VIA MEDICA

IMAGE IN CARDIOVASCULAR MEDICINE

Cardiology Journal
2020, Vol. 27, No. 4, 431–432
DOI: 10.5603/CJ.2020.0114

ISSN 1897–5593

Shockwave intravascular lithotripsy for multiple undilatable in-stent restenosis

Matteo Perfetti[1], Nino Cocco[1], Francesco Radico[2], Irene Pescetelli[3], Nicola Maddestra[1], Marco Zimarino[1, 2]

[1]Interventional Cath Lab, ASL 2 Abruzzo, Chieti, Italy
[2]Institute of Cardiology "G. d'Annunzio University", Chieti, Italy
[3]Cardiovascular Department, ASST Papa Giovanni XXIII, Bergamo, Italy

A 72-year-old patient was admitted for unstable angina; he had undergone previous percutaneous coronary intervention (PCI) with drug-eluting stents (DES) implantation on the right coronary artery (RCA) and left anterior descending artery (LAD) 7 years prior. In-stent restenosis (ISR) was documented on both sites. During PCI of RCA a non-compliant balloon ruptured (**Suppl. Video 1**), causing cardiac arrest. After cardiac resuscitation and adrenaline infusion the procedure was aborted. For the persistence of rest angina, a further attempt was planned with a plaque modification strategy.

Angiography and optical coherence tomography showed diffuse calcifications of the RCA (Fig. 1, upper panel), with a mid-RCA ISR caused by combined DES underexpansion and neo-atherosclerosis and a proximal de novo calcified severe stenosis. Shockwave intravascular lithotripsy (S-IVL; Shockwave Medical, Inc.) was delivered on both sites. A sirolimus eluting balloon (SEB) was then inflated inside the ISR and a DES deployed in the proximal segment, with a good final result (Fig. 1, mid panel).

In-stent restenosis of previous DES at mid-LAD (Fig. 1, lower panel, left side) was similarly due to both neo-atherosclerosis and underexpansion. Four S-IVL cycles followed by inflation of a SEB allowed a good final result (Fig. 1, lower panel, right side).

Shockwave intravascular lithotripsy produces mechanical waves propagating from the balloon (**Suppl. Video 2**) and such waves fracture calcifications without affecting soft tissues; it has been recently proposed for the treatment of both de novo calcified lesion and stent underexpansion. Here S-IVL was used for the treatment of ISR due to both neo-atherosclerosis and DES underexpansion. Further studies are needed to test the safety and efficacy of S-IVL in this subset.

Conflict of interest: None declared

Address for correspondence: Marco Zimarino, MD, PhD, Institute of Cardiology, "G. d'Annunzio" University – Chieti, C/o Ospedale SS. Annunziata, Via dei Vestini, 66013 Chieti, Italy, tel: +39-0871-41512, fax: +39-0871-402817, e-mail: m.zimarino@unich.it

Received: 18.04.2020 Accepted: 21.04.2020

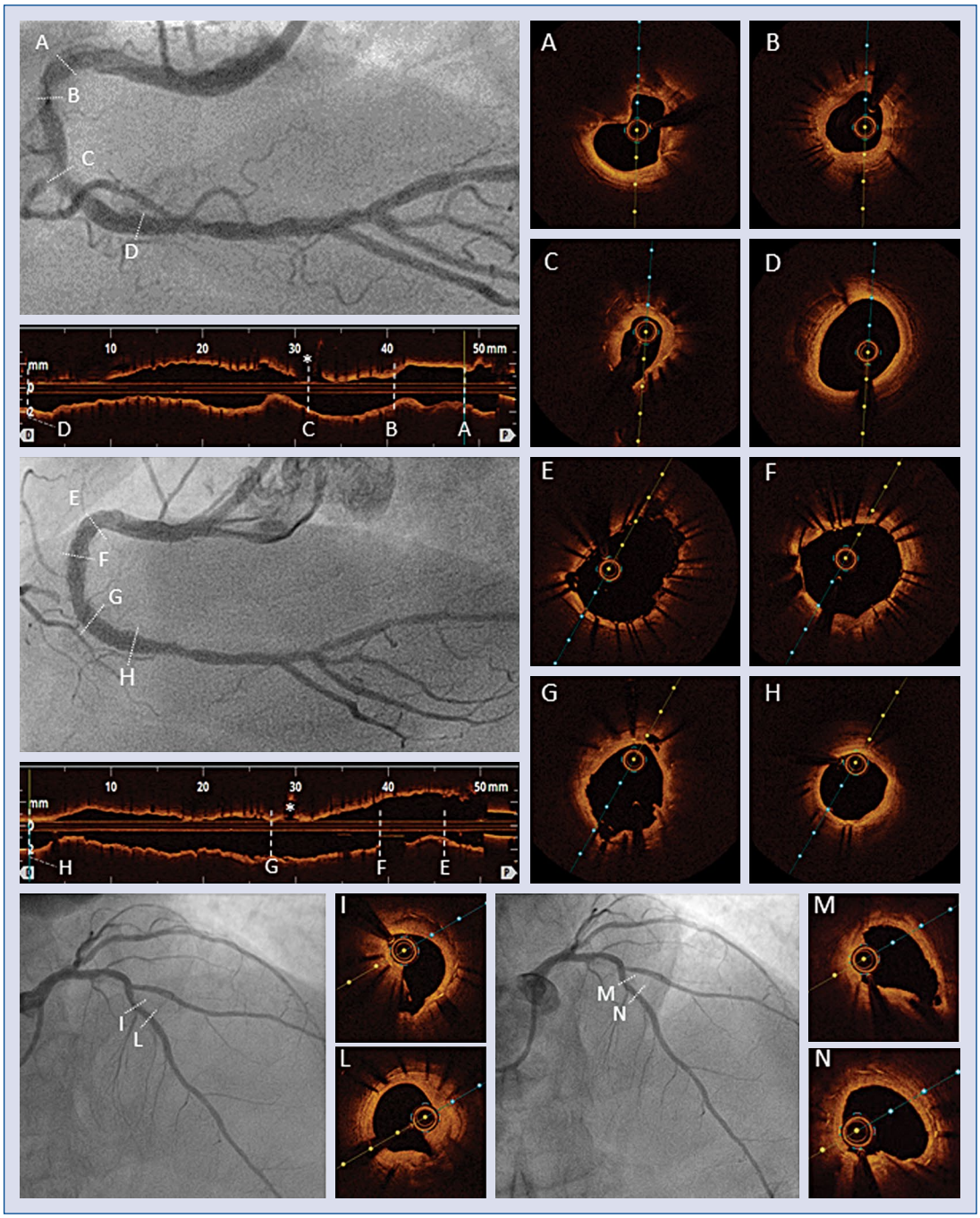

Figure 1. Upper panel: Baseline right coronary artery (RCA): angiography (upper left) of the RCA shows the position of 4 optical coherence tomography (OCT) cross-sections (upper right, **A–D**) reported on the right. **A.** Severely calcified eccentric de novo stenosis of the proximal segment; **B.** Concentric in-stent restenosis (ISR) with neointimal hyperplasia in the early midsegment. Stent underexpansion is detectable; **C.** In-stent restenosis/neo-atherosclerosis of the previously implanted two drug-eluting stents (DES) in overlap with underexpansion of the inner stent; **D.** Non-severe eccentric calcified plaque just below proximal to the DES edge; (*) Acute marginal branch; **Mid panel:** Angiography (left side) and OCT (right side) after 4 cycles of shockwave intravascular lithotripsy (S-IVL) with a 2.5 × 20 mm balloon, subsequent noncompliant 3.0 × 20 mm balloon and 3.5 × 20 mm sirolimus eluting balloon (SEB) inflations inside the ISR and final new 4.0 × 28 mm DES deployment between the proximal edge of the previous DES and de novo proximal RCA lesion; **E, F.** New DES has optimal deployment; **G, H.** Subsequent SEB dilatations achieved satisfactory plaque expansion inside the previously deployed DES; (*) Acute marginal branch; **Lower panel:** Angiography and OCT of baseline left anterior descending artery (left side) show a mid lesion, due to a combined mechanism of stent underexpansion and neo-atherosclerosis (**I, L**); after 4 cycles of S-IVL and inflation of a 3.5 mm SEB an optimal angiographic result is achieved (right side), with good DES expansion and adequate plaque fracture (**M**, **N**).