THE IMPORTANCE OF REOPERATION OR REINTERVENTION WHEN A PRIMARY PROCEDURE FOR CLI FAILS AND THE LIMB IS RETHREATENED: 1, 2, 3, 4 AND MORE PROCEDURES CAN BE WORTHWHILE: A VASCULAR SURGEON’S VIEW
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Disclosures
• Cook, Inc: Consulting, Research
• Aptus Endosystems: Research

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Background
• Optimal treatment of limb threat after 2 or more failed bypasses is debated
• Whether there is a marked reduction in patency and/or limb salvage rates and an increase in complications in patients undergoing multiple bypasses is unclear

Redo surgery- problems
• Difficult dissection
• Infection
• Lack of suitable vein for conduit
• More proximal inflow
• More distal outflow
• Older/sicker patient

Objective
• To review an aggressive approach to LE revascularization with limb threatening ischemia after multiple (>2) failed previous bypasses
• To determine the outcome of multiple, repetitive attempts at bypass

Support for aggressive approach multiple revascularization
2nd (101), 3rd (136), 4th (46), >4 (27)

<table>
<thead>
<tr>
<th>Study</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reconstructions:</td>
<td>389</td>
<td>23</td>
<td>85</td>
</tr>
<tr>
<td>Patients:</td>
<td>202</td>
<td>16</td>
<td>81</td>
</tr>
<tr>
<td>Prosthesis:</td>
<td>87%</td>
<td>38%</td>
<td>21%</td>
</tr>
<tr>
<td>Peri-op mortality:</td>
<td>1%</td>
<td>0%</td>
<td>4%</td>
</tr>
<tr>
<td>Patency (yr):</td>
<td>37%(5)</td>
<td>50%(3)</td>
<td>79%(4)</td>
</tr>
<tr>
<td>Limb Salvage (yr):</td>
<td>59%(5)</td>
<td>50%(3)</td>
<td>69%(4)</td>
</tr>
<tr>
<td>Survival (yr):</td>
<td>80%(5)</td>
<td>62%(3)</td>
<td></td>
</tr>
</tbody>
</table>

Montefiore experience

- 105 revascularization procedures
- 55 limbs (54 patients)
- Limb threatening LE ischemia
- Failed ≥2 ipsilateral infrainguinal bypasses
- Divided into two groups for analysis
  - Group A (all Third procedures)
  - Group B (all Fourth or more procedures)

Procedures (n=105)

<table>
<thead>
<tr>
<th>Operation</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd</td>
<td>55 (100%)</td>
<td>(28) (28)</td>
</tr>
<tr>
<td>4th</td>
<td>26 (52%)</td>
<td>(26) (26)</td>
</tr>
<tr>
<td>5th</td>
<td>15 (30%)</td>
<td></td>
</tr>
<tr>
<td>6th</td>
<td>4 (8%)</td>
<td></td>
</tr>
<tr>
<td>7th</td>
<td>2 (4%)</td>
<td></td>
</tr>
<tr>
<td>8th</td>
<td>2 (4%)</td>
<td></td>
</tr>
<tr>
<td>9th</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>55 (100%)</td>
<td>50 (100%)</td>
</tr>
</tbody>
</table>

48% 28%

Results

- Follow up serial pulse exams/duplex
- No difference in demographics
- Trend towards increased warfarin in Group B
- All patients treated for gangrene/rest pain
- 60% bypass / 40% revision/extension

Results

Mean F/U
- Group A – 23 months (3-76 months)
- Group B – 43 months (3-122 months)

Prosthetic
- Group A – 30 (55%)
- Group B – 33 (66%)

Outflow
- Group A – Pop 11 (20%), Tib/pedal 44 (80%)
- Group B – Pop 7 (14%), Tib/pedal 43 (86%)

Complications

<table>
<thead>
<tr>
<th>Type</th>
<th>Group A</th>
<th>Group B</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-day mortality</td>
<td>0 (0%)</td>
<td>2 (4%)</td>
<td>0.16</td>
</tr>
<tr>
<td>MI</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>0.32</td>
</tr>
<tr>
<td>Wound infection</td>
<td>0 (0%)</td>
<td>1 (2%)</td>
<td>0.32</td>
</tr>
<tr>
<td>Graft infection</td>
<td>2 (4%)</td>
<td>3 (6%)</td>
<td>0.65</td>
</tr>
<tr>
<td>Hematoma</td>
<td>1 (2%)</td>
<td>4 (8%)</td>
<td>0.18</td>
</tr>
<tr>
<td>Prolonged intubation</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>0.32</td>
</tr>
</tbody>
</table>

Primary Patency

- Group A
  - 1 year 24%
  - 3 years 24%
- Group B
  - 1 year 35%
  - 3 years 19%

P=0.54
Summary

- The likelihood of success of repetitive limb revascularization was unrelated to the number of previous failures
- Less than expected morbidity and mortality in this cohort of patients with extensive PVD

Limitations

- Data prospectively collected retrospectively analyzed
- Group A (patency) is a subset of Group B
- Select group of patients in multiple bypass category
- Heterogeneous group of procedures
- No cost or quality of life analysis
- No hypercoagulability data
Principles of Reintervention

• Begins with first intervention
• Applies to all subsequent intervention
• Preserve all options
  – Do not sacrifice collaterals
  – Do not eliminate otherwise usable target segments
• Requires a dedicated interventionalist/surgeon
• Thoughtful approach to reintervention including
  hybrid approaches, e.g. proximal thrombectomy
  with new distal bypass, distal angioplasty

Conclusions

These results in patients facing imminent
amputation, support the concept that
aggressive limb revascularization, even
after 2 or more failed bypasses, can be
performed safely and effectively