# Rotational atherectomy and intravascular lithotripsy — two methods versus single lesion

Adrian Włodarczak[1], Jan Kulczycki[1], Łukasz Furtan[2], Piotr Rola[3], Mateusz Barycki[3], Magdalena Łanocha[4], Marek Szudrowicz[1], Maciej Lesiak[5]

[1]Department of Cardiology, MCZ Hospital, Lubin, Poland
[2]Department of Internal Medicine, District Hospital in Olawa, Oława, Poland
[3]Department of Cardiology, Regional Specialist Hospital, Legnica, Poland
[4]St. Adalbert's Hospital, Poznań, Poland
[5]1st Department of Cardiology, University of Medical Sciences, Poznań, Poland

**Correspondence to:**
Jan Kulczycki,
Department of Cardiology,
MCZ Hospital,
Skłodowskiej-Curie 52,
59–300 Lubin, Poland,
phone: +48 885 169 245,
e-mail: jan.jakub.kulczycki@gmail.com

Copyright by the Author(s), 2021

Kardiol Pol. 2021; 79 (6): 712–713;
DOI: 10.33963/KP.15962

**Received:** March 4, 2021

**Revision accepted:** April 11, 2021

**Published online:** April 16, 2021

Intravascular lithotripsy (IVL) and rotational atherectomy are two different device designs dedicated to overcome their common enemy — heavily calcified lesions. Percutaneous coronary interventions in this kind of lesions are associated with a higher risk of periprocedural complications, such as dissection or perforation of the vessel, distal embolization, or device entrapment [1]. Rotational atherectomy is a well-established procedure with proven superiority over scoring balloons [2]. Intravascular lithotripsy is a relatively novel approach to heavily calcified lesions [3, 4], recently approved by Food and Drug Administration (FDA) in this indication.

An 81-year-old woman with a history of hypothyreosis, and persistent atrial fibrillation, on rivaroxaban treatment, was admitted to the Cardiology Department to undergo urgent percutaneous coronary interventions of the heavily calcified left anterior descending artery (LAD). Initially, the patient had been admitted to a remote hospital due to non-ST-segment elevation myocardial infarction. Coronary angiography revealed chronic total occlusion of the recessive right coronary artery and significant LAD stenosis (Figure 1A). High pressure predilatations (22 atm) with non-compliant (NC) balloons (2 × 18 mm; 2.5 × 20 mm) were unsuccessful. After the first procedure, bleeding from the lower gastrointestinal tract occurred.

Subsequently, the patient was referred to the Cardiac Intervention Unit capable of performing IVL and rotational atherectomy procedures. Laboratory tests on admission revealed severe anemia (hemoglobin, 7.1 g/dl) and coagulopathy (international normalized ratio [INR], 15.27). After blood transfusions and vitamin K administration, due to persistent angina symptoms, the patient underwent angioplasty within 24 hours after the occurrence of first symptoms.

The procedure was performed via the left radial artery with a 7F guide catheter. An initial attempt to cross the lesion with lithotripsy catheter ShockWave IVL 4 × 12 mm (Shockwave Medical Inc., Santa Clara, California, United States), was unsuccessful, therefore rotablation with 1.5 mm burr (Boston Scientific Marlborough, Massachusetts, USA) was performed to facilitate device delivery (Figure 1B–C). Afterwards, due to underexpansion of a 3.5 mm NC balloon, lithotripsy was performed (1 × 20 application) (Figure 1D). Before stent implantation, NC balloon TREK Abbott 3.5 × 20 mm was used for predilatation. Two Onyx drug eluting stents (Medtronic, Santa Rosa, California, United States), 3.5 × 38 mm and 4.0 × 34 mm, were implanted. Postdilatation was performed with NC balloons 3.5 × 15 mm and 4 × 20 mm. An optimal angiographic effect with TIMI 3 flow was achieved (Figure 1E–F). No adverse events including recurrence of bleeding were noted during hospitalization.

Appropriate lesion preparation is essential for optimal stent expansion and is challenging in heavily calcified lesions. Rotational atherectomy is suitable, in case of NC balloon expansion or IVL balloon delivery failure. IVL can be used for optimization of lesions, when suboptimal balloon or stent expansion is suspected.

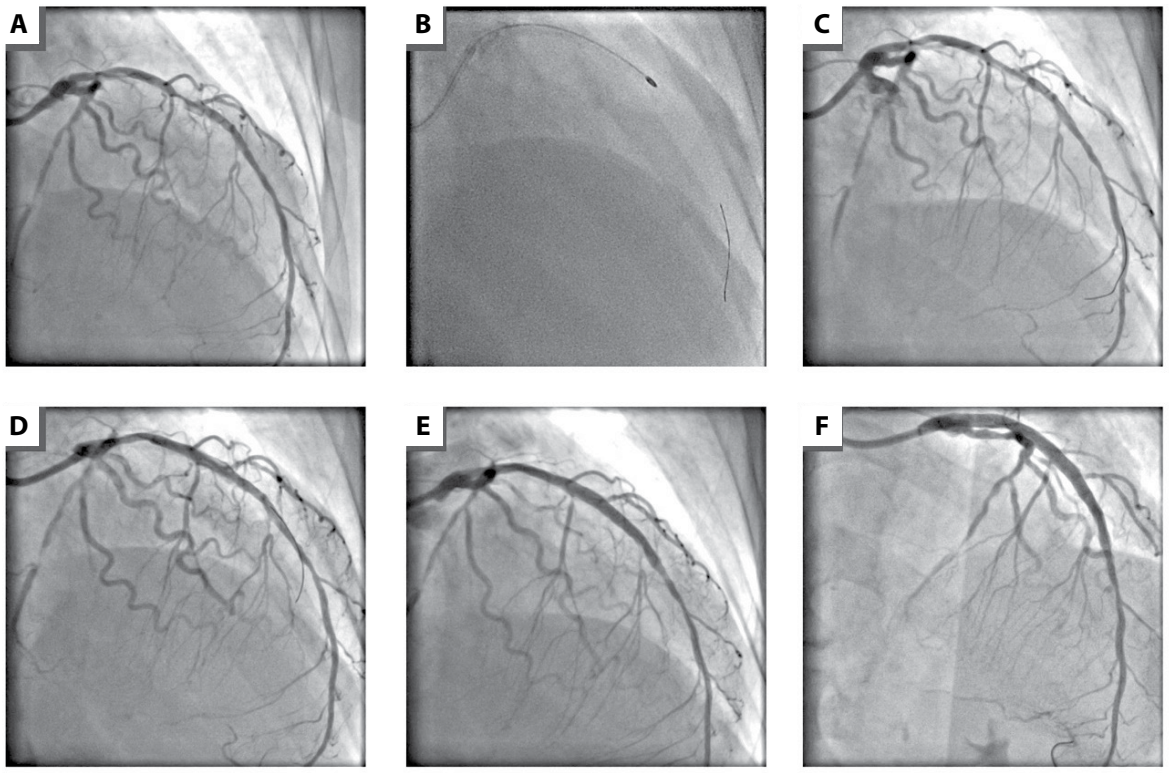


**Figure 1. A.** Angiography of the left anterior descending artery. **B.** Rotablation with 1.5 mm burr. **C.** Angiographic effect after rotablation. **D.** Angiographic effect after lithotripsy **E.** and **F.** final angiographic effect

## *Article information*

**Conflict of interest:** None declared.

**Open access:** This article is available in open access under Creative Common Attribution-Non-Commercial-No Derivatives 4.0 International (CC BY-NC-ND 4.0) license, allowing to download articles and share them with others as long as they credit the authors and the publisher, but without permission to change them in any way or use them commercially. For commercial use, please contact the journal office at kardiologiapolska@ptkardio.pl.

**How to cite:** Włodarczak A, Kulczycki J, Furtan Ł, et al. Rotational atherectomy and intravascular lithotripsy — two methods versus single lesion. Kardiol Pol. 2021; 79(6): 712–713, doi: 10.33963/KP.15962.

## REFERENCES

1. Huang BT, Huang FY, Zuo ZL, et al. Target lesion calcification and risk of adverse outcomes in patients with drug-eluting stents. A meta-analysis. Herz. 2015; 40(8): 1097–1106, doi: 10.1007/s00059-015-4324-1, indexed in Pubmed: 26115740.
2. Abdel-Wahab M, Toelg R, Byrne RA, et al. High-speed rotational atherectomy versus modified balloons prior to drug-eluting stent implantation in severely calcified coronary lesions. Circ Cardiovasc Interv. 2018; 11(10): e007415, doi: 10.1161/CIRCINTERVENTIONS.118.007415, indexed in Pubmed: 30354632.
3. Ali ZA, Nef H, Escaned J, et al. Safety and effectiveness of coronary intravascular lithotripsy for treatment of severely calcified coronary stenoses: the disrupt CAD II study. Circ Cardiovasc Interv. 2019; 12(10): e008434, doi: 10.1161/CIRCINTERVENTIONS.119.008434, indexed in Pubmed: 31553205.
4. Tomasiewicz B, Kosowski M, Zimoch W, et al. Heavily calcified coronary lesion treated by shockwave intravascular lithotripsy. Kardiol Pol. 2019; 77(9): 890–891, doi: 10.33963/KP.14917, indexed in Pubmed: 31364608.