Anomalous Origin of Right Coronary Artery from Left Coronary Sinus (AORL)

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A 36 y old patient presented with marked dyspnea and angina on effort for 1 month. The exercise threshold for onset of symptoms was variable with occurrence of multiple episodes of angina after mild exertion. There was no history of hypertension, diabetes, smoking or tobacco abuse. His fasting lipid profile was normal. Family history was significant for history of coronary artery bypass surgery in his father at the age of 68 years. Clinical examination revealed no abnormal findings. Twelve lead ECG and 2D echocardiogram were normal.

Exercise stress test revealed marked (1.5 mm) ST segment depression in V4-V6 in stage I of Bruce protocol and it was associated with chest pain requiring termination of test. Conventional catheter coronary angiography revealed normal left system, however the right coronary artery (RCA) ostium could not be engaged despite use of multiple catheters. A CT coronary angiogram revealed presence of anomalous origin of RCA from the left coronary sinus (AORL) (Figure 1). The artery followed an inter-arterial course traversing between the ascending aorta and the pulmonary trunk (Figure 2). The RCA came off an acute angle from the aorta and its origin was high i.e. well above the level of pulmonary valve with a “slit-like” opening (Figure 3). He underwent coronary bypass surgery with right internal mammary graft to RCA with proximal ligation of the grafted vessel.

The prevalence of coronary artery anomalies at conventional coronary angiography is approximately 1%. However, a higher incidence of coronary artery anomalies is observed in young victims of sudden death (4%-15%) when compared with adults (1%). Recent reports state an anomalous origin of the right coronary artery (RCA) from the left coronary sinus (AORL), with an inter-arterial course as the most common coronary anomaly.² AORL with an inter-arterial course between the aorta and the pulmonary trunk may be associated with myocardial ischemia and may be the cause of myocardial infarction (MI), sudden cardiac death, arrhythmia, and syncope.³,⁴ Acute takeoff from the aorta, “slit-like” compromised opening and compression of the proximal part of the artery between aorta and the pulmonary artery results in myocardial ischemia. Distension of great vessels during exercise results in further compression and aggravation of ischemia. Amongst all anatomic variables, high origin of the RCA correlates with ischemic complications.⁵ The only clinical variable that seems to consistently correlate with risk of sudden death is age <30 years. While the risk decreases with age, the exact reason is unclear.

Angelini has suggested that this may be due to the stiffening of the aortic wall with age, which might help protect against compression of the Intramural course.¹ The risk of SCD under the age of 10 is also low.

There is no uniform consensus in terms of management of these patients. Surgical therapy is a generally accepted modality in symptomatic patients. Asymptomatic patients are treated with beta blockers and are prohibited from participating in competitive sports.⁶

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References

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