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A Novel Bail-Out 2-Stent Technique for Coronary Bifurcation Disease: Reverse Controlled Balloon-Crush

A 62-year-old male presented to our institute with a non-ST elevation myocardial infarction. He underwent coronary angiography revealing severe bifurcation disease involving the left anterior descending artery (LAD) and first diagonal (D1) (Figure 1A). After passing the LAD lesion with a soft guidewire, while trying to pass the D1 lesion with the soft guidewire, a major dissection developed proximal to D1, and a disruption in TIMI flow was observed (Supplementary Video 1). Despite several attempts, the true lumen could not be achieved in the D1 (Supplementary Video 2). Meanwhile, TIMI flow grade I was observed in both arteries (Figure 1B). Then, a 3.0 x 23 mm DES was implanted into the LAD, and the proximal optimization technique (POT) was performed (Figure 1C) and the true lumen was passed with a Gladius MG guidewire (Supplementary Video 3). A 2.5 x 33 mm DES was implanted from D1 to the LAD with minimal protrusion (Figure 1D). The proximal side-branch optimization was applied by gently retracting the D1 stent balloon, and kissing balloon inflation (KBI) was performed (Figure 1E). The D1 stent balloon was slowly deflated, and the D1 stent was slowly crushed with the NCB in the LAD (Supplementary Video 4). This may have caused less deformation of the structure and cells of the side branch stent. After the second POT, the 2.5 x 15 mm NCB was easily advanced into the D1 stent without the utilization of a low-profile balloon (Supplementary Video 5). After the second KBI and the final POT, the final result was obtained (Figures 1F-H).

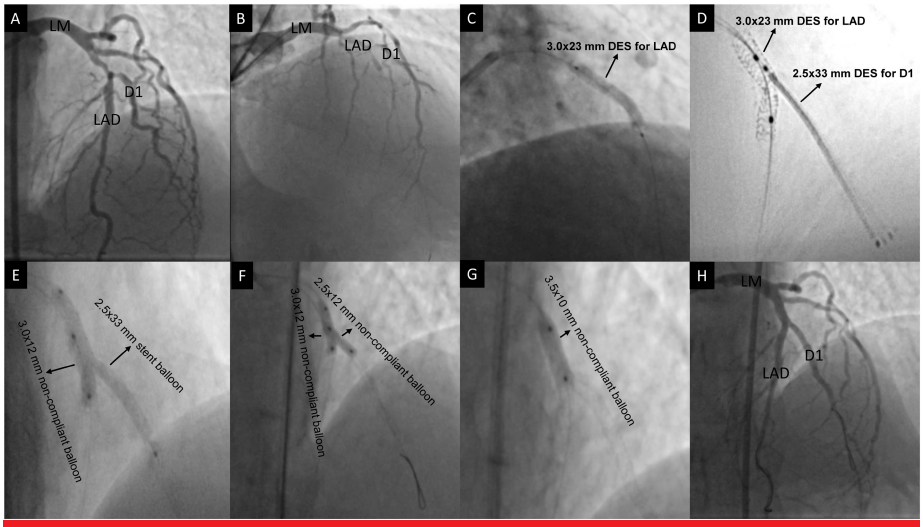

Figure 1. (A) Severe stenosis at the LAD-D1 bifurcation. (B) TIMI flow grade I is observed in LAD and D1. (C) A 3.0 x 23 mm DES was implanted in the LAD. (D) The D1 stent is positioned within the LAD stent with a 1-2 mm protrusion. (E) Proximal side-branch optimization and KBI. (F-H) Second KBI, final POT, and final result. DES, drug-eluting stent; D1, first diagonal artery; KBI, kissing balloon inflation; LAD, left anterior descending artery; LM, left main coronary artery; POT, proximal optimization technique.

E-PAGE ORIGINAL IMAGE

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Supplementary Video 1: A critical stenosis in the left anterior descending artery and a major dissection in the first diagonal artery.

Supplementary Video 2: True lumen cannot be passed for the first diagonal artery with a stiff guidewire.

Supplementary Video 3: After stent placement in the main vessel, the true lumen is passed with the Gladius MG guidewire and microcatheter.

Supplementary Video 4: Slowly the side branch stent balloon was deflated and controlled crushing with a 3.0 x 12 mm non-compliant balloon in the main vessel was performed.

Supplementary Video 5: A 2.5 x 15 mm non-compliant balloon is advanced quite easily into the side branch stent without the utilization of a low-profile balloon.