A case with long calcified chronic total occlusion using the rotational atherectomy

Toyama Prefectural Central Hospital
Division of Cardiology,
Department of Internal Medicine

Yoshiki Nagata, Takuya Mayumi,
Yusuke Mukai, Oto Inoue,
Isao Aburadani, Motoaki Hirazawa,
Michiro Maruyama, Kazuo Usuda
Background

- The treatment results of CTO improved and stabilized.
- However, after the guidewire pass through the lesion, the calcification and long length lesion often interfere with progression of the balloon catheter and the microcatheter.
- We experienced a case with long calcified CTO. This case needed to treat the rotational atherectomy.
- I would like to report about technical note added consideration in this situation.
Case presentation

- Case: 80’s female
- Chief complain: Chest pain
- Past history: Heart failure, Old myocardial infarction.
- Coronary risk factor: Dyslipidemia, Diabetes mellitus, Hypertension, Chronic kidney disease (Cr 1.2mg/dL, eGFR 33)

Clinical course
- She took the standard medical therapy for chronic heart failure in the neighborhood doctor.
- On March 2011, she presented with severe resting chest pain and dyspnea. The electrocardiogram showed ST depression in V2-V6 leads.
- The echocardiogram revealed a cardiac chamber enlargement and severe systolic dysfunction (EF 28%).
- Despite giving an intravenous drip injection in isosorbide dinitrate, her chest pain has not improved.
The initial coronary angiogram showed the chronic total occlusion (CTO) of the middle right coronary artery (RCA) and 90% stenosis of the middle left anterior descending artery (LAD). We performed coronary intervention to the stenosis of LAD. This lesion was implanted a bare-metal stent.
The CTO of RCA had diffuse calcification and the good collateral flow from the left coronary artery. Ten days after the direct coronary intervention, I tried to treat the long CTO of RCA.
First, the antegrade approach was tried with the Wizard78 guidewire with the microcatheter. The 1st guidewire advanced until the calcified site at the one third of CTO. But, this wire bended there. Then the guidewire was changed to Ultimate bros 3g. The 2nd guidewire advanced a little.
The 2nd guidewire was exchanged with Conquest Pro 9g, then this guidewire passed. However, the balloon catheters (1.25mm, 1.5mm) and the microcatheters (Finecross, Corsair) did not passed. The tip of Corsair catheter was crushed.
Try to pass any devices, but did not succeed.

For treating this lesion, the rotablator was required. But I could not exchange the Rotawire, because any catheters were not passed despite using the Tornus-pro and the anchor balloon technique.
Tried to recross through the guidewire route using the rotawire alone.

Once a guidewire is passed, it should not extract until stent implantation.

I approximated the technique to pass the Rotawire.

It was advanced the Rotawire alone following the channel made the guidewires.

But, the passed guidewire have to extract.
How to pass the Rotawire through the CTO?

- The Rotawire was tapered shaft designed for greater flexibility, so this wire bended easily.

- Unfortunately the Rotawire break while manipulating, the rotablator will not move smoothly.

- When the 0.014 inch guidewire passed, the wire made small dissection in the CTO.

- The Rotawire is possible to pass through this small dissection.
Rotawire selection

- The Rotawire must use the extra-support type.
- In another case, the floppy type was crushed during the driling manipulator. I have always chosen the extra-support type in this situation.
I had extracted the passed Conquest pro guidewire and tried to pass again through the making route using the Rotawire alone. It took about 1 hour, the Rotawire reached the exit point of CTO. However, the wire reached not to enough position.
The rotational atherectomy was performed 7 times with Rotalink plus 1.5mm until one third of this lesion.
The maximum deceleration of the platform speed was 10,000 rpm in the first 3 times.
After the rotablation, the coronary angiogram showed no-reflow, but without the coronary perforation.
Next the Rotawire further advanced to the distal point using microcatheter. The additional rotational atherectomy was performed 8 time. The maximum deceleration of the platform speed was 10,000 rpm in the first 2 time.
After rotablation, the following angiogram revealed a diffuse luminal narrowing from the mid to distal RCA without coronary perforation.
IVUS (after rotablator 1.5mm and POBA 3mm)
Stent implantation at the distal RCA using mother child technique

After balloon dilation, Xience V stents were deployed at the distal RCA using mother child technique.
Stent implantation at the proximal RCA

The four Xience V stents were implanted and were covered CTO lesion over.
The final angiogram showed successful recanalization with TIMI 3 flow and no residual stenosis or coronary perforation. Three months after the procedure, the coronary angiogram showed a good result and improved coronary flow of side branches.
Diffuse Chronic Total Occlusion treating by Rotablator

✓ For carrying out the rotablator, it is carefully to manipulate the rotawire alone in the CTO lesion.
✓ The rotawire bends easily, but it must not bend, because the rotablator needs high-speed rotation.
✓ The Rotawire extra support type was excellent in the performance which goes straight on.
✓ Decelerations of the platform speed should be as possible as a little, because they increase the risk of vessel trauma caused by frictional heat.
Conclusion

- The rotablator was usful for the long calcified CTO lesion.

- In this case, the rotawire alone succeed to pass through the long CTO lesion.

- The Rotawire extra support type is excellent and possible to pass through the small dissection by making the passed guidewire.
This is IVUS after the rotablation 1.5mm and the 3 mm balloon dilation. The vessel size was about 4.4 mm. There was diffuse calcification and dissection.