SFA Intervention; The End Justifies the Means

Heavy Calcific FP Lesion:
How to Cross with Wire and Balloon?

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Wire Crossing Strategy For Heavily Calcified FP CTO

1. Intraluminal Approach
   Conventional wire – wire escalation up to Astato 30g
   New intraluminal device – Crosser, Truepath ...
   **Bidirectional approach by retrograde puncture**

2. Subintimal Approach
   Reentry with guidewire – loop method, harder GW
   Dedicated reentry device – Outback, Pioneer
   **Bidirectional approach by retrograde puncture**
Learning with Cases
Focal Severe Calcified CTO Case

- M / 71
- DM, HTN
- Right 4th toe ulcer
Antegrade intraluminal wiring - Calcified Focal P1 CTO

CXI + Halberd failed
→ CXI + Astat 30g

Multidirectional view helpful
The feeling of strong resistance when pulling back the wire inside the CTO body (i.e. The guiding catheter is drawn into the lesion) → GW tip; mostly subintima or wrong way

The feeling of no resistance, and the wire tip moves freely → GW tip; either in the true lumen or in the extravascular space.

CXI + 0.018” Astato 30g
Calcification Silhouette → Guidance For Intraluminal Passage
Hard proximal cap case

MP + Terumo
→ Cut MP tip + Reverse tip Terumo
→ Cut MP tip
   + Microcatheter
   + Astato

SFA ostial CTO

2.0x15mm
Ruptured pSFA Ostial CTO

Rupture → Balloon tamponade

Retrograde P3 access
Ruptured Hard Proximal Cap – IVUS Study

Extraluminal passage of balloon catheter
Ruptured Hard Proximal Cap

Prolonged ballooning through a retrogradly passed wire

DCB + Spot stenting
ISR with Heavy Calcification

M/85, DM, HTN, S/P CABG 17 YA
pSFA and dSFA stenting, 4 YA at the other hospital
ISR with Heavy Calcification

Intraluminal passage of hard ISR CTO
(OTW balloon + soft / hard GW)
ISR with Heavy Calcification

Failed intraluminal → Subintimal

Retrograde access from ATA → difficult d/t P2 calcification

Redo antegrade subintimal tracking → Failed landing into the distal stent
ISR with Heavy Calcification

Redo retrograde…
4 Fr sheath + 4 Fr MP + Stiff Terumo

Broken MP tip

Snaring with bended 0.014” GW
ISR with Heavy Calcification

Direct puncture for the stent

Redo retrograde subintimal tracking → Failed landing into the distal stent

Retrograde subintimal tracking → Antegrade GW landing to the distal stent

Balloon-expandable stenting for the undilatable subintimal path
ISR with Heavy Calcification
Devices used

- Back-up catheters (x5)
  5Fr MP x1, 4Fr JR x2,
  5Fr Glide x1 + 4Fr Glide x1
- Microcatheters (x4): CXI x2, CXC x1, Trailblazer x1
- Wires (x29)
  0.035 Terumo wire: Stiff Terumo x4, Angled-J x3, Angled x2, Strait x2,
  0.018 wires: V18 x1, Astato 30 gm x2
  0.014 wires: Regalia x6, Command ES x6, Astato 20 gm x2
- Balloon catheters (x10) ……

7 hrs procedure, but bankrupt… T.T.
ISR with Heavy Calcification, at 2 months

Successful limb salvage
# Failed Device Delivery After GW Passage

**- Suggested solution -**

## Augmented guide support
- Ipsilateral antegrade approach >>
- Bigger sheath
- Sheath advancement nearest the lesion
- Mother-child technique using a Guidezilla / Guideliner
- Anchor wire / Buddy wire
- Bidirectional access (Retrograde)
  - Give better pushability
  - BADFORM technique

## Lesion Modification
- Balloon assisted microdissection (BAM) with the most slender device
  - Armada XT OTW is my favorite
- Microcatheter (Corsair, Tornus...)
- External piercing
- Intentional balloon rupture
- Rotablation
Focal calcified pATA CTO

5 Fr Ansel

Armada XT OTW
1.5x20 mm
→ Failed passage
→ BAM, failed
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6 Fr Ansel + Guidezilla

+Corsair

Retrograde dorsalis puncture

Armada XT OTW 1.5x20 mm → Failed passage
Simultaneous advancement of both GW and balloons

BADFORM (BAlloon Dilatation using a FORcible Manner)

Remove friction between the wire and the balloon

→ Easier delivery
When all the efforts fail

External piercing
Treatment Options for Complicated FP Disease

- Balloon PTA alone
- BMS
- Atherectomy
  - Directional / Rotational
    - Drug-coated balloons
    - Atherectomy + DCB
    - Interwoven nitinol stent
    - Drug-coated stents
- Graft stent

The main devices of these days
Limitation of DEB for TASC II C/D FP Disease

Just a balloon itself…

- Smaller lumen gain
- Elastic recoil
- Dissection and Acute closure
- Low drug efficiency for heavily calcified lesion
Treatment Options for Complicated FP Disease

- Balloon PTA alone
- BMS
- Atherectomy
  - Directional / Rotational
- Drug-coated balloons
  - Atherectomy + DCB
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The main devices for calcified lesion

Atherectomy Requires Intraluminal GW passage
Case

- M / 76
- DM, HTN
- Left calf claudication, Rutherford 3
- 2VD
  → medical treatment
mSFA calcific severe stenosis

Calcified mSFA stenosis  3.0 mm balloon
DAART

LX-C

5.0x150mm DCB

Final
68/M, ESRD on HD, Rutherford 3 claudication
Calcified SFA CTO

Long calcified SFA CTO → RAART planned

Failed proximal cap digging → Retrograde
Bidirectional Approach → Failed Intraluminal Passage

Bidirectional GW passage → 1.5 mm balloon → IVUS → Subintimal passage confirmed
IVUS-assisted Redirection of Guidewire
RAART with 2.4/3.4 mm Jetstream Device

Sticky burr, BD → Repeat until free motion → BU → Final exit (BD→ BU)
DCB Angioplasty & Final Result

After balloon angioplasty

Final
In-Stent Restenosis
M/69, DM
Both L/E CLI & Claudication, Rutherford 5 / 3
S/P both SFA long stenting, 3 YA
→ 6 sessions of repeat intervention
(other hospital)
After directional atherectomy

DCB angioplasty

Final
Left SFA ISR

Turbohawk atherectomy & DCB angioplasty

Final
Recurred claudication at 3 years
ABI 0.78/0.95

Contralateral approach
7 Fr Ansel sheath

Rotational angiogram
to confirm GW entry

Emboshield at P3

Jetstream atherectomy
2.1/3.0mm

↑ Radius of rotation
→ Wider excision

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No reflow after Jetstream, Mechanism?

Injection in the CTO lesion with a suction catheter

Opening CTO exit
DCB angioplasty (ART; AntiRestenotic Therapy)

Final angiography - RAART for Right SFA ISR CTO
Right SFA ISR CTO
Ipsilateral antegrade approach
7 Fr sheath

Jetstream atherectomy
2.4/3.4mm

Fully filled Emboshield

Final angiography
- RAART for Left SFA ISR CTO
85/F, Resting claudication

Intraluminal guide wire passage

CXI + Gladius

Failed GW passage at mSFA level
USG-guided Intraluminal wiring
Jetstream Atherectomy and DEB Angioplasty
Wire Crossing Strategy For Heavily Calcified Femoropopliteal CTO

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   Conventional wire – wire escalation up to Astato 30g
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2. Subintimal Approach
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My Favorable Wire Crossing Strategy For Heavily Calcified Femoropopliteal CTO

1. Intraluminal Approach
Conventional wire – wire escalation up to Astato 30g
*IVUS-assisted parallel wire technique
*Surface ultrasound-guided intraluminal access
Bidirectional approach by retrograde puncture
To accomplish atherectomy and DCB angioplasty
AART (Atherectomy + Anti-Restenotic Therapy)

2. Subintimal Approach
Late option for ugly Ca++, failed intraluminal, poor condition
AART for Calcified CTO
Better Results with Nothing Behind !!

Thanks for the Time