Case Report

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A Case Report of Abnormal Branched Right Coronary Artery from Left Sinus of Valsalva

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ABSTRACT

BACKGROUND AND OBJECTIVE: Abnormal origin of coronary arteries, which are responsible for providing the heart with freshly oxygenated blood, can lead to complications affecting daily activity. This variation could be harmless and controlable with the aid of medication but sometimes the bad anatomical situation requires operation. In this severe types, early diagnosis is very important. The aim of thid study was to teach medical students about coronary arteries' anomalies.

CASE REPORT: Through the thorax dissection sessions of a 57 years old man, we observed that the right coronary artery along with the left main coronary artery is originated from the left sinus of Valsalva. As it passed posteriorly to the aorta, it could have been pressed by the esophagus or the right auricle of the right atrium.

CONCLUSION: This study showed that the right coronary artery arises from left sinus of Valsalva. Together with the significant cardiomegaly and extra pericardial fat, this abnormally originated right coronary artery could be one of the main causes of this person's health complications while alive.

KEYWORDS: *Coronaries, Congenital Anomaly, Heart, Dissection, Education.*

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Introduction

The heart acts as a muscle pump that begins its function from the beginning of the 5th week until the death providing the body blood supply, and is infused by the coronary arteries.

This system consists of a series of arteries and veins that are divided into two sections of the right and left in a general division: Right coronary artery (RCA) from the right sinus of Valsalva (RSOV) and usually ends in the right margin of the heart, and the left major coronary artery (LMCA) separates from the left sinus of Valsalva-LSOV and goes to the left (1) . In most cases, the overall cardiopulmonary artery pattern is that the right marginal artery (RMA) and the posterior descending artery (PDA) are separated from the right coronary artery, and the Left Anterior descending (LAD) and Circumflex-Cx are the terminals of the left major coronary artery (Fig. 1).

These branches generally blend the walls of the ventricles and coronary arteries. Coronary artery anomalies are observed in 0.3% (autopsy cases) to 3.1% (angiographic cases) of patients (2-5). Myocardial ischemia and other cardiovascular symptoms, such as syncope or sudden cardiac death, are caused by these anomalies.

The origin of the major left coronary artery is from the right Valsalva sinus with a prevalence of 1-2 cases per 10,000 patients, which are underlying cardiac catheterization, forms a small part of this anomaly (6, 4). The origin of right coronary artery is from the left Valsalva sinus and rarely from the left major coronary artery itself, with much less prevalence, occurs from the previous state (9-7).

In the past, these anomalies were only detectable by catheterization using the "dot and eye" method (10), but nowadays using isophagial echocardiography can easily determine the origin of coronary arteries and their position relative to the aortic and pulmonary arteries (11).

Treatment of this condition (the origin of right coronary artery from the left Valsalva sinus) is largely dependent on clinical manifestations and physician's opinion, but generally only if right coronary artery passes between the aorta and the pulmonary artery, especially if there is also evidence of an ischemia, surgical treatment is recommended. In other cases, therapeutic treatments (such as beta-blockers) are used (12-10). One of the most important references to studying such abnormalities is the case report articles. These articles provide information and images of pathological variations that are not found in medical reference books. Purposeful readers will learn more about this item and more when faced with similar conditions in the clinic and make better decisions.

Therefore, the purpose of this report is to help train medical students at universities and doctors and medical staff in hospitals.

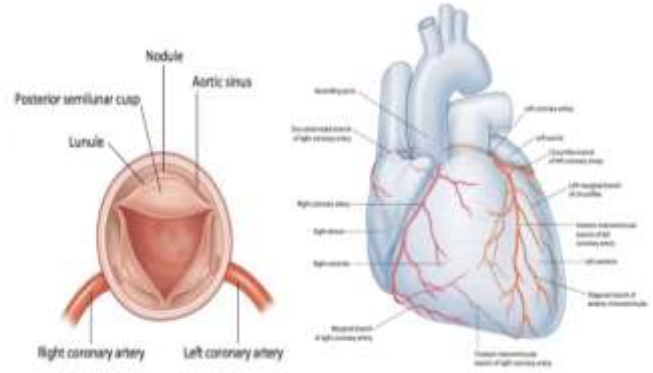


Figure 1. The heart schematic image shows the distribution of left and right coronary arteries. In the normal state, the right and left coronary arteries originate from the left and right valsalva sinus of the aorta, and they perfuse the walls of the heart (1).

Case report

In the beginning of the second semester of the academic year of 2015-2016, in the study hall of the medical school of Guilan University of Medical Sciences, the thorax region of the corpse of a 57-year-old man was presented for the purpose of teaching of postgraduate students in Anatomy and Medicine, based on the Grant's Anatomy Book. After entering the chest cavity, the heart was removed in order to further study after the isolation of its major vessels. With careful examination, it was found that right coronary artery with the left major coronary artery was removed from the left side of the aorta.

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To examine the entrance of these two arteries, the aortic wall was cut to the point where they were detached, and it was determined with certainty that the coronary artery output span 0.6 m in parallel with the opening of the left coronary artery was located in the left vascular sinew (Fig 2).

This artery then passes through the back of the aorta to the right side of the heart to circulate the right and posterior wall of the heart (Fig 3 and 4). The studies revealed that other branches of the arterial system have normal distribution.

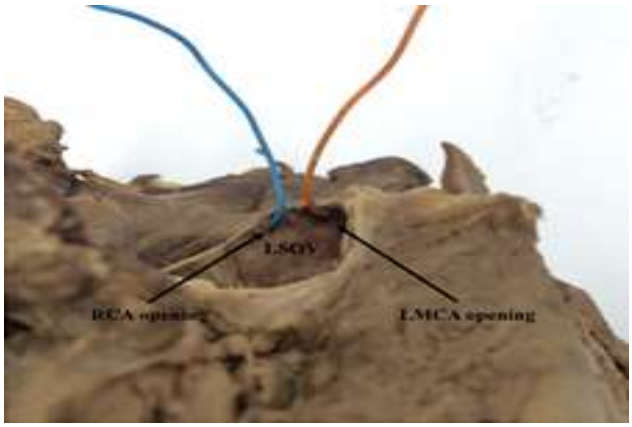


Figure 2. Internal view of the left valsalva sinus. In order to display the right and left coronary arteries, colored wires (Blue and red, respectively) were used.

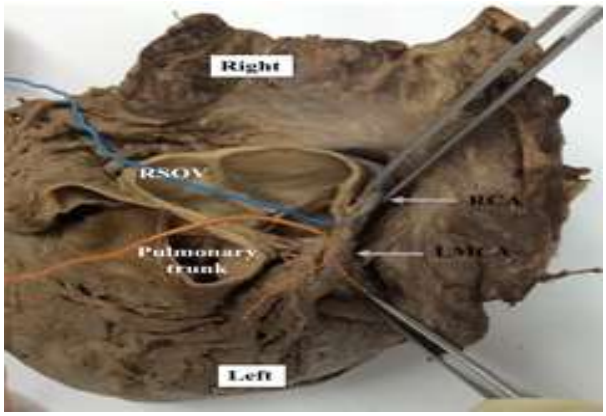


Figure 3. The left side of the heart at the level of separation of left and right coronary arteries represents the continuation of the abnormal coronary artery pathway from the back of the aorta. The blue dash line represents the continuation of the pathway to the right coronary artery and the red dash line represents the continuation of the main left coronary artery pathway.

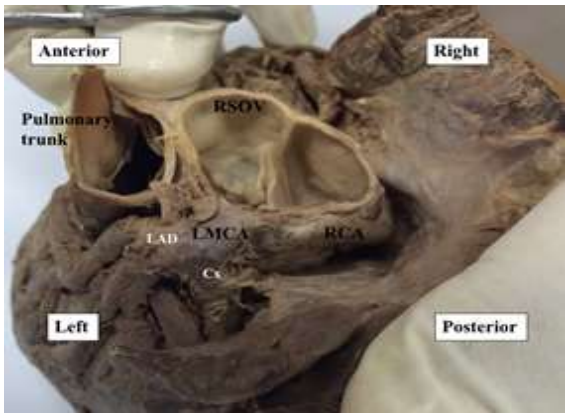


Figure 4. Posterior-lateral view of the heart at the level of separation of right and left coronary arteries, indicating the inner facet of the right sinus of Valsalva, without any arterial branching. As depicted in the picture, the anterior interventricular arteries (LAD) and circular Circumflex (Cx) are naturally separated from the left major coronary artery. Pay attention to the right coronary artery to the aorta; this artery passes through the posterior aorta to the right side of the heart.

Discussion

The results of this study showed that right coronary artery with left coronary artery is orginate from left valsalva sinus. Researches have shown that abnormal origin of right coronary artery can cause chest angina, myocardial infarction, or sudden death of the heart, even in the absence of atherosclerosis, although its pathophysiology is still unclear (13). The compression of the right coronary artery between the aorta and the pulmonary artery is one of the causes that can lead to clinical symptoms (14).

Among the other mechanisms, the obliqe angle of the right coronary artery in the separation site from the aortic wall which causes the entry of this artery to be "like a cleft", in which case this slit entry can occur during intense physical activity such as exercise, collapse, and this greatly affects the blood flow of the heart (14).

In 1992, Taylor et al examined 52 patients with abnormal coronary artery disease, 25% of them suddenly, and in most cases, died in the absence of any specific clinical sign (13). In 1997, the same medical group examined 21 cases of patients with abnormal

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coronary artery disease and examined various anatomical variables such as valve size, angle of seperation, and also clinical symptoms , showed that the age of 30 years and older was associated with a lower rate of sudden death (14).

In the reported case, there is also increasing evidence that it represents a health hazard in this person. Among them, obesity, cardiomegalia, and high levels of fat in the heart, as well as hepatomegaly can be mentioned. Given the anonymity of this person and the lack of access to his medical records, it is not possible to determine with certainty the cause of death, but most probably the heart problem is one of the many problems that affect the quality and quantity of his life.

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