

Case Report

Stenosis in single coronary artery originating from right sinus of valsalva: asymptomatic upto sixth decade of life

Kasam Subramanyam*, Guru Kiran Dangeti, Rangaraj R. Ramalingam, Nagraj S. Moorthy

Department of Cardiology, Sri Jayadeva Institute of Cardiovascular Sciences and Research, Bengaluru, Karnataka-560069, India

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*Correspondence:

Dr. Kasam Subramanyam,

E-mail: ksubramanyam70@gmail.com

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ABSTRACT

Among all coronary anomalies, the prevalence of single coronary artery (SCA) originating from right sinus of Valsalva is 1.3%. Here, we report a rare case of a 60-years-old male serendipitously diagnosed with SCA originating from right aortic sinus with pre-pulmonic course of anomalous left coronary artery (LCA). His angiogram revealed 90% stenosis in distal right coronary artery with normal anomalous LCA. Thus, the patient was treated with percutaneous coronary intervention using a stent and was found stable post-procedure.

Keywords: Anomalous left coronary artery, Percutaneous coronary intervention, Single coronary artery

INTRODUCTION

Congenital coronary anomalies were mentioned in ancient literature about two thousand years ago but, recently its clinical significance has been recognised due to advances in diagnostic technologies. The overall prevalence of coronary anomalies accounts for 0.6-1.3% and among all those anomalies, the incidences of single coronary artery (SCA) originating from right sinus of Valsalva accounts for 1.3%.¹ An anomalous artery can follow inter-arterial, sub-pulmonic, pre-pulmonic, retro-aortic or retro-cardiac path.² Usually, the anomalous left coronary artery (LCA) remains asymptomatic, however have higher risk of sudden cardiac death and can lead to severe ischemic events at the younger age (<30 years). The patients who remain asymptomatic may possibly develop atherosclerotic disease at the older age apparently after fourth decade of life.³

Here, we report a case of 60 years-old male who presented with typical chest pain since last two days. He

was accidentally diagnosed with anomalous SCA originating from right aortic sinus. His angiogram revealed presence of long segment lesion with 90% stenosis in distal right coronary artery (RCA), which was treated with percutaneous coronary interventions (PCI) with stenting. The patient tolerated the procedure well and was haemodynamically stable.

CASE REPORT

A 60-years-old male presented with typical chest pain since last two days. There was no significant past and family cardiovascular history. Routine respiratory system examination and laboratory investigations were normal. His ECG showed Q-waves, ST-elevation and inverted T-waves in leads II, III, aVF suggestive of evolved inferior wall myocardial infarction. The 2D-echocardiography stipulated regional wall abnormality in inferior segments. In hospital, he developed two episodes of ventricular tachycardia and was reverted to sinus rhythm with DC cardio-version.

Coronary angiography was performed, which showed a single coronary ostium in right coronary sinus and an anomalous left main branch originating from RCA (Figures 1).



Figure 1: Right anterior oblique view of a conventional coronary angiogram displaying diffuse stenosis noted in the distal right coronary artery and an aberrant left coronary artery originating from the right coronary ostium.

The distal RCA had a long segment lesion with 90% stenosis. The distal RCA was treated with PCI through implantation of drug eluting stent. The cardiac imaging was carried out using 64-slice dual-source cardiac multi-detector computed tomography (MDCT) followed by contrast administration. It confirmed a single ostium in right coronary sinus and absence of a left coronary ostium in left sinus (Figure 2).

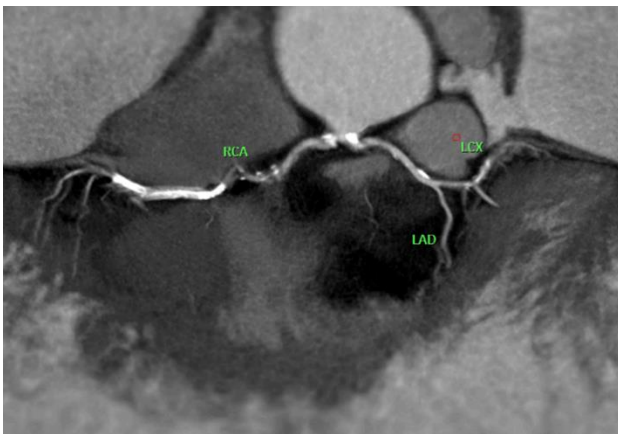


Figure 2: Trans-axial cross-section view: single origin of the coronary artery from the right coronary cusp.

The RCA had a normal origin and there was anomalous origin of the left main coronary artery (LMCA) from right coronary sinus, passing anterior to the pulmonary outflow tract in the distribution of the conus branch (Figures 3A and 3B). This anomalous LMCA was further divided into left anterior descending artery (LAD) and left circumflex artery (LCX) (Figure 4). The anomalous

vessel had a non-flow limiting calcification in its distal portion. LAD was found as a type III vessel and was normal. LCX was also normal and OM1 was a 2mm vessel. The mid to distal RCA showed patent vessel with normal flow. Patient tolerated the procedure well and was haemodynamically stable.

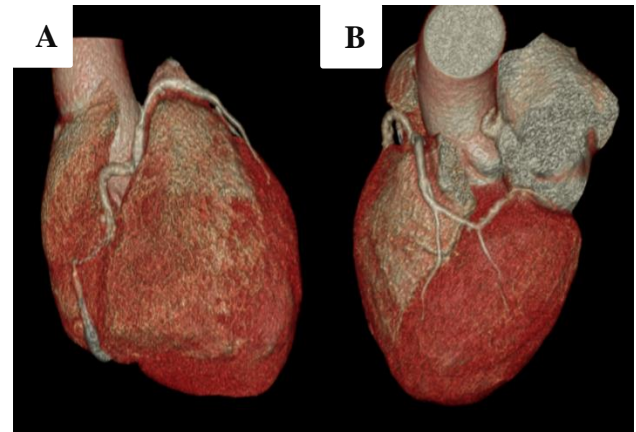


Figure 3: Three-dimensional re-construction of the heart showing a pre-pulmonic course of the anomalous left coronary artery: (A) right anterior oblique view and (B) right anterior view.

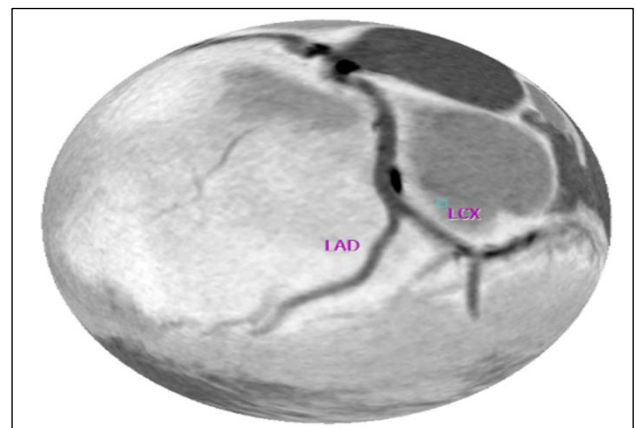


Figure 4: Trans-axial cross-section view showing pre-pulmonic course of anomalous left main coronary artery and the course of left anterior descending and left circumflex artery.

DISCUSSION

Congenital coronary artery anomalies are the deviants in the normal coronary anatomy that usually transpire in less than 1% of general population. Such aberrations are usually discovered fortuitously during coronary angiography or autopsy.⁴ A SCA is the one which arises from the single sinus of Valsalva and supplies the entire myocardium of the heart. The prevalence of SCA, a rare anomaly, originating from single sinus of Valsalva is 0.24-0.66%.⁵ The patient in the present case was coincidentally diagnosed with SCA arising from the right sinus of Valsalva.

Lipton MJ and colleagues were the first to classify the occurrence of SCA based on origin and anatomical distribution of the branches which was modified by Yamanaka O et al, which included 'right' or 'left' (R or L) location of coronary ostium, three groups (I, II and III) and five anatomical subtypes (A, B, C, P and S) based on the relationship of the anomalous coronary artery with the aorta and pulmonary artery, i.e., anterior, between, septal, posterior or combined.⁵⁻⁷ The present case exemplifies Lipton's type R-II-A anomaly in which LMCA arises from right sinus of Valsalva and courses anterior to the pulmonary trunk i.e. follows pre-pulmonic course.

The SCA can be manifested with dyspnoea, palpitation, angina pectoris, dizziness or syncope, typically in older patients usually above 30 years. Anomalous coronary arteries may develop atherosclerosis at later stages of life as normal arteries. It has been stated in the literature that such symptoms may develop due to the impaired coronary blood flow and also may be secondary to the anatomic and functional abnormality of the origin.^{3,8} However, in the current case, the patient develops chest pain due to stenosis in normal coronary artery i.e. RCA as the anomalous LCA is without any significant stenosis even at the sixth decade of life.

Coronary angiography was considered as a gold standard for the diagnosis of coronary anomalies. But, nowadays with the development of various advanced imaging modalities such as MDCT, electron-beam computed tomography and magnetic resonance imaging, the discernment of anatomical courses and origin of abnormal coronary arteries have become more accurate and meticulous for cardiologists. Various studies have stated that non-invasive MDCT is superior to invasive coronary angiography in defining ostial origin and proximal course of anomalous artery.^{4,9}

Apparently, surgical repair has remained as the preferred treatment for anomalous LCA, however currently PCI has been widely used and considered as technically and clinically feasible method in older adults (>30 years).⁸ The patient in the present case was also treated with PCI by implanting a stent in the distal RCA which revealed 90% stenosis. The patient tolerated the procedure well and is doing well after the procedure.

CONCLUSION

The present case is an odd case of anomalous SCA originating from right sinus of Valsalva, discovered at the age of sixty years, with non-significant and non-flow limiting calcification in anomalous LCA. Repeated follow-up is recommended to evade the chances of severe complications in future. The non-invasive MDCT should be employed in the diagnosis of coronary anomalies along with coronary angiography for thorough appraisal of origin and course of abnormal arteries.

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