Veins and Lymphatics

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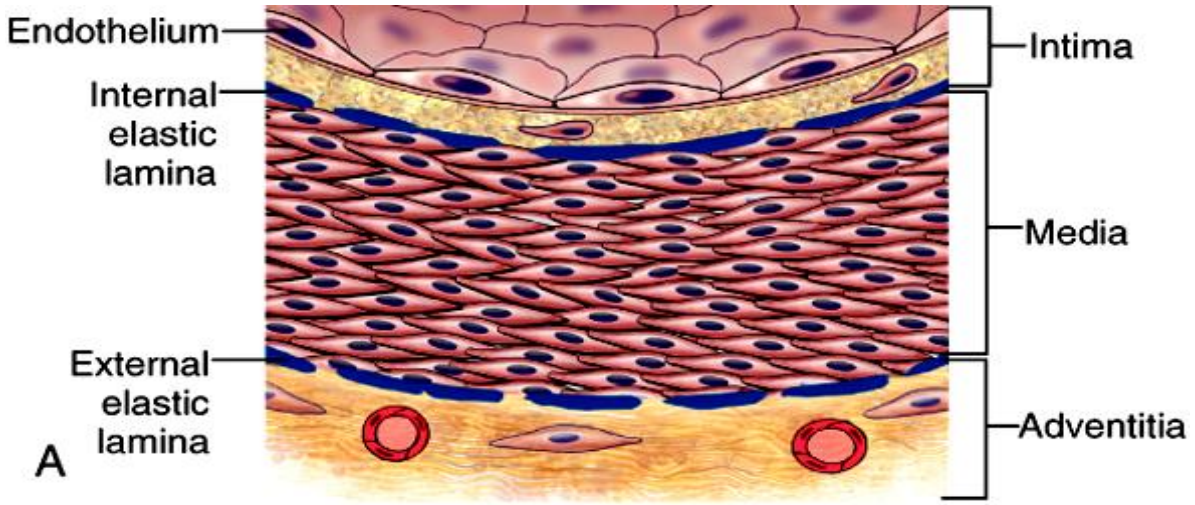

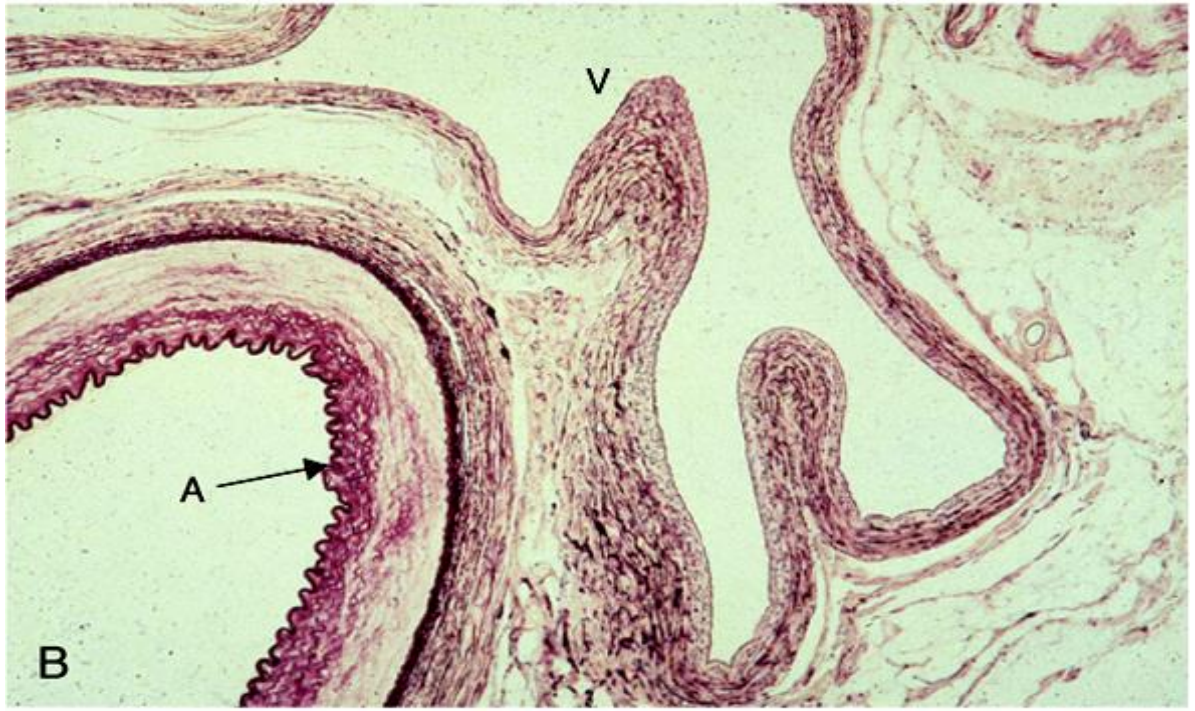

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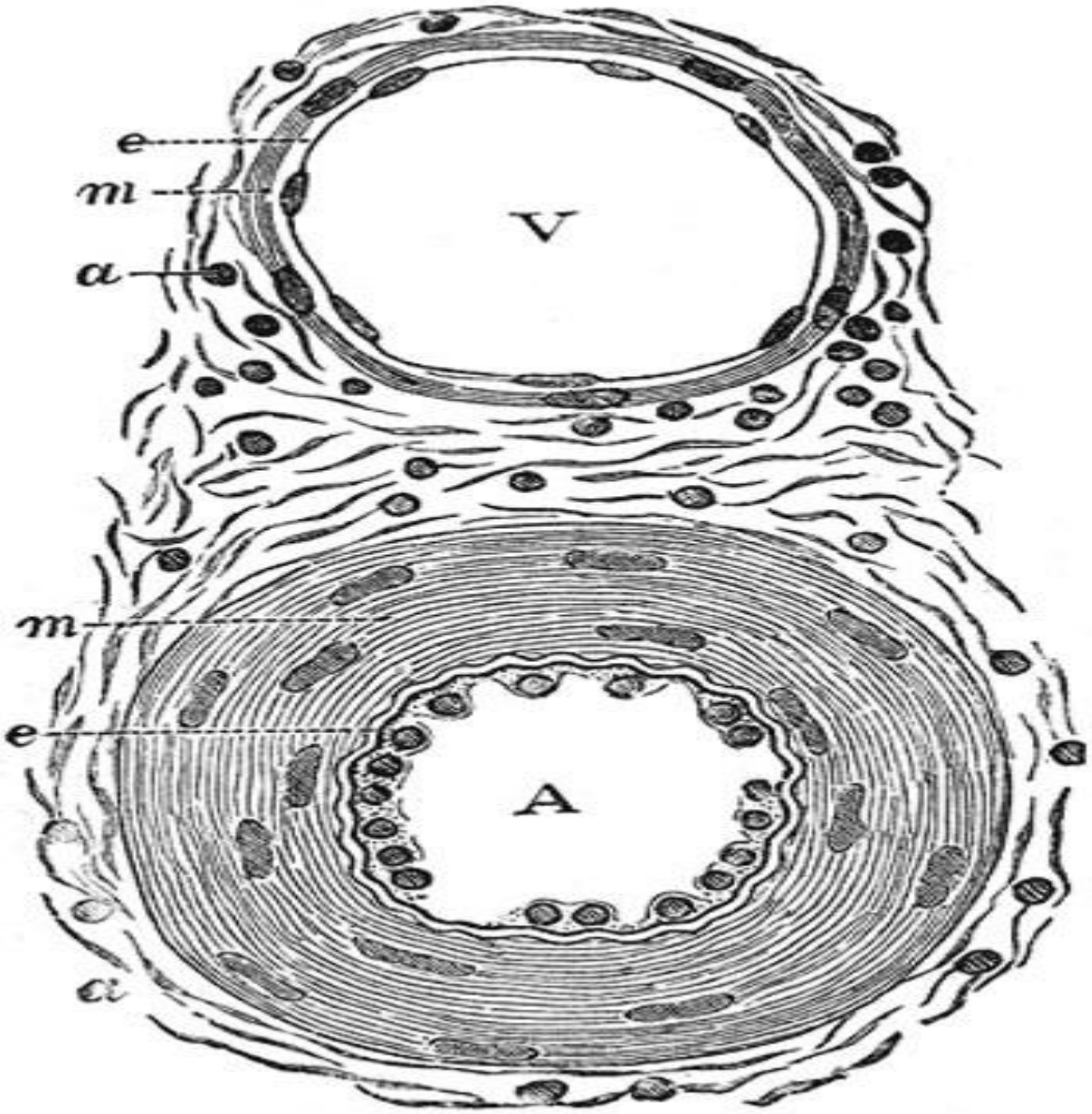
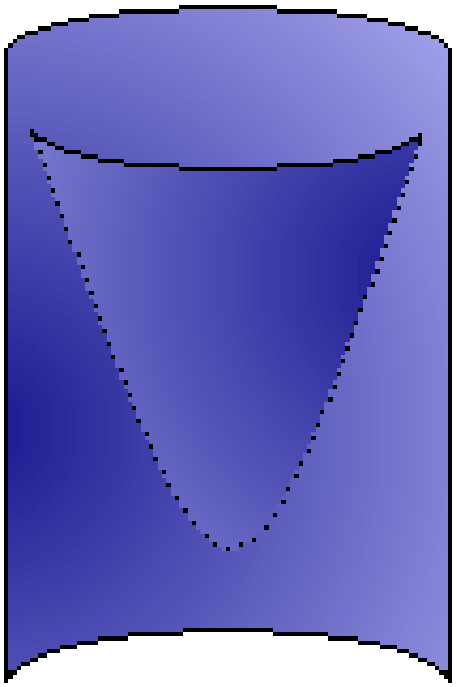
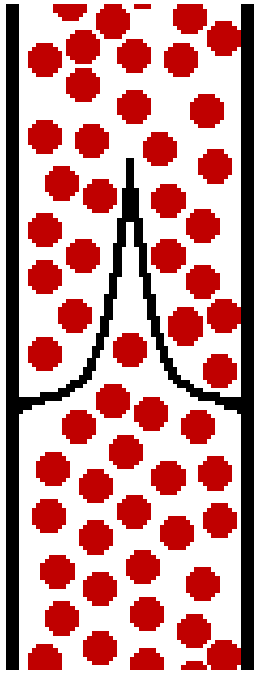
Artery (A) versus vein (V)



Normal vein physiology



pocket valve



Pathology of Veins

- ***Varicose Veins***

- abnormally dilated, tortuous veins produced by prolonged increase in intra-luminal pressure and loss of vessel wall support.

- The *superficial veins* of the leg are most typically involved

Varicose Veins

After prolonged standing

Before

- Symptoms: venous stasis and edema (*simple orthostatic edema*)+ cosmetic effect

- 10% to 20% of adult males and > 30% of adult females develop lower extremity varicose veins

Risk factors

- Obesity
- Female gender
- Pregnancy
- *Familial tendency* (premature varicosities results from imperfect venous wall development)

Microscopic Morphology

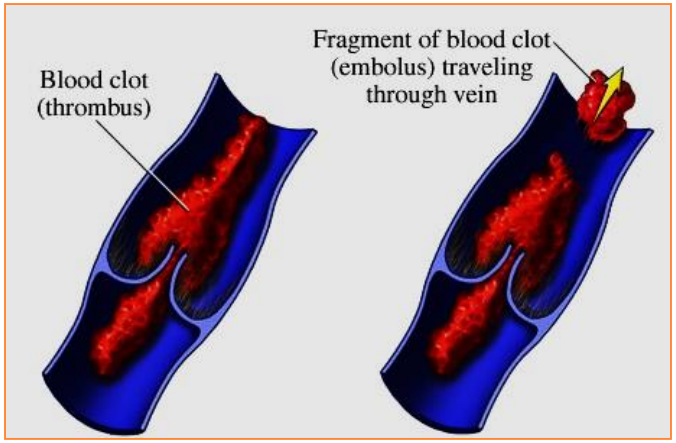
- Vein wall thinning
- intimal fibrosis in adjacent segments
- spotty medial calcifications (phlebosclerosis)
- Focal intraluminal thrombosis
- venous valve deformities (rolling and shortening)

COMPLICATIONS

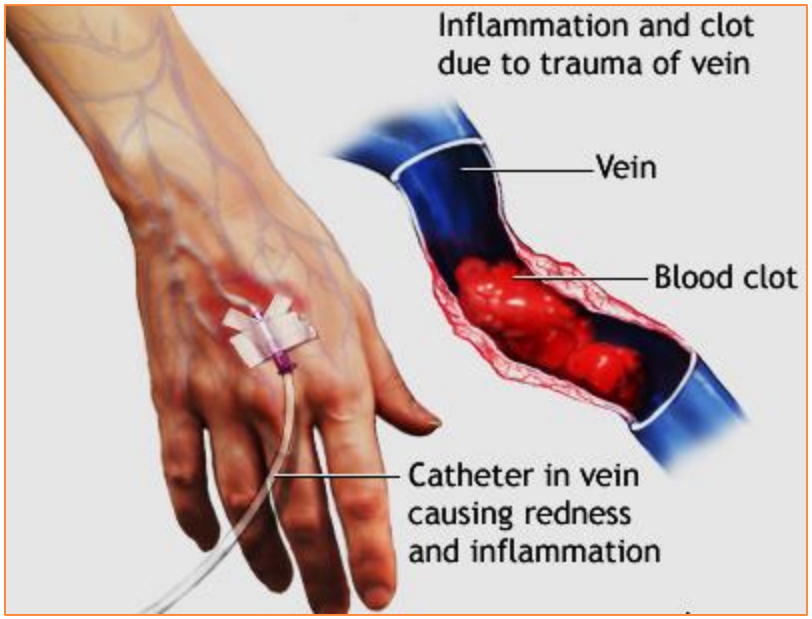
- **stasis, congestion, edema, pain, and thrombosis**
- **chronic *varicose ulcers***
- ***embolism is very rare***

Thrombophlebitis & Phlebothrombosis

- *interchangeable terms*
- ***= Inflammation + thrombosis of veins***
- *Most common site: deep leg veins (**90**% of all)*
- **predispositions**: congestive heart failure, neoplasia, pregnancy, obesity, the postoperative state, and prolonged bed rest or immobilization
- **local manifestations**: distal edema, cyanosis, superficial vein dilation, heat, tenderness, redness, swelling, and pain



- Thrombophlebitis of *upper limb veins* are usually associated with local risk factors like: catheter or canula site; or in some cases can be associated with systemic hypercoagulabilities.



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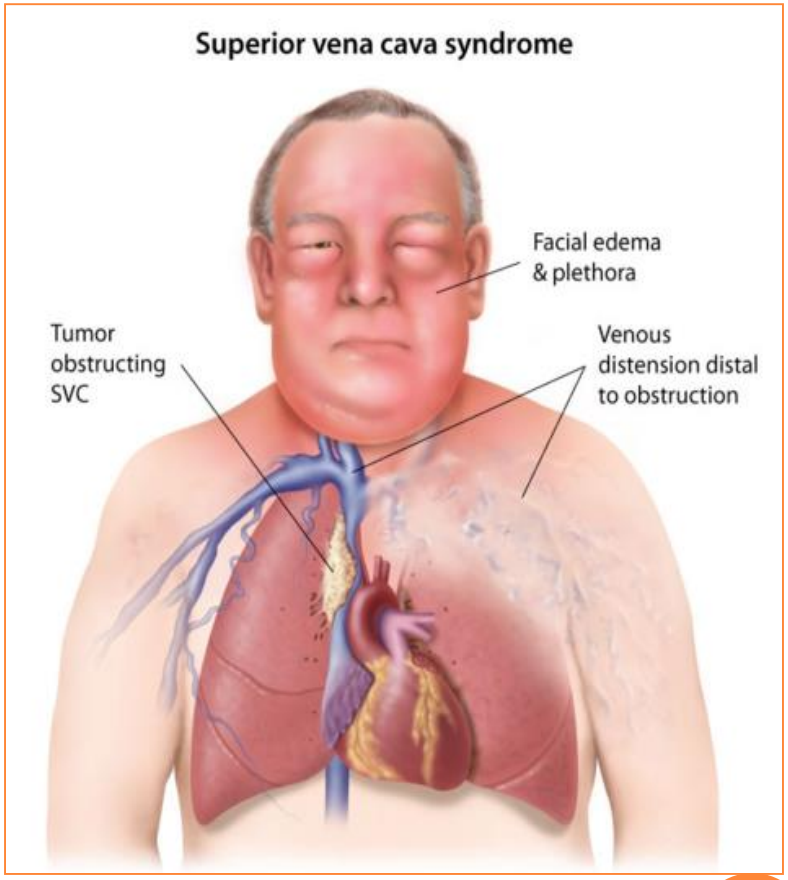
- ***Special thrombophlebitis types:***

1- Migratory thrombophlebitis (Trousseau sign):

- hypercoagulability occurs as a **paraneoplastic** syndrome related to tumor elaboration of pro-coagulant factors (e.g. colon cancer; pancreatic ca; etc…)

2- The superior vena caval syndrome

- caused by neoplasms that compress or invade the superior vena cava
- Most common is lung cancer
- marked dilation of veins of head, neck, and arms with cyanosis



3- INFERIOR VENA CAVAL SYNDROME

- caused by neoplasms compressing or invading inferior vena cava (m/c: hepatocellular carcinoma and renal cell carcinoma) → striking tendency to grow within veins

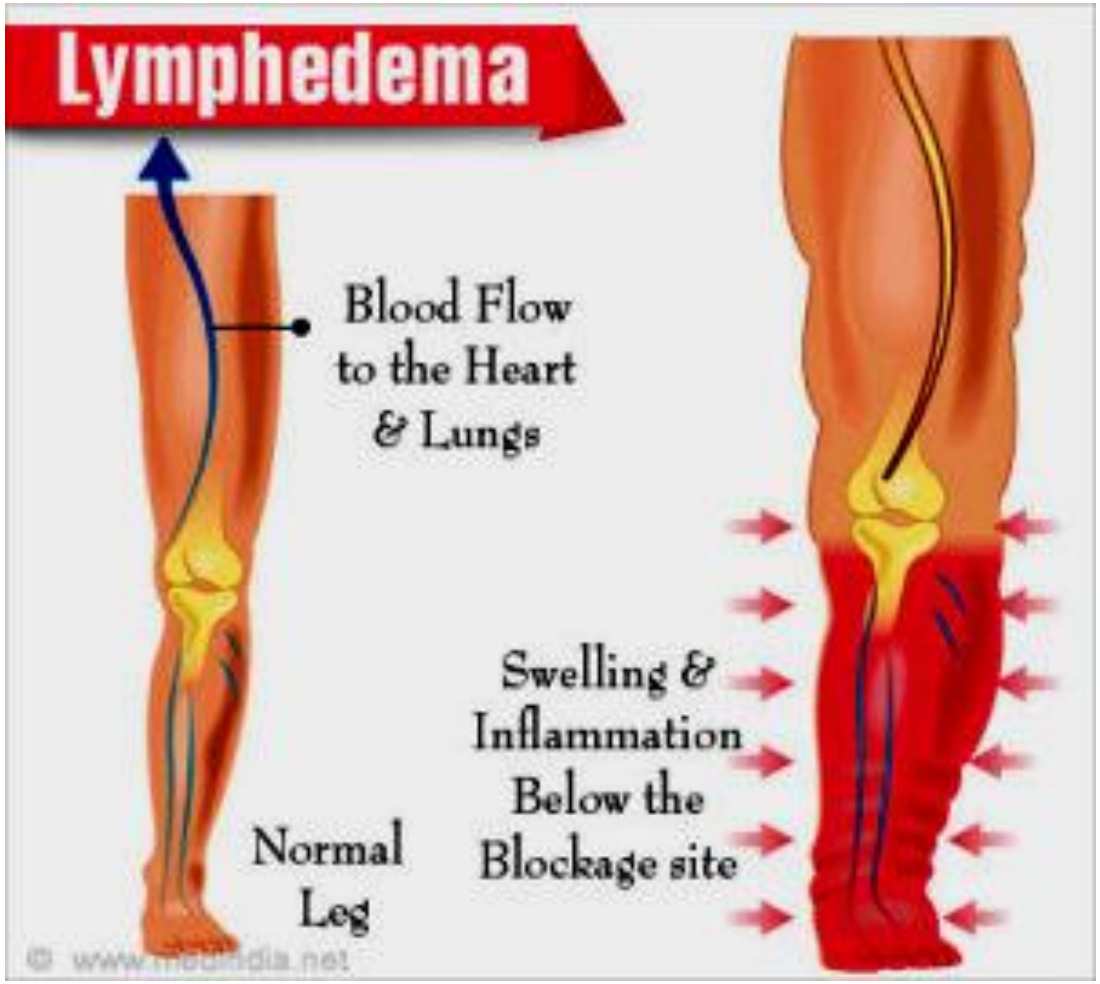
- marked lower extremity edema, distention of the superficial collateral veins of the lower abdomen (medusa)

Pathology of Lymphatics

1- lymphedema

2- lymphangitis

3- chylous


Lymphedema
Blood Flow
to the Heart
& Lungs
Swelling &
Inflammation
Below the
Blockage site
Normal
Leg

LYMPHEDEMA

- can occur as:

1- *Primary (*congenital) lymphedema→ lymphatic agenesis or hypoplasia.

***2- Secondary* (obstructive) lymphedema→** blockage of a previously normal lymphatic examples:

- Malignant tumors
- Surgical procedures removing lymph nodes
- Post-irradiation
- Fibrosis
- Filariasis
- Postinflammatory thrombosis and scarring


Lymphedema

LYMPHANGITIS

- acute **inflammation** due to bacterial infections spreading into lymphatics
- m/c are **group A β-hemolytic streptococci**.
- lymphatics are **dilated** and filled with an **exudate** of neutrophils and monocytes.
- **red, painful subcutaneous streaks** (inflamed lymphatics), with painful enlargement of the draining lymph nodes *(acute **lymphadenitis**).*
- Sometimes, subsequent passage into the venous circulation can result in bacteremia or sepsis.

CHYLOUS

- Milky accumulations of lymph in various body cavities
- caused by rupture of dilated lymphatics, typically obstructed secondary to an infiltrating tumor mass
- types

- ***chylous ascites*** (abdomen)
- ***Chylothorax*** *(chest)*
- ***Chylopericardium*** *(pericardium)*