Anatomic Staging for Chronic Limb Threatening Ischemia

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Revascularization Strategies in CLTI: Key Factors in Decision-Making

- PATIENT RISK
- SEVERITY OF LIMB THREAT
- VASCULAR ANATOMY

Challenges for Revascularization in CLTI

- Multi-level disease is COMMON (endo)
- Long-segment disease and CTOs are COMMON (endo)
- Tibial disease common (both; endo affected more)
- Extensive calcification is frequent (both; endo more)
  - Diabetes and renal disease
- 20-30% lack adequate vein conduit (open)
- Advanced tissue loss requirements (both, endo more)
  - Support healing of foot reconstructions e.g. TMA
  - Large defects may take weeks or months to heal
  - Comorbid conditions often slow wound healing
- Comorbidity burden high (both, open more)
- Durability: 20-80% of DFU will recur; 70% of “CLI” pts survive for at least 2 years (endo)

Disclosures

• NONE
Revascularization in CLTI: Technical Goals and Strategies

- Restore in-line flow to ankle and foot
  - Especially important in tissue loss, infection
- Staged vs simultaneous inflow/outflow correction
- AIOD: frequently treated with ENDO; open bypass for severe patterns or prior ENDO failures
- Infrainguinal disease
  - Great heterogeneity in patterns and burden
  - Evolving roles for ENDO and Open Bypass
  - Needs an integrated limb-based anatomic scheme

Existing Anatomic Schemes

- Bollinger
  - Complex calculation
  - Summed score that captures total burden of atherosclerosis but includes vessels in parallel that may not be target
- SVS runoff score
  - More relevant for bypass surgery
- TASC
  - Segment/lesion focused
    - May be useful for comparing device performance in a given lesion, but less so for defining treatment of advanced limb ischemia
    - Does not address combined/multi-level disease
    - Fails to integrate total path of revascularization for CLI
Lesion severity and treatment complexity are associated with outcome after percutaneous infrainguinal intervention

Brian G. DeRubertis, MD, Matthew Pierce, BS, Rabih A. Chaer, MD, Soo J. Rhee, MD, Rachid Benjelloun, MD, Evan J. Ryer, MD, Craig Kent, MD, and Peter L. Farber, MD, New York, NY

- Review of 324 interventions
- Higher lesion severity in pts with CLI (p<.05)
- Treatment of multi-level disease more common in CLI (P<.025)
- Tibial interventions far more common in CLI (P<.01)


**INFRAPopliteAL Lesion Morphology in Patients With Critical Limb Ischemia: Implications for the Development of Anti-Restenosis Technologies**

Frederic Baumann, MD; Rolf P. Engelberger, MD; Torsten Willenberg, MD; Dal-Do Do, MD; Christoph Kalka, MD; Urs Baumgartner, MD; and Nicolas Diehm, MD

**TABLE 3**

<table>
<thead>
<tr>
<th>Artery</th>
<th>Stenoses</th>
<th>Occlusions</th>
<th>p</th>
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<tr>
<td>All 197 lesions</td>
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<td></td>
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<tr>
<td>ATA (n=72)</td>
<td>108.1±53.6 (n=22)</td>
<td>178.9±75.8 (n=48)</td>
<td>&lt;0.001</td>
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<td>TPT (n=22)</td>
<td>47.6±17.0 (n=12)</td>
<td>63.1±13.4 (n=10)</td>
<td>0.3</td>
</tr>
<tr>
<td>PA (n=49)</td>
<td>63.2±32.8 (n=27)</td>
<td>111.1±65.8 (n=22)</td>
<td>&lt;0.001</td>
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<td>PTA (n=56)</td>
<td>100.7±50.6 (n=14)</td>
<td>178.9±77.7 (n=42)</td>
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<td>136 treated lesions</td>
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<tr>
<td>ATA (n=47)</td>
<td>108.1±53.6 (n=22)</td>
<td>196.5±84.9 (n=25)</td>
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<td>TPT (n=22)</td>
<td>47.6±20.0 (n=12)</td>
<td>43.1±13.4 (n=10)</td>
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<td>PA (n=44)</td>
<td>59.4±30.7 (n=22)</td>
<td>93.2±60.0 (n=22)</td>
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<td>PTA (n=23)</td>
<td>100.7±50.6 (n=11)</td>
<td>113.9±44.1 (n=12)</td>
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</tbody>
</table>

TASC A lesions
- Single stenosis ≤5 cm in length
- Single occlusion <5 cm in length

TASC B lesions
- Multiple lesions (stenoses or occlusions) each ≤5 cm
- Single stenosis or occlusion ≤5 cm not involving the infrapopliteal popliteal artery
- Heavily calcified lesions ≤5 cm in length
- Single popliteal stenosis

TASC C lesions
- Multiple stenoses or occlusions totaling ≤5 cm with or without heavy calcification
- Recurrent stenoses or occlusions after failing treatment

TASC D lesions
- Chronic total occlusion of TFA or SFA ≥20 cm involving the popliteal artery
- Chronic total occlusion of popliteal artery and proximal infrapopliteal vessels
How to combine lesion patterns in a given limb with CLI?

Goals of a Limb-Based Anatomic Scheme for CLI

- Describe PATTERNS of disease to stratify limb-based treatment outcomes in CLI
- Allow for comparison of treatment STRATEGIES to drive clinical trial design and clinical decision-making in CLI
- Focus on infra-inguinal disease
- Principle of restoring in-line flow to the ankle and foot
- Integrate the disease burden over a defined target revascularization PATH from groin to ankle
- Operator defines the desired target path based on clinical circumstances for a given patient

Disease Pattern Relationships

- Retrospective review, single center (UCSF)
- 86 consecutive limbs treated with infrainguinal revascularizations for CLI, had complete baseline angiograms available for review
- 78% DM, 54% smokers, 31% ESRD
- Gender and renal disease strongly associated with FP vs TP predominant patterns
- 40% combined disease, 35% predom FP, 26% predom TP
- TP disease had strong association with amputation outcomes in the ENDO group
Anatomic Patterns and Amputation Outcomes

- Jointly sponsored by SVS, ESVS, WFVS
- First project: Treatment of Chronic Limb-Threatening Ischemia
- Expected publication: early 2017