

Impella-supported intracoronary lithotripsy of left main in-stent restenosis

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DOI: 10.33963/KPa.2022.0007

Received:

December 17, 2021

Accepted:

January 9, 2022

Early publication date:

January 11, 2021

A 69-year-old man with the diagnosed non-ST-elevation myocardial infarction (NSTEMI) was transferred from a local hospital after coronary angiography because of the critical left main (LM) bifurcation in-stent restenosis (ISR) (Figure 1A). Twelve months earlier, the patient underwent NSTEMI complicated by a cardiogenic shock and cardiac arrest, treated with the percutaneous coronary intervention (PCI) of the LM bifurcation with the double kissing crush (DK crush) technique. The procedure result was assessed only by angiography, without using intracoronary imaging. Due to the optimal angiographic effect, no atherectomy was used. The patient's concomitant diseases included chronic heart failure (HF), previous myocardial infarction with a chronic total occlusion (CTO) of the right coronary artery (RCA), permanent atrial fibrillation, type 2 diabetes mellitus, chronic kidney disease stage 3, as well as anemia (hemoglobin, 6.1 mmol/l).

On admission, the patient manifested symptoms of decompensated HF (Killip-Kimball II) with deterioration to pulmonary edema. Echocardiography revealed a severely reduced left ventricular ejection fraction (LVEF) of approximately 20%. The patient was referred to the local Heart Team. Due to high operative risk (SYNTAX score, 47.5 points; EuroSCORE II, 10%), he was disqualified from the coronary artery bypass grafting (CABG) and qualified for high-risk rescue PCI with the use of Impella CP support (Abiomed, Denver, CO, US).

After pharmacological stabilization, we performed PCI by the left femoral approach using the EBU 3.5 Guide Catheter (7 F) (Medtronic Ireland, Galway, Ireland) with Impella CP support (flow, 3.2 l/min), inserted via the right femoral access (Figure 1B). Following

the initial intravascular ultrasound (IVUS) evaluation (Figure 1C), we decided to perform shockwave intravascular lithotripsy (S-IVL) (Shockwave Medical Inc., Santa Clara, CA, US) because of the severely calcified plaques in the distal segment of LM and the proximal segment of the left circumflex artery (LCX). After 80 ultrasonic pulses, the S-IVL balloon (3.5 × 12 mm) was fully expanded. Following the pre-dilatation with the NC balloon (3.5 × 15 mm), the sirolimus-coated balloon (SCB) was successfully delivered (Magic Touch 3.5 × 25 mm). Because of the protruding calcium nodules in the distal segment of the LM (Figure 1D), we implanted the stent into the LM without covering the bifurcation (Figure 1E). The optimal final angiographic result was confirmed by IVUS (Figure 1F). The Impella was explanted directly after PCI while maintaining the patient's hemodynamic stability. The femoral artery was closed with two Perclose ProGlide devices (Abbott Vascular, Chicago, IL, US) and a 6-Fr Angio-Seal (St. Jude Medical, St. Paul, MI, US) device.

Following the PCI, the patient was monitored in the intensive care unit. Due to periprocedural blood loss, two units of red blood cells were transfused. The patient was discharged from the hospital six days after PCI.

The support of high-risk PCI procedures with Impella ensures hemodynamic stability and optimizes organ perfusion, improving crucial parameters such as renal function [1]. Patients without support from the second coronary artery due to its chronic total occlusion are particularly exposed to hemodynamic destabilization during the procedure. The safety and clinical efficacy of Impella's support in treating very high-risk populations have been demonstrated in several large registries and observational studies [2, 3]. Moreover,

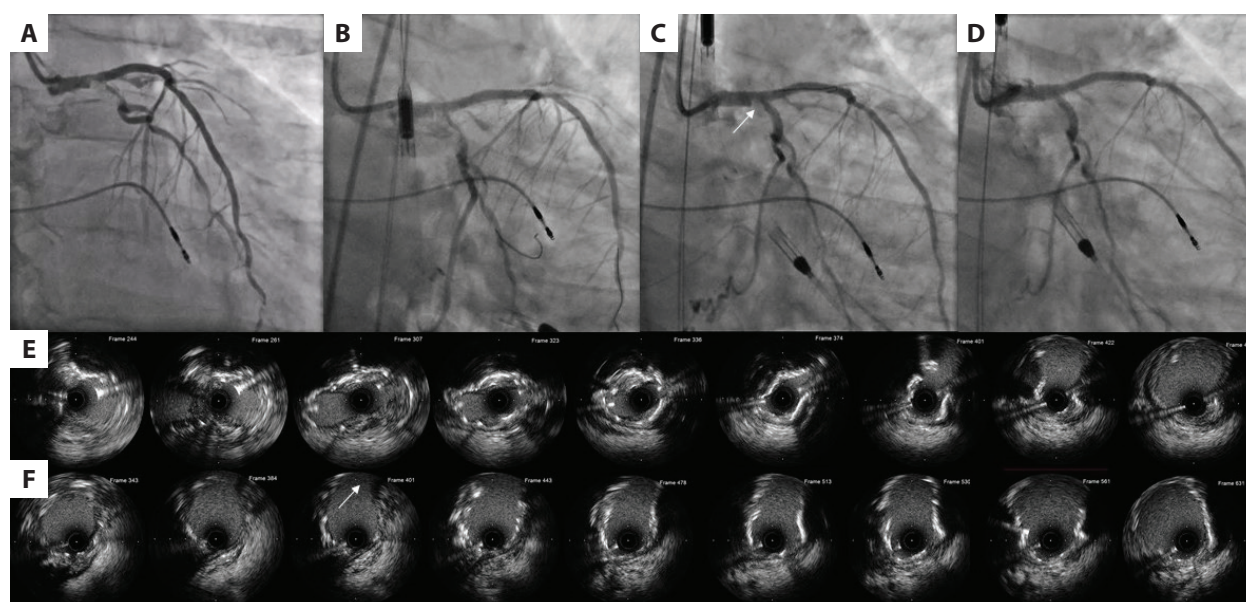


Figure 1. **A.** An anterior-posterior (AP) caudal angiographic view of the left coronary artery (LCA): significant stenosis of the left main and left circumflex arteries (LCX). **B.** AP caudal angiographic view of the LCA with Impella. **C.** Angiographic result after using a drug-coated balloon (DCB); protruding calcium nodules in the distal LM (the white arrow). **D.** Final angiographic view of the LCA after stent implantation. **E.** Intravascular ultrasound (IVUS) cross-sections of the LCX and the left main (LM) before shockwave intravascular lithotripsy (S-IVL). **F.** Final IVUS cross-sections of the anterior descending artery (LAD) in the proximal segment and the LM with a wide LCX ostium (the white arrow)

it should be emphasized that IVL seems to be currently the only effective and safe method of treating restenosis and/or under-expansion of stents implanted within highly calcified lesions [4].

Article information

Conflict of interest: None declared.

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