JACC: CARDIOVASCULAR INTERVENTIONS
VOL. 7, NO. 9, 2014

ISSN 1936-8798/$36.00
PUBLISHED BY ELSEVIER INC.
http://dx.doi.org/10.1016/j.jcin.2014.02.017

IMAGES IN INTERVENTION

# Why Do We Need Post-Dilation After Implantation of a Bioresorbable Vascular Scaffold Even for a Soft Lesion?

Toru Naganuma, MD,*† Azeem Latib, MD,*† Vasileios F. Panoulas, MD,*†‡ Katsumasa Sato, MD,*† Tadashi Miyazaki, MD,*† Antonio Colombo, MD*†

A 53-year-old man underwent coronary angiography because of worsening angina, which demonstrated a severe noncalcified lesion in the proximal left anterior descending coronary artery (LAD) (Figure 1A). Following pre-dilation with a 3.0-mm balloon, and showing no evidence of balloon indentation (Figure 1B), intravascular ultrasound (IVUS) revealed hypoisoechoic plaque with a vessel diameter 3.9 × 4.0-mm at the minimal lumen area (Figure 1C). A 3.5 × 18-mm ABSORB bioresorbable vascular scaffold (BVS) (Abbott Vascular, Santa Clara, California) was subsequently implanted. Despite IVUS showing absence of significant calcification or fibrosis within the plaque, the scaffold balloon

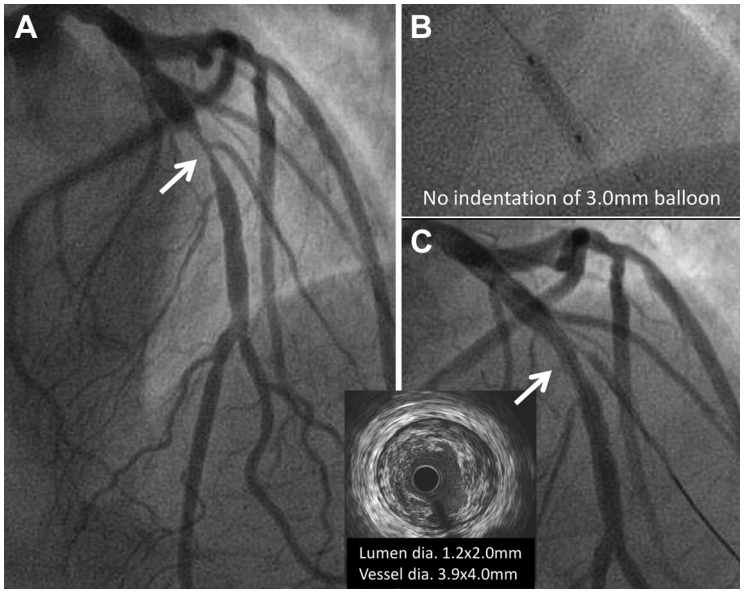


**FIGURE 1 Coronary Angiography and IVUS Images of the Left Coronary System**

**(A)** Pre-procedural angiography demonstrated a severe noncalcified lesion on proximal LAD with involvement of a small diagonal branch **(arrow)**. **(B)** No indentation of a 3.0-mm balloon for pre-dilation. **(C)** IVUS after pre-dilation showed hypoisoechoic plaque with a vessel diameter 3.9 × 4.0 mm. IVUS = intravascular ultrasound; LAD = left anterior descending coronary artery.

From the *Interventional Cardiology Unit, San Raffaele Scientific Institute, Milan, Italy; †EMO-GVM Centro Cuore Columbus, Milan, Italy; and the ‡National Heart and Lung Institute, Imperial College London, London, United Kingdom. Dr. Latib is on the advisory board of Medtronic. Dr. Colombo is a consultant for CID, Saluggia, Italy. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

Manuscript received February 4, 2014; accepted February 13, 2014.

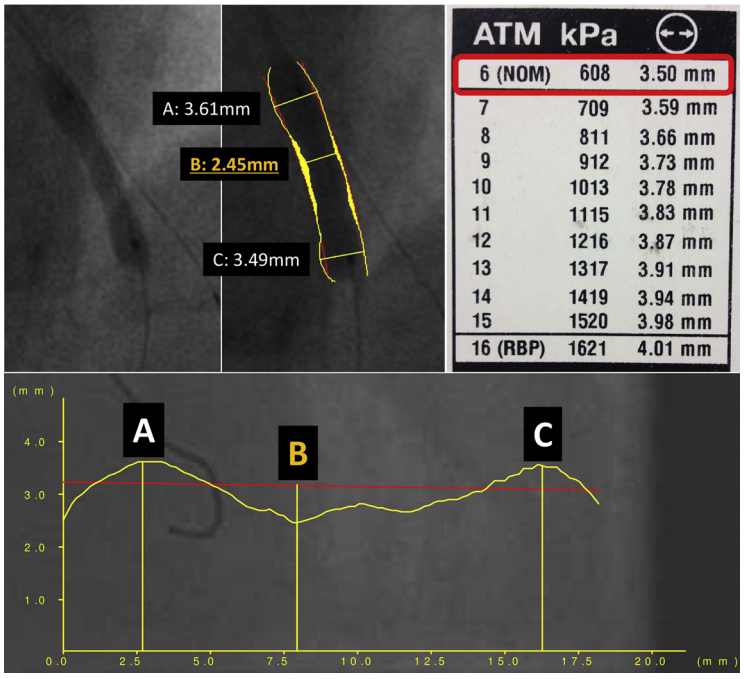


**FIGURE 2 Quantitative Coronary Angiography of the Inflated 3.5-mm Scaffold Balloon at a Nominal Pressure**

A scaffold balloon inflated at a nominal (NOM) pressure showed almost a "dog bone sign," despite surrounding soft plaque, with balloon diameters: 2.45 mm at the middle, 3.61 mm at the proximal, and 3.49 mm at the distal balloon markers. RBP = rated burst pressure.

revealed an almost "dog bone sign" even after 1 min of inflation at nominal pressure (Figure 2). IVUS showed underexpansion of the middle segment of the BVS (Figure 3A), therefore, post-dilation with a 3.75-mm noncompliant balloon was subsequently performed without evidence of balloon indentation (presumed balloon diameter: 3.89 mm at 18 atm). Both angiography and IVUS demonstrated an excellent result with an increase in scaffold area at the lesion site from 5.5 to 10.4 $mm^2$ (Figure 3B).

There is a consensus that meticulous lesion preparation and post-dilation with an appropriately sized balloon are essential for successful BVS implantation (1–4). Of note, the impact of post-dilation

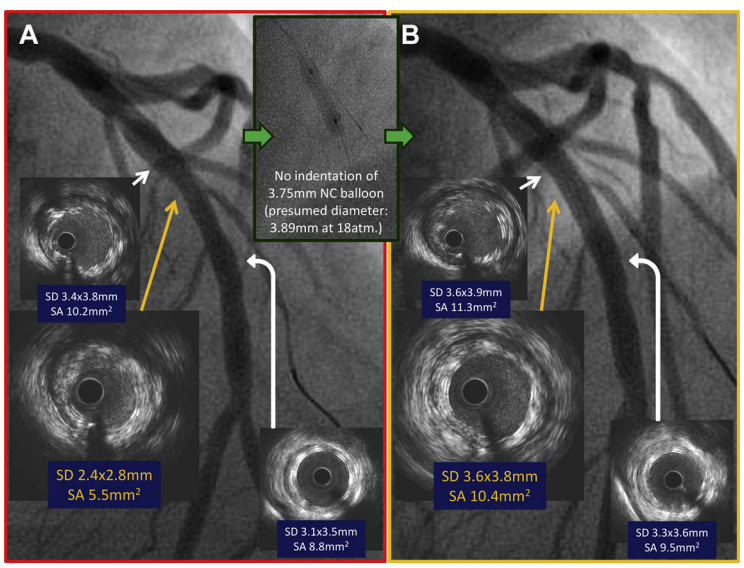


**FIGURE 3 Angiography Before and After Post-Dilation With 3.5- and 3.75-mm Noncompliant Balloons**

**(A)** IVUS and angiography showed underexpansion at the middle segment of the delivered BVS (SD: 2.4 × 2.8 mm, SA: 5.5 $mm^2$), despite surrounding soft plaque, whereas acceptable BVS expansion was noted at proximal and distal segments of the BVS. **(B)** Angiography after post-dilation with 3.5- and 3.75-mm noncompliant balloons showed an excellent result with preserved Thrombolysis In Myocardial Infarction flow grade III to the small diagonal branch. IVUS showed a significant increase in minimum SA (from 5.5 to 10.4 $mm^2$). BVS = bioresorbable vascular scaffold; IVUS = intravascular ultrasound; NC = noncompliant; SA = scaffold area; SD = scaffold diameter.

has not been well described, and it remains unknown why BVS balloon inflation at nominal pressure recommended by the manufacturer does not suffice to achieve full expansion of the scaffold. This case highlights the importance of post-dilation for optimal BVS implantation even when treating soft lesions. The same does not hold true for conventional metallic stents, where a similar type of lesion could have been treated with direct stenting without post-dilation by some operators. This is likely due to the fact that BVS delivery balloon is more compliant than the Xience Xpedition one (Abbott Vascular), to facilitate deliverability of a scaffold with thicker struts (strut thickness 157 μm with BVS vs. 81 μm with Xience Xpedition).

**REPRINT REQUESTS AND CORRESPONDENCE:** Dr. Antonio Colombo, EMO-GVM Centro Cuore Columbus, 48 Via M. Buonarroti, 20145 Milan, Italy. E-mail: info@emocolumbus.it.

## REFERENCES

**1.** Latib A, Costopoulos C, Naganuma T, Colombo A. Which patients could benefit the most from bioresorbable vascular scaffold implant: from clinical trials to clinical practice. Minerva Cardioangiol 2013;61:255–62.

**2.** Costopoulos C, Naganuma T, Latib A, Colombo A. Looking into the future with bioresorbable vascular scaffolds. Expert Rev Cardiovasc Ther 2013;11:1407–16.

**3.** Naganuma T, Basavarajaiah S, Latib A, Costopoulos C, Colombo A. Use of BVS in a chronic total occlusion with bifurcation lesion. Int J Cardiol 2013;167:e129–31.

**4.** Liang M, Kajiya T, Lee C-H, et al. Initial experience in the clinical use of everolimus-eluting bioresorbable vascular scaffold (BVS) in a single institution. Int J Cardiol 2013;168:1536–7.

**KEY WORDS** bioresorbable vascular scaffold, intravascular ultrasound, post-dilation