VASCULAR DISEASE: THREE THINGS YOU SHOULD KNOW

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#1

IS IT A

VENOUS PROBLEM?
PHYSIOLOGY OF VASCULAR DISEASE – VENOUS OR ARTERIAL?

- Arterial pressure
- Ambulatory venous pressure
VENOUS LEG ANATOMY: WHAT COULD POSSIBLY GO WRONG?

- Deep veins
- Surface veins
- Perforators
LOWER EXTREMITY VEINS
HEALTHY VS. DISEASED VEINS

Healthy Vein Valve

Healthy valves keep blood moving in one direction

Diseased Vein Valve

Diseased valves cause blood to move in both directions, elevating venous pressure

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HEALTHY VS. DISEASED VEINS

NORMAL VEINS

- Healthy valve
- Normal blood flow
- Healthy vein

VARICOSE VEINS

- Damaged valve
- Blood flows downward
- Bulging varicose vein
VENOUS DISEASE

• Elevated venous pressures
• Swollen legs and ankles
• Local trauma can lead to ulceration and non-healing wounds
LATERAL SUBDERMAL PLEXUS
RETICULAR VEINS
VENOUS INSUFFICIENCY
THROMBOPHLEBITIS

• How is it diagnosed?
• When is it serious?
• Migratory superficial thrombophlebitis
• Phlebothrombosis
THROMBOPHLEBITIS – TREATMENT

- Non-steroidal anti-inflammatory agents
- Anticoagulation
DEEP VEIN THROMBOSIS

• Diagnosis
• Clinical clues
• Venous duplex scan
• Calf vein thrombosis
• Ilioiliac venous thrombosis
PHLEGMASIA CERULEA DOLENS
DEEP VEIN THROMBOSIS - TREATMENT

- Anticoagulants
- Heparin
- Warfarin
- Xarelto (rivaroxaban)
- Eliquis (apixaban)
- Pradaxa (dabigatran etexilate)
- Greenfield filter
- Permanent or removable?
VENOUS ULCERS

• Always compromised by swelling
• Typical location is medial
• Varicose veins are prominent
LOWEST COMMON DENOMINATOR...

- Valve failure
- Back pressure
- Third spacing
- Local trauma
- Ulceration
VENOUS ULCERS

• Typically less painful
• Swelling
• Hyperpigmentation
• Varicose veins
• Stasis dermatitis
• Granulation
VENOUS ULCERS
VENOGRAMS
LONG-TERM COMPLICATIONS OF VENOUS DISEASE

• Chronic venous insufficiency
• Swollen Legs
• Post-phlebitic syndrome
• Leg ulceration
#2

IS IT AN ARTERIAL PROBLEM?
ARTERIAL DISEASE

• Atherosclerosis obliterans
• Diagnosis
• Clinical Clues
• Tests
LOWER EXTREMITY ARTERIES
PERIPHERAL ARTERY DISEASE (PAD) OF THE LOWER EXTREMITY

**Sudden acute onset:**
- Embolism – heart; “shaggy aorta”; post-cath
- Abdominal aortic aneurysm
- Popliteal aneurysm
- Cardiac embolus from atrial fibrillation

**Slow insidious onset:**
- “…in retrospect, the patient had intermittent claudication”
ARTERIAL WOUNDS

• Lack granulation tissue

• Are often well-circumscribed in atypical locations and are usually painful unless neurotrophic
ALWAYS CHECK THE HEELS!

• Observe for redness, fissures, dry skin
• Heel necrosis often results in amputation below the knee
• Early necrosis is preceded by discoloration
• Heel fissures are very painful and also reflect poor arterial perfusion
HEEL ULCER
KISSING ULCER: COULD IT BE CIRCULATION?
ALWAYS CHECK INTERDIGITAL SPACES: “KISSING ULCER” BETWEEN TOES

• Frequently patients with diabetes have neuropathy which makes them less aware of pain usually associated with ischemic ulcers

• Neuropathic extremities lead to redistribution of weight bearing, subluxation of joints, and prominent bony deformities

• The Charcot foot is prone to pressure necrosis and tissue breakdown

• Interdigital ulcerations also occur due to pressure necrosis
NEUROTROPHIC ULCER
GANGRENE OF TOE – AORTA OCCLUSION
ILIAC AND FEMORAL ANGIOGRAMS
IS THE POPLITEAL PULSE PRESENT?

• There is a learning curve to feeling the popliteal pulse

• The popliteal pulse is critically important when treating wounds in the lower extremities

• If the popliteal pulse is present, then one can assume that the superficial femoral artery is open

• If the popliteal pulse is absent, the chance of intervention for limb salvage lessens since there is no easy access to the vessels in the trifurcation
POPLITEAL ARTERY STENOSIS
POST-TIBIAL PULSE

• Easily felt behind the medial malleolus
• Supplies the plantar pedal arch of the foot
• Perfusion to the heel may be compromised
• Present in all people
• **Fundamental part of the vascular exam in patients with PAD**
FOOT PULSES
POSTERIOR TIBIAL
HEEL ANGIOGRAM BEFORE INTERVENTION
HEEL ANGIOGRAM
AFTER INTERVENTION AND REPERFUSION
FOOT PULSES: THERE ARE 3 PULSES

- **Posterior tibial** artery supplies the **plantar** pedal arch
- **Dorsalis pedal** artery from the **anterior tibial** supplies the **dorsal** pedal arch
- **Peroneal** artery supplies collaterals to the foot
FOOT PULSES
DORSALIS PEDAL AND PERONEAL
INSPECTION AND PHYSICAL EXAM OF THE LOWER EXTREMITIES

• Dependent rubor: Reflects very severe PAD and results from maximal cutaneous vasodilation in the setting of blocked trifurcation vessels

• Pallor with leg elevation: Blanching of the feet when legs are raised reflects decreased arterial perfusion

• Symptoms of PAD may be subtle and are usually not classic
ANKLE-BRACHIAL INDEX (ABI)

• ABI = the ankle systolic BP divided by the brachial systolic BP

• Good screening tool but does not replace a functional history and clinical exam

• A normal ABI does not exclude PAD
VASCULAR DISEASE AND WOUND HEALING

• Peripheral arterial disease and wound healing are major problems which often result in amputation
• Vascular disease in the lower extremities is often overlooked
• PAD is undertreated
• Treatment of PAD can prevent amputation and improve wound healing when an experienced team applies well-known treatment modalities
PAD IS UNDER-RECOGNIZED AND UNDER-DIAGNOSED BECAUSE IT IS INSIDIOUS.

However, once it becomes symptomatic, the resulting prognosis is similar to that of colon cancer, with a five-year mortality between 25-40 percent.
PERIPHERAL ARTERIAL DISEASE
TREATMENT GOALS

• Improve wound healing
• Preserve the limb
• Lower the level of amputation when limb salvage is not entirely possible
• Maintain function in the patient’s ability to ambulate
• RELIEVE PAIN
...IF YOU WANT TO AVOID THIS.
VENOUS OR ARTERIAL?
VENOUS OR ARTERIAL?
VENOUS OR ARTERIAL?
VENOUS OR ARTERIAL?
#3

NOVEL WAYS TO ALTER CARDIOVASCULAR RISK FACTORS
HOW TO ALTER CARDIOVASCULAR RISKS

• One-on-one counseling
• Pre-diabetes is diabetes
• Smoking cessation