Successful Percutaneous Transluminal Angioplasty to Right Superficial Femoral Artery Stenosis via True Lumen to True Lumen with Outback Re-Entry Device

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Key Words: Angiography • Percutaneous intervention • Percutaneous transluminal angioplasty

INTRODUCTION

Outback LTD re-entry device (LuMend, Redwood City, Calif; acquired by Cordis Corp, Miami Lakes, Fla) is a lumen catheter designed to facilitate placement and positioning of guidewires and catheters during peripheral vascular intervention.2,3

The primary difficulty in the treatment of chronic occlusions of peripheral arterial disease is the inability to re-enter the true lumen after subintimal crossing of the occlusion.4-6 Thus Outback LTD re-entry device plays an important role in treating difficult lesions by re-directing wire from subintimal space to true lumen of distal vessel.

Here we report a case with critical right superficial femoral artery stenosis in which an acute angle of the artery makes successful wiring difficult. We use Outback LTD re-entry device to assist with successful wiring to the critical stenotic lesion directly via true lumen to true lumen.

CASE

An 85-year-old woman with a history of diabetes mellitus, dyslipidemia, chronic renal insufficiency with right renal artery stenosis, triple-vessel coronary artery disease with stenting of left circumflex coronary artery, rotablation and stenting of left anterior descending coronary artery, congestive heart failure, New York Heart Association (NYHA) Functional Classification FC III, suffered from a poorly healed wound in the right foot for 8 months.

The ankle-brachial index (ABI) of her right lower limb was 0.59. The peripheral vascular sonography is shown in Figure 1A. The peak systolic velocity (PSV) of the right common femoral artery (RCFA) was 92 cm/s (Figure 1A). The PSV of the right superficial femoral artery (RSFA) over lesion site was 15-132 cm/s (Figure 1B), with post-stenotic velocity ratio (PSVR) to be 8.8. The PSV of the right popliteal artery (RPOP) was 39 cm/s (Figure 1C). The PSV of the right posterior tibia artery (RPTA) was 23 cm/s (Figure 1D). Right dorsalis pedis artery (RDPA) decreased flow (Figure 1E) was noted, suggesting high grade stenosis over right anterior tibial artery (RATA).

Percutaneous transluminal angioplasty (PTA) was performed. A 7 Fr Cook crossover sheath was advanced from the left common femoral artery to the RCFA under assistance of a 0.035\textsuperscript{2} Roadrunner\textsuperscript{2} wire. The angiography (Figure 1F) under panning showed the lesion event and its surrounding situation, and the red arrow points to the culprit lesion. Angiography showed heavily calcified stenosis (95% in diameter) over mid-RSFA (Figure 1G), atherosclerotic right popliteal artery-occluded right anterior tibial artery, and diffuse calcified stenotic RPTA.
RSFA cannot be crossed with 0.035” Roadrunner wire, V-18™ ControlWire™, 0.014” PT™, and .014”. Approach 18G wire under 4 Fr CXI™ support catheter/4 Fr KMP catheter support due to tortuous calcified RSFA with an acute angle over the lesion site (Figure 1H). Thus we used the Outback LTD re-entry device. We put the tip of Outback re-entry catheter into the side branch, which is one of the collateral arteries of RSFA (Figure 2A). We used the needle of the Outback LTD re-entry device to puncture from true lumen of distal RSFA proximally to the true lumen of RSFA distally. Finally, it was crossed by a 0.014” PT™ wire (Figure 2B and Figure 2C). The total wiring course is showed in Figure 2D.

After successful wiring via true lumen to true lumen, we dilated the vessel with a 3.0/40 mm Pacific Xtreme™ balloon at 6 atm (Figure 2E). A V-18™ ControlWire™ Guidewire was exchanged, then RSFA was dilated with a 5.0/150 mm Pacific Xtreme™ balloon at 10 atm. Type D dissection (spiral dissection) with residual stenosis of 85% and 60% was noted. Thus we deployed a 6.0/200 mm Zilver flex™ stent and a 6.0/60 mm LifeStent then post-dilated with a 5.0/150 mm Rival™ balloon at 10-14 atm (Figure 2F and Figure 2G). Residual stenosis was 7% and 5% (Figure 2H). After this procedure, the ABI of her right lower limb increased from 0.59 to 0.95. Peripheral vascular sonography showed as follows. The PSV of RCFA was 119 cm/s (Figure 2I). The PSV of RSFA was 171 cm/s (Figure 2J).
DISCUSSION

Outback LTD re-entry device is designed for re-positioning of wire from subintimal space to true lumen to facilitate angioplasty of chronic total occlusion of superficial femoral artery. In our case with severe stenotic lesion over RSFA, we had difficulty in wiring due to the acute angle of the lesion and the poor torque control of the wire. In this situation, Crusade microcatheter will be effective to solve the problem. Crusade microcatheter can be placed over the collateral vessel, and we can try to cross the lesion with wire from sidehole of the Crusade catheter. However we did not have Crusade microcatheter to facilitate wiring through this critical lesion at that moment. Another method to facilitate angioplasty in tortuous lesions is using 5Fr ST01 (“5-in-6” technique). Our novel method is to puncture from true lumen to true lumen and bypass the stenotic site under the assistance of Outback LTD re-entry device. After successful wiring, the PTA would be easy. Though still an off-label use of this device, Outback LTD re-entry device can assist successful wiring in high

Figure 2. (A, B, C) Successful puncture with Outback LTD Re-Entry Device from true lumen to true lumen of RSFA and 0.14” PT2 300 cm wire can be advanced to right popliteal artery via LCFA. (D) Total wiring course of true lumen to true lumen with Outback LTD Re-Entry Device. The course of ballooning and stenting: (E) 3.0/80 mm pacific extreme balloon at 6 atm, (F, G) 5.0/150 mm Rival balloon at 10 atm, (H) Residual stenosis was 7%, and 5% after stenting. Peripheral ultrasound after PTA: (I) The PSV of RCFA was 119 cm/s, (J) The PSV of RSFA was 171 cm/s. LCFA, left common femoral artery; PSV, peak systolic velocity; PTA, percutaneous transluminal angioplasty; RCFA, right common femoral artery; RSFA, right superficial femoral artery.
grade stenotic superficial femoral artery if the lesion cannot be crossed by conventional wiring techniques.

**LEARNING POINT**

In cases with high grade stenotic superficial femoral artery lesion underwent percutaneous transluminal angioplasty, the Outback LTD re-entry device can be considered to assist the wire to cross the lesion if the conventional wiring technique failed.

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**DECLARATION OF CONFLICT OF INTEREST**

All the authors declare no conflict of interest.

**REFERENCES**


