the splenic vein. It combines with the superior mesenteric vein to form the hepatic portal vein.

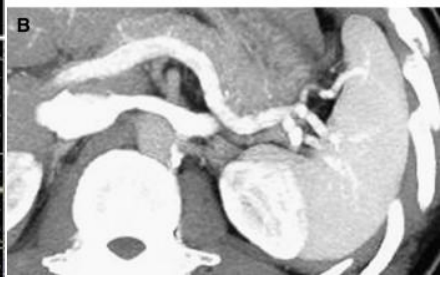












Innervation :The nerve supply to the spleen is from the coeliac plexus.

Lymphatics: The lymphatic vessels of the spleen follow the splenic vessels mentioned above and drain into the pancreaticosplenic lymph nodes, and ultimately the coeliac nodes.

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