Intravascular lithotripsy for ostial left main coronary artery disease

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Heavily calcified coronary lesions pose a challenge in adequate percutaneous treatment. Proper plaque preparation is crucial to ensure successful stent implantation without increasing the risk of stent thrombosis or restenosis [1, 2]. Left main (LM) coronary artery interventions carry a higher risk, compared to other coronary territories. Due to the large diameter of the vessel, the usefulness of well-recognized calcified plaque modification techniques, such as rotational atherectomy, may be limited.

Intravascular lithotripsy (IVL) is a method of plaque modification that uses sonic waves to selectively fracture intimal and medial calcium deposits without any damage to soft vascular tissue. The Shockwave C2 IVL catheter (Shockwave Medical, Santa Clara, CA, US) is a device based on a semi-compliant rapid exchange coronary balloon catheter, advanced over any 0.014" guidewire. The catheter contains two-wave emitters and the sonic energy is transferred after low-pressure (4–6 atm) balloon inflation. The Shockwave C2 IVL usage results in both circumferential and longitudinal calcium fracture thanks to its construction. The recent data from clinical trials and registries are encouraging [3, 4], and evidence on the successful usage of the device in LM disease has already been published [5].

We present a case of an 85-year-old female hospitalized for non-ST-elevation myocardial infarction. Coronary angiography revealed a severely calcified unprotected ostial LM stenosis. The Heart Team chose percutaneous treatment. A Judkins left (JL) 3.5 6-Fr catheter (Launcher, Medtronic, Minneapolis, MS, US) was used to engage LM. Left anterior descending (LAD) and circumflex (Cx) arteries were wired (Sion blue, Asahi Intecc, Japan). Baseline intravascular ultrasonography (IVUS) was not available as the catheter did not cross the lesion. A predilation with 2.0 × 10 mm and 3.5 × 10 mm semi-compliant balloon catheters (Solarice, Medtronic, Minneapolis, MS, US) was done without complete expansion of the latter catheter (a "dogbone" image). To avoid dissection and compromised flow, which might result in hemodynamic instability, an IVL device was chosen to modify the plaque instead of further predilation with non-compliant, cutting, or scoring balloon catheters. A Shockwave C2 IVL 3.5 × 12 mm catheter was introduced without complications (the crossing profile of the device before inflation is 0.044–0.047 inch) and inflated to 4 atm. Since the patient tolerated each inflation and shockwave energy application without any signs of hemodynamic instability or ischemia worsening, a total number of 80 applications (8 series × 10 applications) were done followed by a complete expansion of a non-compliant 3.5 × 12 mm balloon catheter (NC Solarice, Medtronic) at 12 atm. A 3.5 × 12 mm zotarolimus-eluting coronary stent (Resolute Onyx, Medtronic) was deployed and fully expanded at 14 atm. A postdilation with a 3.75 × 8 mm non-compliant balloon catheter (NC Solarice, Medtronic) at 18 atm was done.

Final angiography and IVUS (Opticross, Boston Scientific, Marlborough, MA, US) confirmed proper stent apposition and expansion. The patient made an uneventful recovery and was discharged home two days after the procedure (Figure 1).

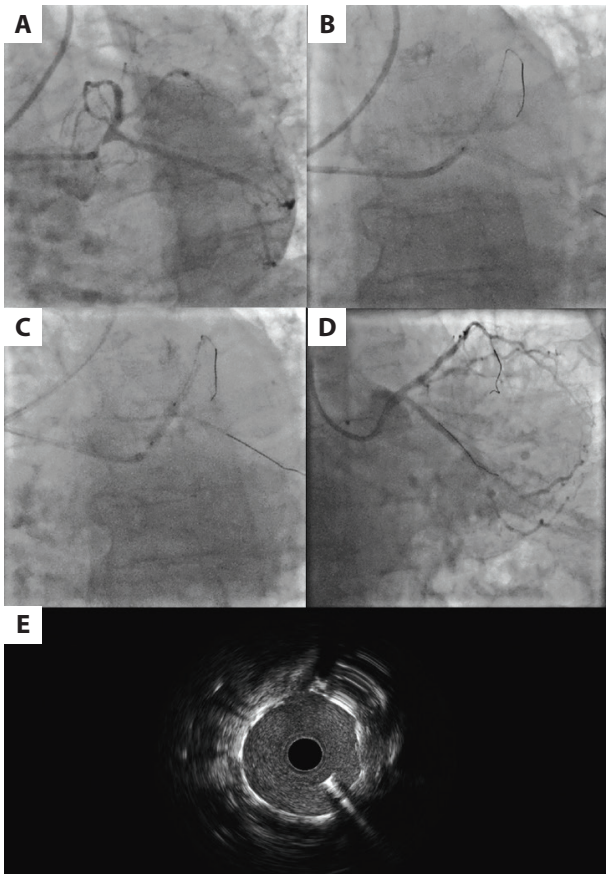

Figure 1. A. Baseline angiography. **B.** Shockwave C2 IVL catheter inflation. **C.** Stent deployment. **D.** Final angiogram. **E.** Final IVUS result

Abbreviations: IVL, intravascular lithotripsy; IVUS, intravascular ultrasonography

Article information

Conflict of interest: None declared.

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