Clinical Case Update

Robotic Radial Bifurcation Bioresorbable Vascular Scaffold PCI

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Case History
A 48-year-old man with no previous medical problems presented with prolonged chest pain, ruling in for a non-ST elevation myocardial infarction. He was treated with aspirin, beta-blocker, statin, nitrate and heparin.

Cardiac Catheterization Procedure
Cardiac catheterization was performed using right radial arterial access via 6 French (Fr) hydrophilic Glidesheath Slender (Terumo). Coronary arteriography revealed a 95% stenosis in the proximal left anterior descending (LAD) artery with a rise to a medium-sized diagonal (D) branch with a 75% ostial lesion (Figure 1). Additionally, the distal right coronary artery was occluded with left to right collateralization consistent with a chronic total occlusion. Left ventriculography revealed normal left ventricular function and wall motion. The decision was made to perform bifurcation percutaneous coronary intervention (PCI) with bioresorbable vascular scaffold (BVS) placement.

Interventional Procedure
The CorPath Vascular Robotic System (Corindus Vascular Robotics) was utilized for percutaneous coronary intervention (PCI). Robotic PCI has been described in detail elsewhere. Briefly, the CorPath System consists of a bedrail mounted robotic drive and sterile cassette. The cassette can be loaded with commercially available 0.014-inch guidewires and rapid exchange angioplasty and stent delivery systems. The cassette manipulates the guidewires and angioplasty devices using motorized rollers that provide axial and rotational forces. The robotic drive is connected to the control console via a communication cable. Operators perform PCI seated in a radiation-shielded interventional cockpit in the catheterization laboratory. Guide wires and catheters are manipulated using joysticks and a touch-screen to control the movements of intravascular devices. Fluoroscopy, electrocardiography, and hemodynamics are “slaved” to monitors within the interventional cockpit for enhanced viewing.

The patient was consciously sedated and anticoagulation was achieved using additional IV unfractionated heparin with an activated clotting time of 250-300 seconds. The left main was engaged with a Runway 6 Fr Left BU4 guide catheter with side holes (Boston Scientific). A 0.014-inch Runthrough NS guidewire (Terumo) was loaded into the CorPath cassette by the scrub tech. The operator moved to the robotic interventional cockpit. Using the joystick on the control console, the wire was advanced across the stenosis in the diagonal. The wire was then placed in the cassette parking track. A 0.014-inch Hi-Torque BMW guidewire (Abbott Vascular) was loaded into the CorPath...
cassette drive unit and robotically crossed the severe left anterior descending (LAD) stenosis.

Pre-dilatation of the LAD was performed with a 2.5 mm x 12 mm Trek NC balloon (Abbott Vascular) placed robotically over the Hi-torque BMW guidewire. Dilatation of the ostium of the diagonal was performed with the 2.5 mm x 12 mm Trek NC balloon placed robotically over the Runthrough NS guidewire (Figure 2). An Eagle Eye Platinum ST (Volcano Corp.) IVUS catheter was placed to image the LAD (Figures 3 and 4). The LAD was dilated with a 4.0 mm x 8 mm NC Trek RX balloon catheter robotically over the Hi-torque BMW guidewire. The diagonal guidewire was then pulled back into the guide catheter. An Absorb GT1 BVS (Abbott Vascular) was then placed robotically over the Hi-torque BMW guidewire (Abbott Vascular) dilating the LAD (Figure 5). This resulted in plaque shift into the ostium of the diagonal (Figure 6).

The Runthrough NS guidewire was then robotically advanced through a proximal BVS strut to rewire the diagonal ostium. The 2.5 mm x 12 mm NC Trek RX was driven robotically over the Runthrough NS through the proximal BVS strut to dilate the diagonal ostium (Figure 7). Final high pressure balloon angioplasty was undertaken robotically with the 4.0 mm x 8 mm NC Trek RX balloon.
catheter (Abbott Vascular) taken up twice covering the distal and proximal extent of the BVS in the LAD. Final angiography demonstrated negligible residual stenosis within the scaffolded LAD and the balloon angioplasty treated diagonal (Figure 8). Post BVS IVUS imaging using the Eagle Eye Platinum ST (Volcano) showed no dissection and good BVS apposition (Figure 9). The patient tolerated the procedure well and was discharged to home the following day.

Discussion

The case described shows the successful utilization of the CorPath robotic system for bifurcation lesions with placement of the Absorb GT1 Bioresorbable Vascular Scaffold (Abbott Vascular). It demonstrates the capabilities of the technology including double-wire intervention, successful BVS delivery, and the ability to re-cross through a scaffold-strut for branch vessel ostium dilatation. More experience with this technology will potentially add to its utilization in more complex lesions.

Reference
