Intravascular ultrasound-guided lithotripsy in a calcified saphenous vein graft

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Percutaneous coronary interventions (PCIs) in saphenous vein grafts (SVGs) can present many challenges and are associated with a high incidence of stent failure [1]. Therefore, optimal preparation of the lesion and optimization of the PCI procedure are crucial for the long-term prognosis. Morphologically, SVG atherosclerosis tends to be diffuse and concentric, with the softer, friable, larger plaque and little evidence of calcification. However, uniquely, the degeneration processes of the vein graft can also include severe calcification [2]. We present a case in which a non-dilatable, calcified SVG was successfully treated by Shockwave Intravascular Lithotripsy (S-IVL).

A 68-year-old woman with hypertension, hyperlipidemia, past medical history of coronary artery bypass graft (CABG), and PCI of the right coronary artery (RCA) due to vein graft occlusion, was admitted to our hospital due to unstable angina. Coronary angiography revealed critical stenoses in proximal, medial, and distal segments of SVG supplying the left anterior descending artery (LAD) (Figure 1A). In addition, there was significant stenosis in the left main (LM) and the left circumflex ar-

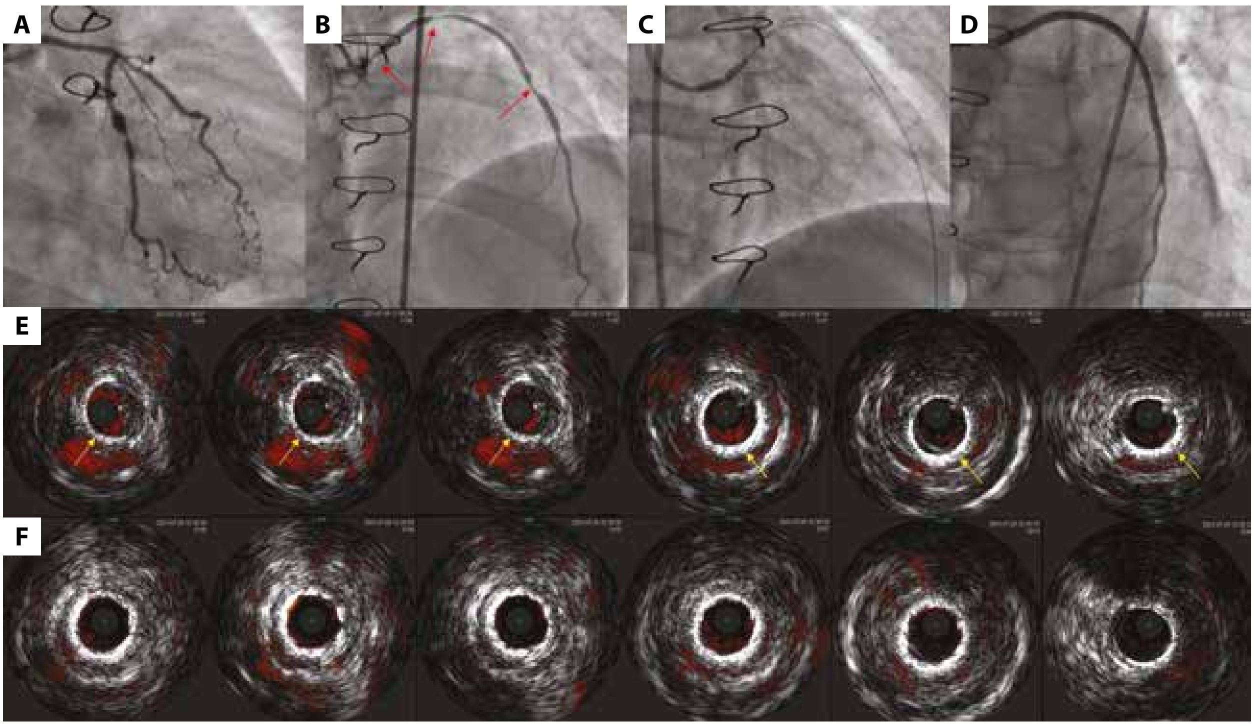

Figure 1. A. An anteriorposterior caudal angiographic view of the left coronary artery: significant stenosis of the left main and left circumflex artery (LCx). **B.** Saphenous vein graft (SVG) to the left anterior descending artery: significant stenosis of proximal, medial, and distal segments (red arrow). **C.** Non-compliant balloon underexpansion in the proximal segment of SVG. **D.** Intravascular ultrasound (IVUS) cross-sections of the proximal SVG after SIVL and stent implantation. **E.** Intravascular ultrasound (IVUS) cross-sections of the proximal SVG before shockwave intravascular lithotripsy (SIVL), calcium rings are marked with the yellow arrow. **F.** Final angiographic view of SVG

tery (LCx) (Figure 1B). At the first stage of PCI, we decided to treat the bypass graft to the LAD. A pre-dilatation with a 2.5 × 15 mm non-compliant (NC) balloon was successfully performed in the middle and distal segments, followed by stenting with Ultimaster 3.0 × 24 mm and Ultimaster 2.5 × 15 mm, respectively. The proximal lesion was pre-dilated with a 3.0 × 15 mm NC balloon; however, it did not expand (Figure 1C). Intravascular ultrasound (IVUS) showed an extensive calcification in the proximal segment of SVG (Figure 1D). Therefore, we decided to use a 3.0 × 12 mm S-IVL balloon. In total, there were 80 applications (at 4 atm) delivered in the proximal vein graft, resulting in an optimal expansion of the S-IVL balloon at 6 atm. Subsequently, we successfully implanted a drug-eluting Ultimaster 3.0 × 18 mm stent (Figure 1E). The optimal effect of the procedure was confirmed by IVUS (Figure 1F).

Percutaneous coronary intervention in SVG differs significantly from PCI in a diseased native coronary artery. Although a severe SVG calcification is rare, its presence can lead to incomplete expansion of stents and, consequently, a higher incidence of stent failure. S-IVL appears to be a safe, effective, and feasible strategy for calcium modification in native coronary arteries [3, 4]. We demonstrated intravascular lithotripsy as a safe and effective treatment method of a calcified SVG disease as well.

Article information

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