Case Report

A Case of the Coronary Artery Aneurysm Including Stent Device after Percutaneous Coronary Intervention

Hideaki Nohara, MD,[1] Tsutomu Shida, MD,[2] Nobuhiko Mukohara, MD,[2]
Hidefumi Obo, MD,[2] and Masato Yoshida, MD[2]

We presented a case of left anterior descending coronary artery aneurysm that was developed after percutaneous coronary intervention (PCI) with stent implantation. The aneurysm was plicated after removal of the stent device, and the left descending coronary artery was bypassed with the left internal thoracic artery. Few have reported surgical treatments for the coronary aneurysm including PCI stent. In this report, a patient requiring PCI stent explantation was described and technical considerations for this patient were discussed. (Ann Thorac Cardiovasc Surg 2004; 10: 202–4)

Key words: percutaneous coronary intervention, coronary artery aneurysm, stent explantation

Introduction

The formation of a coronary artery aneurysm after percutaneous coronary intervention (PCI) is a complication that is not familiar to most surgeons. We reported a case of coronary aneurysm including the stent after PCI, presented details of the intraoperative findings, and also discussed the operative techniques to cope with this complication.

Case Report

A 67-year-old man was referred to our hospital due to a post PCI coronary artery aneurysm. He had a history of acute myocardial infarction in the left anterior descending artery (LAD) four months previously. Coronary angiography showed a 100% stenosis in proximal LAD. Percutaneous transluminal coronary angioplasty using a Wiktor stent was performed, and LAD stenosis became almost 0%. The patient subsequently suffered cardiac tamponade, which was resulted from the coronary injury obtained at the original intervention procedure, and received pericardial drainage.

The patient had no further chest pain, but coronary angiography performed one month after admission showed a coronary aneurysm at the site of stent implantation. Four months after admission, the coronary aneurysm was extended more and stenosis progressed to be 90% in the distal LAD (Fig. 1). Consequently surgical repair and revascularization were indicated for the patient.

Plication of the coronary aneurysm and coronary artery bypass grafting (CABG) were performed through a median sternotomy using cardiopulmonary bypass and cardioplegia. At the operation, the aneurysm was found to be whitish and soft to palpation. A 1 cm longitudinal opening was made in the aneurysm. The aneurysmal wall was 1.5 mm thick, and the tissue was firm but not sclerotic (Fig. 2). A firm adherence around the stent and intimal hyperplasia was noted. Significant traction and careful dissection of pseudointima were necessary to remove the stent, because the aneurysm plication would be difficult to perform with the stent remaining. After removal of the stent, the aneurysm was closed tightly with a 6-0 polypropylene running mattress suture followed by a running over-and-over suture. Distal LAD was bypassed with the left internal thoracic artery (LITA). The patient underwent an uneventful recovery and was discharged 21 days after the operation. The coronary angiography before discharge showed occlusion of the coronary aneurysm and good patency of the LITA graft to LAD (Fig. 3).

From [1]Department of Surgery, Hyogo Prefectural Kaibara Hospital, Hyogo, and [2]Department of Cardiovascular Surgery, Hyogo Brain and Heart Center, Hyogo, Japan

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Address reprint requests to Hideaki Nohara, MD: Department of Surgery, Hyogo Prefectural Kaibara Hospital, 5208-1 Kaibara, Kaibara-cho, Hikami-gun, Hyogo 669-3395, Japan.

Fig. 1. Coronary angiogram showing the LAD aneurysm 4 months after PCI.

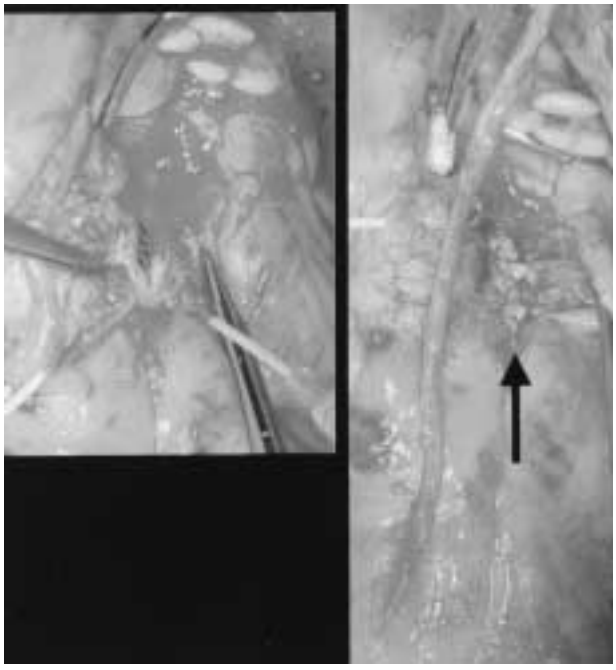

Fig. 2. Intraoperative view of the opened thick walled LAD aneurysm. Note the stent device of PCI was seen in the aneurysm (left). The left internal thoracic artery bypassed to LAD and plication of the coronary aneurysm after the stent was removed (arrow) (right).

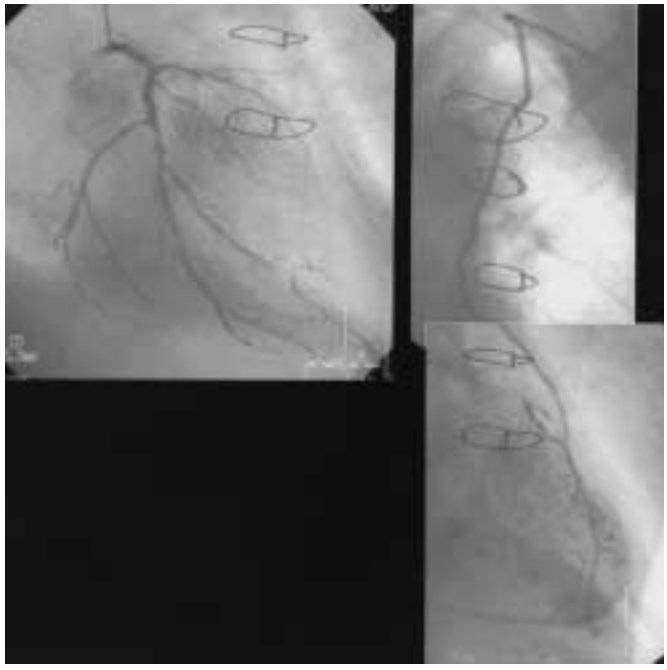

Fig. 3. Postoperative coronary angiogram showed that LAD aneurysm was occluded completely (left) and LITA to LAD bypass was well patent (right).

Discussion

The incidence of PCI related coronary artery aneurysm has been reported to be 3% to 4% in several literature reviews.[1,2)] Dralle and associates review 74 cases reported in the English-language medical literature, and suggest that the PCI-related aneurysms can be classified as early and late occurrence groups.[1)] The early occurrence group, which often develops coronary perforations at the original intervention procedure or very soon after, is reported

to develop a type of pseudoaneurysm.

In our case, although the perforation appeared to be sealed on the following day, an aneurysm was angiographically demonstrated one month after the operation. The natural history of atherosclerotic coronary aneurysms without concomitant deterioration of coronary artery stenosis is not well known, and no surgical consensus has yet been established concerning the most appropriate management of this lesion.[1-5] Previous literature has described the saccular shape of coronary aneurysm, and if the diameter of it exceeds three times that of the adjacent normal coronary segment, there is a likelihood of rupture.[6,7] Ueyama and associates reviewed ruptured coronary aneurysm with development of coronary artery to pulmonary artery fistula, and recommended surgical intervention for patients with coronary aneurysms over 30 mm in diameter.[8] However, post PCI coronary aneurysms that were related to coronary injury have been surgically treated due to the threat of rupture.[1,2] Plication or ligation of the coronary aneurysm and distal coronary bypass are feasible techniques if the stent device is not included in the aneurysm. However, the stent should be explanted completely to close the coronary aneurysm of stent inclusion. In our case, the PCI stent was firmly adherent to the arterial wall. A translucent film of fibrinous materials with intimal hyperplasia was consistently seen across the entire luminal surface of the PCI stent, and it was difficult to remove the stent with traction alone. Karas and associates report the histopathological findings of the vascular responses to balloon injury and stent placement in a swine model.[9] They demonstrate that intracoronary stenting is associated with a marked inflammatory reaction around the stent wires, and the degree of intimal proliferation appears to be greater after stenting than after balloon injury. Careful dissection and resection of fibrous firm adherence around the stent device was required to remove it and to prevent severer coronary injuries. We believed that it was technically safe to remove the stent device using the cardioplegic cardiopulmonary bypass.

In conclusion, coronary injury at percutaneous coronary intervention had a significant risk of coronary aneurysm formation, and close follow-up was warranted. When a coronary aneurysm was detected, surgical intervention should be considered because of the threat of rupture.

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