A transvenous intravascular ultrasound-guided technique for chronic total occlusion of a below-the-knee artery

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Disclosure

Speaker name: Yasuhiro Takahashi

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
Background

- We performed endovascular treatment (EVT) of chronic total occlusion (CTO) of the superficial femoral artery (SFA) using the transvenous intravascular ultrasound (IVUS)-guided (TIG) technique.

- It is easy to retrogradely introduce a guidewire for insertion of an IVUS catheter into the SFV through some venous valves because the venous valve of the superficial femoral vein opens wide.

- In the below the knee (BTK) vein, it is difficult to do so because the venous valve is small and does not open wide.

- In this case, we succeed in antegradeley inserting an IVUS catheter in the posterior tibial vein through the medial malleolus and then we performed guidewire crossing of the CTO of the posterior tibial artery using the transvenous IVUS-guided technique.
Background

Transvenous IVUS-guided technique in the SFA CTO

Guidewire

IVUS catheter

SFA

SFV
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A 72-year-old woman with scleroderma who had history of endovascular treatment (EVT) for the right below the knee arteries was admitted to our hospital because of congestive heart failure.

During a long hospitalization, a bilateral foot ulcer worsened.

Therefore, a repeat EVT for the right BTK artery was performed.

Although skin perfusion pressure (SPP) improved on the right foot after treatment of the right BTK artery, SPP on the left dorsal and plantar was 11 mmHg and 14 mmHg, respectively.

Thereby, EVT for the left lower extremity arteries was performed.
Initial angiography
Initial angiography
Target lesion:
1. CTO of the left posterior tibial artery
2. Severe stenosis (PG 30 mmHg) of the left proximal SFA

Approach: Ipsilateral antegrade
Sheath: 4.5-Fr Parent Plus guiding sheath

Image guidance: Transvenous IVUS guidance
IVUS catheter Eagle Eye® Platinum ST
Introduction of a guidewire into the posterotibial vein
Insertion of an IVUS catheter (Eagle Eye® Platinum ST)
Procedure

Guidewire: Cruise 0.014-inch
Micro catheter: Caravel MC
Guidewire: Gladius 0.014-inch
Micro catheter: Caravel MC
Guidewire: Chevalier tapered 30-g 0.014-inch
Micro catheter: Corsair Armet
Guidewire: Chevalier tapered 30-g 0.014-inch
Micro catheter: Corsair Armet
Guidewire: Jupiter FC 0.014-inch
Micro catheter: Corsair Armet
Procedure

Transvenous IVUS after the guidewire crossing
Final angiography
**Procedure**

NSE PTA OTW 5.0 mm/ 40 mm

After balloon dilation
Endovascular treatment of the BTK artery has been performed commonly with conventional antegrade and bidirectional approaches.

These methods, which usually do not include image guidance except for fluoroscopy, do not ensure intimal tracking of a guidewire.

We believe that the transvenous IVUS-guided technique ensures intimal tracking.

Although a guidewire is difficult to insert retrogradely in the BTK vein against some venous valves for insertion of an IVUS catheter, in this case, we succeeded in antegradey introducing the IVUS catheter after insertion of the guidewire under fluoroscopic and ultrasonographic guidance.
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Discussion

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Discussion

- Intimal tracking was performed in most parts of the CTO lesion; thereby, the lesion was dilated by using a PTA balloon and optimally recanalized.

- Although transvenous IVUS did not supply optimal images in some parts of the CTO lesion, we judged that if a guidewire in two parts of the CTO lesion was in the intraplaque area, a part in between the two parts was highly possible to be also the intraplaque area.
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A transvenous IVUS-guided technique may be useful for endovascular treatment of below-the-knee arteries.
Thank you for your attention
Procedure

Transvenous IVUS

Usual IVUS
Usual IVUS after the guidewire crossing
Procedure

Guidewire: Gladius 0.014-inch
Micro catheter: Caravel MC
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