

IMAGES IN INTERVENTION

Neovascular Microchannels in Sirolimus-Eluting Stent Occlusion at Late Phase

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A 57-year-old man with effort angina pectoris underwent implantation of a sirolimus-eluting stent (3.5/28 mm) for a chronic total occlusion (CTO) in the proximal left anterior descending artery. The patency of the stent was confirmed by a 9-month follow-up angiography, and the patient was free from any chest symptoms during this period. His angina pectoris was recurrent 37 months after the initial stent implantation, although there was no clinical evidence of very late stent thrombosis. Coronary angiograms showed a totally occluded lesion in the stent without visible microchannels. After successfully crossing over the occlusion with a tapered

hydrophilic guidewire, optical coherence tomography (OCT) observation was performed without predilation by a balloon catheter. The presence of microchannels, small vesicular or tubular structures that were differentiated from any side branches, became distinct by longitudinal and cross-sectional OCT images. There was a high-signal layer regarded as neointimal tissue between the microvessels and the lumen. The crossing maneuvers of guidewire and OCT catheter induced some intimal injuries, and the OCT catheter was partly trapped in a false lumen in the distal segment. However, no fresh thrombi were found in this segment (Fig. 1, Online Video 1). Two

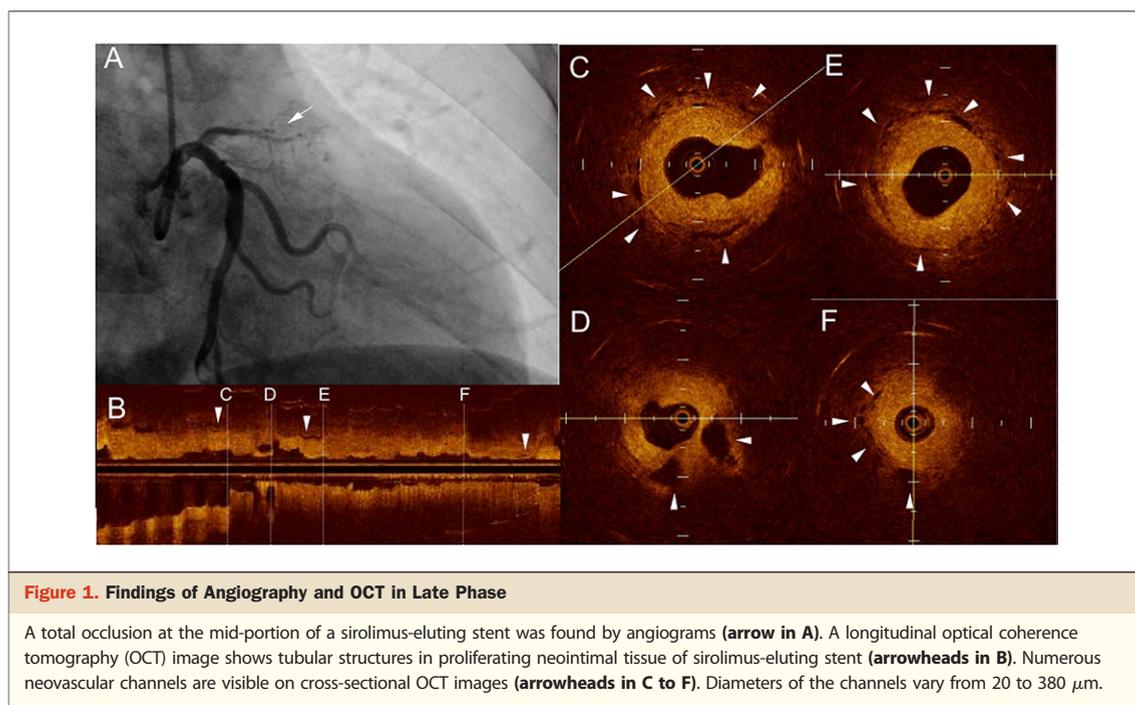


Figure 1. Findings of Angiography and OCT in Late Phase

A total occlusion at the mid-portion of a sirolimus-eluting stent was found by angiograms (arrow in A). A longitudinal optical coherence tomography (OCT) image shows tubular structures in proliferating neointimal tissue of sirolimus-eluting stent (arrowheads in B). Numerous neovascular channels are visible on cross-sectional OCT images (arrowheads in C to F). Diameters of the channels vary from 20 to 380 μm .

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zotarolimus-eluting stents (3.5/18 mm and 3.0/30 mm) were successfully implanted for the in-stent occlusion. Although the precise timing and mechanisms of the late stent occlusion were uncertain, neovascular channels possibly allow guidewire passage into the true lumen distal to the total occlusion. The current OCT images strongly suggest rich neovascular proliferation in the setting of a late and apparently nonthrombotic occlusion of a sirolimus-eluting stent. Although histopathological investigations showed microvessel formation of the CTO lesions (1,2), it was the first time the microchannels in a CTO by use of OCT have been documented.

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APPENDIX

For a supplementary video, please see the online version of this article.