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Successful treatment of tandem calcific right coronary artery stenoses with 50 mm tapered Biomime Morph stent guided by intravascular ultrasound and rotablation using a sheathless guide via the radial access

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ABSTRACT

Tandem and/or diffuse calcific coronary stenoses can present significant challenges during percutaneous coronary intervention (PCI). Often, these long lesions require treatment with multiple stents of different calibers. However, this approach can result in unfavorable outcomes. We report here a case of tandem calcific right coronary artery stenoses in a low body weight elderly lady successfully treated via the radial approach using a sheathless guide with 50 mm tapered Biomime Morph stent aided by intravascular ultrasound and rotablation.

Introduction

Tandem and/or diffuse calcific coronary stenoses can present significant challenges during percutaneous coronary intervention (PCI). Often, these long lesions require treatment with multiple stents of different calibers. However, this approach can result in unfavorable outcomes due to delayed healing and increased inflammation from doubling of metal, drug and polymer at the site of overlap.[1,2] To overcome these limitations, longer (up to 48 mm) lengths of conventional stents [Xience (Abbott Vascular), Synergy (Boston Scientific)] have been manufactured and initial smallish studies point towards possible reduction of adverse events compared to overlapping stents of the same platform.[3]

Case report

An 84-year-old lady, weighing 54 kg was admitted with inferior N-STEMI. Coronary angiogram performed via right radial approach revealed a dominant, heavily calcific right coronary artery (Fig. 1A–D) with critical stenoses in the mid segment and further calcific moderate to significant stenoses distally (Fig. 2A). In view of small radial artery and possible need for rotablation, PCI was undertaken with a 7.5 French sheathless AL 0.75 guide (Asahi Intecc). After multiple attempts the lesion was finally navigated with a Pilot 200 wire with Corsair micro catheter support. Following partially successful pre-dilation (2 mm CB followed by 2.5 mm NCB), an intravascular ultrasound (IVUS) was performed that confirmed a long length of heavy burden of fibro-calcific atheroma along with significant recoil. For optimal vessel preparation rotational atherectomy was performed using a 2mm burr. This led to successful pre-dilatation with a 3 mm NC balloon and subsequent implantation of a tapered 3.5/3 × 50mm Biomime morph drug eluting stent. The stent was further optimized with 3mm and 3.5 mm NCBs from distal to proximal aspect with an excellent angiographic result (Fig. 2B–C). Repeat IVUS confirmed adequate stent expansion and the nice taper of the stent from the proximal to the mid to the distal segment (Fig. 2D–F). She was discharged home few days later and at one year follow-up, she remained angina free.

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Fig. 1. Images of RCA in LAO (A–B) and RAO (C–D) projections without contrast revealing extensive calcification in the RCA.

Discussion

Reduction of access site complications associated with PCI in the setting of MI and low body weight patients makes radial artery the preferred access site in such settings.[4] The need to use adjunctive devices like rotablation leads to the use of larger (>6 French) guide catheters making radial access difficult especially in elderly low body weight patients with smaller radial artery due to sheath-artery mismatch. The Asahi 7.5 French sheathless guide catheters have an outer diameter similar to conventional 6 French guide catheters making radial artery access possible in these situations (as documented in our patient) with shorter length of stay, lower rates of vascular complication, major bleeding and transfusion compared to rotablation done via the femoral access.[5]

In tandem and/or diffusely diseased vessels with angiographic suggestion of significant calcification intracoronary imaging should be considered not only to decide on optimal stent sizing but also to assess overall burden of fibrocalcific disease (extent, thickness and degree of calcification). The later can aid the operator in deciding whether conventional vessel preparation with (compliant and non-complaint) balloons will be adequate or whether there will be a need for further plaque modification using scoring balloons, shockwave balloons, laser therapy or rotablation. In our patient suboptimal expansion of 2.5 NCB along with IVUS evidence of long length of heavy burden of fibro-calcific atheroma and significant recoil guided us towards the need for further plaque modification with rotablation. Adequate vessel preparation following plaque modification by any of the above adjunctive devices should be confirmed by optimal balloon expansion prior to proceeding with stent implantation. Repeating the intracoronary imaging should be considered prior to stent implantation to document adequate plaque modification (eg. breaks in heavily calcific segments) and also post stent implant to decide on need for further stent optimization. In our patient IVUS post stent implantation revealed well apposed stents along with a nice taper from the proximal to distal end as was intended prior to stent implantation and guided by pre-stent IVUS assessment.

The novel BioMime Morph (Meril Life Sciences, India) is a 40, 50 and 60 mm long sirolimus-eluting cobalt chromium stent (65 μm strut thickness, biodegradable polymer) with a tapered design (0.5 mm taper from proximal to distal end) and is available in the following proximal and distal diameters (2.75–2.25 mm, 3–2.5 mm and 3.5–3 mm). The design premises of the Morph stent are three-fold: procedural concerns associated with stenting of long diffusely diseased lesions with overlapping stents; anatomical shape of vessels (10–15% taper for every 30 mm) and potentially improved vessel healing and reduction of MI with ultra-thin strut stents.[6]

Biomime Morph stents can be a novel alternative for treatment of long coronary lesions, overcoming the limitations of overlapping stents. In addition, their use can also minimize contrast usage and fluoroscopy time. Initial reports from single center registries have been promising[7,8] and a larger multi center registry is underway that will further clarify the potential role of this stent in routine clinical practice.[9]

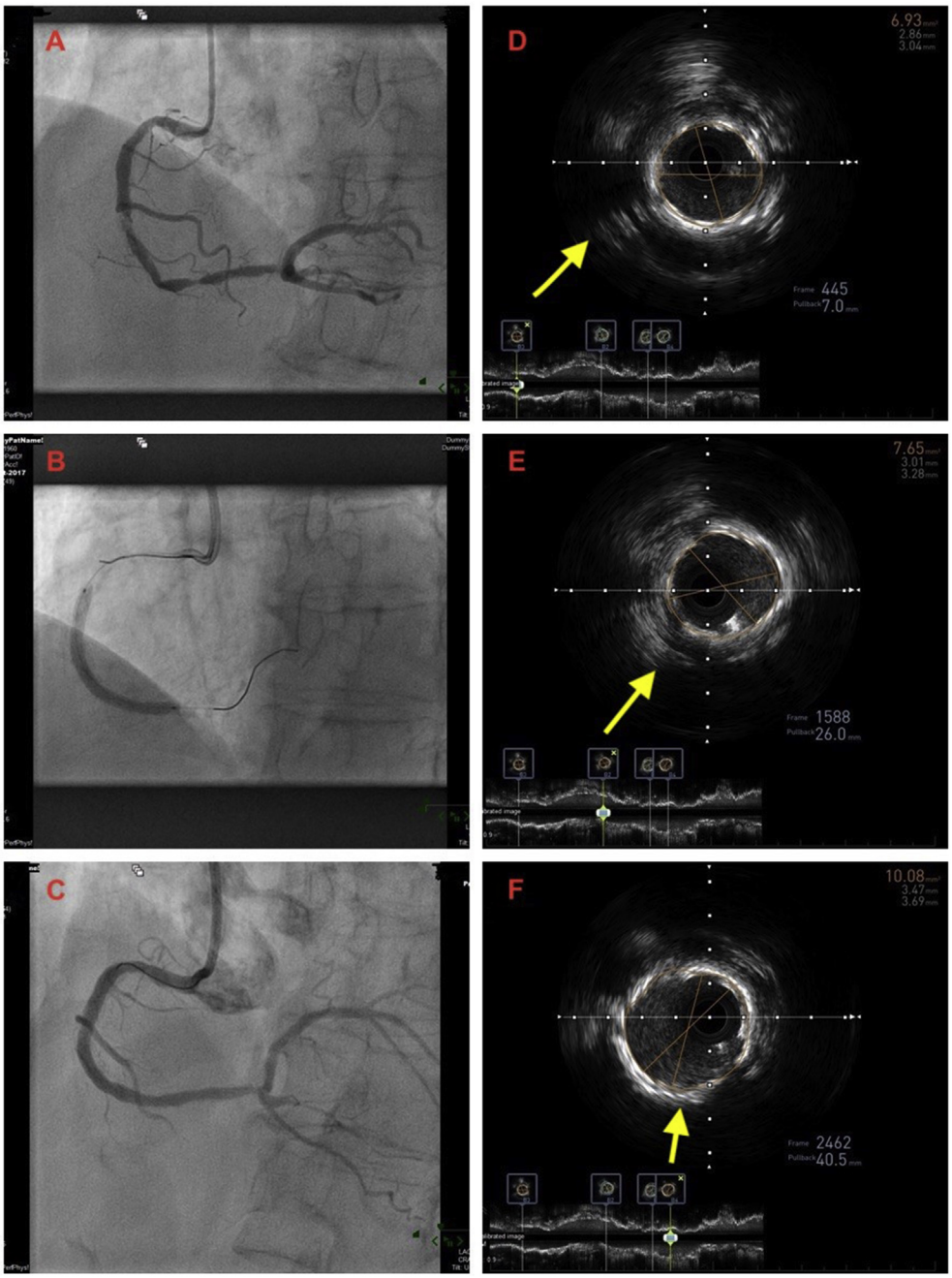

Fig. 2. Diffuse CAD in the RCA prior to and post stent implantation (A–C); IVUS showing the taper of the stent from the proximal to the mid and distal vessel (D–F).

Conflict of interest

None.

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