Multi-modality diagnostic assessment in interventional cardiology

Pyxaras, S.

Chapter 2

Optimization of Tryton Dedicated Coronary Bifurcation System with Co-Registration of Optical Coherence Tomography and Fractional Flow Reserve

This chapter was adapted from:
Optimization of Tryton Dedicated Coronary Bifurcation System with Co-Registration of Optical Coherence Tomography and Fractional Flow Reserve
Stylianos A. Pyxaras, Shengxian Tu, Emanuele Barbato,
Johan H.C. Reiber, William Wijns
JACC Cardiovascular Interventions. 2012,
Volume 6, Issue 7, Pages e39-40

The Tryton-Side Branch Stent™ (Tryton Medical, Inc., Newton, MA, USA) is one dedicated bifurcation system, designed to be implanted in the side branch (SB) along with placement of a standard drug-eluting stent (DES) in the main vessel (1). The procedure is completed by a final kissing balloon dilatation of both stents, which requires crossing of the Tryton-stented side branch through the main branch stent struts (Figure 1). Motorized fractional flow reserve (FFR) pullback (at 1 mm/sec) during hyperemia was used to allocate intracoronary pressure gradient variations, allow co-registration with anatomical, OCT-derived imaging, and verify optimal morphological and functional result of the dilatation of the bifurcation stenoses (Figure 2).

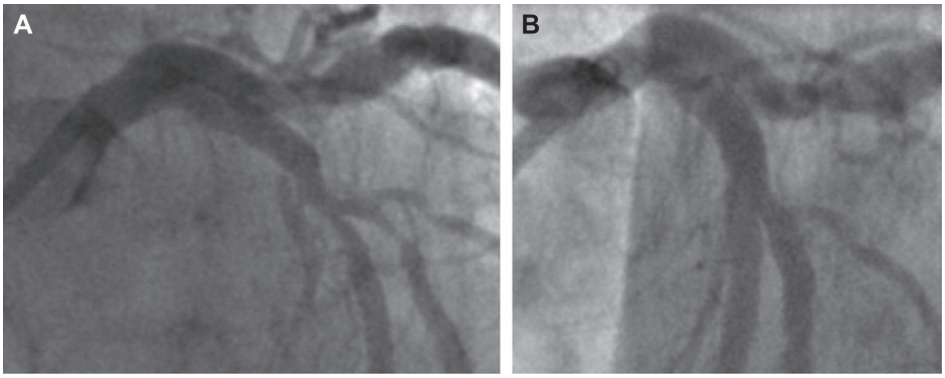

Figure 1. Coronary Angiography Pre- and Post-Stenting of the LAD–D1 Bifurcation Stenoses
(A) Pre-stenting and (B) post-stenting of the left anterior descending coronary artery (LAD)–diagonal (D1) bifurcation stenoses are shown.

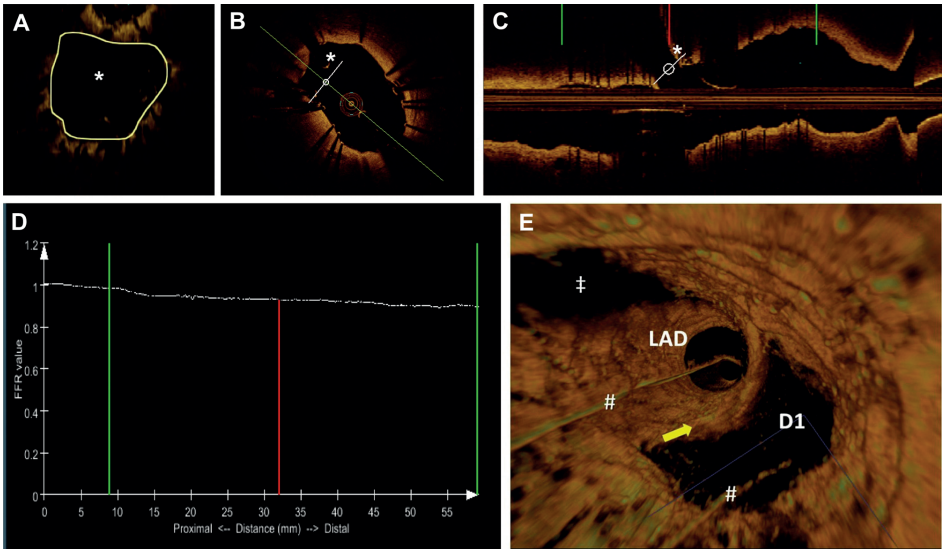

Figure 2. OCT-FFR co-registration after Tryton side branch and main stent dilatation using final kissing balloon technique.
A) Visualization of the side branch ostium by optical coherence tomography (OCT) imaging from the main branch. At the "cutting plane" (indicated by the asterisk
[*]), the area was measured as 8.32 mm^2. The same cutting plane is visualized on the conventional OCT cross-sectional (B) and longitudinal (C) views. (D) Fractional
flow reserve (FFR) variation during motorized pullback of the pressure wire from the diagonal branch showing no residual pressure drop at the carina level (indicated
by the red line). (E) Three-dimensional OCT reconstruction of the bifurcation after Tryton and DES deployment and final kissing balloon inflations. The yellow arrow is
indicating the newly created carina at the bifurcation level. The hash mark (#) indicates the guidewire, and the double dagger (z), the guidewire shadow artifact.
Abbreviations as in Figure 1.

REFERENCE

1. Magro M, van Geuns RJ. TheTryton side branch stent. EuroIntervention 2010;6 Suppl J:J147-50.