How to Overcome the Difficulty of Catheter Manipulation through Severely Tortuous Brachiocephalic Artery during Transradial Coronary Intervention

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Transradial coronary intervention

• Transradial coronary intervention (TRI) has been commonly performed owing to its lower access site complication, early ambulation, and reduction of contrast volume.

Tortuous Brachiocephalic Artery

- During TRI, we sometimes encounter the cases in which crossing a catheter are difficult due to severely tortuosity of the brachiocephalic artery.

Conventional Bail-Out Technique

• Thicker guidewire

• Change to thinner catheter

• access-site crossover

Case Presentation

• We present a case, in which we could successfully cross the catheter through severe tortuous brachiocephalic artery and complete intervention by using 5-in-6 system after failed attempts using 0.038 inch wire and 4-in-6 system.
A 75-year-old male

• He suffered from exertional angina.

• His coronary risk factors were hypertension, dyslipidemia and smoking.
Coronary Angiography and Initial Strategy

- severe stenosis at proximal LAD

- System
  6-French EBU 3.5 Taiga® guiding catheter (Medtronic Vascular, USA)

- Access Site via right radial artery.
Severe Tortuous Brachiocephalic Artery

Guiding catheter could not cross
Thicker Guidewire

- 0.038 inch guidewire was used instead of an initial 0.032 inch wire
- Guiding catheter could not advance
Thinner Catheter

- 4.5-French Cokatte® catheter (Asahi Intecc, Japan) was used as child catheter
- Easily crossed the tortuous site
- 6-French guiding catheter could slightly pass into the ascending aorta.
Manipulation Difficulty

- When a mother catheter is advanced, a child catheter is drawn back by action-reaction law

6FrEBU®

4.5FrCokkate
Manipulation Difficulty

- Change to a 5-French ST01® catheter (Terumo, Japan) in place of Cokatte®.
Successfully Engaged to LCA

Catheters could be manipulated and engaged to left coronary artery easily.
Stent Deployment

Direct deployment of 3.5 X 15 mm XienceV® stent (Abbott vascular, USA)
Sequential Balloon Dilatation

2.5 X 15 mm Hiryu® balloon (Terumo, Japan) was dilated from LAD to diagonal branch with 12 atm

4.0 X 12 mm Quantum apex® balloon (Boston Scientific, USA) was dilated within deployed stent with 20 atm.
Final Angiography

- stent was fully expanded
- Diagonal branch achieved good distal flow.
Follow-up Angiography at 6-month
Advantage of TRI

• Reduced bleeding risk
• Improved patient comfort
• Early ambulation
• Early discharge
• Reduced costs
Disadvantage of TRI

• Difficulty in puncture
• Learning curve
• Limitation of guiding catheter size
• Limitation of bulky atherectomy devices
• Inadequate backup support
• Vessel anomaly and tortuosity
Larger-Diameter Guidewire

• Accommodate thicker guidewire, by which a tortuous vessel will straighten and a guiding catheter will get enough support and lower resistance.

Change to Smaller Size Catheter

• Downsizing of the catheter might decrease resistance and help achieve successful PCI without access-site crossover.

# 4-French vs 5-French

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Action-Reaction Law
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For Tortuous Brachiocephalic Artery Using Mother-Child Technique

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Conclusion

In the case of severely tortuous brachiocephalic artery in which guiding catheter is difficult to cross, mother-and-child technique might be useful and 5-French inner catheter might be adequate and well-balanced in terms of backup strength and resistance compared to 4-French catheter.