

Percutaneous coronary intervention combining rotational atherectomy and intravascular lithotripsy in two vessels with edge restenosis assisted by percutaneous left ventricular pump support

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A 61-year-old white man was admitted to the invasive cardiology department to have high-risk percutaneous coronary intervention (PCI) with percutaneous left ventricular assist device (pLVAD) support. Echocardiography demonstrated a decreased left ventricular ejection fraction of 15% with disseminated regional contractility abnormalities. Coronary angiography revealed multivessel disease with multifocal critical stenosis in the right (RCA) and left descending coronary arteries (LAD) (Supplementary material, *Figure S1A, B*). The patient was consulted by the Heart Team and qualified for multivessel disease (MVD) PCI with pLVAD support.

First, the Impella CP (Abiomed, Danvers, MA, US) was introduced into the left ventricle. Regarding heavy concentric calcifications located in the second segment of RCA, we decided to use rotational atherectomy (RA) (Boston Scientific, Marlborough, MA, US). The RotaWire Floppy was placed in the distal part of the artery supported with the FineCross microcatheter (Terumo Interventional Systems, Tokyo, Japan). Subsequently, rotablation with a 1.5-mm burr at 150 000 rotations per minute was performed. The pre-dilatation within the distal segment was carried out with 2.0 × 20 mm, 2.5 × 27 mm to 16 atm compliant balloons. Then, the Xience 2.5 × 12 mm drug-eluting stent (DES) was implanted with 16 atm. Pre-dilatation in the medial segment of RCA was unsuccessful due to rupture of the 3.5 × 20 mm, non-compliant (NC) super high-pressure balloon (Sis Medical, AG, Win-

terthur, Switzerland) inflated to 30 atm. Therefore, intravascular lithotripsy was performed with the 3.5 × 12 mm — 80 pulses Shockwave balloon (Shockwave Medical, Fremont, CA, US) allowing subsequent implantation of the 3.5 × 38 mm, 22 atm DES Xience. Post-dilatation with the 4.0 × 20 mm to 29 atm NC balloon catheter was conducted, and an optimal effect was confirmed via optical coherent tomography (OCT).

Following, a long calcified lesion in the proximal LAD with concomitant edge restenosis of the previously implanted stent was visualized by coronary angiography and confirmed in the OCT examination (*Figure 1A, C*). The 3.0 × 12 mm Shockwave balloon was used to apply 80 pulses within the stent and proximal segment of the LAD. Subsequently, pre-dilatation with the 3.0 × 20 mm, 20 atm NC balloon was done. Proximally to the previously inserted stent, the 3.0 × 28 mm and 3.5 × 15 mm DES Xience Sierra were implanted. Post-dilatation with 3.5 × 15 mm, 3.0 × 20 mm NC balloons inflated at 28–29 atm was performed. Good stent apposition and expansion were confirmed via OCT (*Figures 1B, D*).

The presented procedure is a rare use of lithotripsy in the treatment of long lesions with calcified edge restenosis with the support of pLVAD due to extreme reduction of left ventricular ejection fraction. Moreover, despite the presence of the cardiac resynchronization therapy defibrillator (CRT-D) and the necessity of pLVAD use, their function

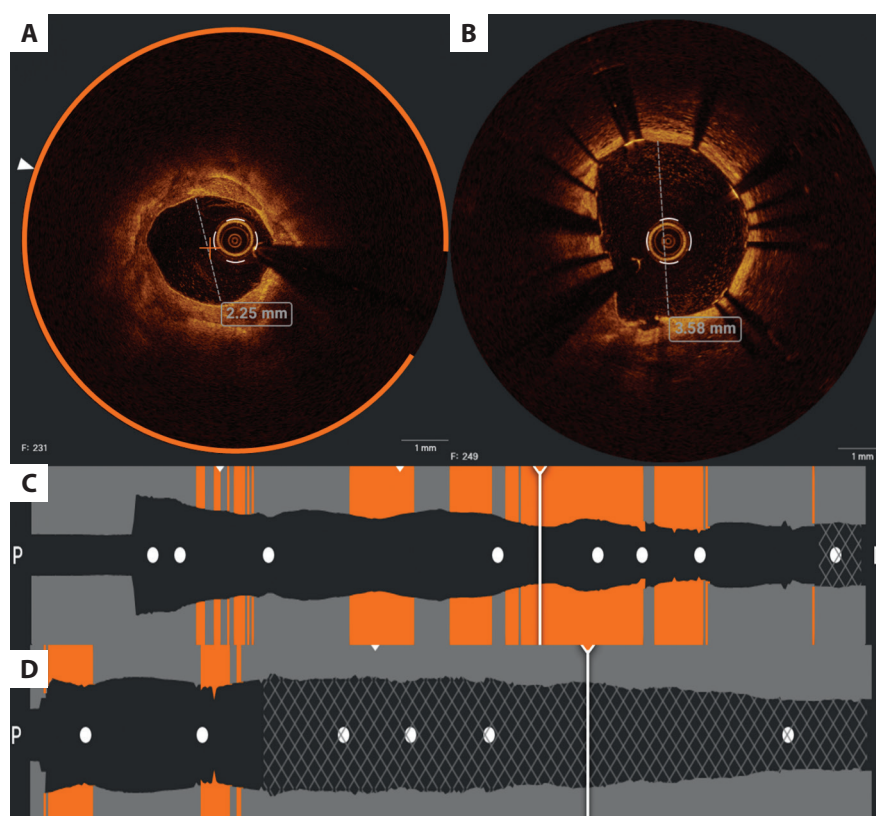


Figure 1. Optical coherent tomography of the left anterior descending artery. **A, C.** Longitudinal and cross-section showing a long, massively calcified lesion of 4 cm in length reaching the proximal edge of the previously implanted stent. In most diseased parts, calcifications were circumferential (360 degrees) with thickness above 1 mm. **B, D.** Longitudinal and cross-section displaying good apposition of implanted stents

remained stable during lithotripsy implementation. Therefore, we suggest that this technology could be beneficial in many clinical scenarios, also complementary to the RA method in the treatment of complex calcified lesions.

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/kardiologia_polska.

Article information

Conflict of interest: None declared.

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