Retrograde Directional Atherectomy from Pedal or Popliteal artery sites: Technique and Advantages

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Current Status of pedal artery access

- Standard “up and over” and antegrade access results in 20-30% failure rate for crossing a complex femoral-popliteal occlusion in CLI patients
- Pedal artery access has been recently established as an alternative technique for CLI patients.
- Simultaneous antegrade common femoral and pedal artery access often utilized

Advantages of pedal artery access

- Small diameter of tibial vessels may help to increase the successful crossing of catheter or wire through occlusion.
- Less likelihood of entering side branch or collateral.
- The most difficult portion of the occlusion is the proximal cap; the distal cap is often softer and less difficult.
- In cases of occluded short segment tibial or popliteal arteries, the pedal approach may offer a shorter arterial segment to cross with balloons, catheters, and stents than traditional ipsilateral or contralateral approaches.
- Useful in cases in which vessel size precludes use of embolic protection devices during antegrade or retrograde femoral approaches.
- May have safety potential in obese patients in whom a groin approach may not be feasible or who cannot be turned to a prone position for popliteal access.
- May have a role in patients having a hostile or infected groin in which conventional intervention is not feasible.

Disadvantages of Pedal Artery Access

- Small-diameter vessels are prone to spasm and dissection.
- Vessels are often calcified.
- Approach near the ankle may cause significant difficulty in sheath passage, because of the sharp angulations.
- Long procedure time and excess contrast use.

Primary therapy from pedal artery access alone

- Rarely performed
- Concern for injury to pedal vessel with use of large sheaths (6F)
- Many devices may not track through small pedal vessels

Disclosures

- Medtronic - Consulting
Advantages of Pedal Artery access alone

- >90% of tibial access cases can accommodate a 6F sheath
- NO closure devices needed
- Small chance for hematoma formation
- NO flat bedrest required
- Minimal risk of infection
- Discharge within 1 hour of procedure

Tips and Tricks

- Start with .018 stiff micropuncture sheath with US guided access
- Peripheral IV heparin should be given at this time ~50 units/kg
- Use a 6FR Terumo short glidesheath with .014 dilator - insert a few centimeters only.
- Administer 5000 units Heparin through sideport of sheath.
- Goal ACT > 300
- If patient can tolerate, 200 mcg of nitroglycerin should be administered through sideport of sheath immediately upon entry and placement.
- Use nitroglycerin liberally in case
- Flush the sheath with heparinized saline frequently after any exchange of catheters, wires, devices.

Concerns for Retrograde directional atherectomy (RDA) in cases from pedal artery access

- Risk of embolization
- Can’t use embolic protection devices
- Often large devices may not track through small tibial vessels
- Risk of spasm/dissection/thrombosis

RDA in CTO cases from pedal artery access - TIPS & TRICKS

- The nosecone is actually "your friend" by having it in front of the cutter.
- Make 3-4 quadrant cut in SFA/popliteal CTO’s but DO NOT extend the cut all the way through the most distal cap (proximal in the SFA) immediately- save this for the end.
- By not atherectomizing through the most distal cap in relation to your sheath, the nosecone acts as a “cork” keeping the flow from rapidly improving
- At the end make 3-4 SHORT passes in distal cap in separate quadrants to open flow up through the rest of the former CTO and limit chances of having an embolic event
- If not a CTO, limit passes to no longer than 2-3 cm’s then pack the nosecone

Champaign – Peoria Experience with RDA

- 157 cases of RDA done over 18 months
  - 142 pedal access
    - Posterior Tibial artery: 111 cases
    - Anterior tibial artery: 29 cases
    - Peroneal artery: 2 cases
  - Sheath size in tibial vessels
    - 6F utilized in all cases
  - 15 direct popliteal artery access
    - 6F sheath utilized in all cases
- Embolic event noted in 2 of 157 cases

Case 1
Summary

- Pedal artery access has established itself as a good alternative for complex/difficult LE lesions
- Our practice is using this access technique more frequently as a primary access
- Our series demonstrates safety and advantages in utilizing RDA