

Neo-ostium Formation in Anomalous Origin of the Left Coronary Artery

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Anomalous origin of a coronary aortic artery is a rare cardiac anomaly. Although it can cause angina, syncope, and palpitations, most patients are asymptomatic. This anomaly requires surgical treatment or intervention because it is associated with sudden death. Several surgical techniques, such as coronary reimplantation, coronary artery bypass grafting (CABG), unroofing, and neo-ostium formation, have been proposed as treatments. We report a case surgically treated with neo-ostium formation in anomalous origin of the left coronary artery from the right coronary sinus.

Key words: 1. Coronary artery anomaly
2. Ostium

CASE REPORT

A 44-year-old man, who had a medical history of panic disorder, visited another hospital due to dyspnea on mild exertion. Computed tomography was performed and revealed a coronary anomaly (Fig. 1). The patient was then transferred to our hospital for further evaluation and treatment. A coronary angiography showed a single coronary artery originating from the right coronary ostium. A single coronary artery bifurcated into the right coronary artery and left main coronary artery. The left main coronary artery coursed between the main pulmonary artery and aorta before bifurcating into the left descending artery and circumflex artery. We thought that panic symptoms or dyspnea on exertion might be a sign of myocardial ischemia due to compression of the left main coronary artery by the pulmonary artery and aorta. We decided that surgical treatment was the best option due to the high

risk of sudden death associated with a coronary anomaly.

Under general anesthesia, median sternotomy was performed. We dissected the left main coronary artery between the aorta and the main pulmonary artery on the beating heart. The proximal left main coronary artery was bifurcated from a single coronary artery that originated from the right coronary sinus. Under cardiopulmonary bypass, cardioplegic solution was infused, and aortic cross clamp was performed. Transverse aortotomy was then performed. Only one coronary ostium was observed in the right coronary sinus, and a single coronary artery originated from the ostium. We dissected the left main coronary to allow separation from the aortic wall. A 5-mm arteriotomy was made to the left main coronary artery at the site in which the left coronary ostium should have been located. Neo-ostium formation was performed with a 5-mm puncher in the left coronary sinus. Anastomosis between the neo-ostium and the left main coronary arteriotomy

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Received: May 31, 2011, Revised: June 16, 2011, Accepted: July 3, 2011

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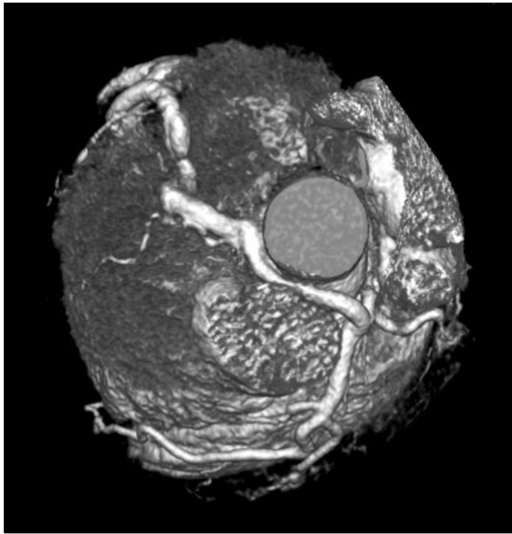


Fig. 1. Preoperative chest CT showing the left main coronary artery originating from the right coronary sinus with the right coronary artery.

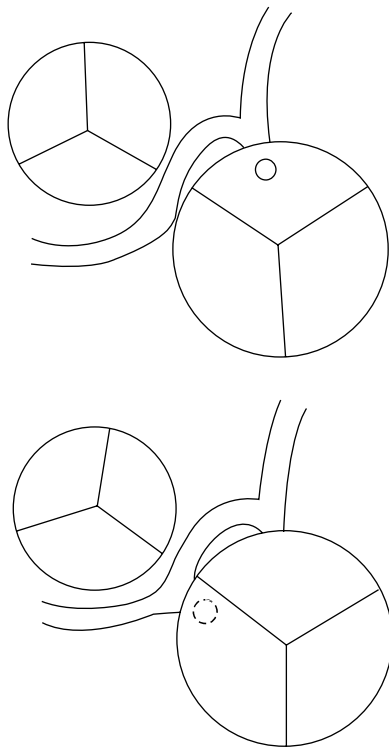


Fig. 2. Schematic review of the operative technique of neo-ostium formation on the left coronary sinus.

site was performed using a 7-0 Prolene continuous running suture (Fig. 2). The aortic cross clamping time was 88 mi-

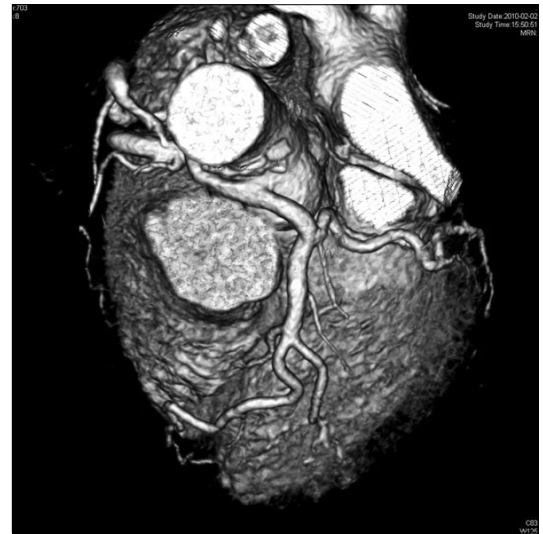


Fig. 3. Postoperative chest CT showing a well-connected left coronary artery system to the neo-ostium on the left coronary sinus.

minutes, and total cardiopulmonary bypass time was 117 minutes.

The patient was discharged on the 11th postoperative day without any complications. Follow-up computed tomographic angiography before discharge showed good patency of the neo-ostium in the left coronary sinus without stenosis at the anastomosis site (Fig. 3). A treadmill test in the outpatient department after 3 months was negative. The patient remained asymptomatic without any complications or events for 15 months after the surgery.

DISCUSSION

Anomalous origin of a coronary aortic artery is a rare cardiac anomaly. Angelini reviewed 1,950 coronary angiographies and reported that the incidence of right coronary artery originating from the left coronary sinus was 0.92% and vice versa was 0.15%, with a total incidence of 1.07% [1]. Patients are usually asymptomatic. However, it may cause angina, syncope, and even life-threatening complications such as myocardial infarction or ventricular fibrillation. Thus, we must consider surgical treatment or intervention if signs of myocardial ischemia are present [2].

Several surgical techniques can be utilized to treat coronary anomalies, such as coronary reimplantation to the original si-

nus, coronary artery bypass graft (CABG), pulmonary artery translocation, unroofing, and neo-ostium formation [3]. In this case, the left main coronary artery was bifurcated from a single coronary artery originating in the right coronary sinus. Furthermore, the left main coronary artery passed between the pulmonary artery and aorta to reach the left heart. The patient's symptoms may be the result of compression by two great vessels [4]. CABG, coronary reimplantation, unroofing or neo-ostium formation could therefore have been considered as viable surgical options. Coronary reimplantation is one of the most physiologically beneficial repairs, but is technically difficult, and stenosis may occur at the site of anastomosis. CABG is technically feasible, but the arterial conduit has a competitive flow problem if no stenotic lesions are present on the natural coronary artery. Also, a vein conduit may be problematic if the patient is young because of long-term patency [5]. Romp et al. reported that favorable results were achieved with unroofing procedures [6]. However, extended unroofing may cause valve insufficiency if the anomalous coronary artery is located under the valve commissure [7]. Unroofing was not proper for our case because a separated left main coronary artery originated from a single coronary artery, not the right coronary sinus. Neo-ostium formation in the left coronary sinus without unroofing was considered to be a proper surgical treatment in this case.

Successful surgical treatment of anomalous of coronary anomaly depends on expertise in anatomic and hemodynamic pathophysiology, in addition to the selection of the appro-

priate surgical treatment option. We report that this case was successfully treated with neo-ostium formation in anomalous origin of the left coronary artery from the right coronary system.

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