Subintimal or intraluminal, which way to go

Koen Deloose, MD
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)

I do not have any potential conflict of interest
Different CTO levels: predictors

- **Level 1 CTO**
  - CTO: <6 months
  - Short length
  - Long stump
  - No calcification
  - Good distal landing
  - No collaterals
  - Success > 90%

- **Level 2 CTO**
  - CTO: 6 - 12 months
  - Medium length
  - Short stump
  - Moderate calcification
  - Good distal landing
  - Some collaterals
  - Success ~ 80%

- **Level 3 CTO**
  - CTO: >12 months
  - Long length
  - No stump
  - Heavy calcification
  - Bad distal landing
  - Lot of collaterals
  - Success ~ 70%
Antegrade intraluminal approach

- Better preservation of collaterals
- Better suited for CLI “calcified” media vessels
- Allows more R/ options
- Results of PIER vary considerably...
- Lower technical failure rate:
  “not based on blind luck but on technical expertise...”
Sometimes you need some help...

Guide wires

Catheters
CTO devices
...of modern “2015” guide wire technology...
intraluminal start – wire advancement

- Straight tip (0.035 – 0.018 – 0.014) workhorses
- fast spin – torquer device
- Real CTO wires
...of modern catheters, CTO devices

- Low profile support catheters (CXI, Quick-Cross, Reecross, Enteer,...)
- Crosser (Bard°)
- Frontrunner (Cordis°)
- Wildcat (Avinger°)
- Truepath (Boston Scientific°)
- Crossboss (Bridgepoint Medical°)
Antegrade intraluminal approach

Mission accomplished

65.4% - 95%

Antegrade subintimal approach

- Workhorse wire first
- CTO wire if needed
- Guidewire ~ (balloon) cath unit
- (CTO devices)

Subintimal = eccentric plaque relocation
Subintimal recanalisation

- **Guidewire**
  - Workhorse 0.035
  - Angled / Straight
  - Stiff (“loop-game”)

- **Support**
  - Catheter : 4 F
  - CTO catheter
  - PTA balloon
  - Sheath
Subintimal recanalisation
Antegrade intraluminal approach

- 65.4% - 95%

Antegrade subintimal approach

- Workhorse wire first
- CTO wire if needed
- Guidewire ~ (balloon) cath unit
- (CTO devices)

mission accomplished

83.5%

Success re-entry site <2cm
But...sometimes....Re-entry difficulties

- Wide distal blind sac
- Calcium-load at re-entry site
- Perforations
Antegrade intraluminal approach

- 65.4% - 95%

Antegrade subintimal approach

- Workhorse wire first
- CTO wire if needed
- Guidewire ~ (balloon) cath unit
- (CTO devices)

Success re-entry site <2cm

Re-entry devices available / reimbursed?

mission accomplished

83.5%
Support of Re-entry devices

- OffRoad Re-entry catheter system
- Pioneer-catheter
- OutBack-catheter
Antegrade subintimal with re-entry devices

- Pioneer (Medtronic)
- Outback (Cordis)
- Enteer (Covidien)
- Offroad (Boston)

+7% extra

mission accomplished
Support of Re-entry device

- Difficulties tracking device over the wire through the lesion
- Difficulties with sharp aortic bifurcations
- Mechanical failures of the device
- Misuse of the devices

- REIMBURSEMENT...
Re-entry devices available / reimbursed?

- Antegrad subintimal with re-entry devices
- Retrograde intraluminal approach

+10% extra

mission accomplished

- Pioneer (Medtronic)
- Outback (Cordis)
- Enteer (Covidien)
- Offroad (Boston)
Retrograde approach

Retrograde is sometimes more easy...
Retrograde approach
Retrograde approach
Retrograde approach
Re-entry devices available / reimbursed?

Antegrade subintimal with re-entry devices

Retrograde intraluminal approach

- Pioneer (Medtronic)
- Outback (Cordis)
- Enter (Covidien)
- Offroad (Boston)

+10% extra

mission accomplished

86.3%

Sheathless/ micropuncture pedal access
- Femoral / popliteal/ distal
- 0.014 – 0.018 workhorse wires
- LP support (balloon) catheters
Re-entry devices available / reimbursed?

Antegrade subintimal with re-entry devices

Retrograde intraluminal approach

- Pioneer (Medtronic)
- Outback (Cordis)
- Enteer (Covidien)
- Offroad (Boston)

Bidirectional approach Michel-Angelo

- Sheathless/ micropuncture pedal access
- Femoral / popliteal/ distal
- 0.014 – 0.018 workhorse wires
- LP support (balloon) catheters

+10% extra

mission accomplished

86.3%
Bidirectional approach
Bidirectional approach

Rendez-vous technique
Bidirectional approach

Standard CART technique

• Bidirectional access
• Inflation retrograde balloon
• Advancing anterograde wire beside inflated retrograde balloon
• By deflating retrograde balloon, entering from antegrade the real distal lumen
Bidirectional approach

Reverse CART technique

- Bidirectional access
- Inflation antegrade balloon
- Advancing retrograde wire beside inflated antegrade balloon
- By deflating antegrade balloon, entering from retrograde the real proximal lumen
Re-entry devices available / reimbursed?

Antegrade subintimal with re-entry devices

Retrograde intraluminal approach

- Pioneer (Medtronic)
- Outback (Cordis)
- Enteer (Covidien)
- Offroad (Boston)

Bidirectional approach Michel-Angelo

- Sheathless/ micropuncture pedal access
- Femoral / popliteal/ distal
- 0.014 – 0.018 workhorse wires
- LP support (balloon) catheters

Mission accomplished

+10% extra
Conclusion

• Intraluminal is the best way to recanalize
• Modern wire, catheter and other device technology can help
• Subintimal is a valuable alternative
• Anterograde and retrograde accesses on different spots extend nowadays our endovascular armamentarium.
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