Scot Stevens
*The University of Tennessee*

**Disclosures**
- Gore
  - Speaker, consultant
- Medtronic
  - Speaker
- Cook
  - Speaker
- Boston Scientific
  - Consultant

**Lower Extremity Endovascular**

...Complications

Scott Stevens

**PAD - Landscape**

- 50 million in U.S.
- Prevalence growing substantially
- Interventions are increasing

*Medicare Payments Surge for Stents to Unblock Blood Vessels in Limbs*
<table>
<thead>
<tr>
<th>Intervention</th>
<th>2005</th>
<th>2013</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronary Artery Endovascular Revascularization</td>
<td>464,567</td>
<td>323,406</td>
<td>-30%</td>
</tr>
<tr>
<td>Peripheral Artery Endovascular Revascularization</td>
<td>302,333</td>
<td>358,168</td>
<td>18%</td>
</tr>
<tr>
<td>Peripheral Vein Revascularization</td>
<td>187,032</td>
<td>323,380</td>
<td>73%</td>
</tr>
<tr>
<td>Vein Ablation</td>
<td>24,999</td>
<td>171,585</td>
<td>586%</td>
</tr>
<tr>
<td>Lower Extremity Bypass</td>
<td>88,548</td>
<td>46,734</td>
<td>-47%</td>
</tr>
<tr>
<td>Lower Extremity Amputation (All Cases)</td>
<td>124,558</td>
<td>113,707</td>
<td>-9%</td>
</tr>
<tr>
<td>Major Lower Extremity Amputation (Above and Below Knee)</td>
<td>54,778</td>
<td>38,166</td>
<td>-30%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intervention</th>
<th>2005</th>
<th>2013</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronary Artery Endovascular Revascularization</td>
<td>464,567</td>
<td>323,406</td>
<td>-30%</td>
</tr>
<tr>
<td>Peripheral Artery Endovascular Revascularization</td>
<td>302,333</td>
<td>358,168</td>
<td>18%</td>
</tr>
<tr>
<td>Peripheral Vein Revascularization</td>
<td>187,032</td>
<td>323,380</td>
<td>73%</td>
</tr>
<tr>
<td>Vein Ablation</td>
<td>24,999</td>
<td>171,585</td>
<td>586%</td>
</tr>
<tr>
<td>Lower Extremity Bypass</td>
<td>88,548</td>
<td>46,734</td>
<td>-47%</td>
</tr>
<tr>
<td>Lower Extremity Amputation (All Cases)</td>
<td>124,558</td>
<td>113,707</td>
<td>-9%</td>
</tr>
<tr>
<td>Major Lower Extremity Amputation (Above and Below Knee)</td>
<td>54,778</td>
<td>38,166</td>
<td>-30%</td>
</tr>
</tbody>
</table>

---

**Indication by Specialty**

<table>
<thead>
<tr>
<th>CLI</th>
<th>Claudication</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC 23% (n=146)</td>
<td>IC 57% (n=2487)</td>
</tr>
<tr>
<td>IR 27% (n=5995)</td>
<td>IR 13% (n=1078)</td>
</tr>
<tr>
<td>VS 50% (n=9012)</td>
<td>VS 30% (n=4693)</td>
</tr>
</tbody>
</table>

*Clinical research study:
Outcomes of endovascular lower extremity interventions depend more on indication than physician specialty.*


Justin R. Wallace, MD, VSS, Theodore You, MD, MSc, Luis Marone, MD, Ralph A. Chaer, MD, MS, Michel S. Ulanowicz, MD.
Indications Influence Outcomes

Intervention complications
Higher for CLI than IC

Embolic Complications

Incidence and clinical significance of distal embolization during percutaneous interventions involving the superficial femoral artery.

Lam RC, Shah S, Faries PL, McKinsey JJ, Kent KC, Morrisey NJ.


Emboli throughout procedure
Most during intervention
Only 1 out of 60 had embolization
Treated with endovascular techniques
Embolization

10,856 procedures
1.7% embolizations
Intervention – 1%
Surgical conversion – 0.18%

Emboli - Decreased

Antiplatelet medications
Statins

Emboli - Increased

DM
Urgent
Length of lesion
Number of arteries treated
Atherectomy

Emboli – Not Associated With

Loss of patency
Amputation
Mortality

Directional Atherectomy
DEFINITIVE LE Trial

800 patients
47 centers
Distal embolization requiring intervention - 1.6%
Surgical conversion – 0.2%

Directional Atherectomy
DEFINITIVE LE Trial

800 patients
47 centers
Distal embolization requiring intervention - 1.6%
Surgical conversion - 0.2%
Embolic Protection

Selectively
High stakes
Embologenic lesion
Wire drops across lesion
Lots of road work

Bailout Options

Damage Control - Cocktail

- Keep wire access
- Re-dose – heparin
- Check ACT
- Vasodilator
- TPA
- Avoid static flow columns
- Back sheath out of SFA

Hybrid Bailout


Fluoroscopically assisted thromboembolectomy
Lipsitz EC, Veith FJ.
Perforation

Wire access
Endo-rescue cocktail
Prolonged balloon tamponade
Prepare for repair

Anterior Compartment

Beware of - wire bias

No Glory in Access

Lessons learned for a safe approach
to lower extremity intervention

Recipe for Failure

“Call me when you have pictures”
Clinical Magnitude

Call to Arms

Ultrasound Guided Access

Micro puncture

UT Medical Center

Femoral Access protocol
4,300 cases
No retroperitoneal hematomas
No A-V fistulas
Decreased hematomas and pseudoaneurysms

Treating The Disease
Embolization