

Restenosis

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A 70-year-old gentleman with type 2 diabetes mellitus and chronic coronary artery disease underwent PCI to the mid RCA with a 2.75×18 mm DES in 2019 and to the proximal RCA with a 3.0×28 mm DES in 2022. He presented with recent-onset chest pain suggestive of ACS.

Electrocardiography demonstrated sinus rhythm with QS complexes and T-wave inversions in the inferior leads. Transthoracic echocardiography revealed regional wall motion abnormalities in the RCA territory with mild left ventricular systolic dysfunction (LVEF 47%). He was diagnosed with evolved inferior wall myocardial infarction. Coronary angiography showed an insignificant mid-LAD lesion and complete ISR of the proximal RCA stent. Myocardial perfusion imaging demonstrated inducible ischemia in the inferior wall.

Procedural Details

The procedure was performed through a right radial approach using a 6F JR 3.5 guiding catheter. The lesion was crossed with a 0.014" Whisper ES guidewire with microcatheter support. Sequential predilatation was performed using a 0.85×6 mm Nano balloon, 1.0×5 mm NC balloon, and 1.5×12 mm NC balloon.

Optical coherence tomography (OCT) demonstrated a highly complex substrate with:

- * Distal RCA (at the distal stent edge) fibrocalcific lesion with a 180° calcium arc, 8 mm depth, extending over 10 mm, with MLA of 2.17 mm^2 .
- * Diffuse neointimal hyperplasia involving the proximal and mid-RCA stents with MLAs of 2.4 mm^2 and 1.35 mm^2 , respectively.
- * Under-expanded stent segments associated with a calcific nodule in the mid RCA and severe underlying calcification in the proximal RCA.
- * An additional proximal edge fibrocalcific lesion with a 270° calcium arc and MLA of 2.12 mm^2 .

A 0.9 mm excimer laser catheter (contrast enhanced) was used at 80 mJ/mm^2 fluence and 80 Hz repetition rate. Further lesion preparation was performed using a 3.5×15 mm NC balloon inflated to 20 atm.

Although drug-coated balloons (DCB) are an established treatment strategy for ISR, repeat DES implantation was preferred in this case because of significant stent under-expansion due to heavy underlying calcification, which necessitated additional radial strength after adequate lesion preparation and also presence of fibrocalcific edge disease extending beyond the original stent margins required complete lesion coverage.

Accordingly, a 3.5×48 mm DES was deployed from the mid to distal RCA, followed by a 3.5×44 mm DES from the ostioproximal to mid RCA with overlap. Final post-dilatation was performed using a 4.0×12 mm NC balloon at 22 atm.

Post-procedural OCT demonstrated excellent luminal gain with minimum stent areas of 8.97 mm^2 and 7.33 mm^2 in the proximal and mid-RCA segments, respectively, without edge dissection or significant residual under-expansion.

To conclude, this case illustrates the value of OCT-guided identification of multiple mechanisms of ISR and demonstrates how contrast-enhanced ELCA can facilitate successful treatment of totally occlusive, heavily calcified ISR. The case also highlights important decision-making regarding lesion preparation and the choice of repeat DES implantation over DCB therapy in diffuse, under-expanded stented segments.