

Stenting for Aorto-Ostial In-Stent Restenosis via Side Strut of an Excessively Protruding Stent Guided by Intracoronary Imaging

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To the Editor: A 54-year-old man was admitted for progressive chest pain. Four years ago, the patient had surgical aortic valve replacement (SAVR), and preoperative multislice computed tomography (MSCT) showed no coronary stenosis. A year after SAVR, he presented with chest pain, and coronary angiogram revealed an isolated ostial left main coronary artery (LMCA) stenosis [Figure 1a]. A 4.0 mm × 18.0 mm stent (Medtronic Vascular, Santa Rosa, CA, USA) was implanted without a high-pressure postdilation [Figure 1b]. The patient was discharged on aspirin, ticagrelor (replaced with clopidogrel after 3 months), and statins. Unfortunately, the stent was found to protrude into the aorta by approximately 10 mm by MSCT at 4-month follow-up [Figure 1c].

During this admission, the patient underwent nonselective coronary angiography due to the previous excessively protruding stent and showed in-stent restenosis (ISR) at ostial LMCA [Figure 1d]. It was almost impossible to place a guidewire through ostium to center lumen of previous stent in this context. A SION guidewire (ASAHI) via the nonengaged JL4.0 (6F) guiding catheter (Medtronic) was attempted to advance into distal left anterior descending through side strut of previous stent, which was confirmed by intravascular ultrasound (IVUS) [Figure 1e and 1f].

A 2.0 mm × 15.0 mm Sprinter semicompliant balloon (Medtronic) was positioned to the side strut and inflated at 8 atm with caution in case of strut deformation and then deposited to the ISR and inflated at 10–14 atm. Optical coherence tomography (OCT) was performed and found focal and concentric fibrous intimal hyperplasia with stent malapposition at ostial LMCA [Figure 1g].

A 4.0 mm × 18.0 mm everolimus-eluting stent (Xience Xpedition, Abbott, Chicago, IL, USA) was deployed following by a 4.0 mm × 12.0 mm Sprinter noncompliant balloon (Medtronic) inflated at 16 atm. Subsequent OCT confirmed good stent expansion without strut malapposition, while IVUS showed the proximal segment of the new stent protruded approximately 7 mm into the aorta [Figure 1h]. Thus, two stents exaggeratedly protruding from the LMCA into the aorta were observed by postoperative MSCT [Figure 1i]. The patient was asymptomatic on aspirin and ticagrelor, and both stents remained good patency at 1-year MSCT follow-up [Figure 1j].

Coronary stenting for aorto-ostial stenosis is usually required to protrude into the aorta by only 1–2 mm for complete stenosis coverage, while it is technically difficult to have repeat intervention for aorto-ostial ISR, with regard to catheter engagement and guidewire placement,^[1] and associated with an increased risk of peri-procedural complications.^[2] This is extremely difficult when it comes to a stent excessively protruding into the aorta, as presented in our case. It is an option to surgically trim of the protruding stent combined with coronary artery bypass grafting but associated with a high operative morbidity rate and poor long-term outcome.^[3]

Eventually, we decided to do coronary intervention via side strut in the hybrid operation room in the guidance of multiple intracoronary imaging modalities. IVUS was used to establish the exact position of wiring the previous stent side strut, while the transient and classic images were not easy to capture. OCT was then performed to elucidate the mechanism of ISR. After evaluation, another thin-strut DES via side strut was implanted for the treatment of aorto-ostial ISR; however, the proximal segment again protruded into the aorta revealed by subsequent MSCT, due to inherently poor visualization and coaxality.

It has never been seen the image of two stents exaggeratedly protruding from the LMCA into aorta. Side-strut stenting technique^[4] for the treatment of aorto-ostial ISR was feasible with a satisfied intermediate-term clinical and MSCT follow-up. However, this technique should be done cautiously, and the safety of long-term follow-up is undefined and warrants further investigations.

Declaration of patient consent

The authors certify that they have obtained the patient's consent form. In the form, the patient has given his consent for his images

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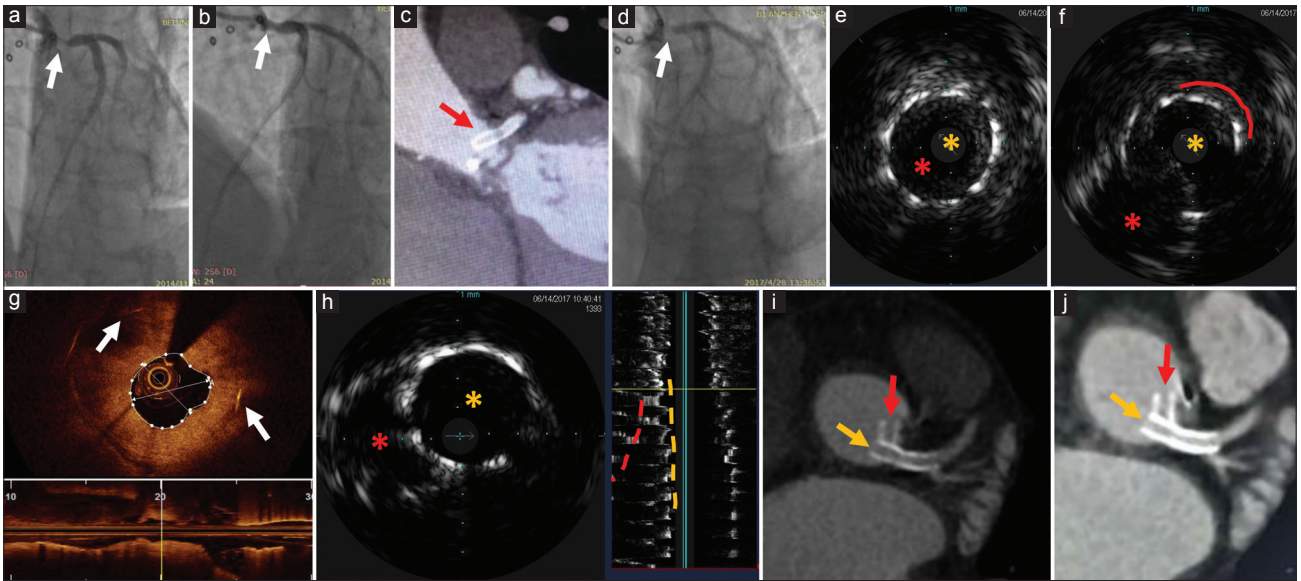


Figure 1: (a) Preoperative angiogram shows ostial LMCA stenosis (arrow). (b) Postoperative angiogram shows stent underexpansion (arrow). (c) MSCT shows the proximal segment of the stent protrudes 10 mm into the aorta (arrow) after PCI. (d) Repeat preoperative angiogram shows ostial LMCA ISR (arrow) at 3-year follow-up after the first PCI. (e and f) Prestenting IVUS reveals guidewire (yellow asterisk) advances into the pervious stent (red asterisk) via side stent strut (red full line). (g) Prestenting OCT imaging reveals focal and concentric fibrous intimal hyperplasia with uncovered stent struts (white arrow) at ostial LMCA. (h) Poststenting IVUS shows focal location of the two stents in aorto-ostial, where the overlapping two stents begin to separate (red asterisk and dotted line represent the previous stent, and yellow ones represent the new stent). (i) MSCT shows integral location of the two stents, the proximal segment of previous stent struts (red arrow) is crushed away by the new stent (yellow arrow), and (j) One year follow-up MSCT shows good patency of the two stents protruding into the aorta. LMCA: Left main coronary artery; MSCT: Multislice computed tomography; PCI: Percutaneous coronary intervention; ISR: In-stent restenosis; IVUS: Intravascular ultrasound; OCT: Optical coherence tomography.

and other clinical information to be reported in the journal. The patient understands that his name and initial will not be published and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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