A protocol for IVUS guided lower limb revascularization with case examples

Successful CTO treatment with IVUS

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I have the following potential conflicts of interest to report:

- Consulting; Century Medical, Nipro, Terumo, Cordis
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s) Boston Scientific, Medtronic, GORE
The publication number of IVUS x Peripheral intervention
Not only technical success but also long-term durability

IVUS use in FP stenting for TASC II A–C lesions associated with higher primary patency rate.

The USE of IVUS resulted in a significant reduction the restenosis after EVT


<table>
<thead>
<tr>
<th>Arterial</th>
<th>Preintervention</th>
<th>Intraprocedure</th>
<th>Postintervention Optimization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iliac</td>
<td>3/6</td>
<td>2/3</td>
<td>1/3</td>
</tr>
<tr>
<td>Femoropopliteal</td>
<td>4/6</td>
<td>3/3</td>
<td>3/3</td>
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<tr>
<td>Tibial</td>
<td>6/6</td>
<td>3/3</td>
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<tr>
<td>Venous</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iliofemoral</td>
<td>5/5</td>
<td>2/2</td>
<td>1/1</td>
</tr>
</tbody>
</table>

Displayed are the proportion of clinical scenarios for each procedural phase that met “may be appropriate” criteria (yellow) or “appropriate” criteria (green).

Clinical expert consensus document on standards for lower extremity artery disease of imaging modality from the Japan Endovascular treatment conference

Short title: Imaging modality expert consensus document for peripheral intervention


From the JET Imaging consensus (JEIC) development Task Force

Masahiko Fujihara Cardiovasc Interv Ther. 2022 Jul 19.
The Types of IVUS

- **Volcano (Eagle Eye)**
  - 20mHz

- **Boston (OptiCross)**
  - 40mHz

- **Boston (OptiCross HD)**
  - 60mHz

- **Terumo (AltaView)**
  - 60mHz
Vessel size Evaluation by IVUS

- Reference (Distal normal vessel)
- Lesion Lumen + EEM

Vessel Size and Area!!!
In endovascular work, procedural and clinical success is needed.
0.035 J wire Loop technique

DUS guidance wire crossing

IVUS guidance wire crossing

IVUS preceding technique

Bidirectional approach by retrograde access

Subintimal approach with reentry device
Guidewire route for CTO

In the CTO, the true lumen is difficult to prove pathologically and both the true and false lumens are impossible to identify by IVUS.

Instead, we can use IVUS to identify the media in the CTO lesion and define the area within as the intimal space and the area outside the media but inside the adventitia as the subintimal space.

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Cardiovasc Interv Ther.
How to go passed the CTO lesion with IVUS?

1. Antegrade intimal space
2. Antegrade subintimal space
3. Retrograde intimal space/Antegrade subintimal space
4. Retrograde subintimal/Antegrade subintimal space
Four situations through the CTO lesion with IVUS:

1. Antegrade intimal space
2. Antegrade Subintimal space
3. Retrograde intimal/Antegrade subintimal
4. Retrograde subintimal/Antegrade subintimal
81yo
Male
R3 Claudication
Hypertension
Diabetes
24cm CTO
IVUS Preceding technique with short tip IVUS
83yo
Female
R5 CLTI
Hypertension
CKD
24cm CTO
Small Vessel

Ranger DCB 5x150
Ranger DCB 4x200
1st wire sub With IVUS

2nd wire 12g into intimal
65\textsuperscript{yo}
Male
R3 Claudication
Hypertension
Diabetes, Smoking
18cm CTO
Antegrade Subintimal

Retrograde via tibial

IVUS check
Antegrade SUB
Retrograde Intimal
Retrograde
2nd wire
Intimal

Antegrade
1st wire
(IVUS)
64yo
Male
R3 Claudication
Hypertension
Diabetes, Smoking
30cm CTO
Proximal cap
Un-catch

Retrograde
Via popliteal

Loon Technique
But un-catch
Prox space

Target retrowire
Manipulate antewire

IVUS confirmation
#1: Wire Rendezvous
(=Wire Snaring)

#2: reverse CART technique
controlled antegrade and retrograde subintimal tracking
58\textsuperscript{yo} 
Female 
R5 CLTI 
Hypertension 
Diabetes, ESRD on dialysis 
34cm CTO with severe calc
Masahiko Fujihara MD, Kishiwada Tokushukai Hospital, Osaka, Japan

Ante Sub
Retro Sub
Same Space

0.035 Loop and Loop

Retrograde Sub
Antegrade sub
Same Space

reverse CART technique
Aggressive PTA
Crack the vessel

PAVE with
VIABAHN
SUMMARY

• Evidence for peripheral intervention using IVUS has been increasing.

• Understanding vessel size and plaque morphology with IVUS contributes to improved clinical outcomes

• IVUS also helps with CTO wire passage and contributes to improved initial success rates

• Accurate wire position confirmation on IVUS is key.
Thank you for your attention

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JET2024
Fukuoka, Japan
JUNE 14(Fri)-16 (Sun) 2024