



# Idiopathic Giant Saccular Coronary Pseudoaneurysm in the Left Main Coronary Artery

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## Abstract

A 70-year-old man with progressive coronary calcification was admitted to our hospital for observation. He had not undergone cardiac catheter examination or treatment previously. Cardiac catheterization and coronary Computed Tomography (CT) revealed coronary stenotic lesions at the Left Descending Artery (LAD) and Right Coronary Artery (RCA) and large saccular coronary aneurysm (40 mm in diameter) in the posterior side of the main pulmonary artery, and surgery was performed to prevent its rupture. After coronary artery bypass was performed followed aortic cross-clamping, the entry was closed by direct suturing with 5-0 and 4-0 prolenes. Postoperative coronary artery CT confirmed the disappearance of the coronary aneurysm and its drainage artery. Clinical examination revealed characteristics of a pseudoaneurysm. Here we report a rare case of idiopathic giant saccular coronary pseudoaneurysm.

## Introduction

Only few studies have reported giant coronary aneurysms in the Left Main Coronary Artery (LMT) [1,2]. Topaz reported that only 0.1% of such cases arise during cardiac catheterization [2]. The etiologies of this condition are multiple factors, including atherosclerosis, Kawasaki's disease, trauma, polyarteritis nodosa, systemic lupus erythematosus, syphilis, and other idiopathic causes [3]. Here we describe a case of a idiopathic giant saccular coronary pseudoaneurysm by clinical observations.

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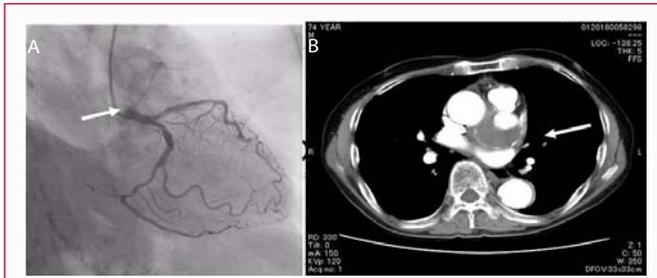
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## Case Presentation

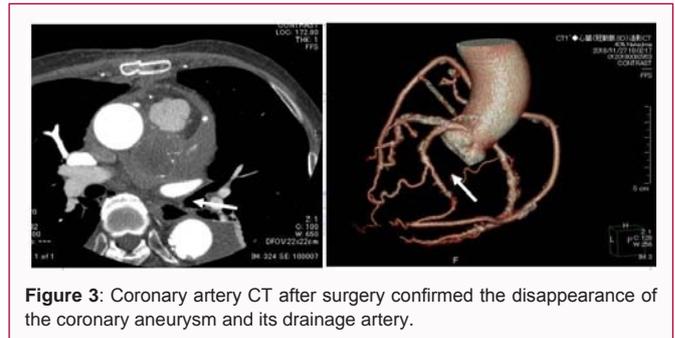
A 70-year-old man presented with calcification of a coronary artery 4 years ago. Because Computed Tomography (CT) revealed progression of the calcification, he was admitted to our hospital for observation. He had not undergone previous catheter examination or treatment. A cardiac catheterization revealed jet blood flow 10 mm away from the orifice of LMT, and a large saccular coronary aneurysm was visualized. Coronary artery CT revealed a giant saccular coronary aneurysm with a diameter of 40 mm in the posterior side of the main pulmonary artery. Additionally, blood flow was observed from the Right Coronary Artery (RCA) and left circumflex artery into the aneurysm. There was a 75% stenotic lesion at segment #6 and #7 of the Left Descending Artery (LAD) and 90% of the RCA segment #2. Although the condition was asymptomatic, the patient underwent surgery to prevent rupture of the aneurysm (Figure 1).

## Surgery

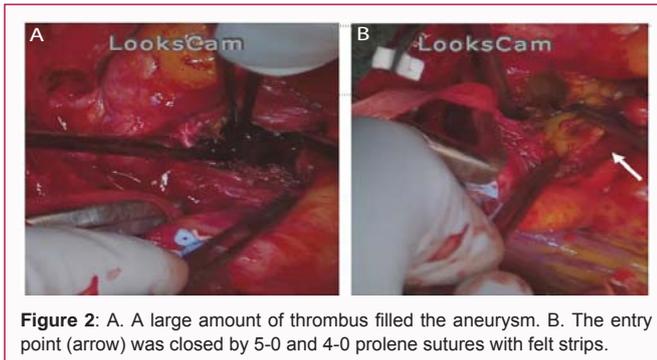
After a median sternotomy, Cardiopulmonary Bypass (CPB) was established via cannulations for the ascending artery and both vena cava. On the anterior surface of the pulmonary artery, meandering vessels were observed that seemed to flow into the aneurysm. An on-pump beating coronary artery bypass was performed at the RCA and LAD with saphenous veins. Before inducing cardiac arrest, adhesion of the coronary artery aneurysm to the pulmonary artery and ascending artery was partially observed. The aneurysm was located just above the LMT on the left side of the aorta and posterior side of the main pulmonary artery. The adhesion was very severe, so it was difficult to separate the aneurysm from the surrounding tissues (the main pulmonary and ascending arteries). As a result, the aneurysm was exposed just enough to enter and visualize the surgical field. At this time, the meandering vessels that seemed inflowing to the aneurysm were ligated. Following aortic cross-clamping, the wall of the aneurysm was opened at the right side of the main pulmonary artery. A large amount of thrombus filled the aneurysm. After removing the thrombus, we examined the entry of the aneurysm at the LMT by administering antegrade cardioplegia. The entry was closed



**Figure 1:** A. Cardiac catheterization revealed jet blood flow 10 mm away from the left main coronary orifice. B. Coronary artery CT showing a giant saccular coronary aneurysm with a diameter of 40 mm in on the posterior side of the pulmonary artery.



**Figure 3:** Coronary artery CT after surgery confirmed the disappearance of the coronary aneurysm and its drainage artery.



**Figure 2:** A. A large amount of thrombus filled the aneurysm. B. The entry point (arrow) was closed by 5-0 and 4-0 prolene sutures with felt strips.

with direct sutures of 5-0 and 4-0 prolens with felt strips, and the lumen of the aneurysm was filled with a hemostatic agent (factor XIII with fibrinogen). Furthermore, the aneurysm wall was closed by double sutures with 4-0 prolens. No particular complication was observed in weaning from the CPB (Figure 2). A postoperative Coronary Artery CT (CACT) confirmed the disappearance of the coronary aneurysm and its drainage artery (Figure 3).

## Discussion

In 1761, a Coronary Artery Aneurysm (CAA) was first reported in an autopsied patient [1]. Saccular aneurysms located in the left main coronary artery have been recorded in only 22 of 22,000 (0.1%) catheterizations according to Topaz et al. [2]. In general, CAA is defined as ectasia of the coronary artery lumen to 1.5 times the normal size of the diameter. Among these aneurysms, the giant type of aneurysm is defined as an aneurysm having a diameter of >4 cm [4], and in our experience, the largest aneurysm observed was 70 mm × 45 mm [5]. The present case involved a giant type of aneurysm having a diameter of 40 mm. However, the prevalence of giant aneurysms is only 0.02% to 0.2% and is much rarer than that of smaller aneurysms [6]. We carefully considered several aspects of the aneurysm before surgery; it was asymptomatic and originated at a site 10 mm from the LMT orifice, and the position was at the posterior side of the main pulmonary artery. Indeed, between the aorta and pulmonary artery (Ao-PA), there was a severe adhesion that allowed limited dissection. Initially, it seemed necessary to dissect the ascending aorta to observe the aneurysm, but it was possible to approach from the top of the aneurysm at the site between the Ao-PA. The cardiac arrest enabled easy observation of the visual field, and the entry from the LMT was easily identified from the top of the aneurysm by administering antegrade cardioplegic solution. A large amount of blood clot was considered as a risk factor for the occurrence of angina or myocardial infarction. The entry orifice from the LMT was closed by sutures with felt strips, and care was taken not to create a stenosis at the LMT.

Anxiety remained until the success of the surgery was confirmed by CACT. It was essential to detect the drainage arteries in the cavity from the aneurism in the case of future recurrence; however, it was difficult to identify all the collateral vessels. Therefore, the cavity of the aneurysm was closed using a hemostatic agent (factor XIII with fibrinogen). For the same reason, the meandering vessels identified on the front side of the pulmonary artery were closed as much as possible. A photodynamic eye imaging system using fluorescent imaging was shown to be useful for detecting residual shunts [5], but unfortunately, this system was not available at our facility. During surgery, the clinical observations strongly suggested that the condition was a pseudoaneurysm; however, we could not obtain much of the aneurysmal wall to diagnose the condition macroscopically. Only few studies have reported pseudoaneurysms generated from the LMT after catheter treatment or surgery [7]; however, to the best of our knowledge, no study has reported idiopathic giant saccular coronary aneurysm, as in the present case.

## Conclusion

Idiopathic giant saccular coronary pseudoaneurysms at the site of the LMT are rare. The aneurysm was successfully treated by directly entering the aneurysm and reaching through the space between the Ao-PA without resecting the ascending aorta or the main pulmonary artery.

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