**CASE REPORT**
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# Very Late Thrombosis of a Drug-Eluting Stent After Discontinuation of Dual Antiplatelet Therapy in a Patient Treated With Both Drug-Eluting and Bare-Metal Stents

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## ABSTRACT

Drug-eluting stents (DESs) are the treatment of choice for obstructive coronary artery disease when percutaneous intervention is feasible. However, late stent thrombosis seems to occur more frequently with DESs and is closely associated with the discontinuation of dual antiplatelet therapy. We report a case of very late stent thrombosis after discontinuation of dual antiplatelet therapy. The patient suffered from acute myocardial infarction (MI) and underwent bare metal stent (BMS) implantation in the left anterior descending artery (LAD) five years prior to presentation. Three years after BMS implantation, he presented again with acute MI and had a DES implanted in the right coronary artery (RCA). He ran out of his medication, but failed to refill his prescription. Sixteen days after discontinuing medication, he experienced an episode of chest pain and was taken to the cardiac catheterization laboratory, where he was found to have thrombosis in the DES, but no thrombosis in the BMS. It is possible that DESs are more vulnerable to late thrombosis than are BMSs, supporting the use of prolonged dual antiplatelet therapy in patients treated with DESs. The patient was successfully treated with balloon angioplasty and thrombus aspiration without complications. **(Korean Circ J 2009;39:205-208)**

**KEY WORDS:** Thrombosis; Stents; Platelets.

## Introduction

In recent years, drug-eluting stents (DESs) have been shown to dramatically reduce the rate of restenosis and the need for repeat revascularization.[1-3] Despite these promising results, late stent thrombosis seems to occur more frequently with DESs and seems to be closely associated with the discontinuation of dual aspirin/thienopyridine derivative (usually clopidogrel) antiplatelet therapy.[1-4] We report a case of late DES thrombosis after discontinuation of dual antiplatelet therapy.

## Case

A 49-year-old man was transferred to the emergency department complaining of squeezing chest pain that had increased in severity over the past four days. Five years prior to presentation, he had undergone percutaneous coronary intervention (PCI) for acute myocardial infarction (MI), along with implantation of a bare metal stent (BMS) (3.5×28 mm Arthos Inert Stent, AMG, Korea) in the left anterior descending artery (LAD) (Fig. 1). Six months later, he developed angina and underwent balloon angioplasty for in-stent restenosis (Fig. 2). Two years after that, he had a paclitaxel-eluting stent (2.75×32 mm Taxus Stent, Boston Scientific, USA) placed in the right coronary artery (RCA) after suffering another acute MI (Fig. 3). The patient was treated with dual antiplatelet therapy: aspirin (100 mg daily) and clopidogrel (75 mg daily). He ran out of his medication, but failed to refill his prescription. Sixteen days after discontinuing medication, he developed chest pain and presented to the emergency department. An electrocardiogram (ECG) performed at that time showed new ST-segment depression and T-wave inversion in leads II, III, and aVF (Fig. 4). Cardiac enzymes were also elevated (creatine kinase-MB 9.9 U/L, Troponin I 7.73 ng/mL, Troponin

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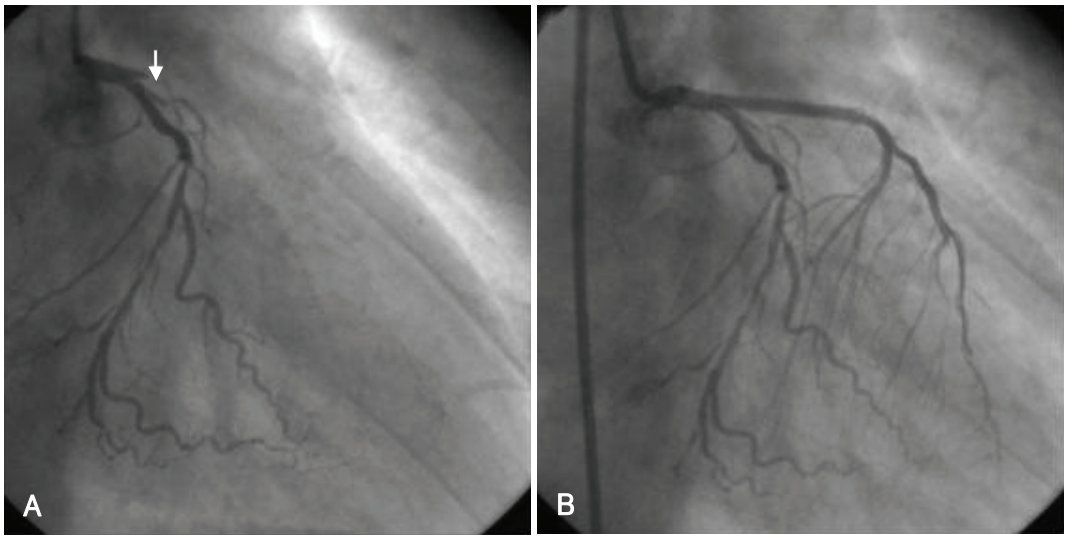


**Fig. 1.** Diagnostic coronary angiogram and primary percutaneous intervention. A: CAG revealed total occlusion of the proximal left anterior descending artery (LAD) (arrow). B: a bare metal stent (3.5×28 mm Arthos Inert Stent) was successfully placed in the occluded LAD. CAG: coronary angiogram.

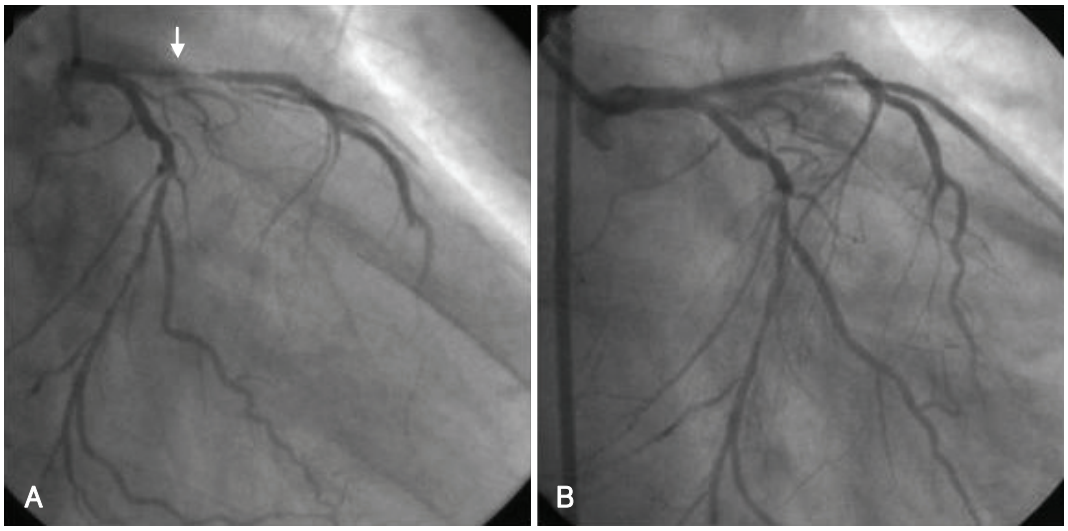


**Fig. 2.** The first follow-up coronary angiogram and percutaneous coronary intervention for restenosis. A: CAG revealed type III diffuse in-stent restenosis in the proximal left anterior descending artery (LAD) (arrow). B: plain balloon angioplasty was successfully performed for the treatment of in-stent restenosis in the LAD. CAG: coronary angiogram.

T 2.64 ng/mL). The patient underwent emergency coronary angiography, which revealed total occlusion of the DES in the proximal RCA due to very late stent thrombosis with grade II collateral flow (Fig. 5A and B). The BMS in the LAD was patent (Fig. 5C). After receiving an intravenous glycoprotein IIb/IIIa receptor blocker (abciximab), the patient underwent repeat balloon angioplasty and thrombus aspiration secondary to recurrent, immediate thrombus formation and coronary occlusion (Fig. 6A). The final angiogram showed good flow without residual stenosis (Fig. 6B).

## Discussion

We report this case to draw attention to the phenomenon of very late stent thrombosis after DES implantation, which might be associated with serious clinical implications after the discontinuation of dual antiplatelet therapy. It is possible that DESs are associated with substantially higher rates of thrombosis when compared with BMSs.

Stent thrombosis (ST) is a generally fatal complication after PCI. It may occur in the acute (<1 day), subacute (<30 days), late (<1 year), or very late (>1 year) periods and may result in serious complications such as MI and death.[5] Very late stent thrombosis (VLST) is defined as a stent thrombosis event that occurs beyond one year. The risk of VLST was analyzed using trial level data in a meta-analysis of 14 randomized trials in which 6,675 patients had been randomly assigned to PCI with DES

or BMS.[6] The incidences of VLST were 5.0 events per 1,000 patients in the DES group and 0 events per 1,000 patients in the BMS group (relative risk=5.0, 95% confidence interval 1.3-19.5). In another report, DESs were reported to have an approximately 0.3 to 0.5 percent greater risk of VLST compared with BMSs.[7] Several factors were shown to be associated with ST, including older age, black race, diabetes mellitus, bifurcation lesion, in-stent restenosis lesion, post-procedure acute renal failure, and lack of clopidogrel therapy.[8] Discontinuation

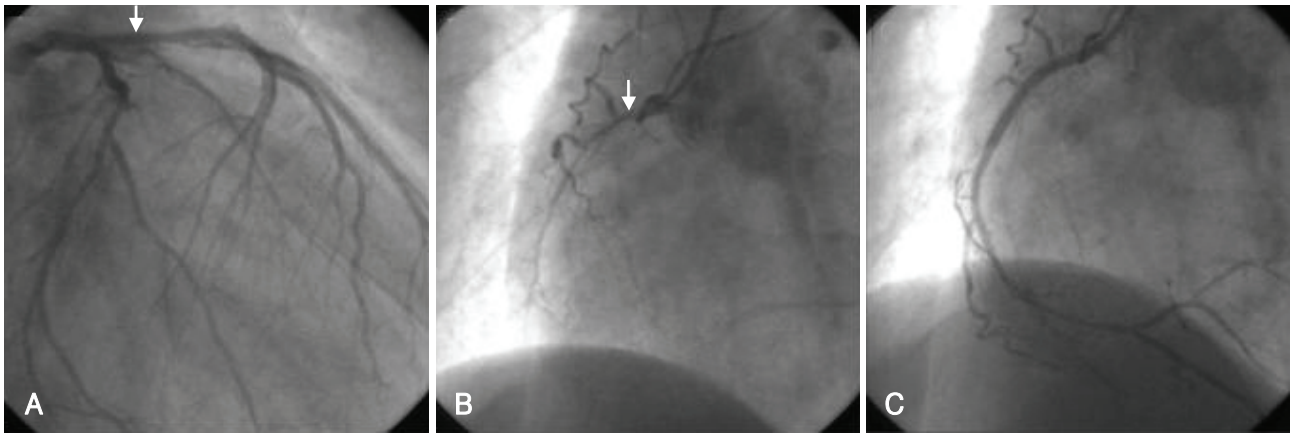


**Fig. 3.** The second follow-up coronary angiogram and percutaneous coronary intervention for de novo lesion in right coronary artery. A: CAG revealed a patent LAD stent (arrow). B: near total occlusion of the proximal RCA was also detected (arrow). C: a TAXUS stent (2.75×32 mm) was successfully implanted after dilation using a 2.5×20 mm balloon in the proximal RCA. CAG: coronary angiogram, LAD: left anterior descending artery, RCA: right coronary artery.

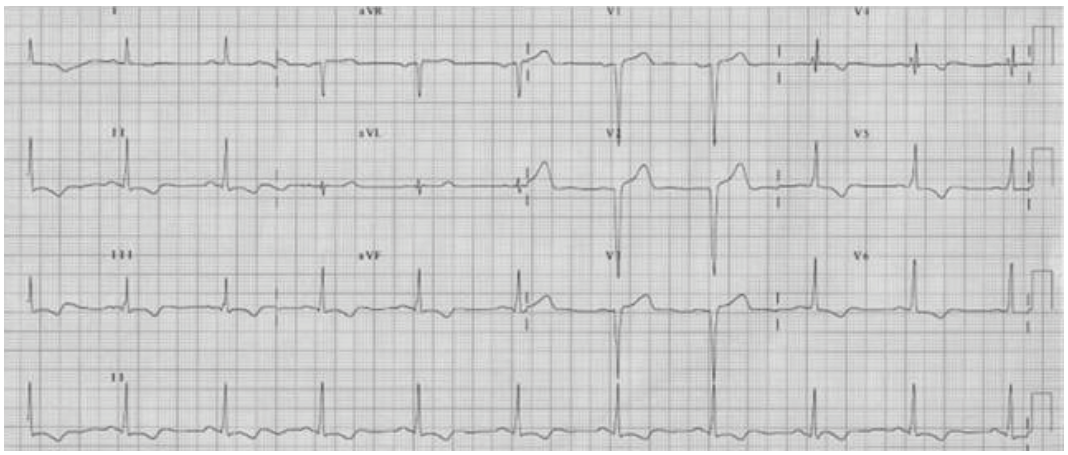

**Fig. 4.** Follow-up electrocardiographic finding. The ECG showed newly developed ST-segment depression and T-wave inversion in leads II, III, and aVF. ECG: electrocardio-gram.

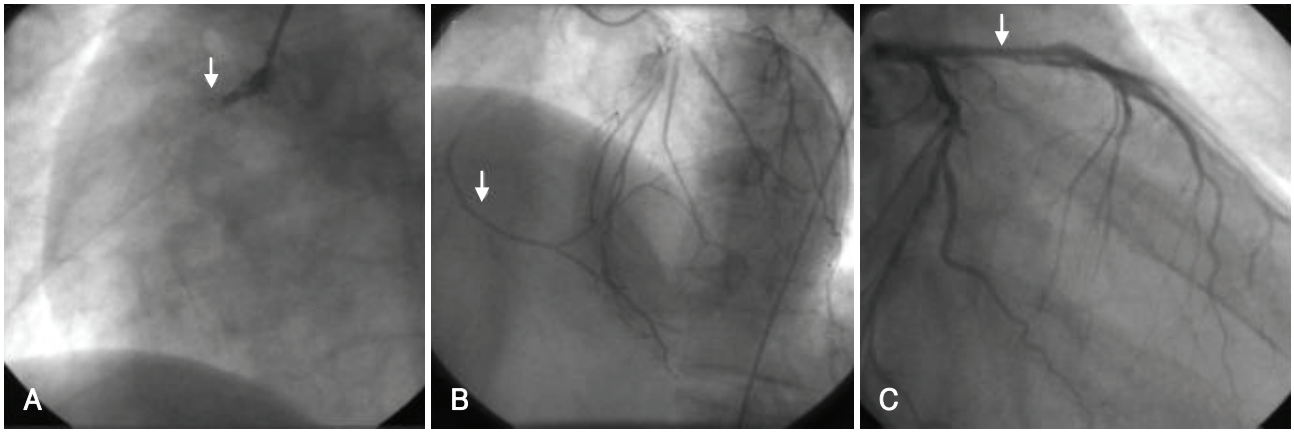


**Fig. 5.** The third follow-up coronary angiogram. A: total occlusion of the proximal right coronary artery at the level of the stent with evidence of thrombosis. B: grade II collateral flow from the left coronary artery (arrow). C: left coronary angiogram revealed a patent bare metal stent in the left anterior descending artery (arrow).

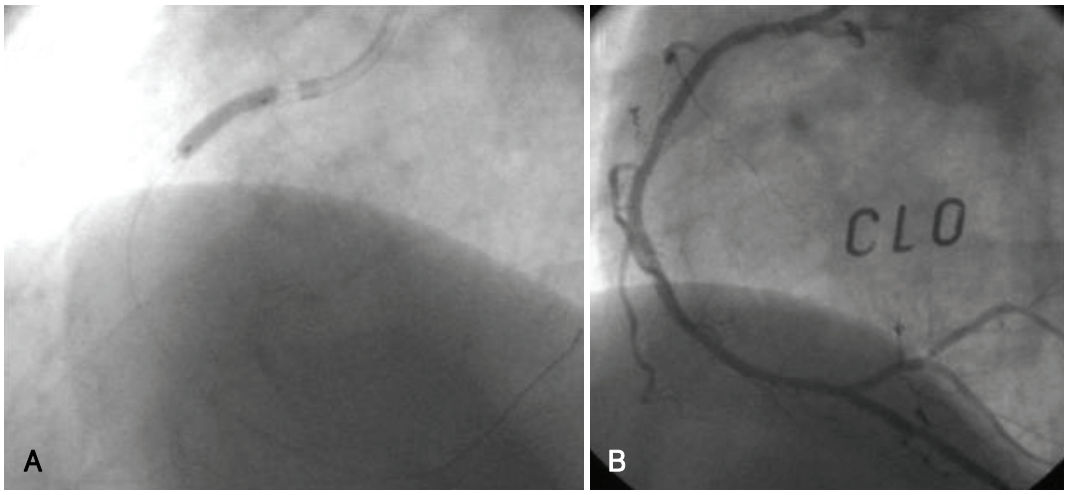


**Fig. 6.** Percutaneous coronary intervention for the very late stent thrombosis in right coronary artery. A: a balloon angioplasty was performed to treat total occlusion of the stented right coronary artery. B: final coronary angiogram showed good distal flow without residual stenosis.

of antiplatelet therapy, as an independent predictor of stent thrombosis, even several years after DES implantation, increases the risk of late stent thrombosis. This finding suggests that clopidogrel compliance may minimize the incidence of VLST after DES implantation.

Current recommendations suggest extending dual antiplatelet therapy beyond one year in patients with low bleeding risk. Antiplatelet treatment should be continued even if there is an increased risk of minor bleeding complications so that life-threatening complications, such as acute MI, are avoided. Patients with previously implanted DESs who are currently taking dual antiplatelet therapy are at high risk for developing stent thrombosis when a situation arises that requires cessation or interruption of dual platelet inhibition.[9)10)]

The optimal duration of antiplatelet therapy in patients with coronary artery stents still remains to be determined. Further large-scale studies are needed to determine the optimal combination and duration of antiplatelet therapy that should be used to prevent these serious thrombotic events.

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