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Case Report

# Evaluation of repeated progression of native coronary artery stenosis by optical frequency domain imaging in a patient with essential thrombocytosis

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ABSTRACT

Essential thrombocytosis (ET) is a myeloproliferative disorder with abnormal proliferation of the megakaryocytes and is manifested clinically by the overproduction of dysfunctional platelets, leading to thrombus formation. Therefore, the accurate evaluation of the morphological features for coronary stenosis and initiation of appropriate treatment may be life-saving for ET patients. In this report, we describe a case of the rapid development of repeated stenosis in the native coronary artery in an ET patient, and optical frequency domain imaging confirmed the etiology of the stenoses. These findings may be helpful for consideration of etiology and therapeutic strategy for thrombotic complications in ET patients.

<**Learning objective:** Although coronary thrombosis could occur in essential thrombocytosis patients with particularly high platelet counts, strong antiplatelet therapy with the use of multiple antiplatelet agents together with a cytoreductive drug for maintaining peripheral platelet count under 60 × $10^4$/$mm^3$ should be considered to reduce the risk of recurrence of coronary events. An accurate assessment of lesion morphology and patient-tailored management can reduce morbidity and mortality in this population.>



## Introduction

Essential thrombocytosis (ET) is a clonal myeloproliferative disorder with uncontrolled platelet count and dysfunction, and its clinical issue is the increased risk of hemorrhagic and thrombotic events including cerebral, coronary, and peripheral artery thrombi [1]. However, there is no current report evaluating the morphological features of coronary stenosis using an intravascular imaging modality for ET patients.

We report a case of the rapid development of repeated stenosis in the native coronary artery in an ET patient; optical frequency domain imaging (OFDI) confirmed the etiology of the lesions.

## Case report

A 57-year-old woman was admitted to our hospital because of frequent attacks of chest pain at rest. No history of coronary risk factors including hypertension, diabetes, dyslipidemia, or smoking, or family history of coronary artery disease were noted. However, she had been diagnosed with essential thrombocythemia, for which she was prescribed anagrelide hydrochloride. Her platelet count was 81 × $10^4$/$mm^3$at the time of hospital admission. Because of an inverted T wave in V1-3 on the electrocardiogram, urgent coronary angiography was performed. A coronary angiogram (CAG) revealed a focal 90% stenosis in the proximal left anterior descending artery, and no atherosclerotic lesion in the right coronary artery (RCA) (Fig. 1A) and left circumflex artery. Subsequently, a single drug-eluting stent was deployed from the distal left main to the proximal left anterior descending artery, with a final kissing balloon inflation through stent struts for the left

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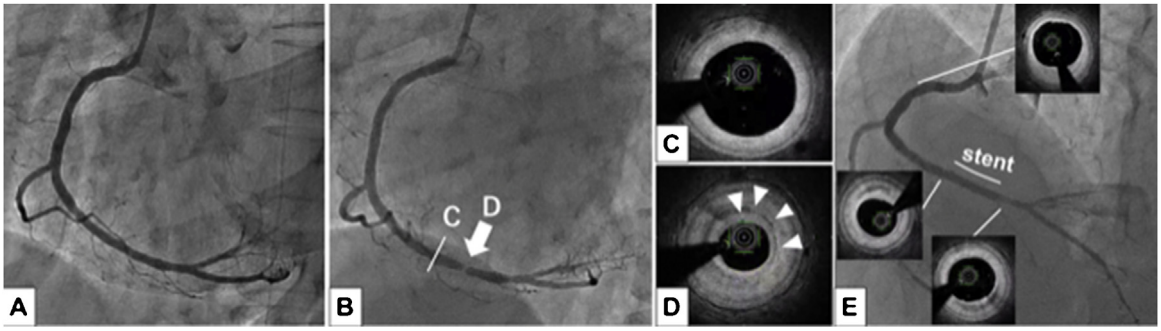


**Fig. 1.** Left anterior oblique projection showed no atherosclerotic stenosis in the right coronary artery (RCA) at the time of initial percutaneous coronary intervention (A). Only one month later, coronary angiography (CAG) revealed a focal 90% stenosis in the distal RCA (arrow) that was not observed on initial CAG (B). Only minimal intimal thickening without atheromatous plaque formation was observed near the stenosis on optical frequency domain imaging (OFDI) (C). OFDI revealed a layered appearance of intimal thickening with the presence of multiple microvasculature (arrowheads) (D). Post procedural OFDI showed multiple appearance of layered intimal thickening throughout the entire segment of the right coronary artery (E).

circumflex artery. The patient was discharged without any in-hospital events and remained asymptomatic while taking dual antiplatelet therapy with aspirin 100 mg and prasugrel 3.75 mg daily. One month later, she had recurrent chest pain during exertion with the appearance of a new wall motion abnormality involving the inferior wall, according to echocardiography. Her platelet count was raised up to $98 \times 10^4/mm^3$ at this time. The CAG revealed a significant stenosis in the distal RCA that was not observed on the initial CAG taken one month prior (Fig. 1B). Coronary OFDI was performed to assess the morphological features of the stenotic lesion. OFDI revealed a layered appearance of intimal thickening with the presence of multiple microvessels, which seemed to be different from usual atherosclerotic plaque (Fig. 1C and D). The lesion was successfully treated with a drug-eluting stent with mild residual stenosis at the distal edge of the stent. After the stent implantation, OFDI showed multiple existence of layered intimal thickening throughout the entire segment of the RCA (Fig. 1E). The dual antiplatelet therapy regimen of aspirin and prasugrel was not changed after the second procedure. However, 13 months after the second procedure, she experienced chest pain during exertion again, and the CAG showed progression of the proximal RCA stenosis and distal RCA stenosis at the edge of the stent where layered intimal thickening was identified by OFDI at the initial procedure (Fig. 2A). OFDI demonstrated multiple layered intimal tissue structure with a microvessel appearance, which was a similar finding to that of distal RCA observed at the time of second procedure (Fig. 2B). At this time, laboratory data showed a platelet count of $63 \times 10^4/mm^3$. After the lesion was successfully treated by deploying another drug-eluting stent without residual stent edge stenosis, antiplatelet therapy was intensified from the initial dual antiplatelet therapy to triple antiplatelet therapy by including 100 mg aspirin, 3.75 mg prasugrel, and 200 mg cilostazol per day. Nevertheless, her exertional chest pain recurred eight months after the third procedure. Her platelet count decreased to $58 \times 10^4/mm^3$ at the time of hospital admission. Although all stents implanted previously were patent with no evidence of luminal narrowing on a CAG, a new 90% stenosis developed at the edge of the stent that was implanted during the second procedure where layered intimal thickening was identified by OFDI at the initial procedure (Fig. 3A). OFDI revealed a tight stenosis at the proximal edge of the stent due to a low-backscatter signal with a layered structure with a microvessel appearance, which may indicate possible organized thrombus adherence to the vessel wall (Fig. 3B and C). Another drug-eluting stent was placed at the proximal site of the previous stent, and the final CAG confirmed no evidence of dissection and Thrombolysis in myocardial infarction 3 flow throughout the RCA. The patient's chest pain symptom on exertion disappeared completely after the intervention, and she was discharged on triple antiplatelet therapy including aspirin,

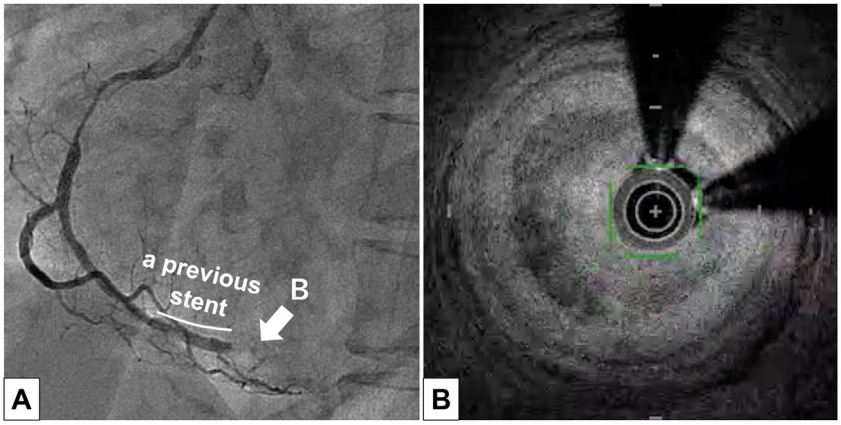


**Fig. 2.** Coronary angiography identified marked progression of the distal right coronary artery stenosis at the distal edge of the stent implanted 13 months ago (A). Optical frequency domain imaging images at the distal edge of the previous stent demonstrated a layered intimal tissue structure. The inner layer of intima was low backscattering structure with weak signal attenuation (B).

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