Keeping your Patients (and their Feet) in Circulation- A Collaborative Approach to Diagnosing and Managing PAD

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Disclosures Relevant to This Presentation

Nancy Ogor - None
Levon Khojayan - None
Sanjay Gandhi - None
What to Expect

- Diagnostic Evaluation of PAD
- Medical Management
- Considerations for Endovascular and Surgical Revascularization
What is Peripheral Artery Disease (PAD)?

- Lower extremity PAD is a arterial occlusive disease due to atherosclerosis of blood vessels in the lower limbs.
- Affects >8.5 M adults in US over the age of 40 years
Claudication - fatigue, discomfort, pain induced by exercise and relieved with rest

Acute limb ischemia - <2 weeks of limb hypoperfusion with 5 Ps (pain, pallor, pulselessness, poikilothermia and paralysis)

Tissue Loss -
  - Minor - ulcer, focal gangrene
  - Major - damage above mid foot

Critical Limb Ischemia - chronic (≥2 wks.) of ischemic rest pain, non healing wound/ulcers or gangrene of 1 or both legs due to objective arterial occlusive disease
Who is at Risk for PAD?

- Age >65 years
- Age 50-65 years with risk factors
  - Smoking
  - HTN (uncontrolled)
  - Dyslipidemia
  - Diabetes Mellitus
  - Family History of PAD
- Age < 50 with DM and one more risk factor
- Individuals with atherosclerotic disease in other vascular beds (CAD, CVD, AAA, renal artery stenosis)
Why Should I Care About PAD

Framingham “High Risk” = 20% at 10 years
Every patient with PAD is at “very high risk”

How do These Patients Present?

PAD Population (50 years and older)

Initial clinical presentation

Asymptomatic PAD 20%-50%

Atypical leg pain 40%-50%

Claudication 10%-35%

Critical limb ischemia 1%-2%

1-year outcomes

Alive w/ 2 limbs 50%

Amputation 25%

CV mortality 25%

How to Patients with Claudication Do over time?

- Asymptomatic PAD: 20%-50%
- Claudication: 10%-35%
- Atypical leg pain: 40%-50%

5-year outcomes:
- Limb morbidity
  - Stable claudication: 70%-80%
  - Worsening claudication: 10%-20%
  - Critical limb ischemia: 1%-2%
  - Amputation (see CLI data)
- CV morbidity & mortality
  - Nonfatal CV event (MI or stroke): 20%
  - Mortality: 15%-30%
  - CV causes: 75%
  - Non-CV causes: 25%

How do I Diagnose PAD - H&P Still works!!!

A thorough history and physical is paramount

Pulse intensity should be assessed and should be recorded numerically as follows:

- 0, absent
- 1, diminished
- 2, normal
- 3, bounding
What Tests Are Available to Confirm Diagnosis of PAD?

- Resting Ankle-Brachial Index (ABI)
- Exercise ABI
- Segmental pressure examination
- Pulse volume recordings
- Toe Brachial Index
- Anatomic Imaging - Ultrasound, CTA, MRA and Angiography
How Do I Measure Ankle-Brachial Index (ABI)

ABI results should be uniformly reported with noncompressible values defined as greater than 1.40, normal values 1.00 to 1.40, borderline 0.91 to 0.99, and abnormal 0.90 or less." (Level of Evidence: B)
Can Patients with PAD have normal ABI?- Yes

- Calcified arteries e.g. renal failure, DM
- Moderate resting PAD especially aorto-iliac disease
What is PVR - What Am I Looking For?
Why Do Exercise ABI Testing?

- Confirms the PAD diagnosis
- Assesses the functional severity of claudication
- May “unmask” PAD when resting the ABI is normal
- Aids differentiation of intermittent claudication vs. pseudo-claudication diagnoses
The toe-brachial index (TBI) is calculated by dividing the toe pressure by the higher of the two brachial pressures.

TBI values remain accurate when ABI values are not possible due to non-compressible pedal pulses.

TBI values ≤ 0.7 are usually considered diagnostic for lower extremity PAD.

*If No big Toe, use next digit, if no toes at all, use a trans metatarsal cuff
Anatomic Imaging- In Patients Being Considered for Revascularization

<table>
<thead>
<tr>
<th>Recommendation for Imaging for Anatomic Assessment</th>
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<tbody>
<tr>
<td><strong>COR</strong></td>
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<td>I</td>
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<td>I</td>
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<td>IIa</td>
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<td>III: Harm</td>
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## Two Major Goals in Treating Patients With PAD

<table>
<thead>
<tr>
<th><strong>Limb Outcomes</strong></th>
<th><strong>Patient Outcomes</strong></th>
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<tbody>
<tr>
<td>• Improved ability to walk</td>
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<tr>
<td>– Pharmacotherapy</td>
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<td>– Supervised Exercise Program</td>
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<td>• Prevention of progression to CLI and Amputation</td>
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<td></td>
<td>• Decrease in Morbidity and Mortality</td>
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<td></td>
<td>• GDMT</td>
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<td></td>
<td>– Lifestyle modification</td>
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<td>– Smoking Cessation</td>
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<td>– Antiplatelet</td>
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<td>– Statins</td>
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<td>– Management of HTN/DM</td>
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Antiplatelet Agents and Statins for Secondary Prevention

- **Antiplatelet Agents**
  - Symptomatic PAD
    - Aspirin or Plavix is recommended (COR-I, LOE-A)
    - Benefit of DAPT is uncertain except after revascularization (COR-IIa, LOE-LD)
  - Asymptomatic PAD
    - Aspirin or Plavix may be considered (COR-IIa, LOE-EO)

- **Statins**
  - Treatment with statins indicated for all patients with PAD (COR-I, LOE-A)
Pharmacotherapy for Claudication

- **Cilostazol**
  - Phosphodiesterase III inhibitor
  - 100 mg bid
  - Platelet aggregation inhibitor, some vasodilatation

Cilostazol and several of its metabolites are inhibitors of phosphodiesterase III. Several drugs with this pharmacologic effect have caused decreased survival compared with placebo in patients with class III-IV CHF. PLETAL® is contraindicated in patients with CHF of any severity.
Cilostazol is Effective Therapy to Improve Symptoms and Walking Distance in Patients with Claudication

Intermittent Claudication:  
*Exercise Therapy (Supervised)*

- **Frequency**: 3–5 supervised sessions/week
- **Duration**: 35–50 minutes of exercise/session
- **Type of exercise**: treadmill or track walking to near-maximal claudication pain
- **Length**: ≥6 months
- **Results**: 100%–150% improvement in maximal walking distance and associated improvement in quality-of-life

Supervised Exercise Program-CLEVER Study

Increase in Peak Walking Time
Stent- 4 minutes
Supervised Exercise- 6 min

Increase in Claudication Onset Time
Stent- 3 minutes
Superv Exercise- 3.4 min
<table>
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<tr>
<th>COR</th>
<th>LOE</th>
<th>Recommendations</th>
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<tr>
<td>I</td>
<td>A</td>
<td>In patients with claudication, a supervised exercise program is recommended to improve functional status and QoL and to reduce leg symptoms.(^{24–26, 28–34, 36, 169, 170})</td>
</tr>
<tr>
<td>I</td>
<td>B-R</td>
<td>A supervised exercise program should be discussed as a treatment option for claudication before possible revascularization.(^{24–26})</td>
</tr>
</tbody>
</table>
When do you refer a patient for revascularization?

- Claudication patients
  - Patient on GDMT with persistent lifestyle limiting symptoms (COR IIa, LOE A)
- CLI (Rest pain, Non healing ulcer, gangrene)
  - Revascularization should be performed when possible to minimize tissue loss
  - Goal to establish in-line flow to the foot
How do you decide Endovascular Versus Surgical Revascularization?

- Anatomic Considerations
  - Aorto-iliac Disease
  - Femoral-popliteal Disease
  - Below knee Disease
How do you decide Endovascular Versus Surgical Revascularization?

• Anatomic Consideration
  – Common Femoral Disease
  – Popliteal Disease
Disease Characteristics- Not all lesions are created equal!!!
Disease Characteristics - Not all lesions are created equal!!!
How do you decide Endovascular Versus Surgical Revascularization?

Patient Considerations
Patient’s co-morbidity and functional status
Presence/absence of venous conduit for surgery
Patient Preference
How do Patients Do after Revascularization?
Aortoiliac Occlusive Disease

Surgical Therapy

Figure 1: 5-year patency (%) of aorto-iliac revascularization (Data from Norgren L, Hiatt WR, Dormandy JA, et al. Inter-society consensus for the management of peripheral arterial disease (TASC II). J Vasc Surg. 2007; 45 Suppl S:S5-67.)
Aortoiliac Occlusive Disease

*Endovascular Therapy*

- High procedural success rates (90%)
- Excellent long-term patency
  (>70% at 5 years)
- Factors associated with a poor outcome:
  - Long segment occlusion
  - Multifocal stenosis
  - Eccentric calcification
  - Poor runoff

*(J Vasc Surg 2013;57:1030-7)*
Figure 3: 5 year patency (%) of femoral popliteal revascularization. (Data from Norgren L, Hiatt WR, Dormandy JA, et al. Inter-society consensus for the management of peripheral arterial disease (TASC II). *J Vasc Surg*. 2007; 45 Suppl S:S5-67.)
The evidence accumulates...

<table>
<thead>
<tr>
<th>Study</th>
<th>Stent</th>
<th>Subjects</th>
<th>Avg. Lesion Length (cm)</th>
<th>% CTO</th>
<th>Freedom from TLR</th>
<th>Fracture Rate (%)</th>
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<tr>
<td>Zilver Trial</td>
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<td>SMART (DES)</td>
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<tr>
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<td>BMS Arm</td>
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<td>16</td>
<td>50+</td>
<td>-</td>
<td>&gt;30</td>
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<tr>
<td>Vibrant</td>
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<td>72</td>
<td>20</td>
<td>50+</td>
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<td>2</td>
<td>53</td>
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Hybrid Approach
How Often Do you Follow Up Patients Post Revascularization

• Generally 1 month, 3 months and then 6-12 months
• Periodic Clinical evaluation and ABI should be considered
• Duplex ultrasound Routine Surveillance
  – Beneficial in infra-inguinal autologous vein bypass patients
  – May be reasonable after endovascular procedures
Conclusion

• PAD patients are at high risk for adverse cardiovascular outcomes
• GDMT and risk factor modification is essential to “keep your patients in circulation”
• Supervised Exercise Programs are effective in improving symptoms
• Revascularization should be considered in appropriate patients for symptom relief and improving limb outcomes
Thank you