



## Single right coronary artery arising from the right aortic sinus – case report

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### Abstract

Single coronary artery is one of the rare anomalies of the coronary circulation. In this case report there was only one coronary artery arising from the right aortic sinus. The single right coronary artery had normal course and distribution and terminated as the posterior interventricular artery after giving off the circumflex artery which in turn terminated as the anterior interventricular artery.

**Keywords:** Single coronary artery, aortic sinus, coronary ostium, coronary artery anomaly

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Received: July 22, 2016 Accepted: September 12, 2016. Published: September 20, 2016. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

### Introduction

Single coronary artery has been defined in many different ways by different authors depending on various components of the coronary circulation present or absent. Ogden and Goodyer [1] in their survey on patterns of distribution of the single coronary artery described single coronary artery as not the absence of a complete coronary artery, but rather the absence of a portion of one of the coronary arteries at the aortic root. Waller et al [2] described single coronary artery as origin of the entire coronary circulation from a single aortic ostium. Smith [3] defined single coronary artery as one in which the entire myocardium is nourished by an artery, regardless of distribution, that arises by one ostium from an arterial trunk. According to Bianchi [4] as quoted by Smith [3], single coronary artery was first reported by Thebesius in 1716 though Roberts and Loubé [5] stated that it was Hyrtl who first reported it

in 1841 when he described an absent right coronary artery in a seven-month old foetus.

According to the modified Lipton's classification, single coronary artery can be classified based on ostial location, anatomical distribution and course of the transverse trunk [6, 7]. Lipton et al [6] described isolated single coronary artery as a rare anomaly occurring in approximately 0.024% of the population. In this case report we describe one of the rare single right coronary artery anomalies.

### Case report

This single right coronary artery anomaly was encountered during autopsy of a male subject who died in a road traffic accident. The heart was dissected and grossly examined. The single right coronary artery arose from the right aortic sinus (Fig. 3) and took its normal course and terminated as the posterior interventricular artery (Figs.2 and 4). At the crus of the heart it gave off the circumflex artery which coursed through the coronary sulcus to the anterior aspect of the heart and terminated as the anterior interventricular artery (Fig. 1). No coronary ostia were seen in the left anterior and posterior aortic sinuses.

### Discussion

The single right coronary artery we encountered resembles the single coronary artery distribution pattern Type 1 R-1 described by Ogden and Goodyer [1] in which a single right coronary artery continues on the posterior surface as the

circumflex branch and terminates as the anterior interventricular artery. According to the modified Lipton classification by Yamanaka and Hobbs [7], the single right coronary artery being reported here is classified as R-I (RAO). In this anomaly the right coronary artery perfused the entire myocardium. People with this anomaly are at risk of developing atherosclerosis than those without. Symptoms associated with this anomaly include chest pain, dypnoea, palpitations, sycope, exercise-induced arrhythmias, myocardial infarction and sudden death due to myocardial ischaemia [7, 8, 9] hence clinicians should also suspect presence of coronary artery anomaly in patients with such symptoms. Any obstructive lesion in the proximal part of the artery would deprive the heart of nutrient rich blood since the whole heart muscle is supplied by one coronary artery. Introduction of catheters or any other instruments in single coronary artery ostium could cause temporal obstruction and symptoms like dyspnoea, angina and vital changes in physiologic variables like blood pressure [10].



**Figure 1:** Anterior aspect of the heart showing the anterior interventricular and diagonal arteries.

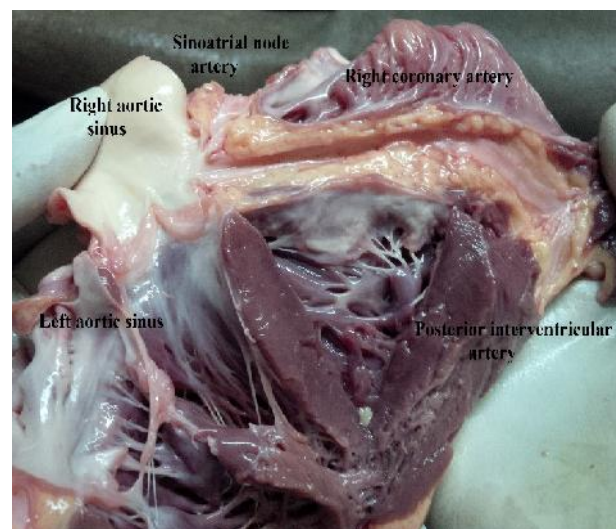
Accurate recognition of coronary artery anomalies is important in order to ensure appropriate management [7]. Knowledge of coronary artery anomalies is not only important to anatomists but also to angiographers and cardiologists performing angiographies and surgery in diagnosis and implementation of interventional measures [11, 12]. Coronary artery anomalies remain undetected in Zambia except during post-mortem due to lack of equipment for accurate diagnosis but with the installation of CT angiography at the University Teaching Hospital Radiology department this will be a thing of the past as they will be detected during diagnostic angiography.



**Figure 2:** Posterior aspect of the heart showing the posterior interventricular artery.



**Figure 3:** Right coronary artery and sinoatrial node artery ostia in the right aortic sinus.



**Figure 4:** Right coronary and sinoatrial node arteries dissected. Right coronary artery terminating into the posterior interventricular arteries.

## Conclusions

The single right coronary artery reported in this case report is compatible with life but can be symptomatic and could become fatal if there is obstruction mainly in the proximal trunk.

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