Anomalous Origin of Right Coronary Artery: An Anatomico-Clinical Perspective of 2 Cases

Divya Mahajan¹, Gaurav Agnihotri², Rahat Brar³

Department of Anatomy, HSJIDS, Panjab University, Sector 25 Chandigarh¹

Department of Anatomy, Government Medical College, Patiala, Punjab, India²

Case report

SUMMARY

The prevalence of anomalous origin of right coronary artery is 0.25%. Though the patients may be asymptomatic the recognition of the condition is important

as they may present with angina pectoris, myocardial infarction or even sudden death. A retrospective analysis of 60 cases of CT coronary angiograms revealed two such rare cases. We have compared the features of these rare variants with the expected

norm and attempted to explain the possible anatomical mechanisms which may lead to the production of clinical signs and symptoms.

Key words: anomalous right coronary artery, coronary angiogram, sudden death

1. INTRODUCTION

Anomalous origin of right coronary artery is a rare congenital anomaly (1). The anomalous right coronary artery originates either from left coronary sinus or from the aortic wall above the coronary sinus (2). Reported first time by White & Edwards in 1948 (3). The incidence of this anomaly as reported in literature is < 1%. (4). Many of these anomalies are clinically benign, however others are associated with serious morbidity (5). A retrospective analysis of 60 cases of CT coronary angiograms revealed two cases of anomalous origin of right coronary artery. We hereby present the origin and course of 2 cases of anomalous right coronary arteries, their comparison with normal anatomy and the possible anatomical mechanism which may lead to the production of clinical signs and symptoms

2. CASE REPORTS

Right coronary artery arises from the anterior/right coronary sinus. The aortic sinuses are dilatations of arterial wall just above the attached base of each aortic cusp. The coronary artery usually arises from the upper part of sinus where the wall

is fibroelastic and dilates up to 16% in systole. The lower part of sinuses is fibrous and almost inextensible. Right coronary artery after originating passes at first anteriorly and then slightly to the right between the right auricular appendage and pulmonary trunk and reaches the coronary sulcus.

In the coronary sulcus, it descends almost vertically to the right cardiac border and then curving around it to the posterior part of sulcus till the crux of the heart. It supplies right atrium & ventricle,

parts of left chambers and interventricular septum.

Case 1.

A 30 year old male presented with exertional angina. The ECG was normal while TMT was positive. Screening CT coronary angiogram revealed **origin of right coronary artery from left coronary sinus**. The artery turned immediately rightwards in a very acute angle and traversed in between pulmonary trunk and aorta before following its normal course. No significant atherosclerotic plaques were seen

Figure 1. CT angiogram origin of right coronary artery from left coronary sinus (case I-upper 3 images) and origin of right coronary artery from ascending aorta (case II-lower 3 images)

Case 2.

A 55 year old asymptomatic female with history of hypertension, family history of coronary artery disease positive. Screening angiogram was done to rule out coronary artery disease. Screening CT coronary angiogram revealed **origin of right coronary artery from ascending aorta**, about 1 cm above the left coronary sinus. The artery traversed in between pulmonary trunk and aorta before following its normal course. No significant atherosclerotic plaques were seen.

3. DISCUSSION

The anomalous right coronary artery is an infrequent coronary anomaly. The prevalence of this anomaly as studied in an autopsy study is 0.026% however studies on coronary angiography showed a higher prevalence of 0.25% (5). The patients with anomalous origin of right coronary artery can be asymptomatic or may present with angina pectoris, myocardial infarction or sudden death (5).

The mechanism of myocardial ischemia is mainly dynamic and not atherosclerotic plaques. The possible causes of obstruction to the flow are (1):

- Ostial obstruction due to slit like coronary orifice,
- Compression of RCA between aorta and pulmonary artery,
- Stretching of the RCA with aor-

tic/pulmonary artery distension.

3.1. Coronary angulation with aortic/pulmonary artery distension

A study of 52 patients with anomalous RCA, by Taylor et al. (7) in 1992 showed asymptomatic sudden deaths in 25% of such cases.

Autopsy studies showed diffuse patchy necrosis and fibrosis of myocardium suggestive of repeated episodes of small infarction (2). The possible cause of sudden death could be sustained ventricular tachyarrhythmia arising from an unstable myocardial substrate (2).

Conventional coronary angiography is the gold standard for diagnosis of coronary stenosis while the CT angiograms has advantages for the diagnosis of coronary anomalies especially by detecting the origin and course of coronary arteries and their relationship to other structures (4). The detection of coronary anomalies have increased with the availability and accuracy of CT angiography.

Conflict of interest: none declared.

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Corresponding Author: Gaurav Agnihotri, MD. S/O Col(Retd) SK Agnihotri, Block D1, Flat 701,, GHS-79, Sandeep Vihar, Sector 20, Panchkula, Haryana, India-134116. E mail id: anatomygaurav@rediffmail.com, ananatomygaurav@yahoo.com, Mobile:919815542792