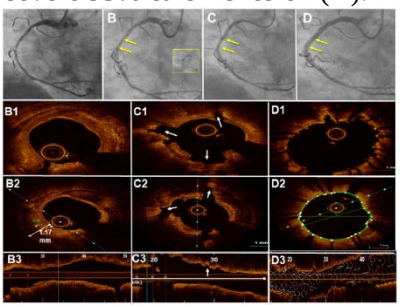
Case of Non-ST-Elevation Myocardial Infarction

Mahmoud Sabbah, MD, PhD, FESC, FSCAI

A 63-year-old man presented with a non-ST-elevation myocardial infarction. He was referred to our hospital for percutaneous coronary intervention (PCI) with rotational atherectomy (RA) after an unsuccessful attempt of PCI because of a severe calcified undilatable lesion (Figure 1A). The procedure was performed through the right radial approach with a 7.5 Fr sheathless AR2 guiding catheter. Multiple series for the lesion preparation and predilatation were attempted using a 1.5 mm then 1.75 mm rota burr (RotaLink Plus®, Boston Scientific, Ireland) followed by sequential non-compliant (NC) balloon dilatations with several high, super high-pressure, and scoring balloons. All failed to properly dilate the lesion resulting in a dog-boning effect (Figure 1B, small inset), and the procedure was terminated due to a large contrast volume and high radiation dose. The Shock wave C2 intravascular lithotripsy (IVL) system (Shockwave Medical Inc., Santa Clara, USA) was used after 2 weeks with a 3.5 x 12 mm balloon, delivering 8 series of lithotripsy shocks followed by effective balloon dilatation with an NC balloon (Figure 1C) and successful implantation of 2 overlapping drug-eluting stents (Figure 1D). Interrogation of optical coherence tomography (OCT) (DragonFly™ Optis™ imaging catheter, Abbott Medical, Westford, USA) before and after lithotripsy balloon application offered a beneficial insight into the differential mechanistic effect of RA versus the IVL balloon. Both RA and NC high-pressure balloons failed to interfere with the thick deep calcification sheets that were exceptionally stiff (Figures B1 and B2, Online Video 1), but the lithotripsy balloon effectively created multiple fissures and micro-explosions up to the thick deep calcium layer (Figures C1 and C2, arrows, Online Video 2), and provided a suitable platform for appropriate lesion dilatation and successful stent deployment without under-expansion or malposition (Figures D1 and D2). This case highlighted that RA is merely paving the road and may help in superficial calcifications. It also showed the useful role of OCT for guiding the appropriate treatment strategy. The Interrogation with OCT in angiographically visible severe calcification could save time, effort, radiation exposure, and contrast as well as a lot of procedural costs. IVL offers a novel option for lesion preparation of severely calcified and undilatable de novo lesions and could be an appropriate alternative for RA.

Figure Legends

Angiographic and optical coherence tomographic (OCT) images of the effect of the shockwave lithotripsy balloon (B, B1, and B2), rotational Atherectomy (C, C1, and C2), and the final post stenting results (D, D1, and D2). The middle (B1, C1, and D1) and lower (B2, C2, and D2) panel images represent the OCT cross-sectional frames corresponding to the angiographic images (B, C, and D) at 2-different levels (yellow arrows, B, C, and D). Angiographic imaging of RCA after the first unsuccessful attempt at a peripheral hospital shows a severe 95% calcific lesion (A).



Consultant Interventionalist, Cardioangiology department