Simple Techniques for Crossing CTO Using Only Catheters and Wires: When and How Often Are Special Techniques Needed

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Faculty Disclosure

Consultant Medtronic, Boston Scientific, Cardinal Health, Volcano

We Stand United

CTOs

Percutaneous treatment of peripheral arterial Occlusion has evolved greatly:

1. Improvement in Techniques, Wires, Catheters, Balloons and stents Lower Profile System, Atherectomy Devices

2. Devices to Cross the Occlusion and Re-enter the True Lumen

How Often Devices Needed?
Based on Three Things

1. Endovascular Experience/Skills
   - Beginner, Intermediate, or Advance: Advance level < 10 %

2. Techniques Used

3. Complexity of the CTO Lesion

Subintimal Angioplasty/CTO

Permits creation of Dissection plane + Re-entry without reducing future bypass options

Create a New Non-diseased channel underneath the diseased lumen area
Angioplasty Attempts/Immediate Failures

- Of the 224 patients allocated to angioplasty, 216 underwent attempted angioplasty.
- Of these, 43 (20%) were considered immediate failures:
  - Lumen could not be crossed with guidewire
  - Lesion crossed subintimally, but could not be re-entered
  - Perforation
  - Patient could not tolerate procedure
  - No lesion upon angiography
  - Lytic/Aspiration Resistant Thrombosis

BASIL Trial participants, Lancet 2005; 366:1925-34.
Distal SFA Occlusion

Advance Catheter & Wire under Roadmap

- Advance a 120 cm angle 4 Fr. Tempo Aqua over a .035 angle Glide wire 280 cm toward “Start” point
- Force the wire into the Occlusion “Prox Cap”
- For Long occlusion form a loop by passing wire back and forth.

Advance Catheter & Wire under Roadmap

- Advance angle 4 Fr. catheter over a .035 angle Hydrophilic wire toward “Start” point
- Force the wire into the Occlusion
- For Long occlusion form a loop by passing wire back and forth.

Advance Catheter & Wire under Roadmap

- Advance the Wire and Catheter into the occlusion (FORCE IT)

Advance Catheter & Wire under Roadmap

- Advance the Wire followed by the Catheter until the “End” point is reached
- At this point “End” point and distal native vessel should be visualized on the Roadmap

Advance Catheter & Wire under Roadmap

- Pass the loop 0.5-1.0 cm into the patent distal native vessel followed by the catheter
Advance Catheter & Wire under Roadmap

- By this point the wire and catheter has entered the True Lumen (feel the resistance). Wire easily pass distally.
- Pull out the wire and back bleeding from catheter (+) for true lumen access.

True Lumen

- Gently hand inject contrast to confirm (True Lumen).
- DO NOT inject if No back bleeding (stain the area).

Critical Point

- Must Enter Wire into the True Lumen at the “END” Point.

Do Not Pass the wire too far beyond the “END” point.

- Extend the dissection distally ‘Convert AK to BK bypass’
- Compromise important collaterals.

Completion Arteriogram
Intraluminal CTO

- Straight tip Wire and Catheter
- 4F catheter and .018 Hydrophilic wire

Balloon Assisted CTO
Crossing and Re-Entry Devices

- Have increased the success of CTO and having a successful outcome
- Decreased need for retrograde approach esp popliteal
- Decreased need for Bypass Surgery
- Decreased stenting of “NO STENT” zone
- Decreased length of stented segment
- Decreased amount of Radiation and Contrast

Re-entry Devices

- Not a Crossing tool, but a Re-entry tool (RD)
- Must pass through the Occlusion first before using (RD)
- Must get to the “Point of Reconstitution”

Arterial Occlusion

Aortic, Iliac

Femoral, Tibial

Cross Lesion

FrontRunner

Enter True Lumen

Outback Re-entry Pioneer Catheter

Endovascular Intervention

Crossing Device

FRONTRUNNER XP CATHETER

- Percutaneous catheter-based technique of controlled blunt microdissection (CMD)
- The catheter’s blunt tip engages the lesion to penetrate the proximal cap of the CTO
- The tip is actuated and delivers enough force to displace plaque, while minimizing the risk of vessel perforation

FRONTRUNNER XP CATHETER

- Repeated application of controlled blunt microdissection enables further device advancement until it reaches the distal end of the occlusion
- Micro-channel creation enables guidewire access for percutaneous intervention
Crossing Device (Frontrunner XP)

- Penetrate Cap with Jaws Open
- Advance FR with Jaws Closed

May enter True Lumen by FR

Blood return, inject 3 cc thru Micro Guide

Pass Wire thru MGC

Stay under True Lumen by FR

Completion Arteriogram after EVI

Runoff

Re-entry Device—Pioneer Catheter

- Using IVUS component, orient catheter toward true lumen by rotating the entire catheter.
- Verify position with fluoro.

True Lumen Entry
Outback LTD Re-Entry Catheter

- Deploy cannula in either "T" or "L" view
- Advance wire
- Retract needle
- Remove device

Outback® LTD™ Orientation Markers

Locate  
Time  
Deploy

Hold On to the Handle while “L” and “T”

Deploy Needle

Non Hydrophilic Wire

Gently Pass .014 wire while Needle is deployed

Remove OD, only after Needle is pulled back

Completion Arteriogram after EVI
Always Check Distal Run Off

Distal Aorta and B/L C. Iliac Occlusion

Pioneer- IVUS

B/L Iliac PTA & STENTING

AVIOD SURGERY!

- Successful CTO can be accomplished using meticulous techniques, and attention to details
- Either wire&catheter technique and/or Crossing--- Re-entry Device

Don't ever give up!