

## Anomalous High Origin of Accessory Right Coronary Artery: A Case Report

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Case Report

**Keywords:** Right Coronary Artery(RCA); Double Right Coronary Artery; Coronary Arterial Diseases

### Introduction

Anatomical coronary variations are rare findings and are often encountered accidentally. Literature suggests the prevalence of coronary artery anomalies is approximately 0.3 – 1% [1]. With growing risk of coronary arterial diseases and increase in the surgical interventions, every coronary variation encountered has always attracted much needed medical attention. Knowledge of coronary variations would assist surgeons to distinguish between normal and anomalous structures, minimizing the risks and misinterpretations especially during surgical procedures [2]. There are numerous literatures explaining the anomalous origin of right coronary artery, but the present case report would be one of its kind showing accessory right coronary artery originating from the upper part of ascending aorta and the presence of normal right coronary artery.

### Case Report

During the dissection hour while explaining about the coronary anatomy on a plastinated heart to our medical students in American University of Antigua. We observed an additional vessel running parallel to the right coronary artery. As it was a plastinated specimen we were unable to locate the exact origin of the anomalous artery but based on the external location and its point of origin, we presume this large vessel may have originated from the upper right ventral aspect of ascending aorta. This anomalous artery was seen running antero-inferiorly on the ventral aspect of the right atrial chamber till it reached the inferior margin just adjacent to right coronary artery. Further course of the artery could not be evaluated as it was fused to the central tendon of diaphragm. From external appearance, the diameter of the lumen was found to be identical when compared to that of the normal RCA in the given specimen. The normal RCA appeared to originate in the lower part of ascending aorta and descended along the anterior atrioventricular groove until it reached the inferior margin of the heart. Few anterior ventricular rami were seen arising from right coronary artery. Left anterior descending and circumflex were normal (Figure 1).

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Anterior view of plastinated heart specimen showing the sterno-costal surface of heart and trunk of great vessels. a – right coronary artery. b – left anterior descending artery, blue arrow indicating the anomalous accessory right coronary artery.

**Figure 1:** Anterior view of the heart.

## Discussion

The right coronary artery usually arises from a single orifice in the right aortic sinus. Initial course it is covered by adipose tissue of the epicardium below the right atrial appendix [2]. It passes in the anterior atrioventricular groove and winds around the inferior margin to continue along the posterior atrioventricular groove. It terminates near the crux of the heart usually by anastomosing with circumflex artery. Youg et al. [1] reported a case of ectopic origin of right coronary artery from the left sinus of Valsalva in a 26-year-old woman [2]. This variation comprises of less than 1% of all congenital coronary anomalies. Double right coronary artery arising from separate orifice has been reported by Karabay et al. [3]. A case of double right coronary artery arising from single orifice has been reported by Harikrishnan S [4]. Many authors feel the occurrence of accessory or double coronary artery is usually distinguished by the region they arise from the ascending aorta and these add on to the knowledge of abnormalities encountered during coronary angiography and or cardiac surgery.

The occurrence of double RCA anomaly was first reported by Barthe et al. [5]. They observed double RCA originated from a single ostium. Both vessels were present within the right anterior atrioventricular groove. After the origin of a conus artery and a ventricular branch, the most anterior RCA descended toward the acute margin of the heart and terminated in a small posterior descending artery. The second RCA terminated in a small posterior descending and posterolateral branches. Both right coronary arteries were almost identical in size and both gave rise to a Posterior descending artery (PDA). Identification of double RCA has always been a challenge and is not easily made based on conventional coronary angiography as it is difficult to distinguish this variation from that of a high takeoff of a large right ventricular branch. This alternative diagnostic possibility creates uncertainty in making the correct diagnosis of double RCA [6]. Though double RCA is a relatively rare entity, it is not necessarily benign, as it has been associated with atherosclerosis, life-threatening arrhythmia and myocardial infarction [7-9]. However, those patients' coronary arteries were free of atherosclerotic lesions. In the absence of atherosclerotic stenosis, ischemia can be a result of anatomical malformations, including an acute takeoff angle of the anomalous vessel, myocardial squeezing, vasospasm and a smaller artery [10].

In comparison with the previous reported cases, present case has been unique for the following reasons:

- a) High origin of accessory right coronary artery.
- b) Both arteries had identical size of the lumen.
- c) Differed in their course.
- d) Arising from two separate ostia.

Reporting any variation regarding coronary vasculature has always proven beneficial for both diagnostic procedures as well as during surgical intervention.

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