Diagnosis and Endovascular Treatment of Critical Limb Ischemia: What You Need to Know

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THE PERIPHERAL EVENT OF THE YEAR
Disclosures

Speaker’s Bureau:
• Astra Zeneca
• Abbott Vascular
• Volcano Corporation
• Spectranetics
• Maquet
• Reflow Medical

Consultant:
• Penumbra
• Spectranetics

Grant/Research Support:
• Spectranetics
• Bard
• Medtronic
• Veryan Medical
• Terumo
• Cordis
• Reflow Medical

Medical/Scientific Boards:
• Boston Scientific
• Abbott Vascular
PAD Outcomes

PAD Population (50 years and older)

- Asymptomatic PAD 20%-50%
  - Progressive functional impairment
- 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%
  - 5-year outcomes

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PAD Outcomes

Ankle-Brachial Index

Incidence of Death per 1,000 Patient Years

- Nondiabetic
- IFG
- Diabetic

Mortality DM and CLI OR 2.38, P < 0.001

Diagnosis: Various Modalities

- Resting Ankle Brachial Index/Toe Brachial Index
- Perfusion Testing
  - \( \text{TCPO}_2 \ (< 30 \text{ mm Hg}) \)- Useful for HBO
  - Fluorescence i.e. SpyElite
- Handheld Doppler
- Exercise Ankle Brachial Index
- Segmental Pressures
- Pulse Volume Recordings
- Arterial Duplex
- CT Angiogram with Runoff
- MR Angiogram with Runoff
- Invasive Angiography (Contrast/CO2 Angiography)
Diagnosis: Toe Brachial Index

- 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.
- Toe Pressure < 55 mm Hg Consistent with Ischemic Ulcers

Treatment

- **SMOKING CESSATION**
  - CLI is often a smoker’s disease
  - Progression is guaranteed with ongoing abuse
- **Hypertension Control**
  - Goal <140/90; <130/80 in CKD and Diabetics
  - Use ACE-I if possible
  - Beta blockers are not contraindicated
- **Tight Lipid Control**
  - LDL < 100 mg/dL in all patients
  - LDL < 70 mg/dL in patients with high risk of ischemic events
Treatment

- **Glycemic Control in Diabetics**
  - Affects treatment success and patency rates
  - A1C > 6.9% associated with increased risk of amputation

- **Exercise Program**
  - If the patients do not move, they will lose the limb
  - Difficult as many patients are not ambulatory with their wounds

- **Antiplatelet Therapy**
  - ASA 75-325 mg
  - Plavix 75 mg
  - Cilostazol 100 mg BID
  - Combination cilostazol/plavix increases endothelial progenitor cells (p < 0.003) and improves ulcer healing (p < 0.01)

- **Endovascular or Open Revascularization**


Treatment: Adjunctive Agents

- Cilostazol 100 mg 2 times/day (n=227)
- Pentoxifylline 400 mg 3 times/day (n=232)
- Placebo (n=239)

Percentage change from baseline MWD (mean)

MWD=maximal walking distance.

*P<.001 vs pentoxifylline.

## Treatment: Endovascular vs. Surgical

<table>
<thead>
<tr>
<th>Inflow Procedure</th>
<th>Operative Mortality (%)</th>
<th>Expected Patency Rate at Follow-up (%)</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aortobifemoral bypass</td>
<td>3.3</td>
<td>87.5</td>
<td>5 years</td>
</tr>
<tr>
<td>Aortoiliac or Aortofemoral bypass</td>
<td>1-2</td>
<td>85-90</td>
<td>5 years</td>
</tr>
<tr>
<td>Iliac endarterectomy</td>
<td>0</td>
<td>79-90</td>
<td>5 years</td>
</tr>
<tr>
<td>Femorofemoral bypass</td>
<td>6</td>
<td>71</td>
<td>5 years</td>
</tr>
<tr>
<td>Axillofemoral bypass</td>
<td>6</td>
<td>49-80</td>
<td>3 years</td>
</tr>
<tr>
<td>Axillofemoral-femoral bypass</td>
<td>4.9</td>
<td>63-67.7</td>
<td>5 years</td>
</tr>
<tr>
<td>Femorotibial bypass (vein)</td>
<td></td>
<td>70-80</td>
<td>6 years</td>
</tr>
<tr>
<td>Femorotibial bypass (PTFE)</td>
<td></td>
<td>30-50</td>
<td>6 years</td>
</tr>
</tbody>
</table>

Treatment: Endovascular vs. Surgical

Updated to Include MAJESTIC data for Eluvia DES
Angiosome Concept

- Direct Flow Associated with Better Outcomes - Especially in the Absence of Adequate Collaterals
  - Improved Wound Healing (RR 0.60)
  - Major Amputation (RR 0.56)
  - Amputation-free Survival Rates (RR 0.83)

Case Example #1

- 70 Year old Man
- Nonhealing Diabetic Ulcer of the Hallux for Over 6 Months
- Multiple Risk Factors
  - Diabetic
  - Hypertensive
  - Smoker
- Rutherford 6
Initial Angiogram

- Antegrade Access into the AT- Unable to Cross the DP CTO
- Direct PT Access
- Spasm Addressed with Vasodilators
Initial Angiogram

- Identify the Occluded Plantar-Pedal Loop (Arch Reconstruction)
- Cross with MicroES 14 and CommandES + Fielder XT
- Coronary Crossing Catheters and Wires Are Useful
Initial Angiogram

- Reversed the Access and Now Wired from AT
- Can Cross with Wire of Choice (I Crossed with an 0.018” Glidewire Advantage)
Initial Angiogram

- Reversed the Access and Now Wired from AT
- Can Cross with Wire of Choice (I Crossed with an 0.018” Glidewire Advantage)
- Changed out to 0.014” Wire and Used a 3.0 mm Coyote Balloon
Initial Angiogram

- Pedal Arch Flow Restored
Initial Angiogram

- Pedal Arch Flow Restored
- Straight Line Flow to Hallux
- Wound Healed Within 2 Weeks
Case Example #2

- 75 Year old Man
- Nonhealing Ulcer of the Right Lateral Forefoot
- Prior Fem-Fem Bypass
- Known Occluded Right Iliac
- Multiple Risk Factors
  - Diabetic
  - Hypertensive
  - CKD
  - Prior Smoker
- Rutherford 6
Initial Angiogram

- Accessed the Fem-Fem
- Severe SFA Stenosis Seen
- Single Vessel Runoff Via Peroneal to Anterior Comm Branch to AT/DP
Initial Angiogram

- Accessed the Fem-Fem
- Severe SFA Stenosis Seen
- Single Vessel Runoff Via Peroneal to Anterior Comm Branch to AT/DP
Initial Angiogram

- Accessed the Fem-Fem
- Severe SFA Stenosis Seen
- Single Vessel Runoff Via Peroneal to Anterior Comm Branch to AT/DP
Treat Inflow

- 2.0 mm TE to the SFA
- 6 x 200 Angiosculpt and DCB
Retro Crossing

- Selective Angio of the Peroneal Show Communicating Branch
- Access with 135 mm Corsair and Externalize 0.014” Command ES Wire Via Retrograde up AT
- 1.4 mm TE Laser Antegrade
Retro Crossing

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Retro Crossing

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Final Angiogram
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