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Stent distortion in the PCI to LMT-LAD lesion

A 77-year-old female was admitted to our hospital for acute heart failure. Coronary angiogram after the management of heart failure revealed the significant stenosis from left main trunk (LMT) to left descending artery (LAD), accompanied with severe calcification. Furthermore, distal LAD had diffuse stenosis. She was diagnosed with heart failure due to myocardial ischemia and underwent percutaneous coronary intervention (PCI).

PCI was performed via transfemoral approach with 6Fr EBU3.5. Because intravascular ultrasound (IVUS) unpassed through the LAD because of severe calcification, rotational atherectomy using 1.5mm and 1.75mm burr was required. After the pre-dilation with 2.25mm balloon, 2.25*38mm platinum-chromium (PtCr)-based everolimus-eluting stent (EES) was deployed at LAD Seg.6-7. Then, we moved to LMT-LAD lesion.

We perform IVUS examination from left circumflex artery (LCX). There was moderate calcification at the contralateral side of the LMT carina, but it appeared that rotational atherectomy to LMT-LCX was not needed. We deployed 3.0mm*24mm PtCr-EES from the ostial LMT to the LAD stent. After we used 3.75mm balloon for proximal optimization technique (POT), we crossed the LAD wire to LCX, retrieved the sandwiched LCX wire into guiding catheter, and inserted the retrieved wire to LAD. Then, the wire position and stent expansion were checked by IVUS.

IVUS could pass the LMT-LAD stent easily. However, IVUS examination revealed that stent struts were protruded at mid-LMT and that LAD wire crossed through the crushed stent strut at the ostial LMT. This stent distortion might be caused by pulling back the LCX wire sandwiched between LMT-LAD stent and calcification. Stent at ostium might be crushed when guiding catheter was drawn. Furthermore, pushing force from the drawn guiding catheter and pulling force by pulling the sandwiched LCX wire might generate bidirectional tension, leading to the protrusion of the stent strut at mid-LMT.

Double lumen catheter was used to get the true stent lumen with another wire, but the double lumen catheter did not cross at ostial LMT. We managed to cross 2.5mm new balloon, and then 3.75mm balloon again. IVUS images showed that the protrusion of stent struts and the crush of the ostial stent were improved. However, we could not find stent struts in some part of mid-LMT. Because the inner lumen was enough and there was no apparent dissection in non-strut site, we determined that the additional stenting was not needed. After the kissing balloon technique, we finished procedure.

Whereas the developments of stent technology have improved the flexibility and deliverability of the stent, radial force and longitudinal integrity of the stent have been compromised. This trade-off should be noticed in the stent selection and PCI procedure. We herein report a case of the distortion of LMT stent, which could be observed with IVUS.