Japanese experience with transcutaneous and intravascular ultrasound to guide peripheral interventions

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Disclosure

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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
How to Cross the CTO lesions

- Only fluoroscopy
- Retrograde approach

Navigation

I don't know where to go.

Intravascular ultrasound (IVUS)
Transcutaneous ultrasound
Intraluminal approach is safety

In patients with long occlusive FP lesions, restenosis is more likely if IVUS shows a within-CTO intramedial route proportion of $>14.4\%$.

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IVUS guided Wiring

- Check the root of guide wire.
- If guide wire was subintimal space, operator recross the guide wire into intraplaque lumen.
- Check the vessel diameter
IVUS guided Wiring
IVUS guided Wiring
How to Cross the CTO lesions

- Only fluoroscopy
- Retrograde approach

Navigation

I don't know where to go.

Intravascular ultrasound (IVUS)
Transcutaneous ultrasound

Ultrasound guided wiring
Benefits of Ultrasound guided wiring

- Decrement of radiation exposure
- Decrement of contrast media
- Possible of wiring to the intraplaque lumen
- Only short time for passing the long CTO lesion, about 5-15 min.
- Safety of the first hard guide wire, 0.014inch GW
- Prevent complication
- Only antegrade approach
Don’t check the guide wire which was penetrated by operator. Our strategy is
1. Sonographer visualize the long axis view of the center of target occluded artery and hold on this view.
2. Operator penetrate with guide wire into this view as guide wire is visualized clearly.
Wiring at Longitudinal direction

180° rotation of GW
Operator selects the route at the superior or inferior.
GW is penetrated into the visualized view.

**Ultrasonography**

- Pullback
- Rotation 90°
- More rotation 90°
- Re-insert
Wiring at cross direction

GW is penetrated into the visualized view.
Combination of Operator and Sonographer
Self Ultrasound Guided EVT

TAI: trans ankle intervention

Contrast media: 20ml, procedure time: 70min
60 cases SFA-CTO

- **Subintimal $\geq 5$cm**: 4 cases (2.0%)
- **Subintimal $< 5$cm**: 46 cases (90.2%)
- **All intraplaque**: 48 cases (80.0%)

**Dose of radiation [mGy]**
- Mean ± SD: $211.9 \pm 268.6$
- Median (min, max): $104.2 (71.0, 251.1)$

**Dose of contrast media [ml]**
- Mean ± SD: $70.5 \pm 67.3$
- Median (min, max): $65.3 (0, 200)$
Ultrasound Guided wiring for BK lesion
Ultrasound Guided Puncture
Ultra high frequency probe (33MHz) by Canon medical
Ultrasound Guided Puncture

2.5mm

23G needle
Ultrasound Guided Puncture
Ultrasound Guided Thrombectomy
Ultrasound Guided Thrombectomy
Ultrasound Guided Thrombectomy
Ultrasound Guided Thrombectomy
Ultrasound Guided Thrombectomy
Navigation was useful and safety in CTO lesions.

IVUS was a useful modality to detect the root of guide wire.

Ultrasound guided wiring was safety to prevent complication and useful to decrease radiation exposure and contrast media.

US is not only diagnostic tool but also treatment tool.
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