Angioplasty for Difficult Complex Lesions With Using the Venture™ Catheter for Wire Placement

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ABSTRACT

We report here on the use of the Venture™ catheter to facilitate successful advancement of a guidewire across difficult, complex lesions after the prior attempts at guide wire passage were unsuccessful with using standard wires. This Venture™ catheter may increase the success rate and reduce the procedural time for such a challenging interventional procedure. (Korean Circ J 2008;38:287-290)

KEY WORDS: Angioplasty; Catheter.

Introduction

Significant angulation and subtotal occlusion are predictive for procedural failure during percutaneous coronary intervention. A proximal stenosis of the circumflex artery, when combined with severe angulation or no visible stump can confer a higher chance of guidewire failure despite the use of modern highly steerable guidewires.

The Venture Catheter (St. Jude Medical Inc., Minneapolis, MN, USA) is the only deflectable catheter for guidewire delivery in this challenging anatomy. This catheter is a low-profile, 6 Fr-compatible, torqueable, support catheter with an 8 mm deflectable atraumatic radiopaque distal tip and it provides support for subsequent wire passage. We present here two cases that demonstrate the benefit of this recently available catheter with a deflecting tip to help negotiate subtotal occlusion or severely angled take-offs of the left circumflex artery from the left main coronary artery.

Case

Case 1

A 61-year old female with a history of hypertension presented with Canadian Cardiovascular Society Class III angina. Coronary angiography showed 60 percent tubular eccentric luminal narrowing at the left anterior descending artery (LAD) ostium and subtotal occlusion at the left circumflex artery (LCx) ostium. Angiogram showed no visible stump to pass the guidewire across the lesion (Fig. 1A).

Using the right femoral approach, an 8 French Extra back-up guiding catheter was engaged in the left main coronary artery. Initial attempts to cross the left circumflex artery ostium were made with hydrophilic-coated 0.014” guidewires such as the BMW (Guidant Corp., Santa Clara, CA, USA) and the Choice PT2 (Boston Scientific., Natick, MA, USA). However, these attempts were unsuccessful due to the lack of back-up support and the unsuitable angulation. The Venture™ Wire Control Catheter was then advanced over the guidewire. The distal tip of the Venture Catheter was directed toward the LCx ostial lesion and the tip was deflected to point towards the origin of the occlusion (Fig. 1B). A 0.014” hydrophilic guidewire was advanced through the Venture Catheter tip. This catheter tip provided back-up support for the guidewire as it was directed around the angle and across the occlusion. The guidewire was then continually advanced to the distal LCx (Fig. 1C).

After removal of the Venture Catheter, the lesion was pre-dilated with an undersized balloon (2.0 × 20 mm), and a Taxus stent (2.5 × 28 mm) was then implanted. A Taxus stent (4.5 × 24 mm) was next deployed from the left main coronary artery to the proximal LAD by using the crushing technique. Finally, kissing balloononing was attempted (Fig. 1D). Following the stent deployment, a good angiographic result was obtained with complete recovery of the LCx, and thrombolysis in...
myocardial infarction (TIMI) grade 3 flow was observed (Fig. 1E). The post-procedural intravascular ultrasound (IVUS) findings showed an acceptable result [the minimal stent area (MSA) of the main stent was 10.2 mm², and the MSA of the LCx ostium was 4.7 mm²] (Fig. 2).

Case 2
A 59-year-old man with hypertension and a history of smoking presented with unstable angina. He was previously admitted in another hospital and he was then transferred to our cardiovascular center for percutaneous coronary intervention because of the presence of a difficult complex lesion. Diagnostic coronary angiography showed diffuse long eccentric luminal narrowing at the LAD (Fig. 3A) and a severely angulated proximal LCx with subtotal occlusion (Fig. 3B). Although there was a small remaining stump of the proximal circumflex, it was angulated at its origin. Despite multiple attempts,
the wire repeatedly prolapsed distal into the LAD. So, a microcatheter was positioned in the ostium of the LCx. This was successfully advanced into the proximal lesion, but it was unable to cross the second angle of the lesion (Fig. 3C). The distal end of the Venture Catheter was advanced into the LAD just beyond the circumflex origin over a BMW wire (Guidant Corp., Santa Clara, CA, USA) and it was placed into a curved configuration by clockwise rotation of the screw mechanism on the proximal control handle and then it was gently withdrawn until it engaged the origin of the LCx. The guide wire was then successfully advanced through the catheter into the distal LCx (Fig. 3D) and the Venture Catheter was removed.

After successful wiring, the pre-procedural IVUS findings showed significant stenosis of the left main coronary artery and the LAD ostium (Fig. 4A and B). Predilation was performed with an undersized balloon at the proximal LCx, and a Cypher stent ($2.5 \times 24 \text{ mm}$) was deployed. A $3.5 \times 28 \text{ mm}$ Cypher stent was placed from the left main coronary artery to the proximal LAD and it was crushed into the LCx stent. After crushing, a Cypher stent ($2.75 \times 28 \text{ mm}$) was deployed at the mid LAD. This was followed by kissing balloononing at the bifurcation lesion (Fig. 3E). We obtained good angiographic (Fig. 3F and G) and IVUS results (Fig. 4C) (the MSA of the LCx ostium was $5.1 \text{ mm}^2$).

**Discussion**

We describe here two cases of using a Venture Catheter to enable access to LCx ostial lesions where severe angu-
vation and total occlusion caused difficult wire support.

The Venture Catheter has previously been documented for use in tortuous vessels, chronic total occlusion and in cases of complex interventions that are beyond inserting the guide wire into coronary bypass grafts. This device has been used to treat those renal artery aneurysms that have difficult vasculature.

We used a “Grapple Hook” technique in the second case. This technique means that the catheter was first advanced in its straight configuration over a wire to a location just beyond the target and only at that point is it actively flexed and withdrawn to engage the target vessel. Although there is the potential for causing trauma to the vessel, the relatively large diameter of the proximal LAD vessel permitted axial rotation and withdrawal of the catheter with a curved configuration. This approach was used in a previous report without complications.

Despite the improvement of the operator’s technique and equipment for performing percutaneous coronary intervention, this procedure can still fail in difficult complex lesions. We demonstrated that this new device was useful to facilitate wire passage in severely angulated vessels and non visible stump lesions. So, this device offers an additional option and it may improve the procedure success of percutaneous revascularization in those patients who have difficult vasculature.

REFERENCES