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Target Lesion

An 80-year-old man with dementia, Parkinson's disease, NK/T-cell lymphoma, diabetes mellitus, hypertension, and dyslipidemia presented with non-ST-segment elevation myocardial infarction (NSTEMI). Two months earlier, he had undergone successful IVUS-guided rotational atherectomy (RA) followed by drug-coated balloon (DCB) angioplasty for a heavily calcified mid-left anterior descending artery. A staged PCI was planned to achieve complete revascularization of the right coronary artery (RCA).

Coronary angiography demonstrated a large dominant RCA with diffuse severe calcification extending from the distal RCA to the bifurcation of the right posterior descending artery (RPD) and right posterolateral branch (RPL). The distal RCA contained a severely stenotic calcified lesion with angiographic features suggestive of a calcium nodule.

Strategy

Because of the extensive calcific burden, large vessel size, and bifurcation involvement, an IVUS-guided strategy was planned. However, despite successful guidewire crossing, the IVUS catheter could not cross the distal RCA because of the extremely tight and heavily calcified lesion. Rotational atherectomy was therefore performed as the initial plaque modification strategy without baseline IVUS assessment.

A 1.75-mm burr was first used to modify the distal RCA-RPL lesion. The guidewire bias was subsequently redirected toward the ostial RPD to optimize plaque modification of both branches. Post-atherectomy IVUS was successfully advanced across the lesion and demonstrated diffuse calcific plaque with extensive superficial circumferential calcification, marked calcium reverberation, and luminal calcium protrusion, confirming a calcified nodular lesion. The external elastic membrane measured approximately 4.8-5.0 mm, confirming a large reference vessel.

Considering the diffuse circumferential calcification, large vessel diameter, and the anticipated risk of stent underexpansion, malapposition, and future stent failure, a stent-less strategy using DCB after adequate plaque modification was selected.

Further lesion preparation was performed with a non-compliant balloon. Initial delivery of the cutting balloon was unsuccessful because of the severe calcification. Guide extension with distal balloon anchoring enabled successful delivery and adequate lesion preparation.

During treatment of the ostial RPD lesion, a small Ellis type I coronary perforation was suspected. Repeat IVUS demonstrated only a localized intramural hematoma without significant vessel disruption, and echocardiography confirmed the absence of pericardial effusion. Conservative management was therefore adopted.

Final Result

Following satisfactory plaque modification, a 4.0 × 25 mm SeQuent Please NEO drug-coated balloon was inflated with prolonged inflation. Final angiography demonstrated TIMI 3 flow with approximately 10% residual stenosis, no significant dissection, no persistent coronary perforation, and preserved RPD and RPL flow. The patient remained hemodynamically stable and was discharged without procedural complications.

This case demonstrates that when baseline IVUS assessment is not feasible because of an uncrossable calcified lesion, rotational atherectomy can facilitate subsequent intravascular imaging and optimize plaque modification. In selected patients with a large diffusely calcified coronary artery harboring a calcified nodular lesion, an IVUS-guided stent-less strategy using rotational atherectomy followed by drug-coated balloon angioplasty may be a feasible alternative to extensive metallic stent implantation.