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Case Report

Multimodality Imaging for Successful Surgical Treatment of Giant Cameral Fistula

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Abstract

Background: Symptomatic coronary-cameral fistula was rare, and it is typically treated with transcatheter closure. However, if the anatomy is not suitable for interventional treatment, surgical treatment should be considered. **Patient and Methods:** We investigated the double giant cameral fistula through multimodality imaging, and planned the surgical closure of the double outlets via the right and left atrium with on-pump beating heart coronary artery bypass grafting.

Conclusion: Our procedure was successful without postoperative complication.

Keywords: Coronary aneurysm; Coronary vessel anomaly

Introduction

The term "coronary-cameral fistula" refers to a communication between the coronary arteries and a cardiac chamber [1]. The incidence of congenital coronary arteriovenous fistulas in the general population is 0.002% [2]. A congenital coronary arteriovenous fistula may arise from the persistence of sinusoidal connections and are usually small and asymptomatic. The hemodynamic consequences depend on the size of the fistula, the pressure gradient along the fistula, and the volume of shunt flow [3,4]. Most of the fistulae are small and do not result in significant changes, although large fistulae with excessive flow rates draining into the right side of the heart can give rise to volume overload and pulmonary hypertension. Shunting of the blood through the fistula can also to coronary steal syndrome leading to ischemia [3]. We report a case of surgical treatment of the patient with symptomatic double outlets of coronary fistula.

Case Report

A 46-year-old man presented with a complaint of chest tightness for 2 months. He had exertional symptoms and cardiac murmur on physical examination. He had no family history of cardiac disease or sudden cardiac death. Resting electrocardiogram showed ST elevation in the inferolateral area. Laboratory workup revealed unremarkable findings. Transthoracic and trans-esophageal echocardiography demonstrated a severely dilated left coronary artery with continuous turbulent flow into the left and right atria (Figure 1). The findings were consistent with an anomalous cameral fistula.

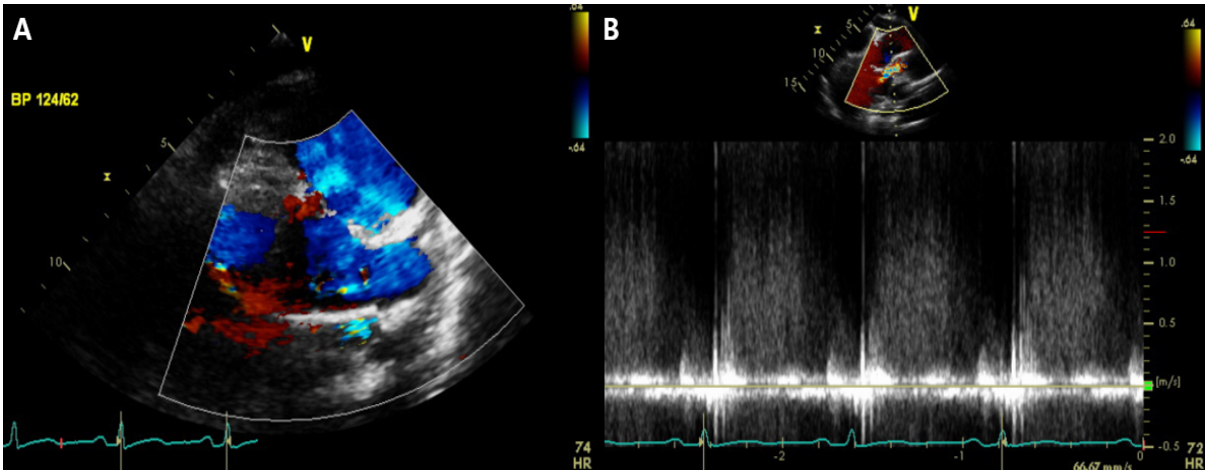

Figure 1: Transthoracic echocardiographic image showing a severe dilatation of the left main coronary artery **(A)** and a left-to-right shunt flow **(B)**.

Computed Tomography (CT) coronary angiography revealed a huge enlargement of the left main coronary artery, which was dilated to a maximum diameter of 2.1 mm. Furthermore, a cameral fistula was observed near the branch of the left main artery, running behind the pulmonary artery on the left atrial roof, eventually draining into the left and right atrium (Figure 2). Diagnostic coronary angiography demonstrated a dilated left main coronary artery, and the left main coronary artery was draining into the left atrium and the right atrium. The flow through the fistula was more dominant in the right atrium than in the left atrium. These images were reviewed at the multidisciplinary heart team meeting, and it was concluded that cardiac surgery should be performed to prevent sudden cardiac death.

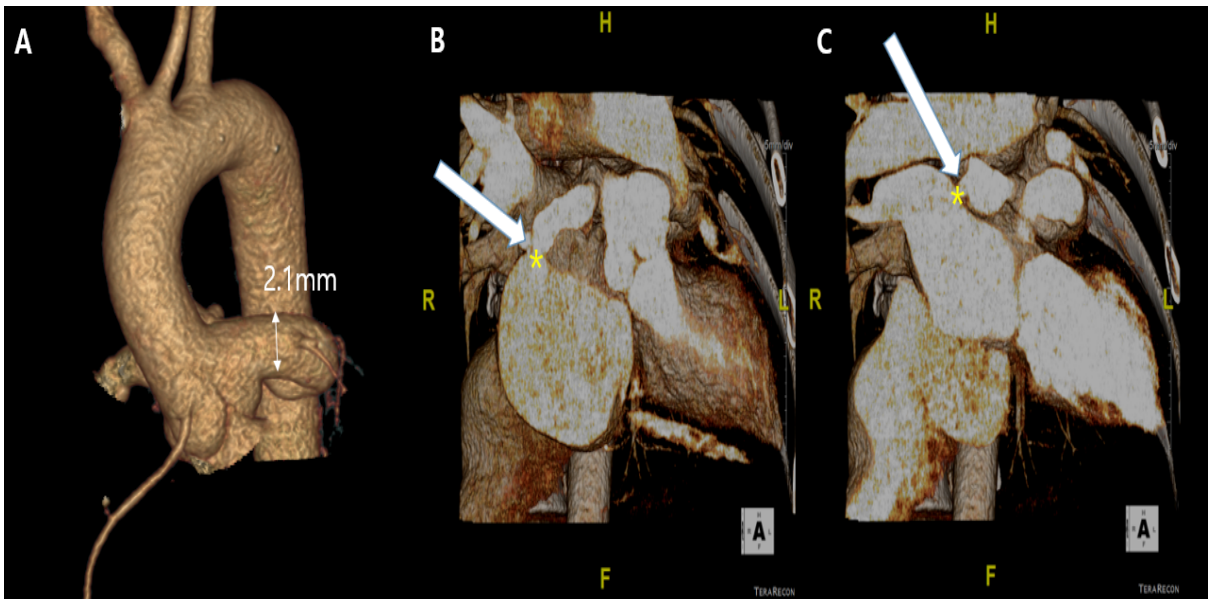

Figure 2: Coronary computed tomography angiography images showing a large left main artery **(A)** with fistulas in the right **(B)** and left atria **(C).**

The patient underwent successful surgical closure of the double outlets via the right and left atria (Figure 3) with on-pump beating heart coronary artery bypass grafting (left internal thoracic artery to the distal left anterior descending artery and composite Y to the obtuse marginal branch with the right internal thoracic artery). The patient had an uneventful postoperative course and was discharged with close outpatient follow-up. Repeat transthoracic echocardiography showed normal left ventricular function and no intra-cardiac shunt flow. Furthermore, postoperative CT revealed an invisible communication (Figure 4).

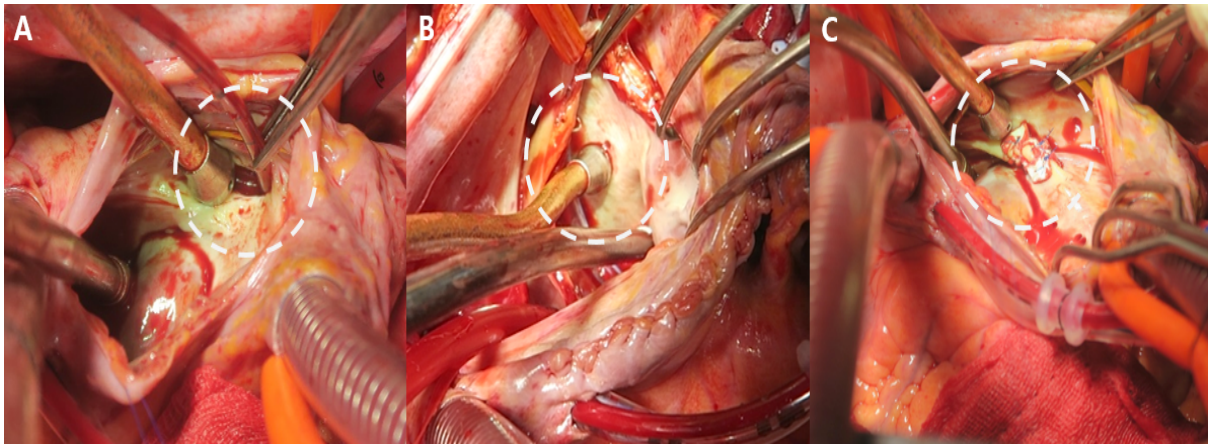

Figure 3: Intraoperative image showing the surgical closure of the fistula. **(A)** Outlet of the right atrium, **(B)** outlet of the left atrium, and **(C)** pledget suture of the shunt in the right atrium.

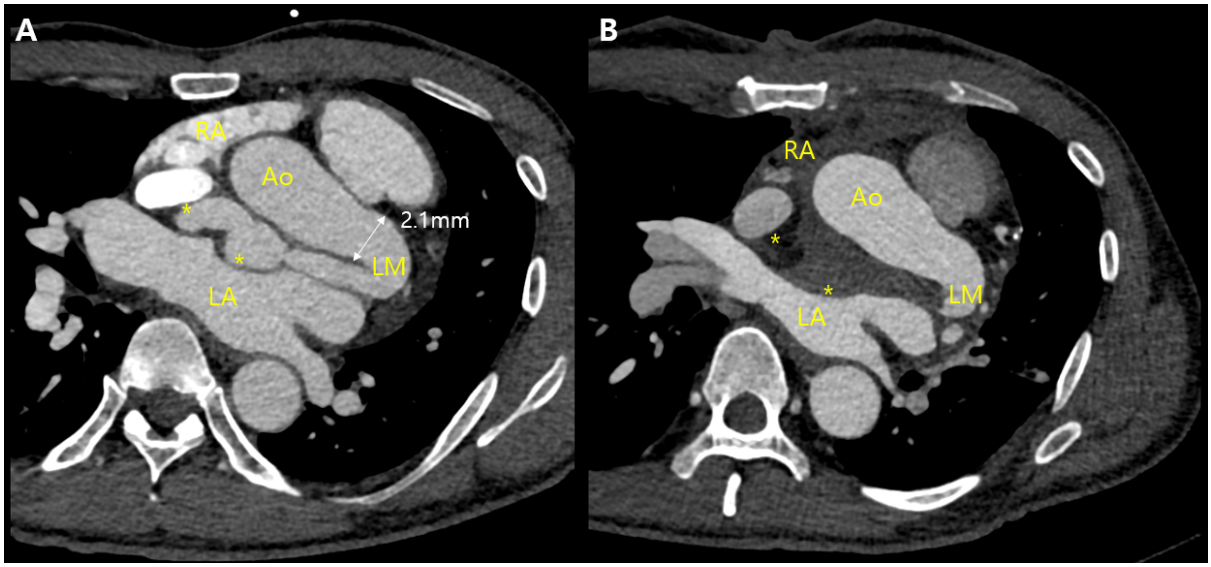

Figure 4: Coronary computed tomography angiography images showing invisible communication of fistulas after surgery. **(A)** Preoperative and **(B)** postoperative images.

Discussion

Transcatheter Closure (TCC) is typically performed in patient with symptomatic fistula. However, the anatomy may not be conducive to TCC, especially if the vessel is tortuous or in cases of a large fistula [5]. It is also recommended in cases of fistulae arising from the proximal segment of coronary arteries as they are prone to aneurysm formation and rupture [1]. In our case, the left main coronary artery was simultaneously draining to the left and right atrium and separately to the left anterior descending artery. This case highlights the added value of multimodality imaging in diagnosing and determining the location of multiple fistulas. It can help in planning a successful surgical approach for treatment.

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