Calcified Arteries Are Hard To Clamp And Sew In Bypass Surgery: Technical Tips And Tricks To Deal With These Problems Successfully

No disclosure or conflict of interest

Limb Salvage Bypass Surgery

Infrapopliteal Prosthetic Bypasses

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- 1st Report on Infrapopliteal Bypasses
- Prosthetic grafts only
- Angiology: 1961

Bypasses to Plantar Arteries & Other Branches: An Extended Approach to Limb Salvage

Tibial Artery Calcification as Marker of Amputation Risk in PAD


Methods

- Prospective case-control study
- 118 symptomatic PAD: 111 volunteers w/o PAD
- Non-contrast CT lower extremity
  - Tibial calcification scored based on scoring software
**Tibial Artery Calcification as Marker of Amputation Risk in PAD**


- ROC analysis
  - TAC more sensitive and specific than ABI to predict major (A) and minor (B) amputations

**Lower Extremity Arterial Calcification: Amputation and Mortality**

Huang, et al. PLOS One. 2014. 9(2): 90201

- Results (n=82)
  - Patients in highest vs. lowest quartile of Calcium Score
    - Higher risk for amputation (RR = 2.88, 95% CI, 1.18-12.72, P=0.03)
    - Higher risk for all-cause mortality (RR = 5.16, 95% CI, 1.13-21.61, P=0.04)

**Duplex mapping: select the least calcified segment**

**Duplex mapping: select the best segment**

**Strategies to control bleeding during bypass operations**

Advantages:
1. Bloodless operative field
2. Avoids clamp trauma

Disadvantages:
1. Not effective in severe cases
2. Possible muscle damage

Matas, 1888
Esmarch bandage
Cuff pressure
Popularized by Victor Bernhard
**Strategies to control bleeding and allow suturing**

A simple technique to allow:

1. Bleeding control
2. Arterial incision
3. Suture placement

Previously these patients were deemed “unreconstructable”…
Bypasses to Heavily Calcified Rock-Like Arteries

- **Patients and Methods**
  - 355 infrapopliteal bypasses in 298 patients
  - Mean age = 72 (Range 39-99 years)
  - Critical ischemia
  - Autogenous vein grafts (n=169), ePTFE (n=163), composite graft (n=23)

- **Degree of calcification noted by operating surgeon**
  - Group I (116) no calcification
  - Group II (203) mild to moderate calcification
  - Group III (36) severe calcification

- **Conclusion**
  - Calcium deposits are located in the media, specifically in the internal elastic membrane
  - Calcified plaque is closer proximity to intima than adventitia
  - Fracture technique injured intima in 1/3 of cases, no cases of adventitia perforation
**Conclusion**

- Repair intimal damage is paramount
- Thick, small vessels ≤ 1 mm diameter with heavy calcifications had a high failure rate (90%) 
- Limb salvage rates are comparable to bypasses performed to non-calcified vessels