Don’t Get Stuck!

Lessons to be Learned in CLI Interventions About Progressive Algorithm Used in Treating Coronary CTOs

Amjad AlMahameed, MD, MPH
Interventional Cardiologist and Endovascular Specialist
Cardiovascular Institute of the South
Houma, LA, USA

18th Annual Conference
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THE PERIPHERAL EVENT OF THE YEAR
Setup for Success

Don’t Get Stuck

• Have the tools necessary to embark on these cases (wires, catheters, sheaths, re-entry devices, hockey-stick US probe, atherectomy devices, covered stents, DCB, DES, surgical backup)
• Have adequate time allocated to complex PAD (CTO, CLI/limb salvage) cases (*CTO cath lab day concept*)
• Stage procedure if necessary (maximal flouro time and contrast volume cutoffs)
• Communicate with patient, family, referring doc, and other vascular clinicians pre- and post-procedure and discuss expectations
• Cath lab and administration support for complex PAD program
• Ongoing quality assessment and case/peer review process
• Share knowledge, educate, and continue to learn
• Declare procedure objective during Time Out
• Perfusion = tissue viability and symptom relief (regardless of the angiosome)
• Dilute contrast, targeted images, incorporate Co2 (AK)
• Respect the calf and avoid causing compartment syndrome
• Understand collateral network and anatomy of unopacified vessels (assess other leg)

• You need to fit these procedures in your cath lab schedule – Communication with referring/vasc surg backup/cath lab schedulers and staff
• Insist on excellent quality angio, review carefully, plan strategy to achieve stated objective(s)
• know when to quit
• 97% Technical success rates in TASC C and D lesions associated with >90% limb salvage+*

The Hybrid Algorithm for CTO PCI

provisional approaches

Dual Catheter Angiography

yes
1. Clear proximal cap
2. Good Distal Target

no

Antegrade

yes
Wire escalation fail
Dissection Reentry (crossboss-stingray)

no

Retrograde

yes
3. Length < 20mm

no

Wire escalation fail
Dissection Reentry (reverse CART)

fail
Dissection Reentry (reverse CART)

fail
Dissection Reentry (crossboss-stingray)
Define Type of Proximal and Distal CTO Caps (Concave vs. Convex)

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- Proximal and distal cap shapes should be assessed via selective high-quality DSA angiography performed both antegradely and retrogradely.
- Initial Ca++ common at the cap while medial and adventitial Ca++ usually seen inbetween the caps.
- May help selection of primary crossing route.
1. **Is antegrade access feasible?**
   ① Disease in the aorta, ipsilateral iliac, CFA, profunda, and proximal SFA?
   ② High CFA bifurcation?

2. **If antegrade access isn’t feasible, is contralateral CFA feasible?**
   ① Prior AAA repair or kissing aortic bifurcation stents?
   ② Severe iliac tortuosity/calcification prohibiting sheath advancement?
   ③ Occluded contralateral iliac?

3. **Assess need for alternative retrograde tibiopedal access:**
   ① Multilevel disease present?
   ② Very long CTO?
   ③ CLI/Limb salvage?
   ④ Proximal CTO cap in the SFA/popliteal region, and reconstitution is in the mid to distal tibials?
   ⑤ Accessible tibiopedal **target** vessel(s)
   ⑥ “**True**” reconstitution segment(s) identifiable by angiography?

4. **Avoid temptation to embark on complex Fem-Pop CTO/CLI/Limb Salvage from radial or brachial approach**
   ① Deconstructed vector forces by steep angulation
   ② Decreased pushability and trackability
The Hybrid Algorithm for Lower Extremity CTO/CLI PTA

**CLI/Limb Salvage? (Rutherford 5, 6)**

**Claudication? (Rutherford 3, 4)**

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**Initial diagnostic DSA Angiography via L Radial Access**
- Assess anatomy, level(s) of disease/CTOs, reconstitution segment
- Understand the morphology of the CTO cap
- Determine feasibility of antegrade approach
- Verify need for alternative (retrograde tibiopedal) access
- Place a radiopaque marker to assess with landmarks going forward

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**Antegrade approach feasible?**
- Insert 5 F
- Braded Sheath
- Antegrade angiography

**Target vessel tibiopedal Access Indicated/Feasible?**
- Obtain Tibiopedal access
- Retrograde Angiography

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**Contralateral CFA Access (Up-and-over)**
The Hybrid Algorithm for Lower Extremity CTO/CLI PTA

Antegrade access

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Tibiopedal access

Dual Catheter Angiography

Concave proximal cap
CTO <150 cm
Reconstitution in SFA, P1 or P2

Yes

Antegrade crossing
• Escalate catheters
• Escalate/de-escalate wires
• Dissection/Re-entry device

Unsuccessful crossing

Successful crossing

Definitive Therapy

Yes

Externalize wire reverse access

No

• Retrograde access
  • Tibiopedal
  • SFA/Pop
  • Schmidt access

No

• SAFARI
• CART
• RE-CART
• RE-BACK

Yes

Successful wire connection (crossing)
Direct Stent Puncture Technique:

- Direct puncture of the mid-portion of stent under fluoroscopic guidance
- 18 gauge needle, .035 wire retrograde in the lumen of the stent
- Wire directed or snared into proximal catheter
- Use when prior attempts created large SI space
- Advance 3.0-4.0 mm balloon from below over retrograde wire (in SI space or within CTO)
- Advance antegrade Outback from above over the antegrade wire (in the SI space of within the CTO)
- Point Outback needle toward the inflated retrograde balloon

- Puncture the balloon
- Advance the antegrade wire into the retrograde balloon and apply negative pressure to collapse the retrograde balloon on the antegrade wire
- Pullback the collapsed retrograde balloon-trapped antegrade wire combination into the distal true lumen
"There is no elevator to success. You have to take the stairs."

- Zig Ziglar
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