1121 **Repeat revascularization for long-segment in-stent chronic total occlusion lesion that have re-occluded in a short period after first treatment.**

Toru Nakanishi1, Hiromasa Kato2, Yoshiaki Ito3, Yasutaka Yamauchi1

[1]Cardiology, Takatsu General Hospital, Japan

[2]Cardiology, Fukui Prefectural Hospital, Japan

[3]Cardiology, Saiseikai Yokohama Eastern Hospital, Japan

[Introduction] Revascularization for in-stent chronic total occlusions (in-stent CTOs = ISOs) is technically challenging and was traditionally associated with suboptimal procedural success rates. Consequently, ISOs are often treated medically or surgically based on the disease extent of other coronary arteries.

With the various available devices and strategies, percutaneous coronary intervention (PCI) has become more liberally used to treat ISOs, leading to improved procedural success rates as evidenced by recent registry data. Nevertheless, controversy persists about the efficacy of PCI for ISOs, mainly due to the perception of inferior treatment durability with specific focus on post-procedural stent optimisation compared to that seen for de novo stenotic or CTO lesions.

[Case] A 64-year-old man had recurrent exertional angina pectoris and a chronic totally occluded in-stent lesion in two coronary arteriess and a de novo severely stenotic lesion in one artery were identified as the culprit lesions. He had a history of previous revascularization for main trunk and three-vessel lesions, including a previous inferior myocardial infarction, and a history of inpatient treatment for heart failure. In July 2024, a ISO lesion in ostium of the right coronary artery (RCA), a ISO lesion in middle segment of the left anterior descending branch (LAD), and a severely stenotic lesion in the middle of the circumflex branch (LCx) was demonstrated. The patient had a left ventricular ejection fraction (LVEF) was 35%. The patient was highly obese (BMI 41.1), which made fluoroscopic imaging extremely difficult to visualize the lesion and treatment device.

After treatment of the circumflex branch, a one-session treatment was attempted in September 2024 for a ISO lesion in the LAD and a ISO lesion in the RCA. First, a ISO lesion in the LAD with a relatively short occlusion length (J-CTO score 0pt) was successfully penetrated through the intimal true lumen by 3D wiring using Gaia Nest 3 as a primary antegrade escalation strategy, and a drug-eluting stent (DES 2.5/38mmm) was implanted. A ISO lesion in the RCA (J-CTO score 3pts; abrupt proximal cap, occlusion length, bend) was occluded from the ostium and the distal cap of the occlusion was located at the bifurcation of the RPDA and RPLV, all of occluded lesions consisted in the stent. Due to poor visualization of the distal cap of the occlusion, primary retrograde strategy was initiated. After failed guide wire septal channel, connecting to the RPDA, crossing with Suoh03, X-treme XT-R, SION black, the antegrade escalation strategy was switched. However, the occlusion was hard and difficult to penetrate even with Gaia Next 3 and Gladius EX. A 3D wire with a Conquest Pro 12 ST was used to penetrate a distance of about 110 mm inside the stent. An existing stent was placed from the distal RCA into the RPDA, and the RPLV was stent-jailed. Finally, the RPDA was treated with a drug coated balloon (DCB 2.5/30mm) and 3 drug-eluting stents (DES 4.5/20mm Megatron + 4.0/48mm + 3.5/48mm) were implanted, and the RPDA was reflow, whrease the RPLV was difficult to reflow.

The follow-up coronary angiography was performed in Oct 2024 and showed a re-occlusive lesion at the right coronary artery ostium and this patient complaint recurrent dyspnea on exertion.

In Jaunary 2025, the patient attempted to revascularize a ostial ISO in the RCA. The patient was treated in primary retrograde approah via the LCx AVG to RPLV collateral circulation to achieve essential RPLV revascularization, with Suoh03 successfully crossing through the channel and the distal end of the RPLV/RPDA bifurcation occlusion punctured with Gladius EX. Retrograde knuckle guide wire penetration successfully reached at the proximal RCA, and

antegrade guide wire puncture and penetration was successfully by Miracle Neo3, resulting in successful reverse CART (control antegrade and retrograde technique) and successful externalization, kissiing balloon inflation (KBI) was performed to the RPDA/RPLV, which was difficult to maintain reflow due to soft thrombotic lesions, and the RPDA/RPLV to proximal RCA was treated with 6 DCBs in the stent. After the guidewire, crossing into RPDA, was removed incidentally, blood flow stagnation remained. The RCA trunk (from ostium to distal segment of RCA repeatedly) was dilated in long inflation, and the RPDA, which was easily re-occluded by recoil, was successfully punctured with a Conquest Pro 12 ST using real-time IVUS guide, requiring multiple bifurcation treatments with a cutting balloon KBI. Finally, we confirmed that the RPDA/RPLV maintained reflow and terminated the procedure.

[Conclusion] The 1st attempt PCI was difficult to wire penetration due to hard fibrotic plaque lesions in the stent, and the 2nd attempt PCI was difficult to maintain reflow due to soft thrombotic lesions in the stent. Challenging in-stent reocclusion lesions with different pathologies require challenging treatment, and long-term maintenance of vessel patency is a concern.