Veins and Lymphatics

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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
  \emph{(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 result 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.
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

Normal Leg

Swelling & Inflammation Below the Blockage site
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
  - *chyloous ascites* (abdomen)
  - *Chylothorax* (chest)
  - *Chylopericardium* (pericardium)