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IMAGES IN INTERVENTION

Three-Dimensional Intravascular Optical Coherence Tomography Rendering Assessment of Spontaneous Coronary Artery Dissection Concomitant With Left Main Ostial Critical Stenosis

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A 47-year-old man was emergently referred from another tertiary care center for percutaneous coronary intervention to the left main coronary artery (LM). Diagnostic coronary angiography (CAG) indicated a critical stenosis at the LM ostium (Fig. 1A, arrow) and haziness in the proximal to mid–left anterior descending coronary artery (LAD) (Fig. 1A, dotted line). Intravascular ultrasound showed a heavy plaque burden at the LM ostium (Fig. 1B). Emergent stent implantation was

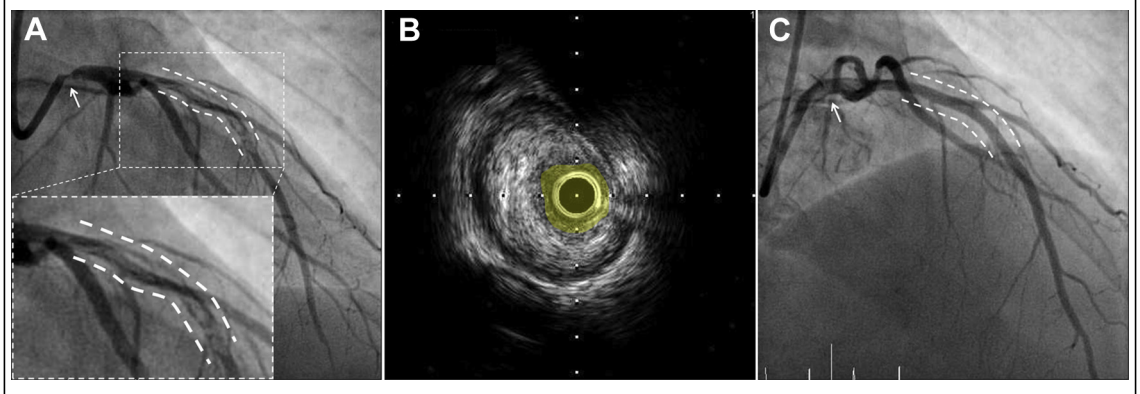

Figure 1. CAG and IVUS

(A) Coronary angiography (CAG) showed a critical stenosis of the left main coronary artery (LM) ostium **(arrow)**. A long spiral with a hazy appearance suspicious of a spontaneous coronary artery dissection (SCAD) was identified at the proximal left anterior descending coronary artery (LAD) **(dotted line)**. **(B)** Large fibrofatty plaque burden (**yellow** indicates the minimal luminal area) with tightly compacted guiding catheter at the LM ostium was shown by intravascular ultrasound (IVUS). **(C)** Final angiogram showed optimal results at the LM **(arrow)** and at the SCAD lesion in the LAD **(dotted line)**.

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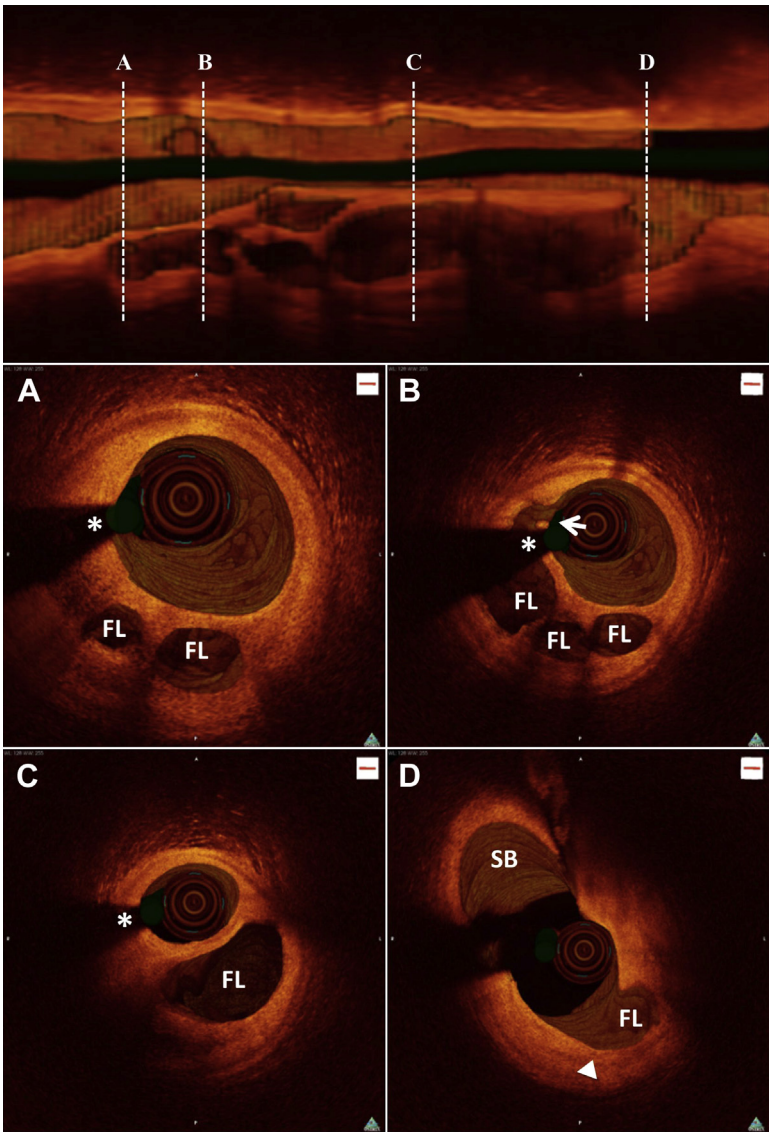

Figure 2. Three-Dimensional–Rendered OCT Images

Axial 3-dimensional (3D)-rendered images confirmed the existence of a spontaneous coronary artery dissection. Corresponding cross-sectional images clearly identified the true lumen separated from the false lumen (FL). The **dashed white lines** labeled with **A**, **B**, **C**, **D** indicate the corresponding cross sectional images respectively. The **arrow** indicates the entry door, **arrowhead**, the re-entry door, and **asterisk**, a shadow artifact caused by the guidewire. OCT = optical coherence tomography; SB = side branch.

performed with a Resolute Integrity 4.0- × 12-mm stent (Medtronic Vascular, Santa Rosa, California) from the ostium to the mid-body of the LM. Because the chest pain was not relieved after stenting, optical coherence tomography (OCT) (C7-XR system, C7 Dragonfly catheter, LightLab Imaging, St. Jude, Minneapolis, Minnesota) was done to more accurately assess the thrombotic lesion in the proximal to mid-LAD. Longitudinal OCT images clearly showed the intimal-medial dissection in the thrombotic LAD lesion. In cross-sectional OCT images, the true lumen was separated from the false lumen with the "entry" and the "re-entry door" sites, which strongly suggested spontaneous coronary artery dissection (SCAD) in the proximal LAD. The 3-dimensional (3D)-rendered OCT imaging on a stack of the color-coded 2D images using a Digital Imaging and Communications in Medicine (DICOM) viewer and OsiriX software (version 3.9.1; OsiriX Foundation, Geneva, Switzerland) clearly revealed

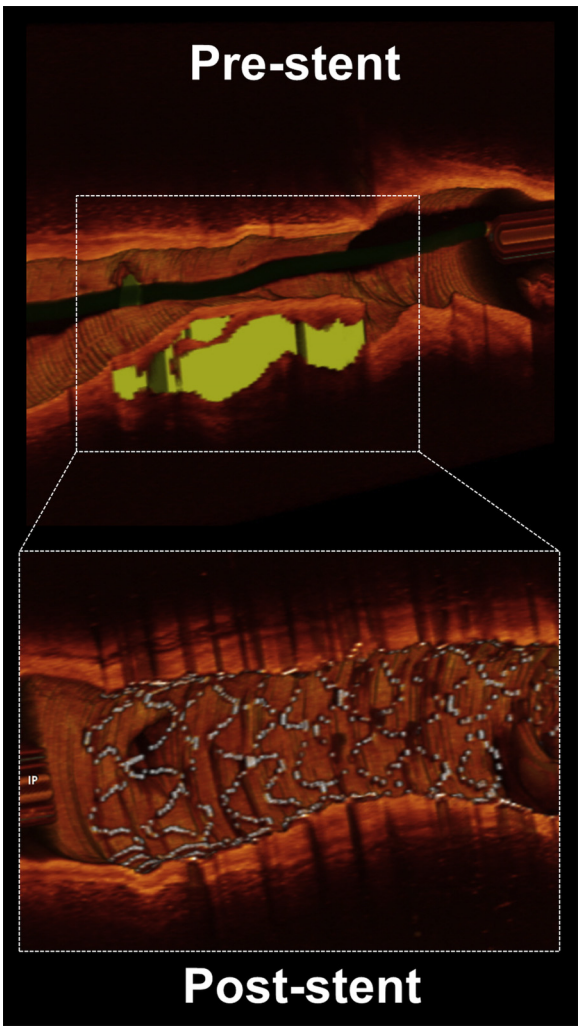

Figure 3. Pre- and Post-Stenting 3D OCT Reconstruction Imaging

The 3D reconstruction images showed the morphology of the SCAD lesion in detail. The false lumen is indicated by **yellow**. The post-stenting 3D-rendered image revealed a complete sealing of the false lumen by the stent. Abbreviations as in Figures 1 and 2.

the SCAD morphology (Fig. 2A, 2C), showing a proximal entry tear, dissection flap (Fig. 2B, arrow), and re-entry tear to the true lumen in the distal part (Fig. 2D, arrowhead). Because of the sustained flow limitation in the LAD, a Resolute Integrity 3.0- × 30-mm stent (Medtronic Vascular) was implanted in the LAD SCAD lesion. Final angiogram and post-stenting 3D-rendered OCT image showed optimal results, with Thrombolysis In Myocardial Infarction flow grade III (Figs. 1C and 3). Because the IV-OCT 3D-rendered images can identify coronary structures more accurately (1,2), automatic 3D-OCT rendering technology under development could be helpful to guide an optimal therapeutic strategy for SCAD patients.

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Key Words: 3-D rendering ■ optical coherence tomography ■ spontaneous coronary artery dissection.