STRATEGIC VASCULAR INTERVENTION IN THE COMPLEX LOWER EXTREMITY WOUND

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Vascular Disease in the US

![Graph showing prevalence of stroke, PAD, and CHD](image)

- **CHD**: coronary heart disease
- **PAD**: peripheral arterial disease

Pathologic Progression of PAD

Atherosclerosis > Thrombus Formation > Ischemia > Limb Pain/Wounding > Impairment

Atherosclerosis and platelet activation lead to the formation of a thrombus in arteries. Narrowed arteries and formation of a thrombus impedes blood flow to the periphery and results in ischemia. Ischemia may lead to painful symptoms, cell death, and physical impairment.


Risk Profile of PAD

- **The REACH (REduction of Atherothrombosis for Continued Health) Registry** studied 7,013 patients with symptomatic PAD

**Key Finding**

- 63% of PAD patients had polyvascular* disease

![Graph showing relative 5-year mortality rates](image)


IT’S MORE THAN MEETS THE EYE

Relative 5-Year Mortality Rates

- **Prostate Cancer**: 8%
- **Hodgkin’s Disease**: 18%
- **Breast Cancer**: 23%
- **PAD**: 32%
- **Colorectal Cancer**: 39%
- **Lung Cancer**: 66%

- **PAD patients** with polyvascular disease had combined temporarily coronary artery or carotid or peripheral occlusive disease or both.

*All relative 5-year mortality rates compared to general population.
Risk Factors for PAD in the United States

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Adjusted Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Smoking</td>
<td>4.46</td>
</tr>
<tr>
<td>Diabetes</td>
<td>2.72</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1.75</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>1.68</td>
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</table>

Odds ratios for risk factors

* Age- and gender-adjusted odds ratio.

Diabetes and Atherosclerosis

Diabetes mellitus:
- Accelerates atherosclerosis 200%–400%
- Risk of coronary artery ischemic events increases 2–4 times
- Results in 4 times risk of stroke
- PAD develops a decade earlier
- CV risk equivalent to 3 non-diabetic risk factors

EPIDEMIOLOGY OF DIABETES

- 20 million Diabetics U.S.
- 6.7% population
- Higher prevalence in AA and HA (11%)
- 2200 new diagnosis/day (1.5/minute)
- 4th leading cause of death

MORBIDITY/MORTALITY OF AMPUTATION

- 68% Contralateral Amputation within 5 years
- 50% mortality rate within 3 years
- 25% remain hospitalized

Diabetic Patients with PAD are at Increased Risk for Poor Outcomes

VASCULAR STUDIES

- Palpate Pulses: Femoral, Popliteal, DP, PT
- Non-invasive testing
  - Ankle Brachial Index
  - Segmental pressures
- TcPO2
- CTA or MRA
- Angiogram

How to Perform and Calculate the ABI

<table>
<thead>
<tr>
<th>ABI</th>
<th>Description</th>
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<tbody>
<tr>
<td>&gt;0.90</td>
<td>Normal</td>
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<tr>
<td>0.71-0.90</td>
<td>Mild Obstruction</td>
</tr>
<tr>
<td>0.41-0.70</td>
<td>Moderate Obstruction</td>
</tr>
<tr>
<td>&lt;0.40</td>
<td>Severe Obstruction</td>
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</tbody>
</table>

PARTNERS Program
ABI Interpretation

Right ABI
Right Arm Pressure
Left ABI
Left Arm Pressure

Example
Higher Ankle Pressure
Higher Brachial Pressure

Right Arm Pressure:
Left Arm Pressure:

Decline in Survival Associated With Severity of PAD

<table>
<thead>
<tr>
<th>Year</th>
<th>100</th>
<th>80</th>
<th>60</th>
<th>40</th>
<th>20</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABI &gt;0.95</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>0.4-0.85</td>
<td>40</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>&lt;0.4</td>
<td>80</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

PAD Disease Management

Symptomatic Treatment/Prevention of Ischemic Events

- Exercise
- Control of risk factors
  - Smoking cessation
  - Hypertension
  - Hyperlipidemia
  - Antiplatlet therapy
- Pharmacologic therapy
  - Pentoxifylline
  - Cilostazol
- Selective use of interventional therapy

Indications for Surgical Intervention

- Gangrene
- Non-healing ulcers
- Claudication causing lifestyle deterioration refractory to pharmacologic intervention and behavioral modification

Treating Critical Limb Ischemia

Treatment for severe PVD in the 1800's
SURGICAL OPTIONS

Surgical
- Endarterectomy
- Bypass

Percutaneous
- Angioplasty
- Atherectomy
- Stenting
- Laser

OPTIONS

- Limb/wound should be evaluated for healing potential prior to deciding on intervention
- Comorbidities and overall health need to be evaluated prior to intervention

ANATOMIC CLASSIFICATION SHOULD GUIDE TREATMENT
TASC CLASSIFICATION

OPTIONS
OPEN VS. PERCUTANEOUS
BASIL
- 27 U.K. centers evaluating 452 patients with severe leg ischemia
- These were patients that were TASC B-C
- Findings 30% more expensive
- Over 2 years the patient was more likely to be free from amputation if they originally were randomized to surgery first
- Less amputations if had bypass first
- If patients have life span greater than 2 years and SLI, consider bypass if surgical candidate

Address Inflow First!

Occluded aorta with large collateral artery

GANGRENE OF THE FOREFOOT

83 yo female
Smoker
Presented to podiatry
Sent for vascular evaluation
56 yo diabetic male
Admitted via Medical Service
Vascular and Podiatric evaluation

SEVERE TIBIAL DISEASE

RUN-OFF INTO FOOT

PTA TIBIAL VESSELS

Popliteal Occlusion Atherectomy
Transmetatarsal Amputation

57 yo female
Pain in toes overnight
Presented to ED

ISCHEMIC FOOT

ARTERIAL DOPPLER'S

CONCOMITANT FEMORAL AND TIBIAL DISEASE

> 73 yo male post MI with PTCA
> New onset A-FIB
> Diabetes
Total Occlusion

PREVIOUS STENT

Distal Bypass

Healed Transmetarsal Amputation
FULL METAL JACKET OR "ENDO FEM-POP"

BELOW KNEE RUNOFF

ABOVE KNEE AMPUTATION

Address Inflow First!

Occluded aorta with large collateral artery

THE PAD GUIDELINE IS INTENDED TO GUIDE LIFELONG PRIMARY TO SPECIALTY PAD CARE

Population at risk:
- Age and risk factors
- Establish the PAD diagnosis

Population with symptoms:
- Improve limb outcomes
- Prevent CV ischemic events

Population remains at risk:
- Primary care management of legs and life, in collaboration with vascular specialists

- ABI
- TBI
- Duplex US
- MRA
- CTA
- Angiography

Integrated care requires a partnership of vascular specialists (vascular medicine, cardiology, interventional radiology, nursing, podiatry, and others)

- Medical Therapy
- Endovascular Therapy
- Surgical Therapy

ABI=ankle-brachial index; CTA=computed tomographic angiography; CV=cardiovascular; MRA=magnetic resonance angiography; TBI=toe-brachial index; US=ultrasound.
• Understanding PAD pathology and strategically approaching revascularization

• Understanding who benefits from Medical, interventional vs. surgical bypass

• Venous Stasis...