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A 75-year-old woman was hospitalized for heart failure repeatedly over the previous three years. Despite optimal medical therapy, she experienced worsening heart failure every 2–3 months and required five hospitalizations. During one admission, she broke her pelvis due to a fall and subsequently developed worsening renal dysfunction and urinary tract infection, resulting in marked frailty and physical deconditioning.

Previous CAG had demonstrated severe stenoses in the left main trunk (LMT), ostial left anterior descending artery (LAD), and ostial left circumflex artery (LCX) so called True Bifurcation lesion. She also had concomitant moderate aortic stenosis. During rehabilitation, she had chest pain accompanied by ST-segment depression in ECG, suggesting ongoing myocardial ischemia and the need for early revascularization.

For the preparation of TAVI, we assessed the Aortic access route using CT. CT demonstrated heavy calcified plaques in ostial LAD to ostial LMT and CT-low density plaque at ostial LCX. CT also revealed heavy tortuosity of the descending aorta. We discussed the strategy in the heart team conference and selected PCI.

Because of severe aortic tortuosity, We inserted an intra-aortic balloon pump (IABP) via the left brachial artery and positioned in the descending thoracic aorta. We inserted 8-Fr 40 cm long sheath via the right femoral artery to overcome severe aortic tortuosity and engaged 8-Fr SPB 4.0 SH guiding catheter into the left coronary artery. We advanced Sion Blue and Sion guidewires into the LAD and LCX, respectively. Even with IABP support, hypotension occurred easily after IVUS insertion alone. IVUS showed Tenting sign at the carina side of the ostial LAD. Multiple pull-back runs of the orbital atherectomy system(OAS) were performed at low and high rotational speeds from the ostial LAD to distal LMT. Careful watching was needed to avoid to avoid debulking the plaque free vessel. Repeated episodes of hypotension required intravenous norepinephrine support. IVUS confirmed effective modification of the calcified and non-calcified plaque. Subsequently, we performed OAS toward the LCX in a similar manner, resulting in debulking of the bifurcated lesion.

Despite having performed OAS, fibrous plaque remained at the LCX ostium. Therefore, We performed directional coronary atherectomy (DCA). We exchanged the LCX wire to a Grand Slam 300-cm wire. We used an Atherocut M 9.0mm catheter. A large amount of plaque was removed, and IVUS confirmed that the % residual plaque was less than 60%.

Subsequently, we performed balloon dilatation to LAD and LCX using a KIZASHI 3.0/10 mm balloon sequentially. We used drug-coated balloon to ostial LCX, and then implanted DES(3.5 × 15 mm Ultimaster Nagomi)in the LMT–LAD. Finally, KBI was performed with two 3.0-mm balloons. Final IVUS showed good stent expansion and favorable bifurcation geometry. The patient's post-procedural course was uneventful, and she was transferred to a rehabilitation facility on postoperative day 13. Careful procedural planning and mechanical circulatory support enabled successful PCI for the complex lesion of a frail patient.