Guide wire selection

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BTK interventions

• Navigation
  – Long stenosis/multiple stenoses
  – Tortuous anatomy
    • Transcollateral
    • Pedal arch

• Crossing CTO
BTK interventions

• Navigation and CTO crossing require different guide wire characteristics
• In both cases you need control
  – Torque control
  – Control of guidewire course within CTO
  – Shape retention
Crossing CTO’s

• Guidewire technology
  – Understanding of how guidewires are constructed

• Crossing techniques
Guidewire technology

The Three Most Important Design Features that Impact Performance

- **Distal Tip**
  - Tip Load
  - Spring Coil
  - Taper
  - Coating

- **Core**
  - Thickness
  - Material
  - Smooth or Abrupt Taper

- **Coating**
  - Hydrophilic + Polymer
  - Hydrophilic on Spring Coil
  - Hydrophobic
  - Uncoated Distal Tip
20th century wire construction

3-piece: Stainless Steel Shaft and Ni-Ti tip and stainless steel ribbon

2-piece: Stainless Steel Shaft and Ni-Ti tip

1-piece: All stainless steel core from proximal to distal
21st century wire construction

- Round core
- ACTONE
  - Less Torque Whip
  - Better Torque Response
  - Protect Core From Kinking
  - Increases Torque Force
21st century wire construction

Tapered Tips & Pre-shaping

Micro-cone Tip

Mini Pre-shape

VS
## Crossing techniques

### TABLE

<table>
<thead>
<tr>
<th>Technique</th>
<th>Indication</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antegrade Standard sliding</td>
<td>Softer and less calcified lesion, microchannel, or subtotal lesion</td>
<td>Less traumatic.</td>
<td>Possible low success rate, not suitable for hand lesions.</td>
</tr>
<tr>
<td>Drilling</td>
<td>Short segment occlusion</td>
<td>High chance of intraluminal crossing.</td>
<td>Not suitable for long occlusions or complex cases. Modulating the strength of the drilling motion limits the risk of perforation, but also limits the chance of success.</td>
</tr>
<tr>
<td>Penetration</td>
<td>Hard or calcified lesion, reentry from the subintimal space into true lumen</td>
<td>Increases the success rate of antegrade crossing.</td>
<td>Potential risk of vessel perforation.</td>
</tr>
<tr>
<td>Parallel wire</td>
<td>Any situation</td>
<td>Increases the success rate of antegrade crossing.</td>
<td>Need for multiple guidewires.</td>
</tr>
<tr>
<td>J-loop, knuckle wire, subintimal angioplasty</td>
<td>Long occlusion</td>
<td>Rapid traversal of long total occlusions, less likely to cause vessel perforation.</td>
<td>Risk of compromising branches or being stuck in the calcified lesion. Potential failure of reentry into the true lumen.</td>
</tr>
</tbody>
</table>

### Retrograde

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<tr>
<td>Distal tibial or dorsalis pedis artery puncture</td>
<td>Preserved distal vessel</td>
<td>Stronger backup force to cross the lesion.</td>
<td>Potential risk of puncture site occlusion during the procedure or during follow-up.</td>
</tr>
<tr>
<td>Transcollateral</td>
<td>Unavailable reconstituted vessel and sufficient collateral vessel</td>
<td>No need for retrograde puncture.</td>
<td>Insufficient backup force. Potential risk of injury to the collateral vessel.</td>
</tr>
<tr>
<td>Transpedal arch</td>
<td>No distal vessel available</td>
<td>Possibility of complete revascularization.</td>
<td>Insufficient backup force.</td>
</tr>
<tr>
<td>Metatarsal or plantar artery puncture</td>
<td>Occlusion of the pedal arch</td>
<td>Possibility of revascularization of the dorsalis pedis artery or plantar artery.</td>
<td>Failed procedure resulting in urgent worsening of underlying toe ischemia.</td>
</tr>
<tr>
<td>CART, reverse CART; rendezvous, confluent balloon, looping wire</td>
<td>Failed reentry using conventional techniques</td>
<td>Increases the success rate of guidewire crossing.</td>
<td>Need for further dedicated devices.</td>
</tr>
</tbody>
</table>

CART: Controlled antegrade and retrograde tracking.
Sliding technique

- Ideal for soft lesions
- Tapered tip needed to increase likelihood of finding microchannels
- Pre-shaped tip for navigation
Sliding

Regalia XS 0.014”
Sliding

Regalia XS 0.014”
Drilling

- Requires tactile feel of torque response
Penetration technique proximal and distal cap

- Requires high penetration power and tip load

Kawarada O et al, JET 2014;21:266-280
Drilling and cap penetration

Halberd 0.014” mini pre-shape
Drilling and cap penetration

Halberd 0.014” mini pre-shape
Drilling and cap penetration

Halberd 0.014” mini pre-shape
Drilling and cap penetration

Halberd 0.014” mini pre-shape
J-loop technique

- Knuckle wire intraluminal (lambda)
- Subintimal tracking
- Requires soft hydrophilic tip
- Needs good shape retention

Kawarada O et al, JET 2014;21:266-280
Common features

- Lack of control (wire will go where it wants to go)
- Difficult to stay intraluminal
- Proper orientation in one plane, does not necessarily mean proper orientation in the other
Simulation model

Lesion length: 10cm
Lesion Diameter: 7mm
Crossing in AP view

Old wire technology
Crossing in bidirectional view

‘whipping’

Old wire technology
Essentials in crossing

• Cap penetration
  – Facilitated by micro-cone tip and mini pre-shape

• Intra-luminal crossing (intimal tracking)
  – Re-entry maybe difficult
  – Completely different approach
  – Learn to think in 2 dimensions, because now you have the tools!
Cap penetration

Halberd 0.018"
Shape retention

Crush test

Halberd 0.018”
Torque control
Torque control
Intimal tracking

PTA Guide wire for treating tight occluded lesion with strong torque force

By using deflection & control

Stiffness + Torque
Intimal tracking: concept

To guide the wire through the occlusion to the distal lumen by using deflection and rotational control.

- Penetrability
- Tip flexibility
- Tip shape durability
- Torque performance
- Torque response
- Lubricity

You guide the wire!
Guiding the wire to the distal true lumen with rotational control by using deflection which occurs when advancing a shaped GW.
Crossing in bidirectional view

New wire technology
Intimal tracking in practice

Occlusion popliteal artery, TTF and PA
Intimal tracking in practice

Recanalization
Intimal tracking in practice

No stump fibular artery

Soft tip guidewire slides off towards collateral
Intimal tracking in practice

Fluoroscopic view
Intimal tracking in practice

Halberd 0.014"

Micro-cone and mini-preshape > drilling
Intimal tracking in practice

Halberd 0.014”
Mini-preshape>re-directing
Intimal tracking in practice

Halberd 0.014”
‘Therapy-delivery’
Intimal tracking in practice
Differentiate between navigation and crossing

New guide wire technology allows better control in crossing
- Optimal torque control
- Intimal tracking
- Shape retention

Make the step of 2D to 3D, and think 3D

Be in control, because now you can
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