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Left main bifurcation PCI with two self-apposing sirolimus-eluting stents using culotte technique

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Short-title: Left main PCI: culotte with self-apposing stenting

Classifications: Bifurcation, Drug-eluting stent, Left main

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A 56-year-old male was admitted to our institution for percutaneous coronary intervention (PCI) of a left main (LM) bifurcation lesion. Since LM dimensions were very large (reference vessel diameter [RVD] 5.1mm at intravascular ultrasound [IVUS]), an aneurysm in the proximal left circumflex (LCx) (RVD 5.2mm at IVUS) was present (Panels A,B, Online-Video 1) and no severe coronary calcification was evident, we chose to implant two self-apposing stents. Accordingly, after performing pre-dilatation with semi-compliant balloons, a 3.5-4.5x22mm sirolimus-eluting stent was deployed from LM to LCx and a 3.5-4.5x17mm sirolimus-eluting stent was implanted from LM to left anterior descendent (LAD) (culotte technique, Online-Video 2-3). After kissing-balloon inflation and final proximal optimization technique (Panel C, Online-Video 4-6), IVUS assessment confirmed good stent apposition on LM, LAD and also on proximal LCx aneurysm (Panels D-F).

To the best of our knowledge, this is the first reported case showing the feasibility of two-stent LM bifurcation PCI using self-apposing stents. The self-expandable Xposition-S sirolimus-eluting stent is mounted on a semi-compliant balloon, whose inflation splits the sheath in which the stent is restrained. The balloon and the sheath are then withdrawn leaving the nitinol stent apposed to the vessel wall. The advantages of this device when performing two-stent bifurcation PCI are the facilitated guidewire recrossing thanks to the open cells design, the cell disconnection feature allowing for easier side-branch access, and the possibility to achieve complete stent expansion and apposition even in the presence of large vessel diameter discrepancies. Moreover, the highly visible markers at both stent edges allow accurate stent positioning, which is crucial when performing a two stent-strategy. On the contrary, the relatively high strut thickness (102μm) could be a potential pitfall when performing a two-stent PCI resulting in double strut layer.

However, this is mitigated by large vessel dimensions and dynamic increase in stent diameter during the post-procedural period.

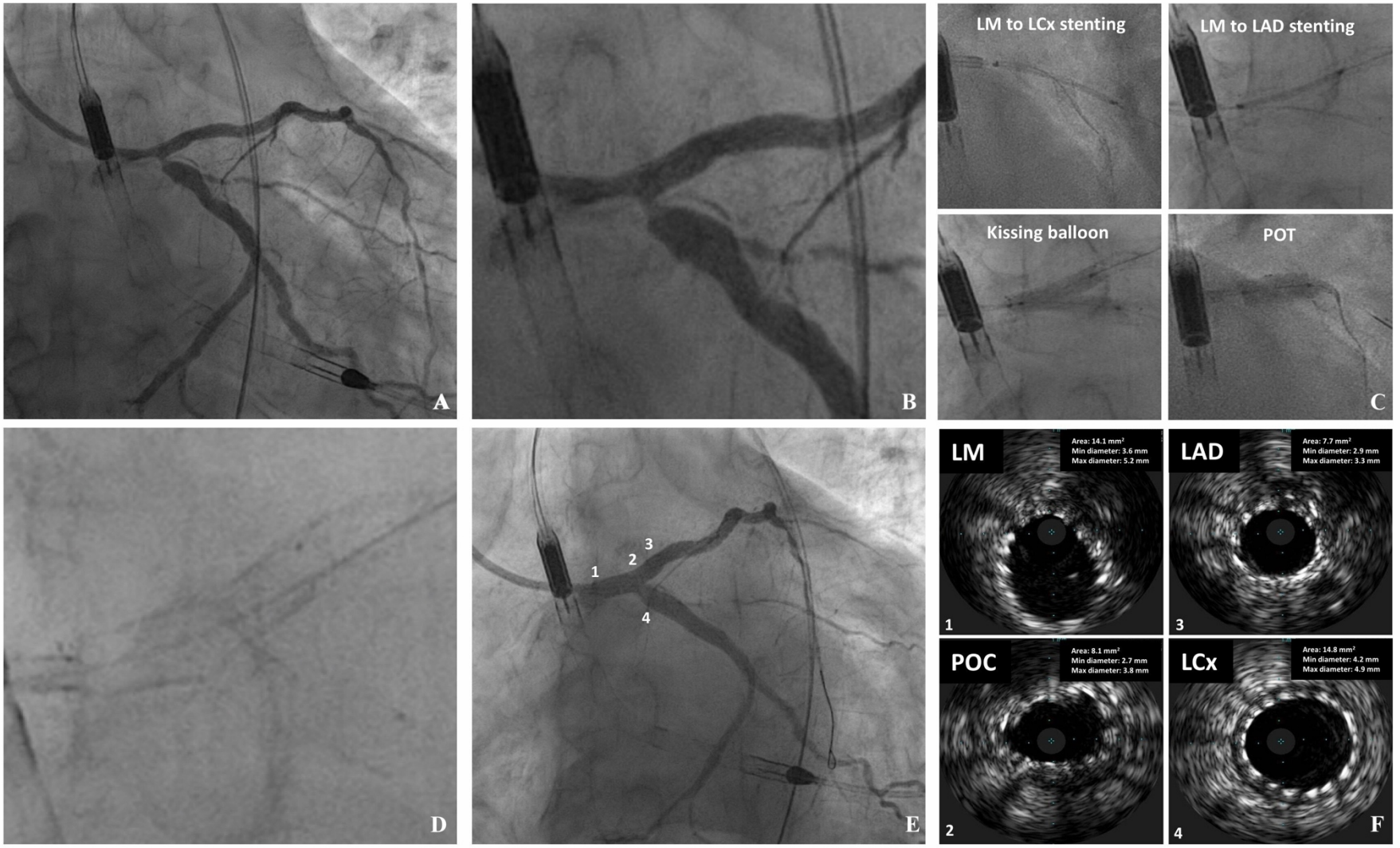
Figure.

A-B. Coronary angiography.

C.Left main(LM)-left anterior descendent(LAD) and LM-left circumflex(LCx) stenting: culotte technique, kissing-balloon inflation and proximal optimization technique(POT).

D-E. Angiographic result after stent deployment.

F.Final intravascular ultrasound assessment confirming good stent apposition. POC=Polygon of Confluence.



Supplementary data

Online video 1. Baseline coronary angiography

Online video 2. Sirolimus-eluting stent implantation from left main to left circumflex

Online video 3. Sirolimus-eluting stent implantation from left main to left anterior descendent

Online video 4. Kissing-balloon inflation

Online video 5. Final coronary angiography

Online video 6. Final coronary angiography