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Three-Vessel Revascularization for Non-ST Elevation MI

A new coronary guidewire provides enhanced performance characteristics.

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CASE REPORT

A 69-year-old woman with a history of hypertension and chronic obstructive lung disease presented to her primary care physician with a 24-hour history of left anterior precordial chest pain. She was sent immediately to the emergency department of an outlying hospital where an electrocardiogram demonstrated new anterior T-wave inversions. Her initial troponin-I level was elevated, and she was stabilized with aspirin, unfractionated heparin, topical nitroglycerin, and an intravenous beta-blocker. The patient was subsequently referred to our institution for further management. Cardiac catheterization was performed after arrival.

Cardiac catheterization demonstrated moderate left ventricular dysfunction with anterior and apical hypokinesis, moderate mitral regurgitation, and an ejection fraction of 30%. Coronary angiography revealed severe three-vessel coronary disease, with a long 99% proximal left anterior descending (LAD) artery stenosis and a 90% very distal LAD stenosis, a focal 90% stenosis in the proximal left circumflex artery (Figure 1A, B), and an 80% stenosis in the mid-right coronary artery (Figure 1C). Because the patient was not believed to be an optimal candidate for coronary artery bypass surgery due to medical reasons, we elected to proceed with immediate three-vessel percutaneous revascularization.

After adequate intravenous Angiomax (The Medicines Company, Parsippany, NJ) anticoagulation was administered, the left coronary artery was engaged with a 6-F FL4 guiding catheter (Boston Scientific Corporation, Natick, MA). The LAD lesions were easily crossed with a Runthrough™ NS coronary guidewire (Terumo Interventional Systems, Somerset, NJ). The proximal lesion was predilated with a 2.5-mm Maverick angioplasty balloon (Boston Scientific Corporation). We then deployed a 2.5-mm X 16-mm

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Taxus stent (Boston Scientific Corporation) in the proximal LAD; the distal LAD was dilated with the Maverick balloon alone, without stenting, because of the distal location of the lesion.

The left circumflex lesion was then crossed with the same Runthrough NS guidewire. The lesion was directly stented with a 3.5-mm X 12-mm Taxus stent. The right coronary artery was then cannulated with a 6-F FR4 (Boston Scientific Corporation) guide catheter, which was found to provide less-than-optimal support. However, after crossing the lesion with the same Runthrough NS guidewire, this stenosis was also directly stented with a 3-mm X 16-mm Taxus stent. Final angiography showed an excellent angiographic result at all lesions within the dilated portions, and no evidence for dissection or distal perforations (Figure 1D, E). Of note, the Runthrough NS guidewire retained the original curve throughout all interventions and did not require reshaping for any of the procedure.

DISCUSSION

Coronary artery bypass grafting remains the revascularization treatment of choice for most patients with left mainstem coronary stenosis or three-vessel coronary disease with left ventricular dysfunction. However, in this case, bypass surgery was contraindicated for medical reasons. Therefore, multivessel percutaneous revascularization was utilized to achieve revascularization in a single procedure, at the time of diagnostic cardiac catheterization.



Figure 1. Angiographic image showing the 99% stenosis on the proximal LAD and a 90% stenosis on the distal LAD (A). Focal 90% stenosis in the proximal left circumflex artery (B). Angiographic image showing the 80% stenosis in the mid right coronary artery (C). Final angiographic appearance of the LAD and the left circumflex artery (D). Final angiographic appearance of the right coronary artery (E).

In this case, the efficiency and safety of the coronary stenting was enhanced by the use of a novel coronary guidewire. The Runthrough NS coronary guidewire was recently launched in the US by Terumo Interventional Systems and represents unique advances in guidewire technology. Utilizing their extensive experience with other nitinol guidewires, Terumo has successfully achieved a coronary guidewire that has a flexible, yet durable, nitinol shaping tip. The guidewire tip retains its shape better than other leading coronary guidewires, as shown in head-to-head testing (data on file, Terumo Corporation, Tokyo, Japan). The Runthrough NS provides the ability to perform multi-vessel procedures with only one guidewire, which may improve procedural efficiency and reduce costs related to guidewire usage. The nitinol tip also facilitates multiple reshaping attempts to allow the physician to achieve exactly the right curve configuration as needed for different lesion characteristics. As a result, prolapsing the guidewire, navigating stent struts, or calcified tortuous lesions will not create the excessive tip deformities experienced in other stainless steel shaping ribbon guidewires.

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The Runthrough NS also features Terumo’s unique DuoCore™ Technology. DuoCore seamlessly fuses two proven guidewire technologies (nitinol and stainless steel), thus enabling one-to-one torque transfer and excellent steerability, pushability, and trackability. This

is a proprietary technology that Terumo has developed to combine the support and torque benefits of stainless steel with the shaping durability and flexibility of nitinol into one guidewire. In addition, this first-choice coronary guidewire features the optimal balance of hydrophobic and hydrophilic coatings. The tip has a hydrophobic coating, and the body of the wire has hydrophilic coating. The resulting smooth trackability in tortuous vessels and superior device delivery create a significantly improved experience for the user; yet, the hydrophobic tip provides the fine tactile feel required for meticulous and precise intracoronary manipulation. This case demonstrates crossing of complex lesions even in the distal segment, while maintaining excellent torque control. In combination, the full-length coatings of the guidewire provide smooth delivery of the devices and trackability within the vessel, while the body of the guidewire provides unexpected device support.

CONCLUSION

This case demonstrates a diagnostic cardiac catheterization and concurrent three-vessel coronary stenting procedure that was greatly facilitated by a novel and unique coronary guidewire. The performance characteristics of this guidewire make it an excellence choice for many situations, and the use of one guidewire for multiple lesion types may result in patient safety and economic benefits, as well as improved time efficiency in the catheterization lab. ■

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