Long-Term Results Of Inframalleolar Bypasses For Chronic Limb-Threatening Ischemia (CLTI)

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Challenges in the Lower Extremity Revascularization for CLTI

- Long, diffuse lesions
- Often calcified
- Concomitant inflow/outflow disease
- Long Occlusions common

Management of Chronic Limb-threatening Ischemia: Treatment Decisions

- Optimize medical therapy
- Endovascular Techniques
- Bypass operation
- Careful wound care, offloading
- Toe and forefoot amputation (versus primary amputation—BKA)

Without revascularization, limb loss is likely

Outcomes with bypass to Dorsalis Pedis Artery (DP)

- 1032 bypasses to DP artery performed at Beth Israel Hospital, Boston, between 1990-2000
- 69% male, mean age 67
- 92% had DM
- All patients had CLTI
- Conduit: 31% nonrev, 26% in situ, 23% rev, 17% arm vein
- Inflow: 29% CFA, 53% pop, 11% SFA


Disclosures

None
Outcomes with bypass to DP

- 30 day mortality 0.9%
- 4.2% early failure rate of bypass
- Primary patency 5 years 57%
- Secondary patency 5 years 63%
- Limb salvage 5 years 78%
- Patency better in males and patients with DM and use of GSV


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### Table 3. Outcome with standard error of all pedal bypasses

<table>
<thead>
<tr>
<th>Year (%)</th>
<th>1 year (%)</th>
<th>5 year (%)</th>
<th>10 year (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary patency</td>
<td>71.2 ± 2.6</td>
<td>59.7 ± 3.2</td>
<td>40.9 ± 5.0</td>
</tr>
<tr>
<td>Assisted primary patency</td>
<td>76.5 ± 2.4</td>
<td>69.3 ± 2.9</td>
<td>58.6 ± 4.9</td>
</tr>
<tr>
<td>Secondary patency</td>
<td>81.1 ± 2.2</td>
<td>70.7 ± 3.1</td>
<td>68.4 ± 3.8</td>
</tr>
<tr>
<td>Secondary patency (IVUS imaging based)</td>
<td>79.3 ± 2.4</td>
<td>68.1 ± 3.5</td>
<td>62.8 ± 3.8</td>
</tr>
<tr>
<td>Leg salvage</td>
<td>78.6 ± 2.6</td>
<td>72.0 ± 2.8</td>
<td>67.2 ± 4.0</td>
</tr>
<tr>
<td>Survival</td>
<td>70.3 ± 2.4</td>
<td>37.4 ± 2.8</td>
<td>26.8 ± 2.2</td>
</tr>
<tr>
<td>Amputation</td>
<td>58.4 ± 2.6</td>
<td>29.8 ± 2.6</td>
<td>12.8 ± 2.2</td>
</tr>
<tr>
<td>Free survival</td>
<td>58.4 ± 2.6</td>
<td>29.8 ± 2.6</td>
<td>12.8 ± 2.2</td>
</tr>
</tbody>
</table>

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### Figure 4. Cumulative leg salvage of diabetic vs non-diabetic patients. DM = diabetes mellitus

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Evaluation of paramalleolar and inframalleolar bypasses in dialysis- and nondialysis-dependent patients with critical limb ischemia

- 401 bypass procedures in 333 consecutive patients between 2000-2013
- All cases for CLTI
- Mean age 68, 67% male, 57% HD

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<table>
<thead>
<tr>
<th>Distal anastomosis</th>
<th>Value (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorsalis pedis</td>
<td>145 (124-166)</td>
</tr>
<tr>
<td>Terminal anterior tibial</td>
<td>88 (77-100)</td>
</tr>
<tr>
<td>Terminal posterior tibial</td>
<td>34 (25-45)</td>
</tr>
<tr>
<td>Popliteal</td>
<td>193 (143-244)</td>
</tr>
</tbody>
</table>
Cardiac History

• History of congestive heart failure--hypertrophic cardiomyopathy and diastolic dysfunction.
• Underwent PCI for CAD 6 months prior to presentation.

Completion Angiogram

Vein graft
Vein-DP anastomosis

How do you define “long term success”?

• Patency
• Preservation of limb and life
• Resolution of symptoms
• Healing of ulcerated tissue
• Functional improvement
• Resource utilization
• Cost-effectiveness
• Patient satisfaction (many pts dread returning for the contralateral leg—delayed presentation)

Trials in Progress

• BASIL 2
Conclusions

• Inframalleolar and Paramalleolar bypass for Chronic Limb-Threatening Ischemia (CLTI) is feasible with a good quality vein conduit
• The procedure is relatively safe and durable
• Functional outcomes are acceptable, but careful patient selection is needed