Cardiovascular Intervention and Therapeutics (2019) 34:383–385
https://doi.org/10.1007/s12928-018-00566-6

IMAGES IN CARDIOVASCULAR INTERVENTION

Excimer laser coronary angioplasty for a lotus root-like structure in the left anterior descending coronary artery

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Received: 8 November 2018 / Accepted: 25 December 2018 / Published online: 4 January 2019
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Introduction

A 46-year-old patient had coronary angiography in 2008 for left ventricular dysfunction accompanied by acute embolic occlusion of the left external iliac artery. One week before hospitalization, he suffered a blow to the anterior chest during karate. The coronary angiogram revealed a slit-like lesion in the first septal branch, the second diagonal branch (DB) and the mid-left anterior descending coronary artery (LAD). Thereafter, he had no subjective symptoms and did not require medications or additional hospital visits. In August 2017, he presented to our hospital with right-sided leg pain. His coronary risk factors were smoking, hypertension, and dyslipidemia. We diagnosed acute limb ischemia due to an embolism from a left ventricular mural thrombus using cardiac MRI, enhanced CT, and ultrasound cardiography (UCG). After surgical therapy with a Fogarty arterial embolectomy catheter, we reassessed the coronary lesion using multiple modalities. Coronary angiography revealed thin channels, which joined distally in the LAD including the septal and second diagonal branches (Fig. 1a-1). Additionally, we performed invasive measurement of fractional flow reserve (FFR) with intracoronary papaverine administration. The FFR value in the LAD was 0.74. We performed intravascular ultrasound (IVUS) (Fig. 1a-2) and optical coherence tomography (OCT)-guided percutaneous coronary intervention (PCI) to the LAD. First, we performed excimer laser coronary angioplasty (ELCA) (0.9 mm, 60 mJ, 60 pulses) only after wiring to confirm the effectiveness of treating the membrane-like lesion. We used three wires to protect and destroy the lotus root-like lesion in the 2nd and 3rd DBs. Then, we performed ELCA (0.9 mm, 80 mJ, 80 pulses) again around the main vessel and 2nd diagonal branch. Thereafter, we confirmed the destruction of the lotus root-like lesions by OCT. The lesion in the 2nd DB was not derived from the membrane-like lesion in the main route. ELCA was very effective in destroying the membrane-like stenotic lesions, and there was no side branch (SB) occlusion (Fig. 1b). We successfully deployed drug-eluting stents after ballooning without SB occlusion (Fig. 1c). We treated the patient with triple therapy using dual antiplatelet drugs and warfarin after PCI. Follow-up UCG revealed slight wall motion recovery with severe apical hypokinesis.

Discussion

Multiple channels within a coronary artery have been observed using OCT in recent clinical studies [1], and these channels are thought to be compatible with spontaneous intraluminal recanalization of thrombus [2]. In this case, the detailed etiology of the multiple channels was unknown; however, possible causes include woven coronary artery anomaly, traumatic coronary artery dissection, spontaneous coronary artery dissection, plaque rupture, and coronary embolism. It is important to maintain the patency of the SB bifurcating from a lesion with a lotus root appearance when performing PCI. Some methods have been reported for optimal SB wiring using the dual lumen microcatheter under OCT guidance [3]. To our knowledge, this is the first report of the effectiveness of ELCA for a lotus root-like structure.

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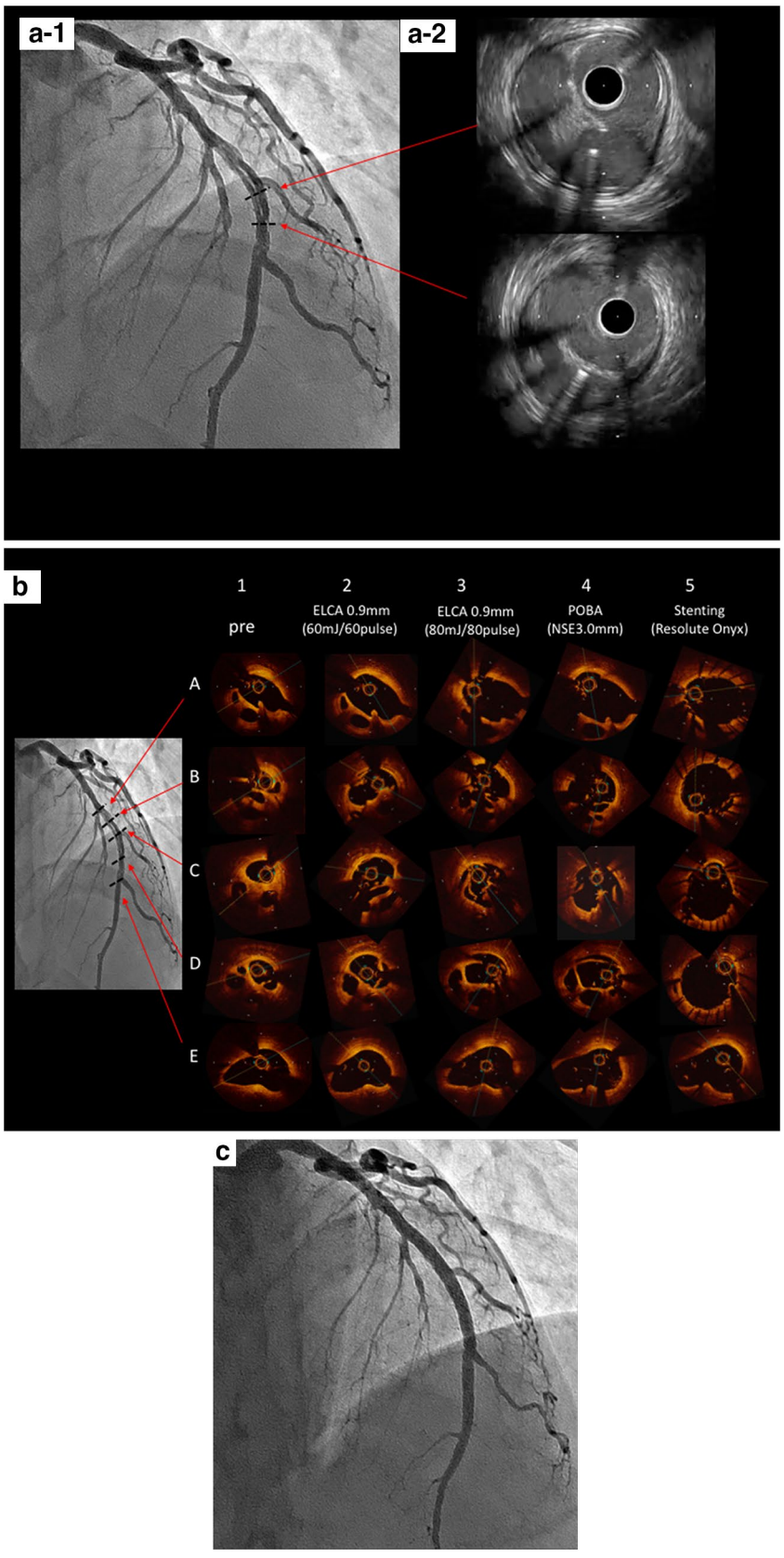

Fig. 1 **a-1** Coronary angiography revealed thin channels, which join distally in the LAD including the septal and second diagonal branches. **a-2** IVUS revealed a multichannel structure within the internal elastic lamina. **b** First, we performed ELCA (0.9 mm, 60 mJ, 60 pulses) only after wiring. Then, we performed ELCA (0.9 mm, 80 mJ, 80 pulses) again around the main vessel and second diagonal branch. Thereafter, we confirmed the destruction of the lotus root-like lesions by OCT. **c** Final coronary angiogram revealed good antegrade coronary flow without SB occlusion

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