

# Peripheral Vascular Disorders

## PERIPHERAL DISORDERS

- **Def:** diseases and disorders of the blood vessels
- Impacts blood flow to the body's tissues
- 2 types:
  - **Arterial**
  - **Venous**

- Ischemia in **heart and brain**
  - Most pts with PAD die due to MI or stroke
- Main cause is **atherosclerosis**
  - But can happen due to other things like trauma, embolism, thrombosis, etc.
- Risk factors

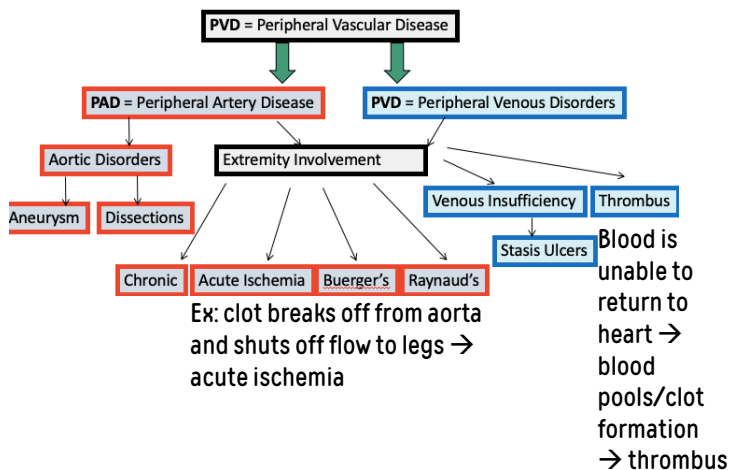
### Modifiable

### Non-modifiable

Nicotine  
Diet  
HTN  
Diabetes  
Hyperlipidemia  
Stress  
Sedentary lifestyle

Increasing age  
Female gender  
Genetics

## PAD VS PVD



|        | Arterial Disease                                                                 | Venous Disease                                                                          |
|--------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Skin   | cool or cold, hairless, dry, shiny, pallor on elevation, rubor on dangling       | warm, though, thickened, mottled, pigmented areas                                       |
| Pain   | sharp, stabbing, worsens w/ activity and walking, lowering feet may relieve pain | aching, cramping, activity and walking sometimes help, elevating the feet relieves pain |
| Ulcers | severely painful, pale, gray base, found on heel, toes, dorsum of foot           | moderately painful, pink base, found on medial aspect of the ankle                      |
| Pulse  | often absent or diminished                                                       | usually present                                                                         |
| Edema  | infrequent                                                                       | frequent, esp. at the end of the day and in areas of ulceration                         |

## Subjective Assessments

- Keep in mind that s/s appear after 75% of the vessel has narrowed
- Ask for **intermittent claudication** to rest pain
  - Intermittent claudication occurs in early stage and pain in rest is late sign

## Objective Assessments

- Check pulses bilaterally
  - Low pulses or absent pulses
- Decreased capillary refill
- Cool, pale, and cyanotic leg with elevation
- Bruits
- Thick, opaque nails
- Shiny, atrophied skin
- Sparse hair growth
- Ulcers (**deep, well-rounded, usually on toe or distal part of limb**)

## Intermittent Claudication

- **Def:** blood flow is good in legs during rest but when person is active, blood flow is decreased → pain and cramping
- Is the classic symptom of PAD
- Usually disappears within 1-2 mins after exercise
- **Femoral and popliteal** arteries are most affected → calf muscle pain
- By the time pt feels pain during "rest" and at night, the disease is pretty serious

## PERIPHERAL ARTERIAL DISEASE

- Main emergencies:
  - Ischemia in tissues leading to **gangrene and amputation**

- Pain is worst during night due to gravity working against heart sending blood to leg

- Diet changes
- Stop smoking
- Meds (maybe)
- Controlling other comorbidities
- Others

### PAD Progression

1. Asymptomatic
2. Intermittent claudication
3. Ischemic rest pain
4. Gangrene/limb loss

### Symptoms: 6 Ps

- Pain
- Pallor
- Paresthesia (loss of sensation)
- Paralysis
- Pulselessness
- Poikilothermia (coolness)

### Diagnostic Tests

- **Doppler ultrasound**
- **Ankle-brachial index**
  - Equation: **lower extremity/higher extremity**
  - Should be above **1.0**
  - Lower extremity should have higher BP, so if BP is high in leg → PAD

|                  |                                                                                      |
|------------------|--------------------------------------------------------------------------------------|
| <b>&gt; ~1.0</b> | <b>No arterial insufficiency</b>                                                     |
| 0.50-0.90        | Mild-moderate insufficiency (with claudication)                                      |
| < 0.50           | Moderate insufficiency (with ischemic rest pain)                                     |
| ≤0.40            | Severe insufficiency (with severe ischemia or tissue loss)<br>Hinkle & Cheever, 2014 |

- **Exercise test**
- **Angiography**
- **MRA/CTA** (imaging tool)

## MANAGEMENT

### Conservative Management

Only for pts with **mild to moderate PAD**

- **Exercise therapy**
  - Most effective
  - Method: pt walks until there's pain, rests, then resumes (repeat process)
  - Creates **collateral circulation** to help better blood flow to leg

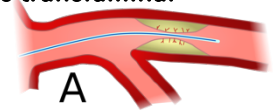
### Pharmacologic Therapy

- **Cilostaxol (Pliteal)** –vasodilator –is one of the most effective meds
- **Aspirin**
- **Statins** (lipid-lowering med)
- Others

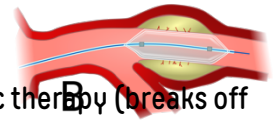
### Surgical Processes

- Main purpose is to re-perfuse tissues either by re-opening clogged vessels or by making new routes
- Types

- **Percutaneous transluminal angioplasty**



- **Bypass**
- **Thrombolytic therapy** (breaks off clots)



- **Amputation**
  - Only with advanced atherosclerosis and **gangrene of extremities**

### Post-Operative Care

- Pt is monitored for signs of **decreased circulation** in affected limb
- Main goal is to promote circulation
- Priorities
  1. Assess and report changes in skin color and temp distal to the surgical site every **2-4 hours**
  2. Assess **peripheral pulses**
    - Sudden absence may mean **thrombosis**
    - You may mark location of pulse with pen
    - You may use a Doppler
  3. Assess wound for redness, edema, and drainage
  4. Promote circulation
    - Reposition pt every **2 hours**
    - Tell pt not to cross leg

- Encourage activity if possible
5. Give med with analgesics for pain

#### KEY TEACHING POINTS

- **Most important is stop smoking**
- Lose weight
- Elevate feet at rest but **not above heart**
- Avoid restrictive cloth
- Inspect foot daily
- Others

#### BUERGER'S DISEASE

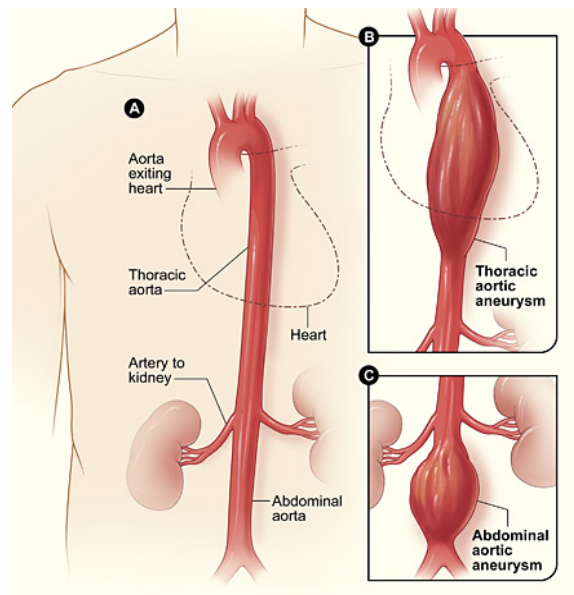
- **Def:** constriction of smaller arterioles and veins in toes and fingers due to vessel inflammation
- Most common in young men who **smoke**
- First s/s is **bluish cast to toe or finger** and severe pain
  - Can lead to **gangrene** and **ulcers** (serious complications)
- **Nursing interventions:**
  - Relieve pain
  - Neurovascular check
  - Assess skin for ulcers
  - Teach stop smoking

#### REYNAUD'S DISEASE

- **Def:** autoimmune disease, causing **vasospasm** in fingers → slow BF to fingers → numbness, cyanosis, and pain → then following spasm, fingers become extremely red with tingles and throbbing pain
- Usually bilateral
- **Ulceration** can develop with longstanding disease
- Happens in **coldness** or stress
- **Nursing interventions**
  - **Avoid cold (most important)**
  - Avoid stress
  - Analgesics for pain
  - Vasodilator like calcium channel blockers
  - Stop smoking
  - No caffeine
  - Others

#### ANEURYSM

- **Def:** outpouching or dilation of arterial wall
- Pathophysiology
  - Dilation of arterial wall → damage to tunica media → more dilation → degeneration and weakening of artery → risk of rupture
- Is **permanent**
- Main cause is **atherosclerosis (85%)**
- Treatment may depend on **size**
  - 3cm may not be treated with surgery but above 5.5cm needs surgery
- Classic s/s
  - Can be **asymptomatic** in the beginning
  - **Bruits**
  - **Abdominal and back pain**
  - **Pulsatile abdominal mass**
- Usually happens in **thorax** and **abdomen**



#### Thoracic Aortic Aneurysm

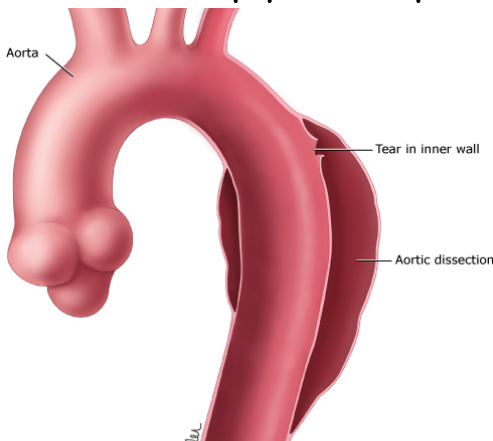
- Occurs mostly in men **between 40-70 yrs**
- Can develop in ascending, transverse, or descending aorta
- Pt usually realizes symptoms due to **"mass effect"** –when the sac of blood presses on surrounding areas and cause pain
  - Chest pain that is more severe when pt is in supine position
  - Cough
  - Dyspnea
  - Hoarseness
  - Dysphagia

## Abdominal Aortic Aneurysm

- Most common site is at the abdominal aorta **below the renal arteries**
- S/s
  - Abdominal pulsations
  - Bruits
  - Pain or tenderness in **mid-upper abdomen** or **lower back**
  - May lead to **embolus**, so look out for signs of **embolism**

## DISSECTION

- **Def:** "false lumen" develops between the **intima** and **media** and blood flows in between those layers → tear or separation of layers
- **Risk factors:**
  - HTN
  - Chest trauma
  - Cocaine/meth use
  - Congenital heart diseases
  - Male gender
  - Pregnancy
  - Others
- **Acute dissections** have very high mortality rates
- Symptoms
  - Sudden, severe pain (tearing or ripping pain) in **anterior chest or back** (between shoulder blades)
  - Can cause **sympathetic response**



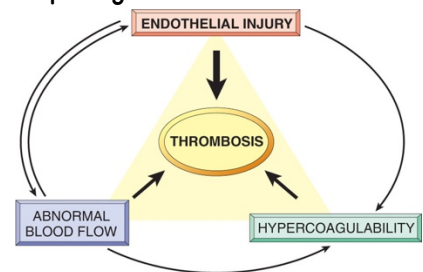
## Nursing Management

- Risk factor management (control HTN, stop smoking, etc.)
- Pre-operative management
  - Do **baseline assessment** (labs, peripheral vascular status)

- Preoperative education
- **Prophylactic antibiotics**
- Checking **NPO**
- Bowel prep
- Post-operative management
  - Monitor and maintain **graft patency**
  - Avoid extremes of BP b/c high BP can rip the graft
  - IV fluid and blood administration if needed
  - System-based assessments
    - Cardiovascular check
    - GI check (**ileus** –not moving food forward – can develop; return bowel movement)
    - Renal check
    - Peripheral perfusion check
    - Neurologic check

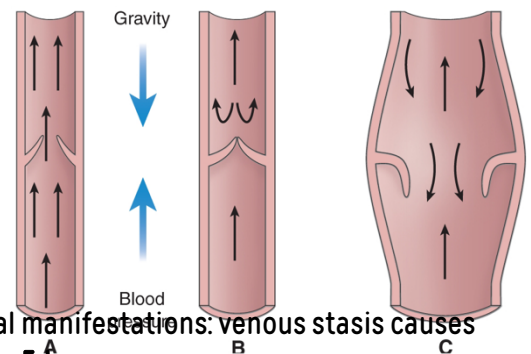
## VENOUS DISORDERS

- **Def:** alteration in transport of blood from the capillary back to heart
- Causes:
  - Changes in smooth muscle and CT make the veins less stretchy → limited recoiling capacity to push blood back
  - Incompetent valves → backflow of blood
  - Anything that affect **Virchow's triad**



## Venous Insufficiency

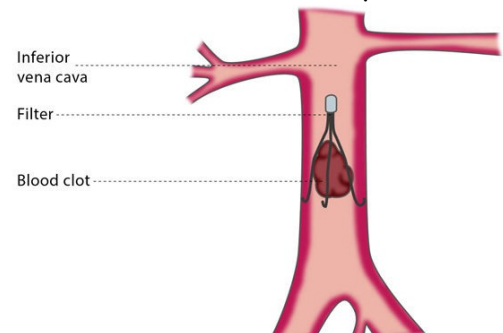
- Damage to valves → backflow of blood → high pressure in veins → inflammation and tortuous veins



- Clinical manifestations: venous stasis causes
  - **Edema**

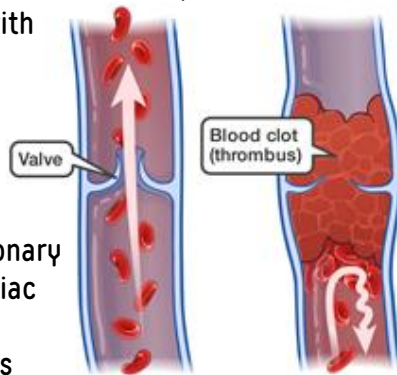
- **Altered pigmentation**
- **Pain**
- **Stasis dermatitis**
- Risk factors
  - Standing for a long time
  - Obesity
  - Pregnancy
  - Oral contraceptives (causes **estrogen spike** → estrogen can cause clotting)
- Complications
  - Venous **ulceration**; b/c edema puts a barrier between ulcer and blood flow, ulcers don't get healed properly
  - **Cellulitis** (infection)
  - **Dermatitis** (irritation or inflammation of skin)
- Management
  - Goal is to **reduce venous stasis** and prevent **ulcers**
  - Education
    - Sleep with feet elevated about 6 inches (15cm)
    - Elevate feet for 15 min every 2 hours
    - Avoid prolonged sitting/standing
    - Use compression stockings after legs have been elevated
    - Others
  - Treatment of ulceration
    - Compression therapy
    - Dressing

- Bed rest with elevated legs to 15-20 degrees above heart level
- Warm and moist heat packs
- Reduce pain
- Ambulation after **anticoagulant** have been given
- Monitor signs for **bleeding and pulmonary embolism**
- Medical management
  - Anticoagulant meds
    - Heparin
    - Low molecular weight heparin
    - Oral anticoagulants
    - Factor Xa inhibitor
  - Fibrinolytic therapy
- Surgical management
  - Only done for recurrent or extensive thrombi or for high risk of pulmonary embolism
  - **Thrombectomy**: incising the common femoral vein and extracting clot
  - **Vena caval interruption**: transvenous placement of a grid or umbrella in the vena cava to block any emboli



### Deep Vein Thrombosis

- Tends to occur at **bifurcations of deep veins** (those are the areas with turbulent BF)
- Major concern is **pulmonary embolism**
  - Pulmonary embolism can occlude pulmonary artery → cardiac collapse
- Clinical manifestations
  - **Pain, warmth, edema** in extremity
  - Many cases are **asymptomatic** so you need to check for **risk factors**



### Management of DVT

- Nursing management