Case Report

Coronary Artery Pseudoaneurysm after Aortic Valve Replacement: A Case Report Treated with Coil Embolization

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Abstract

We present a case of a coronary artery pseudoaneurysm occurring following aortic valve replacement surgery. Immediately postoperatively, she developed tamponade managed with pericardiocentesis. Following discharge, the patient subsequently developed dyspnea on exertion and exertional chest pain refractory to antianginal medical therapy. Coronary artery angiography demonstrated a new apical left anterior descending (LAD) coronary artery pseudoaneurysm emptying into the right ventricle. She underwent coil embolization of the pseudoaneurysm, resulting in clinical improvement. This is the first case of a coronary artery pseudoaneurysm following aortic valve replacement treated with coil embolization.

Keywords: Coronary Angiography; Coronary Artery Pseudoaneurysm; Coil Embolization

Abbreviations

LAD: Left Anterior Descending;
CT: Computed Tomogram;
PCI: Percutaneous Coronary Intervention;
PTFE: Polytetrafluoroethylene

Introduction

We present a case of a coronary artery pseudoaneurysm occurring following aortic valve replacement surgery. Immediately postoperatively, she developed tamponade managed with pericardiocentesis. Following discharge, the patient subsequently developed dyspnea on exertion and exertional chest pain refractory to antianginal medical therapy. Coronary artery angiography demonstrated a new apical left anterior descending (LAD) coronary artery pseudoaneurysm emptying into the right ventricle. She underwent coil embolization of the pseudoaneurysm, resulting in clinical improvement. This is the first case of a coronary artery pseudoaneurysm following aortic valve replacement treated with coil embolization.

Case Presentation

A 65-year-old female with a history of hypertension, hyperlipidemia, morbid obesity, single vessel coronary artery disease, and prior aortic valve replacement had a new coronary pseudoaneurysm discovered during coronary angiography. The patient had prior stenting of the proximal to mid LAD coronary artery five years earlier. Angiography prior to bioprosthetic aortic valve replacement for severe symptomatic aortic insufficiency showed severe instant restenosis,
and no other coronary abnormalities (Figure 1). The proximal LAD was restented, with no abnormalities in the apical vessel. Her aortic valve replacement surgery was complicated by pericardial tamponade immediately after surgery, requiring pericardiocentesis in the immediate postoperative period.

Following hospital discharge, the patient reported new anginal symptoms with exertional chest pain and dyspnea. A cardiac stress test showed apical ischemia. Pulmonary function testing was normal. The patient underwent repeat coronary artery angiography two years following valve replacement for her exertional chest pain syndrome. The apical LAD had a new pseudoaneurysm measuring 1.0 cm in diameter, with a fistulous connection between the pseudoaneurysm and the apical right ventricular apical cavity (Figure 2A). One month later, the patient was re-hospitalized for a recurrent chest pain syndrome. A contrast cardiac computed tomogram (CT) angiogram demonstrated the same apical LAD pseudoaneurysm and right ventricular fistula (Figure 2B). This pseudoaneurysm was not present prior to bioprosthetic aortic valve replacement, and was presumably associated with iatrogenic intraoperative injury to the LAD during de-airing of the left ventricle.

The patient developed progressive exercise intolerance and chest pain despite antianginal medical therapy. She then underwent successful coil embolization of the pseudoaneurysm using ten 18S Tornado embolization microcoils (Cook Medical, Bloomington, IN; one 10/4, one 6/2, two 8/4, and six 4/2)
Following coil embolization of the LAD pseudoaneurysm, there is no further communication with the right ventricle. At six month followup, the patient had marked improvement in her exercise capacity and near resolution of her dyspnea on exertion.

Clinical Discussion

Coronary artery aneurysms are very rare. They are classified as true or false (pseudoaneurysm) according to the presence or absence of all three layers in the wall of the aneurysm [1]. Coronary pseudoneurysm is defined as a disruption of coronary vessel wall integrity, and the formation of a closed space surrounded by adjacent structures [1]. Intravascular ultrasound may be helpful in clarifying the morphology of coronary artery aneurysms and thus confirming whether the aneurysm is true or false [2-3].

In the present case, coronary angiographic findings prior to aortic valve replacement showed no restenosis and no other coronary abnormalities. However, subsequent coronary angiography showed a new coronary pseudoaneurysm in the apical LAD, confirmed by cardiac CT imaging.

Coronary pseudoaneurysms are most commonly related to catheter-based coronary interventions. Other rare etiologies include blunt chest trauma, cardiac tumors, infection [3] and cardiac-related surgery [4]. Although this patient had a history of stent implantation, the coronary pseudoaneurysm was not related to the prior percutaneous coronary intervention (PCI). The PCI was in the proximal to mid LAD, while the pseudoaneurysm occurred apically. We assume that the pseudoaneurysm was related to ventricular needle access in order to allow for intraoperative de-airing of the left ventricle, with an unrecognized coronary injury.

Coronary pseudoaneurysms caused by aortic valve replacement have not been reported. Coronary artery pseudoaneurysms have the potential risk of rupture or ischemia, leading to coronary steal. In this case, the patient had symptoms of chest pain prompting corrective treatment. Therapeutic strategies include medical therapy, observation, surgery, coil embolization, and polytetrafluoroethylene (PTFE)-covered stent implantation [5]. In the present case, she remained refractory to medical therapy. Although surgical repair is an option, percutaneous repair using coil embolization or a PTFE-covered stent may be preferable to avoid sternotomy. Coil embolization is considered as safe and effective treatment for coronary artery fistulas [6].

Conclusion

In conclusion, we successfully treated the coronary artery pseudoaneurysm by means of percutaneous coil embolization. To our knowledge, this is the first reported percutaneous treatment of coronary artery pseudoaneurysm with a fistula emptying to the right ventricular apical cavity secondary to aortic valve replacement.

References


