Crossing Techniques for challenging femoropopliteal CTO
- How I do it -

Hiroyoshi Yokoi, MD
Fukuoka Sanno Hospital
Fukuoka, Japan
Disclosure

Speaker name:

..................Hiroyoshi Yokoi...............................................................

I have the following potential conflicts of interest to report:

☐ Consulting
☐ Employment in industry
☐ Stockholder of a healthcare company
☐ Owner of a healthcare company
☒ Other(s)  Cook, Termo, BSJ,

☐ I do not have any potential conflict of interest
Geographical Scope of EVT Physicians

**North America**
- 40% VS
- 40% IC
- 20% IR

**Europe**
- 10% IC
- 70% IR
- 20% VS
- 30% IC
- 50% IR
- 20% VS
- 10% IC
- 70% IR
- 20% VS
- 30% IC
- 35% IR
- 35% VS

**Asia-Pacific**
- 10% IC
- 30% IR
- 60% VS

**Latin America**
- 20% IC
- 30% IR
- 50% VS

IC; Interventional Cardiologist  IR; Interventional Radiologist  VS; Vascular Surgeon

Japanese EVT-CTO wiring techniques developed from PCI
Progress of CTO-EVT in Japan

Factors contributing to progress of CTO EVT

• Antegrade approach
  0.014-0.018 stiff and tapered CTO wire technology
  Imaging Guided approach (Surface echo, IVUS)

• Retrograde approach
  Distal site puncture technique
  Trans-collateral approach
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Which wire is appropriate for CTO?

- **0.014** or **0.018** or **0.035**

In Japan, **0.014-0.018 inch guidewire** is favorable than 0.035-inch guidewire in CTO intervention.
How I shape the tip of guidewires?

For non-CTO lesions:
- Use a small needle to shape the tip.
- Shaping has smooth curve.
- The diameter of the curve is 3 to 6 mm.

For CTO lesions:
- We bend the tip.
- 2 bending points.
- Distal bending is only 1 to 2 mm in length.
How to handle guidewires for CTO lesions?

• There are 3 types of techniques to manipulate the guide wires:
  1) Controlled Drilling Technique
  2) Penetrating Technique
  3) Sliding Technique

• For the usual or tortuous lesions, 1) may be better.
  Non tapered tip GW or hydrophilic plastic GW

• For the very hard lesions, 2) may be better
  Tapered tip GW with strong penetration power

• For the micro-channels present, 3) may be better.
  Tapered tip plastic-jacket hydrophilic GW
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Treasure is a hydrophilic coated 0.014-0.018” PTA guidewire, which possesses superior torqueability due to its structure using thick stainless steel wires for the spring coil.

High torque performance
Good for controlled drilling
Detailed characteristics

Balanced power to cross the highly resistant lesions

- Tip load: 12gf
- Balanced support shaft design
- Micro-cone tip
- Composite Core
- Mini pre-shape

Advantages in the occluded lesion:
- Push transmission
- Penetrability
- Torque response
- Shape retention
- Easily catches the entry point of the occluded lesion
- Easy directional control
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Astato is a 0.014-0.018" hydrophilic coated PTA guidewire, which possesses high penetration power with its 30g tip load and tapered design down to 0.013".

High penetration force
Good for penetration
**Naveed 4 Hard 15 / Hard 30 / Hard 50**

Variety of heavy weight tip load wires for CTO lesions

<table>
<thead>
<tr>
<th></th>
<th>Length</th>
<th>Distal Diameter</th>
<th>Shaft Diameter</th>
<th>Coil Length</th>
<th>Radiopaque Marker</th>
<th>Hydrophilic Coating</th>
<th>Coat Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard15</td>
<td>190cm</td>
<td>0.012”</td>
<td>0.013”</td>
<td>7cm</td>
<td>7cm</td>
<td>8cm</td>
<td>Hydrophilic/PTE</td>
</tr>
<tr>
<td>Hard30</td>
<td></td>
<td>0.013”</td>
<td>0.014”</td>
<td>5cm</td>
<td>5cm</td>
<td>5.5cm</td>
<td>Hydrophilic/PTE</td>
</tr>
<tr>
<td>Hard50</td>
<td></td>
<td>0.013”</td>
<td>0.014”</td>
<td>4cm</td>
<td>4cm</td>
<td>5.5cm</td>
<td>Hydrophilic/PTE</td>
</tr>
</tbody>
</table>

*Naveed Hard15,30,50 was previously sold by FMD as NEXUS series
Jupiter MAX product spec.

- **Length**: 190 cm, SUS core
- **Radiopaque**: 3 cm
- **PTFE Coating**: 0.014 inch
- **Hydrophilic Coating**
- **Tip load**: 100 g
- **25° 1 mm pre-shaped**
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CTO Wire Escalation Techniques

Hybrid Sliding-Drilling-Penetration

- Sliding (if micro-channel present) (Filder XT)
  ‣ Not cross
- Controlled Drilling (Treasure XS 12, Halberd)
  ‣ Not cross
- Penetrating (Astato XS 30, Naveed Hard 50, Jupiter MAX)
  ‣ Not cross
- Sliding (Knuckle wire) (0.35 Radifocus1.5mmJ)
Intraluminal vs. subintimal

All the effort we do for getting the intraluminal space using several techniques and devices.
Antegrade CTO Wiring

Parallel wire technique

First wire

Second wire
Deflection and directional control with the balanced penetration force and torque response

- Balanced support shaft design
- Micro-cone tip
- Composite Core
- Mini pre-shape

- Push transmission
- Penetration
- Deflection control
- Torque response
- Shape retention

Advantages in the occluded lesion
- Easily catches the entry point of the occluded lesion
- Easy directional control

Tip load: 7.5gf
The importance of active wire control and the required wire performance

Active wire control

Push force

Changing the direction by controlling the wire tip with torque.

Make a course correction when the wire goes out from the path for wire crossing
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0.018 Treasure GW manipulation with 4F CXI catheter through novel side-grooved sheath by surface echo guidance
Echo guide (SFA-DFA Bif)
Eagle Eye® Platinum ST (Volcano)

Navifocus WR (Terumo)

OptiCross (Boston)
To identify in which direction the true lumen is present.
IVUS-guided parallel wiring

CTO-exit
IVUS-guided technique for long SFA CTO

Prox

Mid

Dis

wire preceding

IVUS preceding

or

wire preceding

or

IVUS preceding
IVUS preceding SFA-proximal to mid

by courtesy of Kawasaki
Wire preceding

(by courtesy of Kawasaki)
Antegrade approach sometimes fails

Advancing into CTO lumen

Wiring in CTO body

Successful penetration
Retrograde access is key to success

Antegrade approach

Antegrade fails

Retrograde approach
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Take Home Message

• EVT for SFA- CTOs is still technically developing.
• Generally, we have to be very flexible to change our strategy during EVT.
• We have to be familiar with all of the techniques, which have been developed.
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