Multiple Interstrut Cavities
A Potential Mechanism for Very Late Stent Thrombosis? Insights From Optical Coherence Tomography

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A 48-year-old man who had had a 3.5 × 33 mm sirolimus-eluting stent (Cypher, Cordis, Warren, New Jersey) deployed 46 months earlier for unstable angina, presented with a 1-h history of chest pain due to an anterior ST-segment elevation myocardial infarction. He was taken to the cardiac catheterization laboratory for primary percutaneous coronary intervention. Coronary angiography demonstrated a filling defect, consistent with thrombus, within a stent in the proximal left anterior descending artery with Thrombolysis In Myocardial Infarction flow grade 3 (Fig. 1A). Successful thrombectomy was performed with an Expressway (Atrium Medical, Hudson, New Hampshire) catheter. Post-thrombectomy angiogram demonstrated minimal thrombus, but there was contrast staining outside of the stent struts (better seen in the magnified inset, arrows). Optical coherence tomography imaging revealed multiple cavity-like structures between the struts that corresponded to the regions of contrast staining on the angiogram (Figs. 2A to 2C). There was some residual thrombus in the proximal stent, adjacent to an interstrut cavity (Fig. 2A). The stent was adequately expanded and well apposed. There was mild neointimal hyperplasia without plaque rupture and no uncovered struts.

The annual incidence of very late stent thrombosis (VLST) (occurring more than 1 year after implantation) is approximately 0.4% to 0.6% (1). Proposed stent-related risk factors for VLST include incomplete neointimal stent coverage, late stent malapposition due to positive remodeling, neointimal plaque rupture, and stent fracture (2). Our case illustrates the novel observation that irregular contrast staining along the stent margins, seen months to years after its deployment, might be due to the formation of multiple interstrut cavities. Moreover, the presence of the extensive cavities, in the absence of other stent-related risk factors for VLST, leads us to hypothesize that there might be a mechanistic link between the interstrut cavities and stent thrombosis. The pathophysiology responsible for the cavities is unknown, but we speculate that they might be...
a consequence of sirolimus-eluting stent-induced arterial inflammation or, alternatively, thrombus dissolution on the abluminal edges of the stent after implantation in a patient with an acute coronary syndrome (3). Finally, the case demonstrates the utility of optical coherence tomography for intravascular imaging, due to its high resolution.

**Figure 2. Optical Coherence Tomography Imaging of the Stent**

Images correlate to the location identified on the coronary angiogram. (A) Thrombus seen at the edge of an interstrut cavity. (B) Multiple interstrut cavities (arrows) corresponding to areas of contrast staining in the proximal segment of the stent. (C) Multiple interstrut cavities (arrows) corresponding to areas of contrast staining in the mid segment of the stent. (D) Distal stent showing good stent apposition with mild neointimal hyperplasia. (E) Distal reference vessel has mild atherosclerosis.

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**REFERENCES**


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