Single versus Multivessel Targets in Infrapopliteal Lower Extremity Arterial Revascularization

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Disclosures

- Co-Global Principal Investigation for DEFINITIVE LE
- Speakers Panel for Medtronic
- Scientific Advisory Boards: Spectranetics, Abbott
  Endologix, WL Gore, Bolton consultant
- Cook Aortic Division
  – IDE fenestrated and branched aortic grafts
  – Proctor

Critical Limb Ischemia (CLI)

- Significant involvement of Tibial arteries in CLI pts
  – most times multiple tibial arteries
- In most cases, anatomically involves multi-level disease
- Until recently, open surgical reconstruction was mainstay of therapy
- Endovascular intervention has rapidly become an acceptable first-line approach for limb salvage

Target Selection

- Traditionally with open vascular reconstruction, the least diseased distal target vessel was selected
- This single vessel approach was initial strategy in endovascular interventions
- Alternative strategies have emerged

Modern Endovascular Target Selection Strategies

- Single vessel
- Angiosome-directed revascularization
- Multi-vessel revascularization

Angiosome Directed Revascularization

- An angiosome is an area of tissue perfused by a single feeding vessel
- 6 angiosomes are identified in the foot fed by the 3 vessels
- Peroneal feeds the smallest area

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Angiosome Revascularization

- Theory: wounds may heal better when the angiosome specific to the wound is directly targeted
- Sizable amount of retrospective data exists comparing outcome of angiosome-direct vs angiosome indirect outcomes
- Lida et al. in 2010 showed a benefit 86% vs 69% for limbs with an angiosome-direct revasc.

Angiosome Direct Evidence

- More (retrospective) evidence showing advantage for angiosome direct revascularization

Angiosome Direct Limitations

- Nearly all evidence is retrospective, and vessel targeting was analyzed after procedure
- Practicality of angiosome directed therapy?
- Confounding effect of peroneal revasc. (small angiosome = almost all peroneal interventions included in "indirect" group

Multivessel Revascularization Strategy

- If one is good, are more better?
- Endovascular technology continues to improve
- Recannalizing multiple vessels technically feasible
- Theoretical benefits on wound healing/perfusion
- Are proximal intervention patency improved with more outflow?

Evidence for Multi-vessel

- Darling et al. analyzed 673 limbs in 2016.
- 22% underwent multiple tibial vessel intervention
- No difference in this group vs single vessel group re: freedom from amputation, reintervention and survival
- No analysis of angiosome targeting

Evidence for Multi-vessel Effect on SFA intervention patency

- Davies 2008 looked at 305 limbs in 241 patients
- Excluded patients undergoing tibial intervention
- Scored run off (1 perfect, >10 poor)
- Showed patency improvement for SFA interventions based on run off #
Advanced Revascularization Techniques
• Subintimal Arterial Flossing with Antegrade-Retrograde Intervention (SAFARI)
• Pedal-plantar loop technique
• Jury still out on when to employ these techniques

Pedal loop Technique
• Takes advantage of natural anastomosis between anterior and posterior tibial arteries via plantar loop
• Able to cross second tibial in retrograde fashion
• Manzi showed 85% technical success in 2017

Pedal loop Technique
H&P
• 72 yo woman with right 5th toe dry gangrene.
• PMH: DM II, ESRD on HD, HTN
• Non smoker
  • Fem Pop PT DP
  • Rt 2+ 1+ DS NA
  • Lt 2+ 1+ DS DS

Angiogram
PRE AND POST TP TRUNK AND PT PLAQUE EXCISION
RUNOFF

Postop course

- Underwent right 5th toe amputation with good healing
- Developed non-traumatic right 1st and 2nd toe ischemic changes that progressed to dry gangrene.

REPEAT ANGIOGRAM

AT BRANCH

PERONEAL BRANCH

Peroneal Plaque Excision and PTA

2x40mm balloon
My Strategy

- Optimize run off vessels with specific attention to the target vessel going toward the wound (multi vessel technique)
- Combination of standard endovascular techniques, SAFARI and trans loop techniques facilitate the ability to perform multivessel revascularization

Summary

- Endovascular technology has vastly increased our options for limb-salvage
- Our potential endo-options have out paced the evidence
- Patients with CLI need a personalized strategy for limb-salvage

Thank you