

Original research article**Quadrifurcation of left coronary artery****Dr. Meera Jacob**

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Abstract

The dissection method will be used in this research project with the intention of determining the frequency of quadrifurcation of coronary artery in 30 adult human hearts. The incidence of quadrifurcation of the left coronary artery was found to be 10% during the course of our research. This study would be important for the correct interpretation of coronary angiograms, the correct management of patients having percutaneous coronary intervention, and surgical revascularization of the myocardium. Considering that coronary artery disease is one of the leading causes of death in nations that are still growing economically. Diagnostic and therapeutic interventional methods will benefit from having knowledge of the prevalence of such coronary artery patterns.

Keywords: Coronary artery, branching pattern, quadrifurcation, left coronary artery, bifurcation

Introduction

It is through the left posterior aortic sinus that the left major coronary artery emerges. There is no branching off of the early section of the left major coronary trunk, which measures a few cm to a few mm in length. This preliminary segment of the left coronary artery is encased in sub-epicardial fat. When it reaches the atrio-ventricular groove, it will split into the left anterior descending artery, also known as the left anterior interventricular artery, as well as the left circumflex artery. After that, the right and left ventricular branches are produced by the anterior interventricular artery. The diagonal artery gets its name from the fact that the left ventricular branches, of which there can be anywhere from 2 to 9 of them, travel over the front surface of the left ventricle in a diagonal pattern ^[1]. In most cases, the first diagonal artery of the is quite substantial. It can develop independently from the trunk, at which point it is referred to as a trifurcation; in other cases, it can duplicate itself, at which point it is referred to as a quadrifurcation. Baptista *et al.* found that the left coronary artery displayed three different types of division: bifurcation, trifurcation, and quadrifurcation. The bifurcation of the left coronary artery results in the formation of the left anterior descending artery as well as the left circumflex artery. The artery gives rise to three branches: the left anterior descending, the left circumflex, and the third branch is itself a branch of the left circumflex artery. The name "ramus diagonals" is given to the artery. The two branches that formed the median in Quadrifurcation were referred to as ramus diagonalis I and ramus diagonalis II ^[2]. In addition to the left anterior interventricular artery and the left circumflex artery, there is reportedly also a branch that is known as the median or intermediate artery, which was discovered by Suruca H.S. *et al.* ^[3] According to Banchi ^[4], the artery that originates between the left circumflex artery and the left anterior descending artery is also referred to as the middle artery. It was given the label arterial diagnostic by Crainicianu ^[5]. Other names for this artery include the ramus obliquus, ramus lateralis, Marginal ramus and intermediate artery. All of these names refer to the same structure ^[9]. The majority of authors favoured utilising Ramus diagonalis, which is also frequently utilised by clinicians and medical professionals. According to Verna E. and her colleagues' findings, the diagonal branches, also known as the ramus diagonalis, have an atypical anatomic trajectory since they do not follow the heart groove. In most cases, they move in a zigzag pattern and can be found all over the surface of the ventricle ^[10].

Materials and Methods

A total of 30 Human heart specimens were collected from the Department of Anatomy, Yenepoya Medical College to study the branching patterns of human coronary arteries and their clinical importance. We dissected the thoracic cavity to explore the middle mediastinum and removed the pericardium along with a heart with a small portion of ascending of aorta. All the heart specimens were cleaned for free of clots and the branches of the coronary arteries were dissected from the coronary Ostia to their distal course up to the possible extent of the arteries. Both the coronary arteries were dissected till their terminal branches and noted the variation in the branching patterns of both the coronary arteries. The variations Quadrifurcation of the coronary arteries were noted in the present study.

Results



Image 1: Quadrifurcation of left coronary artery

Table 1: Frequency

Total	Frequency	Percentage
30	03	10%

Discussion

Alterations in the course and structure of the coronary arteries that are present at birth are referred to as anomalies of the coronary arteries^[5, 6]. The many different configurations that coronary arteries might take as a result of disruptions in the typical regression of vascular sprouts from the network of arteries in the interventricular and atrioventricular grooves during the early stages of development^[7-9]. Because they have the ability to supply a considerable region of the myocardium, the extra arteries are functionally essential. This is the reason for their importance. In situations like this, they make up a significant part of the source of collateral circulation in the event that the LAD or LCX become blocked^[10]. The high frequency of extra arteries suggests that catheterization of LCA is more challenging and since their presence modifies the angle of bifurcation, they increase vulnerability to atherosclerosis^[11]. In addition, since their presence alters the angle of bifurcation, they increase the risk of developing atherosclerosis. In the Indian population, the incidence of branching patterns in the left coronary artery, such as bifurcation, trifurcation, and quadrifurcation, is higher when compared with what has been described in prior research. In this particular investigation, neither a pentafurcation of the left coronary artery nor any changes associated with the right coronary artery were discovered. The Left Coronary Artery is More Prone to Variations in the Branching Pattern, and the Incidence of the Current Study Agrees with Previous Literature^[12, 13]. The Left Coronary Artery is More Prone to Variations in the Branching Pattern. The changes that were found in this study could be the result of embryological abnormalities; yet, knowing of such variations is essential for surgeons when they plan a procedure involving the heart.

Conclusion

Branching patterns of coronary arteries should be acknowledged during the catheterization for coronary angiography.

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