

Case study

Malignant course of Right Coronary Artery

Abstract

Anomalous origin of a coronary artery is uncommon but potentially clinically significant. Manifestations vary from asymptomatic patients to those who present with angina pectoris, myocardial infarction, syncope, arrhythmias, and sudden death. We describe an anomalous origin of the RCA with malignant course between aorta and pulmonary artery which is a very rare anomaly. Angiography is invasive, have a relatively low cannulation success rate. Therefore, CT coronary angiography is the best method for imaging. Sudden death without symptoms occurs frequently in patients with anomalous RCAs, so surgical repair is recommended.

Introduction-

Anomalous aortic origin of a coronary artery is uncommon but potentially clinically significant. Manifestations vary from asymptomatic patients to those who present with angina pectoris, myocardial infarction, heart failure, syncope, arrhythmias, and sudden death even in absence of atherosclerosis. In the present case we describe an anomalous origin of the right coronary artery (RCA) from the left sinus of Valsalva with malignant course of

RCA between aorta and pulmonary artery which is a very rare anomaly, and its incidence is 0.019% to 0.49% on coronary angiography.¹⁻³

Case Report-

A 65-year-old male patient presented to emergency room with history of syncope and sweating from last 2 days, pulse rate being 54 minute and blood pressure being 118/76 mm of hg, on examination first and second heart sounds were normal without any murmur. Electrocardiogram was done that showed sinus rhythm with early repolarization changes. Echocardiography was suggestive of no regional wall motion abnormality with normal ejection fraction. Troponin T was negative, Stress test was done which was inconclusive at 6.4 Mets by modified Bruce protocol, patient did not develop any syncope during the test but developed breathlessness significant which made him to stop the test. He was then subjected a coronary angiography which showed normal coronaries but anomalous origin of Right coronary artery (RCA) from left sinus of Valsalva and a malignant course between aorta and pulmonary artery and rest of the findings being normal (fig .1.1 and 1.2). After this CT coronary angiograph was done which confirmed the diagnosis of malignant course of RCA (fig.2). Patient was then sent for corrective surgery.

Discussion-

The incidence of coronary artery anomalies is approximately 1% among patients undergoing cardiac catheterization,⁽¹⁻³⁾ 0.29% among autopsy specimens,⁽⁴⁾ and less than 0.1% among prospective echocardiography screenings.⁽⁵⁾ Most anomalies are incidentally detected and do not create clinical problems.⁽¹⁻⁴⁾ Anomalous origin of the right or left coronary artery from the contralateral sinus of valsalva which is described above is uncommon and mostly asymptomatic but many patients, particularly young ones, present with sudden death or myocardial ischemia with or without symptoms. These anomalies are rare, and many cardiologists and radiologists are unfamiliar with them. However, **despite of being rare** 19-33% of sudden cardiac deaths in the young population are attributable to coronary artery anomalies.⁽⁶⁾ hence lies the importance of indentifying them.

The Pathophysiology of the restricted coronary blood flow seen in this anomaly is suggested to be the acute takeoff angle, slit-like orifice, and compression of the intramural segment by the aortic valve commissure are all thought to narrow the orifice, lateral luminal compression of the intramural portion of the coronary artery and compression of the coronary artery between the aorta and the pulmonary artery⁽⁷⁻⁹⁾. However, there is still controversy concerning the mechanism by which the interarterial course is compressed between the aorta and the pulmonary artery. An intravascular ultrasound (IVUS) study⁽¹⁰⁾ found that luminal compression of the coronary artery was

totally attributable to the aorta because the pressure of the pulmonary artery was much lower than that of the aorta. The methods used to evaluate anomalous RCAs include echocardiography, angiography, Multidetector computed tomography (MDCT) scan, and Magnetic resonance imaging (MRI). Non-invasive tools such as MDCT⁽¹¹⁻¹⁴⁾ and MRI⁽¹⁵⁾ can provide precise information about the complex anatomy of coronary artery anomalies, though MDCT is preferred due to its higher spatial resolution and rapid exam time. Additionally, MDCT can provide numerous multiplanar image reconstructions to permit precise evaluation of the takeoff portion and course of the anomalous coronary artery. Evaluation is difficult in angiography because the complex three-dimensional structure of the anomalous coronary artery is displayed in a two-dimensional plane, and selective cannulation of the anomalous coronary artery is made difficult by the small, slit-like orifice. The success rate of selective cannulation is 55-61%. MDCT provides excellent information concerning orifice location and the course of the anomalous coronary artery, so MDCT should be performed prior to angiography or IVUS. The size and shape of the slit-like orifice differ according to image projection, so multiplanar image reconstruction is necessary in precise evaluation. Angiography is invasive, have a relatively low cannulation success rate, and are limited with respect to multiplanar image reconstruction. Therefore, MDCT is the best method for imaging coronary artery anomalies despite its radiation. Surgical treatment methods are variable. The unroofing procedure^(16,17) manipulates the orifice,

enlarges the orifice, and makes an acute angulation, which decreases the lateral compression of the intramural segment. Sudden death without symptoms occurs frequently in patients with anomalous Left coronary arteries, so surgical repair is recommended.⁽¹⁸⁾ However, sudden death is extremely rare in asymptomatic patient with anomalous RCAs, and there is no sudden death in children under 10 years of age or adults over 30 years of age.

Conclusion

On the basis of above case and earlier reported cases it is advisable to be vigilant in symptomatic patient for malignant anomalous RCA. This case report also emphasizes the role of non-invasive CT Coronary angiography in accurate detection of anomalous coronaries and their malignant course.

References-

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Fig. 1.1 and Fig. 1.2 - Coronary angiography - showing anomalous origin of RCA from left sinus of Valsalva.

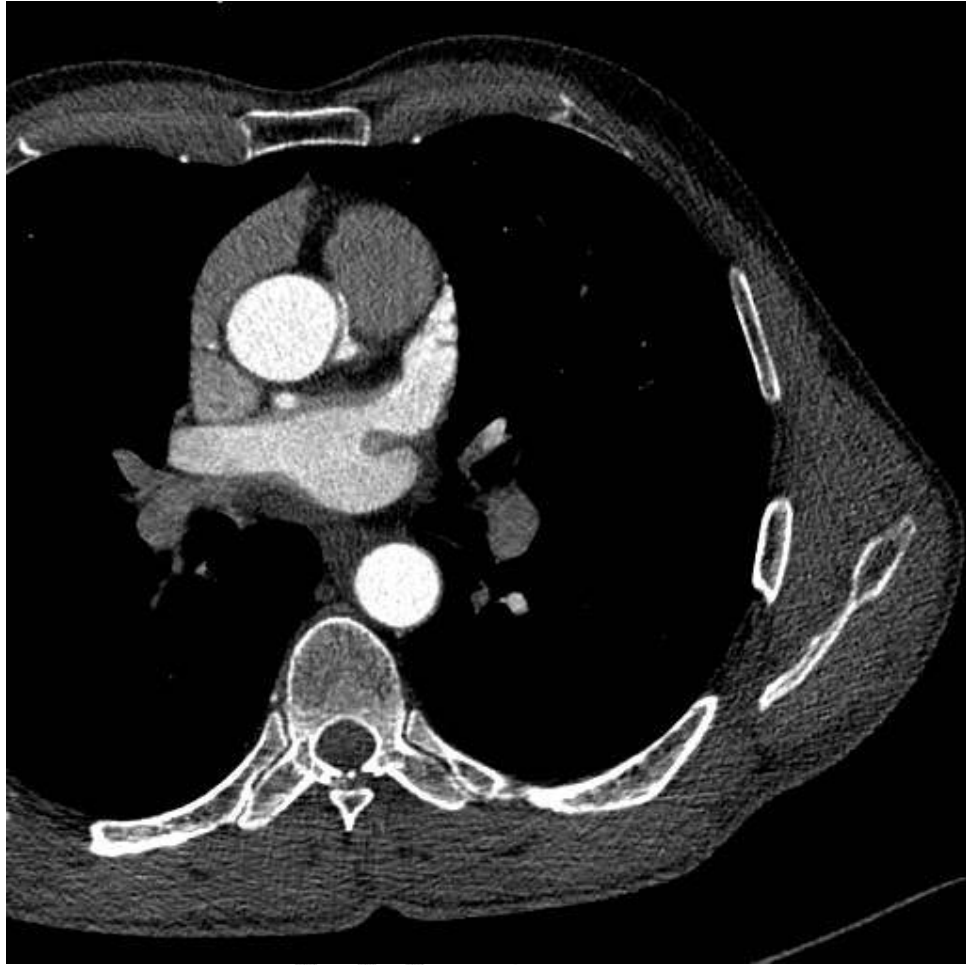


Fig. 2 CT coronary angiography showing malignant course of RCA between aorta and pulmonary artery.