Intentional wire manipulation with IVUS guidance is only reliable method for antegrade approach in CTO

Takuma Tsuda, MD, PhD
Department of Cardiology, Nagoya Ekisaikai Hospital
Aichi, Japan
Disclosure

Speaker name: ........................................Takuma Tsuda.................................

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
Angiography showed left PTA CTO and long CTO between rt. SFA ostial to plantar artery with no island.
CTA also showed long CTO between rt. SFA ostial to plantar artery with no island.

How do you overcome this tough case??
It’s time to perform IVUS guided wiring !!!!

Key point of IVUS guided wiring is to co-register IVUS and angiography, but some steps below is required

step1): side branch method

step2): wire bias method

step3): co-registration

step4): Wiring !!!!
How to co-registration between IVUS and angiography

step1): side branch method

- If there was some side branch like IIA, DFA, ATA, PTA, Peroneal, side branch method could be useful method as a first step for reconstruction of 3D IVUS image.
- However, orientation must be ambiguous.
How to co-registration between IVUS and angiography step2): wire bias method

1. True lumen
2. 1st GW (on IVUS)
3. False lumen
4. 2nd GW

IVUS

angiography

rotate IVUS image

LAD 50°
RAO 35°
LAO 50°
AP 0°
How to co-registration between IVUS and angiography (step2): wire bias method

1. Identify true lumen on IVUS.
2. Align true lumen with first guidewire (GW) on IVUS.
3. Rotate IVUS image to align with angiography view.
4. Align second GW with true lumen on IVUS.

Angiography:
- LAD 50°
- RAO 35°
- LAO 50°

IVUS:
- AP 0°
- RAO 35°
- LAO 50°
- True lumen
- False lumen

1st GW (on IVUS) → 2nd GW
How to co-registration between IVUS and angiography (step3): co-registration

1. 1st GW (on IVUS)
2. 2nd GW

**true lumen**

**rotate cine angle**

**LAO 40° ~ 50°**

true lumen could not be separated from IVUS by AP 0°

true lumen could be separated clearly, and should exist left side of 1st GW by LAO 45°

Principal of GW manipulation

CCW

CW
How to co-registration between IVUS and angiography (step 4): Wiring!!!

1. 1st GW (on IVUS) → CCW45°
2. 2nd GW → CW45°
3. 2nd GW → CW90°
4. 2nd GW → CCW135°
After I progressed the antegrade wire step by step, I dilated the balloon at the lesion that IVUS confirmed as true lumen. Then, I progressed the first wire as a dummy wire. 3D-antegrade wiring was continued with IVUS guidance by the first dummy wire.
Then, I progressed the first wire as a dummy wire. 3D-antegrade wiring was continued with IVUS guidance by the first dummy wire.
Antegrade wire reached to popliteal artery with wire inside all true lumen.

EVT (1st session)

Rt. femoral A: 6Fr Parent (26)

MC: X-support (135), Corsair Armet (90), Crusade PAD (140)

GW: HT Command 0.014
    → Treasure 0.018 with IVUS guide
    → Halberd 0.014 with IVUS guide

Device: BARD SD (70)
    Crosser

BC①: Crosperio RX 2.0/40
BC②: Senri 4.0/20
BC③: Coyote 3.0/220
BC④: Metacross RX 7.0/220

Stent①: LIFESTENT SOLO 6.0/200
Stent②: LIFESTENT SOLO 7.0/200
Stent③: SMART CONTROL 8.0/40
IVUS showed the wire still inside the vessel. Finally, wire was passed to plantar artery by ultrasonography guided wiring technique. IVUS showed wire almost inside the vessel.
Final angiography showed one straight line with excellent antegrade flow.
2 weeks later, EVT to peroneal artery was performed due to incompleter wound healing. As the same with 1st session, IVUS guided wiring was performed to penetrate wire.

EVT (2nd session)

System:
Rt. femoral A: 6Fr Destination (45)

MC: Caravel (150),
Corsair Armet (90),

GW: HT Command 0.014
   → Gladius 0.014
   → Treasure XS12

Device: Crosser

BC①: ULTRAVERSE RX 2.0/40
BC②: SHIDEN 7.0/40
BC③: Coyote 3.0/220
BC④: Coyote 4.0/150
After succeeded to penetrate peroneal artery, long inflation with long balloon was performed.

EVT (2nd session)

System)
Rt. femoral A: 6 Fr Destination (45)

MC: Caravel (150),
Corsair Armet (90),

GW: HT Command 0.014
  → Gladius 0.014
  → Treasure XS 12

Device: Crosser

BC①: ULTRAVERSE RX 2.0/40
BC②: SHIDEN 7.0/40
BC③: Coyote 3.0/220
BC④: Coyote 4.0/150
But, finally IVUS showed that plantar was still inside CTO.
When ballooning to CTO site of planter artery, reperfusion by small vessel was obtained. Final angiography showed excellent antegrade flow.
Angiography
TCA
DP
IVUS
Re-entry device
Angiography
In the situation without chance of DP, TCA or Re-entry device, antegrade approach with IVUS-guided 3D wiring could be only promising method as a **gate keeper**, which requires high quality of wiring technique but provides reproducibility of the procedure.
Takuma Tsuda, MD, PhD.
Department of Cardiology, Nagoya Ekisaikai Hospital
Intentional wire manipulation with IVUS guidance is only reliable method for antegrade approach in CTO

Takuma Tsuda, MD, PhD
Department of Cardiology, Nagoya Ekisaikai Hospital
Aichi, Japan