

Case Report

Unusual Branching Pattern of Left Coronary Artery- Case Report

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Abstract

During dissection of thorax of an 80 year old Female cadaver for undergraduate MBBS students, a heart was detected to have variant branching pattern of left coronary artery. Typically left coronary artery bifurcates into anterior interventricular artery and circumflex artery which continues in the left coronary sulcus. But the present case left coronary artery splitted into anterior interventricular artery and common trunk. The anterior interventricular artery gave diagonal/ventricular branches in the left as usual but ectopically generated a ventricular minor artery and a luminal artery. The luminal artery entered the infundibulum of right ventricle and ended near the septal papillary muscle. Common trunk divided into circumflex artery and anomalous diagonal artery. The case is reported for its virgin occurrence.

The knowledge of new configuration of branches of left coronary artery will be of paramount importance to cardiologists in cardiac surgery and to anatomists for new variant.

Keywords: Circumflex artery; Infundibulum of right ventricle; Left coronary artery; Luminal artery; Ventricle minimus artery

Abbreviations

LCA: Left Coronary Artery; RCA: Right Coronary Artery; AIV: Anterior Interventricular Artery; Cx: Circumflex

Introduction

Heart is supplied by two coronary arteries, Left Coronary Artery (LCA) and Right Coronary Artery (RCA). Variations in the branching pattern of LCA have been described by many authors [1, 2].

Typically LCA gives Anterior Interventricular Artery (AIV) and main artery continues as circumflex artery in left anterior coronary sulcus. Anterior interventricular artery from its left side gives many sub-parallel diagonal and ventricular branches to supply the left ventricle. But in the present cadaveric study, two arteries named as ventricular minor artery and luminal artery ectopically arise from right side of AIV. Ventricular minor artery enters the myocardium and ends there. Luminal artery enters into the lumen of right ventricle of heart.

In addition to these new arteries, a diagonal artery arises from common trunk along with circumflex artery. These variations are not reported in literature as far as known to the author and may affect the pathophysiology of heart. So the knowledge of these variants may be of immense use to clinicians, imagery experts and anatomists. Therefore the case is reported.

Case Report

During dissection of thorax of an eighty year old female cadaver, the heart was found to have variant configuration of branching pattern of LCA as well as AIV as described below-

LCA after travelling 1.5 cm from its origin gave a common

trunk of 1.00 cm and AIV (Figure 2). Common trunk bifurcated into Circumflex (Cx) and diagonal arteries. Cx artery after travelling 2.00 cm in the left anterior coronary sulcus gave marginal artery and ended aberrantly at the left border of heart.

A new artery named as ventricular minor (Figure 1a and 1b) arose from right side of AIV at 0.50 cm from its origin. The diameter of this artery was 0.15 cm and length was 3.00 cm. This artery, after its emergence, entered into the myocardium of right ventricle and ended there. Further on the same side, another new artery named as luminal artery arose from the AIV after 1.50 cm from its origin. This artery passed between the ascending aorta and pulmonary trunk and then entered the infundibulum of right ventricle (Figure 1a). Travelling through the infundibulum, it ended at the septal papillary

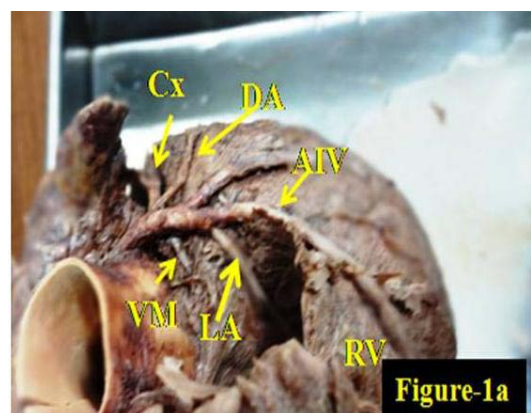


Figure 1a: Luminal artery entering the infundibulum. VM: Ventricular Minimus; LA: Luminal Artery; Cx: Circumflex Artery; DA: Diagonal Artery; AIV: Anterior Ventricular Artery; RV: Right Ventricle.

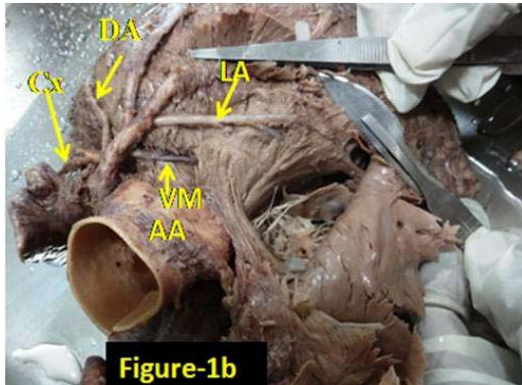


Figure 1b: shows extent of luminal artery in the cavity of right ventricle after opening the right ventricle.

VM: Ventricular Minor; LA: Luminal Artery; Cx: Circumflex Artery; DA: Diagonal Artery; AA: Abdominal Aorta.

muscle of the right ventricle (as exposed after opening the ventricle Figure 1b). The luminal artery after travelling for 2.00 cm having uniform diameter of 0.25 cm in the right ventricle gave a small arterial branch. Running further for 1.10 cm gave another branch and ended in the papillary muscle with reduced diameter of 0.08 cm. All the measurements were taken by venire caliper.

Discussion

According to some authors, normal variant is an alternative pattern which is relatively infrequent compared to normal, but it occurs in more than 1% of otherwise normal individuals [3, 4]. The advances made in coronary arterial bypass surgeries and modern methods of myocardial revascularization makes sound and complete knowledge of the normal and variant anatomy of coronary artery [5] indispensable and imperative. Diagonal branch normally arises from AIV/Cx arteries as described in Gray's anatomy (2008) [6] but in this case common trunk gives diagonal artery and Cx artery. Ectopic luminal artery too arises from AIV and entering in the lumen of right ventricle. That is why it has been named as luminal artery. This luminal artery is a new discovery and being reported for the first time. The diameter of this artery is uniform showing that it is not affected by luminal blood and there was no differential influence of externally surrounding blood flow on the uniform width of the artery. Widening of blood vessel occurs due to sheer flow of blood through them [7]. Uniform diameter of luminal artery suggests that it must have accommodated the blood during fetal life time. The cause of the formation of luminal artery may be developmental, genetic

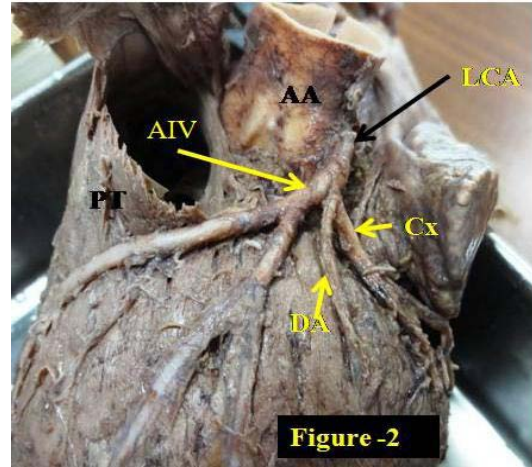


Figure 2: Common trunk giving circumflex and diagonal arteries.

LCA: Left Coronary Artery; Cx: Circumflex Artery; DA: Diagonal Artery; AIV: Anterior Ventricular Artery.

or circumstantial. It is speculated that the normal supply to septal papillary muscle might have been insufficient during developmental stage. Therefore luminal artery might have been generated. The discovery of luminal artery may change traditional old concepts of supply to papillary muscle.

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