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Case Report

A unique case of ST-elevation myocardial infarction related to very late stent thrombosis

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ABSTRACT

A 67-year-old man was transferred to our hospital because of anterior ST elevation myocardial infarction (STEMI). He had a history of a sirolimus-eluting stent implantation from the left main to the left anterior descending coronary artery (LAD) 9 years before and had undergone laparoscopic prostatectomy 8 days before in the setting of discontinuation of dual antiplatelet therapy. Emergent coronary angiography showed total occlusion in the distal LAD that was successfully treated by aspiration alone. Optical coherence tomography (OCT) showed no vulnerable lesion from the occluded lesion to the proximal LAD. OCT demonstrated that the thrombus attached to floating struts at the left main bifurcation and non-apposed struts at the left coronary ostium partly protruding to aorta, while the other struts were covered and well-apposed. Based on OCT findings, this case of STEMI was thought to be caused by distal embolism of a thrombus that formed at the stent site before it evolved into total occlusion.

<**Learning objective:** We demonstrated how optical coherence tomography can be essential in revealing the underlying pathology. The patient showed an unusual manifestation of ST-elevation myocardial infarction caused by distal embolism of a thrombus that formed at the sirolimus-eluting stent due to dual antiplatelet therapy discontinuation during perioperative period. Optical coherence tomography revealed very late stent thrombosis at the left coronary ostium and could elucidate the underlying mechanism.>

Introduction

Although the issue of stent thrombosis has largely been resolved using 2nd-generation drug-eluting stents (DES), late stent thrombosis (LST) after 1st-generation stent implantation remains a concern [1]. Cessation of antiplatelet drugs for non-cardiac surgery has been known as one of the risk factors for LST [2]. Autopsy studies have demonstrated that delayed neointimal coverage and abnormal vessel wall response after 1st-generation stent implantation are possible mechanisms for stent thrombosis [3]. In vivo, optical coherence tomography (OCT) has an advantage to evaluate stent coverage or malapposition since OCT has finer temporal resolution in comparison with intravascular ultrasound (IVUS). In general, stent thrombosis demonstrates total occlusion at the site of stent. But, we report herein an unusual manifestation of very late stent thrombosis (VLST) after non-cardiac surgery, in which pathogenesis could be clarified by OCT.

Case report

A 67-year-old man, who had undergone laparoscopic prostatectomy 8 days before, was transferred to our hospital because of severe anterior chest pain. Nine years previously, he underwent percutaneous coronary intervention for medina 1-0-0 left main bifurcation lesion at another hospital. A sirolimus-eluting stent (SES, Cypher^{TM} 3.5 × 23 mm; Johnson and Johnson, New Brunswick, NJ, USA) was implanted from the left main to the left anterior descending coronary artery (LAD) in a crossover manner with kissing balloon technique for silent myocardial ischemia, and coronary angiography performed 5 years after the stenting revealed no significant lesion at the stent site. He had been taking dual antiplatelet therapy (DAPT) with 100 mg of aspirin and 25 mg of clopidogrel. As a result of the consultation with the regular physician, urologists decided to cease clopidogrel and aspirin for

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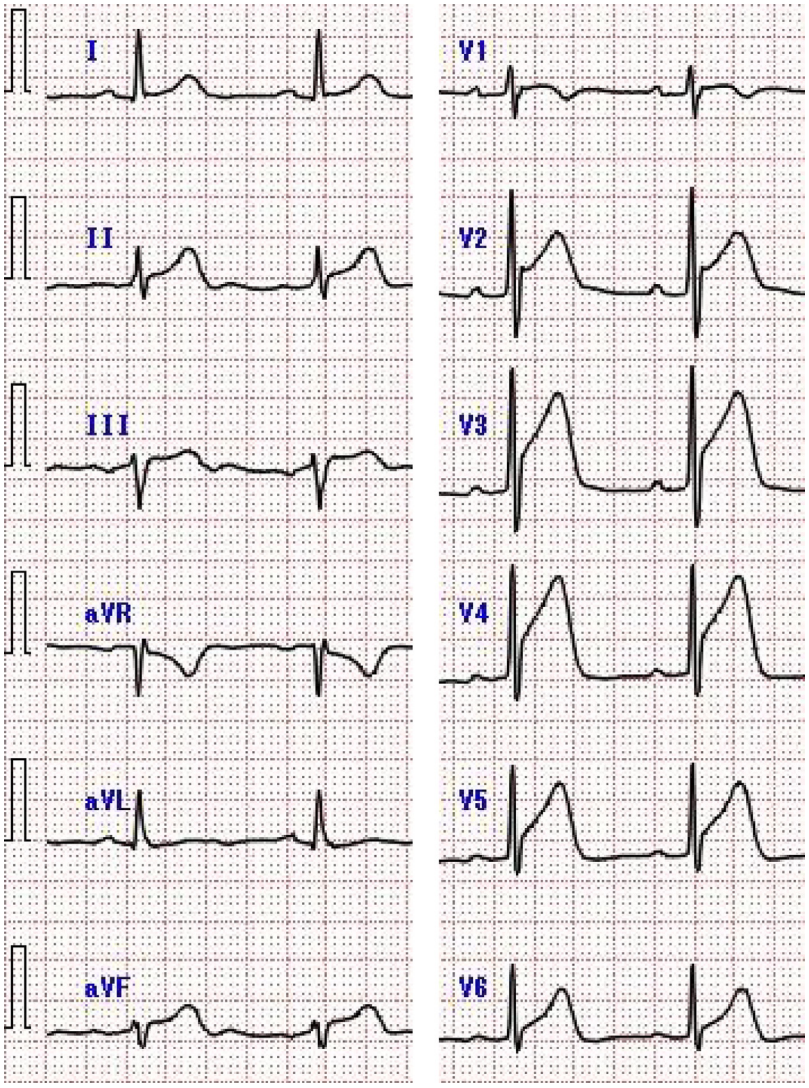

Fig. 1. The electrocardiogram on admission showed ST-elevation in V1-6 leads.

14 days and 7 days prior to prostatectomy, respectively, and only aspirin was resumed 3 days post operatively for misgivings about postoperative bleeding. Unfractionated heparin 10,000 U/day was administered during DAPT-free period. Diagnosis of ST-elevation myocardial infarction (STEMI) was made on the basis of an elevated high-sensitivity troponin I level (46.3 pg/mL), ST-elevation in the precordial leads on an electrocardiogram (Fig. 1), and akinesis in the apical wall on a transthoracic echocardiogram. Emergent coronary angiography showed no significant findings in the right coronary artery, total occlusion in the distal LAD, and significant stenosis at the ostium of the left circumflex artery (LCx) (Fig. 2). Some thrombi could be aspirated using a thrombectomy catheter (Fig. 2), after which a thrombolysis in myocardial infarction (TIMI) 3 grade flow was achieved. OCT showed no vulnerable plaque or thrombus from the occluded lesion to the proximal LAD. However, OCT clearly demonstrated the thrombus attached to floating struts at the left main bifurcation as well as non-apposed struts at the left coronary ostium partly protruding to aorta (Fig. 3, see Supplementary data online, Video 1) while the other struts were covered and well-apposed. After OCT imaging, balloon angioplasty using a scoring balloon was performed for the LCx lesion. Stenting for LCx lesion was deferred since further thrombus formation could occur by new metallic stent. Balloon angioplasty for the left main ostium to appose stent strut was not performed because of risk of systemic thromboembolism. Finally, prasugrel loading and insertion of intra-aortic balloon pumping were carried out. We completed the procedure without flow limitation (Fig. 4). The peak values of creatine kinase (CK) and CK-MB were 637 U/L and 67 U/L, respectively. The patient's postoperative course was uneventful, and he was discharged 7 days after the event. Histological examination revealed a platelet-rich thrombus with few inflammatory cells. Cardiac magnetic resonance imaging demonstrated late gadolinium enhancement was localized in the apical region (Fig. 3), suggesting this case of STEMI was caused by distal embolism of a thrombus that formed at the stent site. Follow-up coronary angiography 3 months after the onset showed no restenosis at the ostium of the LCx.

Discussion

Several studies have demonstrated approximately 0.26–0.53% annual incidence of LST in 1st-generation DES [4]. Autopsy study suggested that lack of healing and absence of endothelial cell

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