A rotablation-resistant lesion: rare and highly challenging to treat percutaneously

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A 66-year-old man with a history of arterial hypertension and cigarette smoking was initially admitted to our center with a diagnosis of non–ST-segment elevation myocardial infarction. He underwent balloon percutaneous coronary intervention of the massively calcified and occluded right coronary artery. However, that procedure did not provide widening but only restored flow in the artery, due to the presence of undilatable lesions (FIGURE 1A). The second treatment attempt was made with the use of rotational atherectomy. Several runs at 140 000 to 160 000 rpm were performed using a 1.5-mm Rotablator burr (Boston Scientific, Marlborough, Massachusetts, United States), which allowed passage through the lesion. However, predilatations with a semicompliant balloon revealed that the lesion was still resistant. Optical coherence tomography (OCT) using a Drygon Optis probe (Abbott, Lake Bluff, Illinois, United States) was performed for precise evaluation of the lesion anatomy. It showed reference vessel diameters and massively calcified lesions with a 360-degree calcified ring, calcification depth reaching 1.23 mm, and calcification length of approximately 29 mm (FIGURE 1B). A round shape of calcified plaque was also visible after burr passage (FIGURE 1C). Additionally, white thrombi were noted in the vessel lumen (FIGURE 1D). Subsequently, noncompliant balloon inflations at high pressure (20–22 atm) were performed, and all of them were ineffective. At this point, the operators decided to use a 3.5/15-mm AngioSculpt balloon catheter (Biotronik, Berlin, Germany), but 4 inflations at 18 atm were also unsuccessful. Considering a highly resistant, calcified lesion, it was decided to attempt rotational atherectomy using a bigger burr (2 mm). Three runs at 150 000 to 180 000 rpm were performed with distal burr passage, but a noncompliant balloon inflated at a pressure of 30 atm was still unexpanded. Finally, 4 inflations of a super high-pressure 3.5/10-mm OPN NC balloon catheter (SIS MEDICAL AG, Frauenfeld, Switzerland) at 36 atm resulted in full expansion of the lesion, with a 1:1 sizing to the reference vessel diameter. Another OCT examination showed cracks in the calcified plaque with dissections and the extension of the artery lumen (FIGURE 1E). Finally, a 3.5/48-mm drug-eluting stent was implanted. Postdilatations with 3.5/15-mm and 4/15-mm noncompliant balloons provided a satisfactory angiographic result confirmed by OCT, with cracks of calcified plaque visible under the stent (FIGURE 1F).

The presented case shows that the treatment of highly calcified coronary lesions, which could be associated with worse immediate and long-term outcome, may require several complementary methods.[1-3] There are some case descriptions of stenoses called "rotablation-resistant lesions," reporting on what to do when the burr does not cross the lesion and suggesting to use a smaller or, paradoxically, bigger burr. In our case, despite several passages of even a big burr, the stenoses were still undilatable. Cracks in calcified lesions resulted in better final stent expansion, but it was obtained during the described procedure only after aggressive treatment with high-pressure, cutting-balloon predilatations, use of a big burr, and high-speed rotablation.[4,5] Intravascular lithotripsy is a new promising method for the treatment of such calcified plaques. An additional finding was the presence of thrombi,

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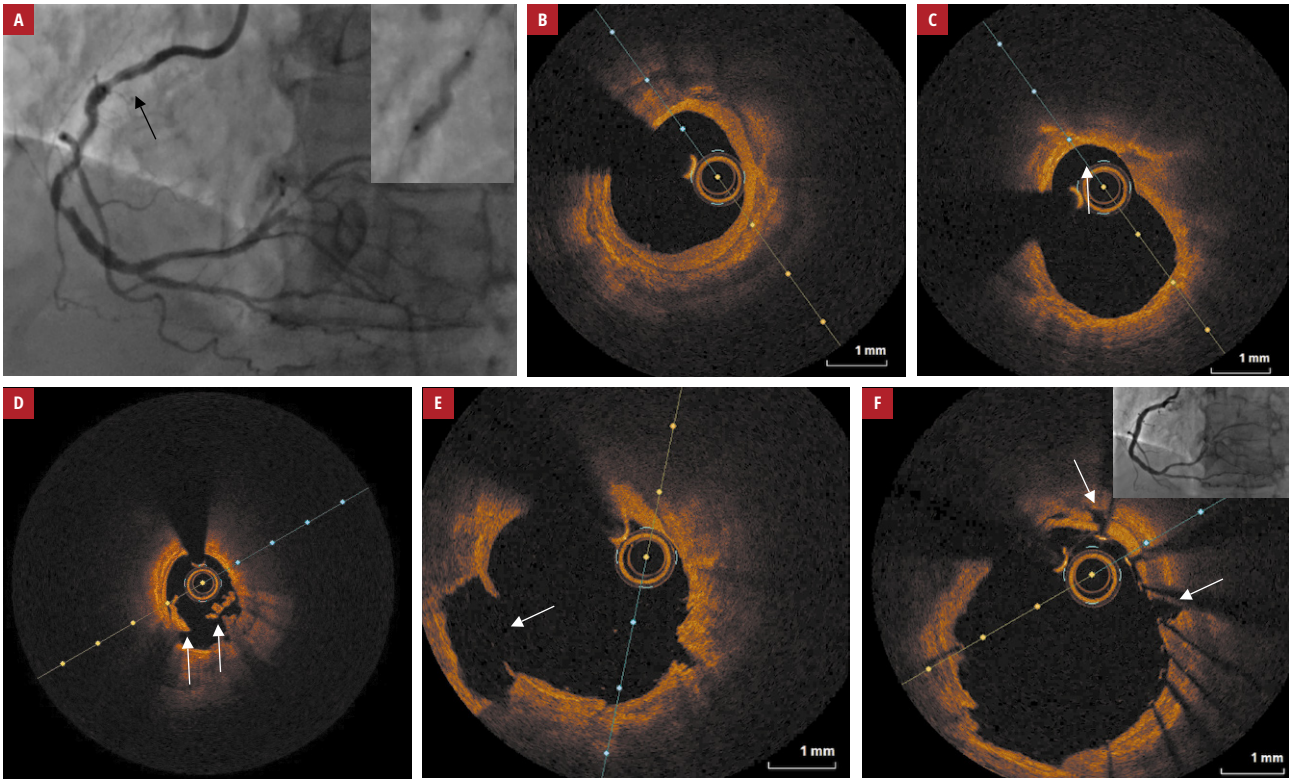

FIGURE 1 **A** – baseline coronary artery angiography showing the right coronary artery with calcified, undilatable lesions (arrow); **B** – optical coherence tomography showing a 360-degree calcified ring; **C** – the burr track visible in the calcified plaque after rotablation (arrow); **D** – white thrombi in the vessel lumen (arrows); **E** – cracks in the calcium deposits with dissections and the extended artery lumen after high-pressure inflations (arrow); **F** – final coronary angiography of the right coronary artery (inset) demonstrating satisfactory stent expansion, which was confirmed by optical coherence tomography that showed cracks in the calcium deposits under the stent (arrows)

which could be associated with previous myocardial infarction and, potentially, with the complex instrumentation in the artery.

ARTICLE INFORMATION

CONFLICT OF INTEREST None declared.

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