

Burr Upsizing During Rotational Atherectomy After Failure of the Smallest Burr: A Solution for an Uncrossable Severely Calcified LAD Lesion

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[Target Lesion]

A 76-year-old woman with a history of hypertension and diabetes mellitus was emergently admitted to our hospital because of chest pain persisting for 2 hours. Electrocardiography showed ST-segment depression in leads V3–V5. Transthoracic echocardiography revealed a reduced left ventricular ejection fraction of 43% and hypokinesis of the mid-to-apical anteroseptal wall. Emergency coronary angiography demonstrated diffuse 90% stenoses in the mid-left anterior descending artery (segment #7) and the first diagonal branch (segment #9), with severe calcification suspected on fluoroscopy.

[Strategy]

Via the right radial approach, the left coronary artery was engaged with a 6-Fr JL 3.5 guiding catheter, and a SION guidewire was advanced into the LAD. Although intravascular ultrasound (IVUS) assessment was attempted, the IVUS catheter could not cross the lesion; therefore, rotational atherectomy (RA) was selected for lesion modification. RA was initiated with a 1.25-mm burr at 200,000 rpm. Despite nine attempts, each associated with an approximately 5,000-rpm deceleration, the burr failed to cross the lesion. Because inadequate guiding-catheter backup support was suspected, the guiding catheter was exchanged for a 7-Fr EBU 3.5 catheter. Despite repeated RA of segment #7, lesion crossing remained difficult.

Severe proximal calcification was also present in segment #9. RA using a 1.25-mm burr successfully crossed this lesion. For the main LAD lesion, the burr size was subsequently upsized to 1.5 mm, allowing successful lesion crossing. Multiple RA runs were performed at 200,000 rpm. IVUS of segment #9 revealed a dissection; therefore, a Xience 2.25 × 28 mm stent was implanted in #9 without protruding into the main LAD, followed by post-dilatation with a Ryurei 2.0 × 20 mm balloon. Segment #7 was pre-dilated using a Wolverine 2.25 × 15 mm cutting balloon, followed by implantation of an Orsiro 2.5 × 40 mm stent and post-dilatation with a Hiryu Plus 2.5 × 15 mm balloon.

[Final Result]

The final angiogram demonstrated TIMI grade 3 flow despite residual 90% stenosis at the ostium of segment #9. No residual stenosis was observed in the main LAD lesion, and the procedure was completed without complications. The successful crossing of the lesion with the 1.5-mm burr, despite failure with the 1.25-mm burr, may have been related to differences in burr geometry and to the greater amount of calcium ablated by the 1.5-mm burr, compared with the 1.25-mm burr, in the straight segment immediately proximal to the angulated segment that could not be crossed. This case suggests that increasing the burr size may be effective in selected cases in which the smallest burr fails to cross a calcified lesion.