A Case of Iatrogenic Intra-Stent Coronary Dissection after Biolimus-Eluting Stent Deployment in the Left Main Coronary Artery

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Abstract

We encountered a case of an iatrogenic intra-stent coronary dissection at the guiding catheter engagement in 6-month follow-up angiography after a biolimus-eluting stent implantation in the left main coronary artery (LMCA). The optical coherence tomography revealed peeling of the thin neointima inside the stent and thrombus formation. We made a reentry through the dissected lumen with the guide wire and dilated with balloon, which provided sufficient lumen and completion of the bail-out without additional stenting. Since the neointima is immature and fragile, we should take care for the catheter engagement to the LMCA previously treated with the drug-eluting stent.

ABBREVIATIONS

LMCA: Left Main Coronary Artery; PCI: Percutaneous Coronary Intervention; FD-OCT: Frequency Domain-Optical Coherence Tomography; DES: Drug Eluting Stent; LAD: Left Anterior Descending artery; LCX: Left Circumflex artery; CAG: Coronary Angiography; POBA: Plain Old Balloon Angioplasty

INTRODUCTION

Iatrogenic coronary dissection is rare but associated with a potential risk of acute impairment of coronary blood flow which results in devastating complication of percutaneous coronary intervention (PCI). Its incidence has been reported 0.06% of the diagnostic or interventional coronary procedures, 0.25% of whole PCIs in recent reports [1,2]. When a guiding catheter is engaged to the coronary artery, an inappropriate maneuver is likely to occur the dissection in the ostium of the engaged coronary artery. However, after stenting at the ostium of the left main or the right coronary arteries, iatrogenic intra-stent coronary dissection has not yet been reported. Previously, there are a few case reports that spontaneous intra-stent coronary dissection was confirmed with frequency domain-optical coherence tomography (FD-OCT) [3-5], which suggested an involvement of rupture in the neatherosclerosis lesion and reabsorption of the organized thrombus within the stent.

We encountered an unusual complication of intra-stent coronary dissection which occurred easily after the insertion of guiding catheter in the left main coronary artery (LMCA). We assessed the dissection accurately with the FD-OCT and found a possible risk of fragility of neointima in the drug-eluting stent (DES).

CASE PRESENTATION

A 78-year-old man with hypertension and dyslipidemia underwent the PCI for relieving angina pectoris 6 months before, in which a 3.5×24mm NOBORI stent (TERUMO, Tokyo, Japan) was implanted from the ostium of LMCA to the proximal segment of left anterior descending artery (LAD). The patient was re-admitted to our hospital for the assessment of 6-month follow-up state by angiography and FD-OCT. A 6-French guiding catheter (Heartrail II, IL 3.5, TERUMO, Tokyo, Japan) was engaged to the LMCA via right radial artery. We confirmed that GC was engaged appropriately by intial test shot, and then confirmed no serious problem. Coronary angiography (CAG) demonstrated no in-stent restenosis without any impairment of coronary blood flow at the first shot (Figure 1). However, immediately after then, the patient suffered from serious chest pain with ST-segment depression.
and wide QRS duration in broad anterior chest leads (Figure 2A). His hemodynamics was temporally collapsed due to ventricular tachycardia, which was spontaneously terminated (Figure 2B). In order to confirm the situation, secondary shot of the contrast medium was performed, which resulted in the impairment of coronary flow in whole left coronary artery (Figure 3A,B). Immediately, we tried to advance guide wires (GW) in both LAD and left circumflex artery (LCX) and succeeded in both advancements with some difficulty in the LAD. Fortunately, his hemodynamics was stabilized after GW advancement into the LAD, therefore we performed FD-OCT observation in both LAD and LCX carefully at a rate of 2 ml/sec, total amount of 5ml by an auto injector. It showed that neo-intimal surface in the LMCA was peeled from the stent previously implanted and divided the LMCA into two lumens with plenty of thrombus (Figure 3C). We diagnosed as intra-stent coronary dissection with impending occlusion due to the thrombus. After thrombus aspiration, we confirmed the neo-intimal dissection from the proximal LMCA to the proximal LAD and the entry and the re-entry point by the FD-OCT assessment (Figure 4). And then, we inflated 3.0 and 3.5mm non-compliant balloons in LAD and LMCA, respectively. We confirmed adequate luminal gain (LMCA 8.5mm², LAD 5.1mm²) with sufficient compression of the dissected site with recanalization to the true lumen in both entry and re-entry sites. Hence, we judged that additional stenting was not necessary (Figure 5). The patient’s symptom and ST-T changes in the electrocardiogram were recovered and post-procedural creatinine phosphokinase was not elevated. After careful observation for 1 week, the patient was discharged without any adverse events.

DISCUSSION

Iatrogenic coronary dissection induced by guiding catheter insertion into the LMCA may lead to catastrophic hemodynamic loss and broad myocardial infarction. In the International Registry of Aortic Dissection report [6], iatrogenic coronary dissection was likely to occur in patients with older age, diabetes mellitus, hypertension, and a higher degree of atherosclerosis. In the present case, the intra-stent coronary dissection occurred after the engagement of the guiding catheter and deteriorated coronary flow due to the separation of the lumen by intimal flap promoted thrombus formation in each narrowing lumen. When we encounter the iatrogenic dissection at the engagement of the guiding catheter, we should not inject the contrast media to avoid the progression of dissected lumen. However, we did not recognize intra-stent coronary dissection at first, because we engaged the guiding catheter without serious difficulty or rough maneuver and first CAG did not show any significant restenotic lesion with high risk of ostial dissection in the LMCA. Therefore we observed the lesion using the FD-OCT with the injection of contrast medium and fortunately found an intra-stent coronary dissection with high resolution image without any progression of the dissection or hemodynamic shock. The FD-OCT images...
To the best of our knowledge, this is the first report of an iatrogenic intra-stent coronary dissection at mid-term follow up period after DES deployment in the LMCA. Since the neo-intima inside the DES has a risk of frailty due to its thinner thickness or immaturity, we should take care for appropriate guiding catheter engagement in case of previous DES deployment in the LMCA.

REFERENCES


