Effective Revascularization in CLI - Angiosomes and Common Sense -

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CLI - Introduction

• Inadequate perfusion often prevents healing of diabetic foot ulcers.
• Tibial-plantar (crural) arteries are frequently involved.
• Despite successful revascularization, ulcer healing may be a slow process, especially in ESRD patients.
• Anatomic location, characteristics of the ulcer, infection, and inadequate local ulcer treatment (pressure unloading) may explain delayed healing despite “successful” revascularization

Common Sense – CLI Revascularization

• Posterior tibial artery revascularization with a patent plantar arch is the preferred anatomy to heal ischemic foot lesions.
• Anterior tibial artery is often spared in diabetics and a SFA/popliteal-dorsalis pedis vein bypass is associated with high likelihood of forefoot lesions healing.
• Peroneal artery bypass or angioplasty may not achieve adequate foot perfusion.
  • Toe systolic pressure > 40 mm Hg
  • TcPO2 >30 mm Hg
Vascular Surgery ER Consultation

64 yo diabetic man with 5 day history of RT foot infection
ROS – foot pain, fever
PMH – prior spinal stroke
Meds – None
Labs – Hg 14 gm, WBC 16,500
  glucose 229; creatinine 0.65 mg%

Phy Exam: + femoral pulse – monophasic Doppler tibial artery flow
  odorous RT foot with purulent drainage

Angiosome Concept

Introduced by Taylor and Palmer in 1987
Divides the foot into 3-D anatomic units supplied by specific arteries
Foot is divided into five angiosomes
Anterior tibial – 1
Peroneal – 1
Posterior tibial – 3
Terminal branches: medial, lateral plantar arteries
Hypothesis – Foot Angiosomes

- Foot revascularization (bypass, endovascular) based on the angiosome concept of tissue perfusion will result in improve ulcer healing and limb salvage
- Two patient treatment groups
  - Direct - tibial artery angiosome revascularized
  - Indirect – ulcerated angiosome fed by collaterals from other angiosomes

Angiosome-targeted infrapopliteal endovascular revascularization for treatment of diabetic foot ulcers

- 250 limbs – 226 pts
- Diabetic foot ulcer
- Direct revasc – 48%
- Indirect revasc – 52%
- Faster ulcer healing in Direct revasc group (p<0.001)

Outcomes of angiosome and non-angiosome targeted revascularization in critical lower limb ischemia

64 pts with CLI with a single tibial artery to foot (ABI=0.5)

Lesion site:
- Forefoot: 81%
- Heel: 17%

**Direct** Revasc – 69%
- Open: 62%, PTA: 38%

**Indirect** Revasc – 31%
- Open: 48%, PTA: 52%

No difference in limb salvage


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Conclusion

- Revascularization of the CLI foot with tissue ischemia based on the angiosome concept is possible in most patients.

- Direct angiosome revascularization results in improved ulcer healing, but does not affect limb salvage or bypass graft patency.

- The angiosome concept may be more relevant for endovascular interventions than bypass surgery.