Peripheral Vascular Disease for the Primary Care Provider

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Disclosures

Non-Declaration Statement: I have no relevant relationships with ineligible companies to disclose within the past 24 months. (Note: Ineligible companies are defined as those whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.)

Educational Objectives

At the conclusion of this session, participants should be able to:

- Recognize the common signs and symptoms of patients presenting with peripheral vascular disease of the legs
- Differentiate between the symptoms and physical exam findings of venous disease from the symptoms and exam findings of arterial disease in the legs
- Describe the best initial treatments for peripheral venous and arterial disease, and when to refer to a vascular surgeon

Question 1

A 60-year-old man presents to the office due to 6 months of bilateral buttock and thigh pain. It occurs after walking 20 feet and is completely relieved with resting. His past medical history includes a 30 pack-year history of smoking, hypertension, and a stroke 3 years ago. He also reports impotence for approximately 6 months as well. Which of the following exam findings would be most likely for this patient?

A. Absent femoral, popliteal, pedal pulses

B. Absent popliteal and pedal pulses; normal femoral pulses

C. Absent pedal pulses; normal femoral and popliteal pulses

D. Normal femoral, popliteal, pedal pulses

Question 2

A 55-year-old woman with no significant past medical history presents with a 7-month history of a dull, aching sensation in her right leg. She notes that this sensation is provoked by extended periods of standing and is relieved when she lies in a recumbent position. She denies a history of smoking, trauma, injuries, fever, chills, chest pain, shortness of breath, hemoptysis, cough, skin changes, or peripheral edema. Her physical exam reveals several dilated, tortuous veins along the medial right thigh, which are especially pronounced upon standing. The remainder of the physical exam is normal. Which of the following would be the most appropriate initial treatment for her?

A. Warfarin (Coumadin)

B. Referral to a surgeon

C. Lower extremity compression

D. Cilostazol (Pletal)

Question 3

A 75-year-old man comes to the clinic with persistent leg pain with exertion. Three months ago, the patient was found to have an ankle-brachial index of 0.6, and he was started on atorvastatin, chlorthalidone, and aspirin. Since then, he has successfully quit smoking and has participated in a supervised exercise therapy program where he has achieved a 10 lb (4.5 kg) weight loss. The pain, an aching in the right thigh and calf after walking more than 3 blocks, has not improved. The right femoral artery pulse is diminished compared to the left, and pedal pulses are non-palpable. He has no ulcers. Which of the following therapies is most appropriate for this patient?

A. Femoropopliteal angioplasty
B. Trial of a PDE3 inhibitor
C. Trial of a P2Y12 inhibitor
D. Femoropopliteal bypass

Patient Scenario

A 52-year-old man presents due to chronic leg pain…

- Pain is described as an “aching” that he has experienced for several months
- The pain is worse at the end of the day
- Is relieved by walking or elevating the legs
- The lower parts of the legs appear to be darker than the rest

Patient Scenario

A 52-year-old man presents due to chronic leg pain…

- Pain is described as an “aching” that he has experienced for several months
- The pain is provoked by walking
- Is relieved by stopping and resting
- The skin of the lower legs appears to be thin and “shiny”

Pathophysiology of Chronic Venous Disease

- Veins – easily distensible vessels
  - Low rate of blood flow
  - Veins in the lower extremities work against gravity
  - Blood is propelled via pumping action of the leg muscles
  - Backflow of blood is prevented by valves
- Over time, veins can become over-distended
  - Can occur due to prolonged standing
  - Valves are no longer able to shut properly
  - Allows for backflow of blood down the legs

Pathophysiology of Chronic Venous Disease

- If venous blood is not adequately drained from lower legs…
  - Leads to edema, varicose veins, hyperpigmentation
  - Legs feel “heavy”, “aching”
  - Symptoms tend to be worse at the end of the day
- Skin of hyperpigmented legs can break down easily
  - Leads to ulcers

Risk factors for Chronic Venous Disease

- Occupations with prolonged standing
  - Ex: healthcare workers, teachers, cashiers, chefs
- History of DVT (or superficial venous thrombosis)
- Medical conditions causing obstruction to venous outflow
  - Obesity
  - Pregnancy
  - Abdominal/Pelvic masses

Pathophysiology of Chronic Arterial Disease

- PAD = Atherosclerotic vascular disease
  - Risk factors: Smoking, diabetes, smoking, smoking, diabetes
  - Also hypertension, hyperlipidemia, age
- Partial or complete blockages lead to ischemia
  - Pain in muscles of leg with exertion (ie: intermittent claudication)
  - Is relieved by stopping and resting
- The skin of the lower legs appears to be thin and “shiny”
  - May have poorly healing wounds

Pathophysiology of Chronic Arterial Disease

- Non-atherosclerotic causes are less common
- Aneurysmal disease
  - Thrombus lines the walls of the aneurysm
  - Can “seed” emboli to lower extremities – may cause acute symptoms
  - Not just AAA – popliteal, iliac and femoral arteries
- Fibromuscular dysplasia
  - Especially in younger women
  - More commonly affects carotids or renal arteries

Leg Pain – Is It Vascular?

- Possible sources of leg pain
  - Lower back – radicular pain
  - Peripheral nerves – multiple etiologies
  - Joints
  - Arterial and/or venous insufficiency
- Leg pain from vascular etiologies
  - Typically – predictable and reproducible
  - Pain does not involve the joints

Leg Pain – Arterial vs Venous

Characteristics of leg pain from chronic arterial disease

- Most commonly – intermittent claudication
  - Felt in the muscle
  - Occurs with exertion and relieved by rest
  - “Cramping”, “aching”, “tired”
  - Muscles that are distal to the diseased artery are affected
  - Patients have a consistent “claudication distance”

Leg Pain – Arterial vs Venous

Characteristics of leg pain from chronic arterial disease

- Rest pain – symptom of critical limb ischemia
  - Occurs when lower leg is only being supplied by collaterals
  - When upright – collaterals bring adequate amount of blood
  - When lying down – gravity drains the forefoot of blood, making it ischemic
  - Has regular timing – ie: patient goes to bed, is woken up by foot pain after 2 hours, every night
- Leg cramps at night are *not* from vascular causes

Leg Pain – Arterial vs Venous

Characteristics of leg pain from chronic venous disease

- Worse at the end of the day, or after prolonged standing
  - Improves with leg elevation; sometimes with exercise
- May be described as “achy”, “dull”, “tired”; not “cramping”
- Often associated with edema
- If an ulcer is present – ulceration is often very painful

Leg Pain – Arterial vs Venous

Swollen legs – vascular or something else?

- Many possible etiologies for chronic lower extremity edema
  - Increased volume in right-sided heart failure
  - Decreased oncotic pressure in nephrotic syndrome, advanced liver disease, malnutrition
  - Medications: especially CCBs, corticosteroids
  - In many of these cases: edema not confined to legs, and not dependent

Evaluating for Vascular Causes of Leg Pain

History

- Provoking/Palliating factors are an important differentiator
  - Walking/stopping vs standing/raising legs vs changing positions
- Medical history gives important clues
  - Arterial disease in another part of the body
  - Diabetes, Hypertension, Dyslipidemia, Obesity
- Social history
  - Occupation is important for both venous and arterial patients
  - Smoking

Evaluating for Vascular Causes of Leg Pain

Physical Exam

- Visual inspection of legs
  - Hyperpigmentation – especially on medial ankle
  - Varicose and/or spider veins
  - Lack of hair, dependent rubor – in advanced arterial disease
  - Hypertrophic or elongated toenails
  - Ulcers or other wounds*
- Neurologic exam for loss of protective sensation

Evaluating for Vascular Causes of Leg Pain

Physical Exam

- Palpation of legs
  - Skin temperature discrepancy – more likely in acute disease
  - Edema
- Pulse exam
  - Start with Dorsalis Pedis/Posterior Tibialis, work your way up
  - Pulses may not be where the textbooks say (especially DP)
  - Pulses distal to area of PAD will be diminished/absent
  - If available, a hand-held Doppler can be helpful

Evaluating for Vascular Causes of Leg Pain

Physical Exam

- What if you can't find palpable pulses?
  - Patient might have mild/moderate PAD – will have Doppler signals
  - Patient might have severe PAD – poor/absent Doppler signals
  - Patient's anatomy might be preventing you from feeling the pulse
  - Remember – there is a 3rd pedal artery (Peroneal) that can't be palpated
  - Always correlate history/symptoms with pulse exam

Evaluating for Vascular Causes of Leg Pain

Physical Exam

- Lower extremity ulcers
  - Classic locations: above medial malleolus for venous; over bony prominences for arterial
  - If pulses are palpable – it isn't an arterial ulcer
  - If pulses are not palpable – it might still be venous, but need to evaluate ASAP

Evaluating for Vascular Causes of Leg Pain

Diagnostic Testing – Arterial Disease

- Ankle Brachial Index (ABI)
  - ≤0.9 indicates PAD
  - <0.5 indicates severe PAD
  - <0.3 indicates possible critical limb ischemia
  - >1.4 is “falsely elevated” due to noncompressible vessels – consider getting TBIs
  - If ABI in normal range but you’re still suspicious – can do an Exercise ABI

Evaluating for Vascular Causes of Leg Pain

Diagnostic Testing – Arterial Disease

- ABIs for asymptomatic patients?
  - Asymptomatic PAD is unlikely to progress to claudication, and **very** unlikely to progress to critical limb ischemia
  - PAD is a risk factor for other forms of cardiovascular disease
- Guidelines disagree on asymptomatic testing
  - USPSTF gives a Grade I (insufficient evidence) to screening asymptomatic adults

Evaluating for Vascular Causes of Leg Pain

Diagnostic Testing – Arterial Disease

- AHA/ACC recommendations
  - Moderate recommendation to measure ABI in patients at high risk for PAD:
    - Age ≥65 years
    - Age 50-64 years with personal risk for atherosclerosis or family history of PAD
    - Age <50 years with diabetes + 1 other risk factors
    - Patients with known atherosclerotic disease in another vascular bed

Evaluating for Vascular Causes of Leg Pain

Diagnostic Testing – Arterial Disease

- Arterial Duplex
  - Provides more information than ABI
  - Physiologic test – measures velocity of blood through an artery
- CT or MR Angiography
  - The most detail of any non-invasive test
  - Used for surgical planning
- Contrast Angiography
  - Still considered Gold Standard, but rarely used for diagnosis
  - Invasive, performed at the time of an intervention

Evaluating for Vascular Causes of Leg Pain

Diagnostic Testing – Venous Disease

- Venous Duplex Reflux study
  - Measures diameter of major veins, and degree of backflow of blood
  - Helpful if considering intervention
- DVT study is not useful for chronic venous disease
- Diagnosis can usually be made clinically, without any studies

For any vascular patient – knowing the A1c is helpful

Treatment of Chronic Venous Disease

- Compression is key!
  - Compression stockings – at least 20-30mm Hg
  - Should be properly fitted, replaced every 3-4 months
  - Pneumatic compression devices for severe cases
- Increased physical activity
  - Walking, calf exercises
  - Weight loss
- Leg elevation
  - Reduces venous pressure, relieves symptoms

Treatment of Chronic Venous Disease

- Good skin care
- No role for diuretics to treat edema due to venous insufficiency
- Venoactive meds may provide some relief
  - Horse chestnut seed extract
- Venous ulcers
  - Compression, elevation, ambulation are still key
  - Must make sure there is no concomitant arterial disease
  - Wound dressings may promote healing – zinc or iodine dressings
  - Can consider venous intervention to promote healing

Treatment of Chronic Venous Disease

- Who should be referred to a specialist?
  - Any non-healing or poorly healing ulcer
  - Patients who cannot tolerate compression
  - Patients who still have bothersome symptoms with treatment
  - Cosmetic reasons

- Not all vein procedures are considered cosmetic

Treatment of Chronic Arterial Disease

- Peripheral arterial interventions can be risky
  - Most surgical interventions are long, complex
  - Endovascular procedures can cause arterial dissections, distal embolization
- Interventions do not address the underlying disease, only its effects
  - Less than 15% of patients with claudication will ever progress to critical limb ischemia
  - Revascularization with no modification of risk factors = more revascularizations

Treatment of Chronic Arterial Disease

- Who does benefit from an intervention?
  - Patients with non-healing wounds
  - Patients with rest pain
  - Patients with lifestyle-limiting claudication

- The location and extent of disease are factors in the success of revascularization

Treatment of Chronic Arterial Disease

- For patients with claudication (or asymptomatic PAD) – start with risk modification
  - Antiplatelet agent, high-intensity statin
  - Smoking cessation*
  - BP control
  - Glycemic control
  - Structured exercise program
  - Education on foot care, trauma precautions

Treatment of Chronic Arterial Disease

- Cilostazol – for claudication not responding well to treatment
  - Contraindicated in all forms of heart failure
  - Up to 20% discontinue within 3 months due to side effects
- COMPASS trial: low-dose Rivaroxaban + ASA vs ASA alone
  - Enrolled over 7000 patients with PAD in 33 countries
  - Rivarox/ASA was superior to ASA alone at preventing CV death, MI, CVA and major adverse limb events
  - Also had more non-fatal bleeding events (mostly GI)
  - Considered for patients at high risk of CV death or limb loss, and low bleeding risk

Treatment of Chronic Arterial Disease

- Who should be referred for a possible intervention?
  - Open wound (even if not infected) – urgent referral
  - Rest pain – urgent referral
  - Lifestyle-limiting claudication
  - Claudication not responding to medical treatment
- Endovascular techniques are advanced enough that most legs can be revascularized without open surgery

Take Home Points

- Prevention is the best treatment
  - Risk factor identification and mitigation
  - Smoking cessation is vitally important
- In PAD, differentiate between claudication and critical limb ischemia
- Patients can have both venous and arterial disease
- Any patient with an ulcer should be seen by a vascular specialist
- Aspirin and a high-intensity statin are first-line PAD treatments
- Smoking cessation is critically important

Questions?

- Please email me with questions:
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