

Shepherd's Crook and Trifurcation of Right Coronary Artery Detected on 256 Slice Multi Detector Computed Tomography -Coronary Angiography (MDCT-CA): A Rare variant

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Abstract

Shepherd's crook anomaly with trifurcation of right coronary artery is rarely described in the literature. We have described a case of shepherd's crook and trifurcation of Right Coronary Artery (RCA) detected on 256 slice MDCT-CA in a 55 year old patient.

Introduction

With the advent of modern and faster CT scanners, it has become possible to essentially freeze the heart and obtain detailed images of the coronary tree non-invasively. A common indication for MDCT-CA is chest pain with intermediate pre-test probability of coronary artery disease [1]. Many times, various coronary artery anomalies are detected on MDCT-CA. Though many of them are benign, some of them can be cause of chest pain and sudden cardiac death in patients. In a study by Diwan et al. [2], the prevalence of coronary anomalies as detected by conventional angiography in North Indian population was 1% in men and 1.53% in women. Here, we present a rare anomaly of shepherd's crook and trifurcation of Right Coronary Artery (RCA), as detected on 256 slice MDCT-CA.

Case Presentation

A 55 year old non-hypertensive, non-diabetic non-smoker gentleman presented to AIIMS Patna Radio-diagnosis department for MDCT-CA, indication being a single episode of heaviness and chest pain for a single day one month back. The Electrocardiogram, Troponin T test and Echocardiogram (Ejection fraction- 60%) were normal. MDCT-CA coronary angiography was done using Siemens SOMATOM Definition Flash CT scanner and reviewed using Syngo. via software.

The calcium score was nil. The RCA was seen originating from right coronary sinus. The main trunk of RCA continued in right atrio-ventricular groove for 2 cm, following which it made a tortuous upturn followed by a sharp downturn thus forming a half loop, a variant called Shepherd's crook [3] and continued inferiorly for further 1.4 cm on the right ventricular epicardium. Then, it trifurcated into two branches that coursed posteroinferiorly over right ventricle and one branch that coursed anteroinferiorly over right ventricle. The proximal RCA gave off a branch just 6 mm distal to its origin that continued in the right atrioventricular groove upto the base of the heart. There were no plaques or stenosis identified. The Left Main coronary artery was short measuring only 3.2 mm in length. No other anomalies were identified. The heart had left dominant circulation (Figures 1-3).

Discussion

Shepherd's crook anomaly is a sharp tortuous upturn followed by a sharp acute downturn of the artery. The anomaly, though not having adverse cardiac effects, can pose a challenge to invasive cardiologist. An MDCT-CA study by Saglam M, et al. [4] found frequency of

Shepherd's crook RCA to be 3.6%. They found it to occur more frequently in older age group and proposed the cause to be secondary to age related degenerative process. Trifurcation of Left Main Coronary Artery into Left Anterior Descending Artery, Left Circumflex Artery and an intermediate branch called Ramus Intermedius is relatively common, with incidence among cadaveric specimens in Karnataka and Hyderabad region found to be 14.5% [5] However, trifurcation of RCA is a rare anomaly. To our knowledge there has been only a

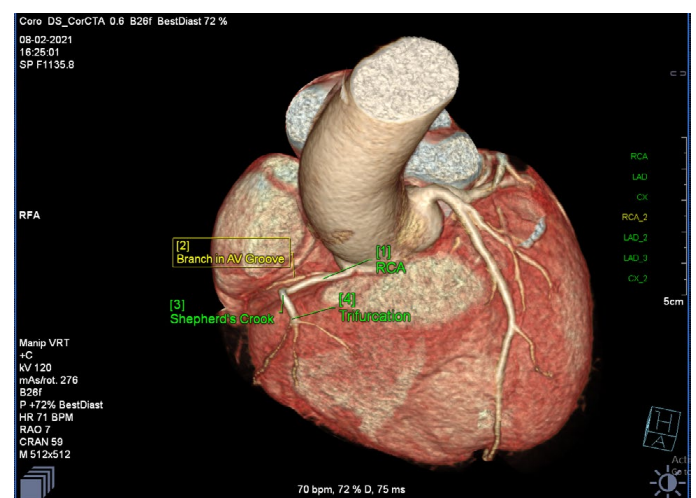


Figure 1: Volume Rendered Technique (VRT) 3D image shows the branch of RCA in atrioventricular groove, the continuation of the RCA over right ventricular epicardium and its eventual trifurcation.

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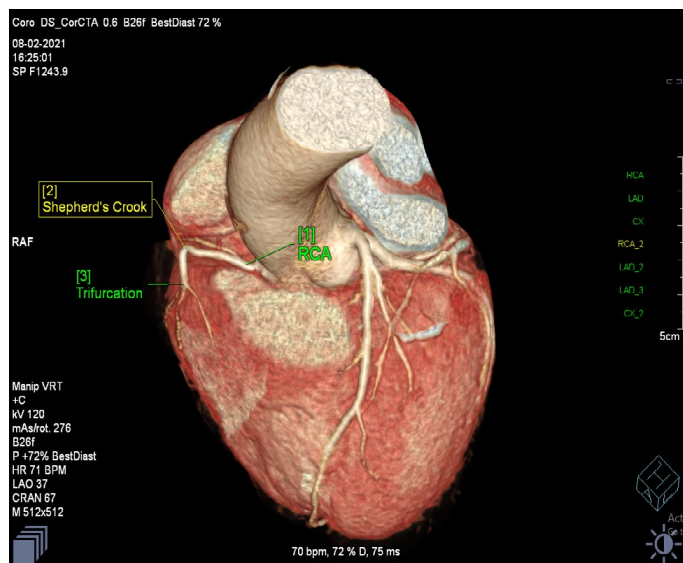


Figure 2: VRT 3D image showing the RCA making a half loop before its trifurcation. This tortuous upturn followed by immediate downturn is termed as Shepherd's crook deformity. It is commonly seen soon after its origin from right coronary sinus.

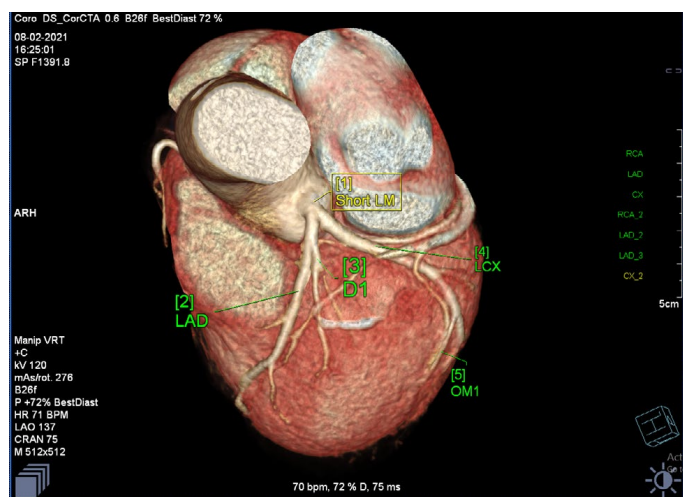


Figure 3: VRT 3D Image shows small Left Main (LM) artery, which bifurcates into Left Anterior Descending Artery (LAD) and Left Circumference ARTERY (LCX). The D1 (first Diagonal Artery) is seen arising from LAD and the first Obtuse Marginal Artery (OM1) is seen arising from LCX.

single case reported in a cadaveric specimen in which there was early trifurcation just after 2 mm from its origin [6]. The site of trifurcation may predispose to coronary artery disease. Besides, the anatomic variant is important while considering percutaneous approach and stent placement. Cardiac function can be expected to be normal as was in our case as the trifurcated branches supply all the regions normally perfused by RCA. It can be expected with increase in use of MDCT-CA, more such anatomic variants can be detected which can alert the invasive cardiologist prior to undertaking percutaneous intervention.

References

1. Gonzalez SP, Sanz J, Garcia MJ (2008) Cardiac CT: Indications and Limitations. J Nucl Med Technol 36: 18-24.
2. Diwan Y, Deepa D, Randhir C, Prakash NC (2017) Coronary artery anomalies in North Indian population : a conventional coronary angiographic study. Natl J Clin Anat 6: 250-257.
3. Villa AD, Sammut E, Nair A, Rajani R, Bonamini R, et al. (2016) Coronary artery anomalies overview: The normal and the abnormal. World J Radiol. 8: 537-55.
4. Saglam M, Ozturk E, Sivrioglu AK, Kafadar C, et al. (2015) Shepherd's crook right coronary artery: a multidetector computed tomography coronary angiography study. Kardiologia Pol Pol Heart J 73: 261-273.
5. Hosalinaver J, Hosalinaver A (2018) A study of incidence of trifurcation of left coronary artery in adult human hearts. Ital J Anat Embryol 123: 51-54.
6. Nayak SB (2018) Trifurcation of right coronary artery and its huge right ventricular branch: can it be hazardous?. Anat Cell Biol 51: 139-141.