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Abnormal Origin of the Right Coronary Artery from the Left Anterior Descending Artery

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Coronary artery anomalies occur rarely, but can have important consequences. For that reason, it is of great value to identify these abnormalities and determine the most appropriate treatment. Among these anomalies, anomalous origin of the right coronary artery (RCA) as a branch from the left anterior descending artery (LAD) is a very rare coronary abnormality. In this case, we report a patient with anomalous RCA from LAD along with non-ST elevation myocardial infarction

Key Words: Coronary Artery Anomaly, Myocardial Infarction

Sol Ön İnen Arterden Çıkan Anormal Orijinli Sağ Koroner Arter

Koroner arter anomalileri seyrek görülmekle birlikte önemli sonuçlara neden olabilmektedir. Bu yüzden bu anomalileri açığa kavuşturmak ve uygun tedaviyi vermek çok önem arz etmektedir. Koroner anomaliler arasında ise sol ön inen arterden köken alan anormal orijinli sağ koroner arter anomalisine daha nadir rastlanmaktadır. Bu vakamızda non-ST elevasyonlu miyokard enfarktüsü ile başvuran bir hastada sol ön inen arterden çıkan anormal sağ koroner arter anomalisine sahip bir hastayı sunduk.

Anahtar Kelimeler: Koroner Arter Anomalisi, Miyokard Enfarktüsü

Introduction

Congenital coronary artery anomalies are encountered incidentally during cardiac catheterization. Most of these anomalies have been regarded as benign entities, but some kinds of congenital coronary anomalies, especially in the event of atherosclerosis, can lead to myocardial ischemia. We report a patient diagnosed with acute coronary syndrome in whom the right coronary artery arised from the left anterior descending artery.

Case

A 50 -year-old female with hypertension and diabetes mellitus was admitted to hospital because of a 6-hour history of resting chest pain. The pain was substernal and squeezing. Physical examination was normal except a pansystolic murmur, grade 2 of 6, at the apex. The electrocardiogram showed sinus rhythm with diffuse T-wave inversion in leads D1-aVL-V₂-V₅. Laboratory tests were performed. The levels of the creatine kinase MB isoenzyme and troponin I were 80 U/l and 2.8 ng/ml, respectively (normal ranges are 0-24 U/l and 0.0-0.02

ng/ml, respectively). A transthoracic doppler echocardiographic examination showed mild-to-moderate mitral regurgitation, anterior, lateral and inferior hypokinesis, moderately low ejection fraction. Diagnosis of non-ST elevation myocardial infarction was made and medical treatment was begun.

Diagnostic coronary angiography was performed after 48 hours. Selective catheterization of the left coronary artery revealed occlusive coronary artery disease. Attempted cannulation of the right coronary artery was difficult. An injection into the right sinus of Valsalva in a left anterior oblique projection revealed the absence of a right coronary ostium (Figure 1).

The left coronary ostium was located normally in the left sinus of Valsalva. The anomalous right coronary artery originating from the first septal branch was demonstrated (Figures 2 and 3).

Angiographically there were atherosclerotic lesions in the LAD, circumflex, proximal and midportion of the anomalous right coronary artery (Figure 3).

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Figure 1. Aortography in the left anterior oblique view demonstrating absence of right coronary ostium in the right sinus of Valsalva

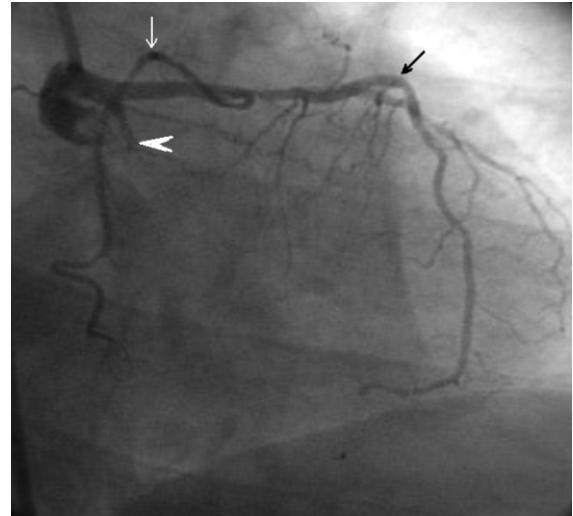


Figure 2. Right anterior oblique view of coronary angiography demonstrates right coronary artery originating from left anterior descending coronary artery (*dark arrow* shows the LAD, *white arrow* shows the anomalous right coronary artery, *white arrowhead* shows the Cx)

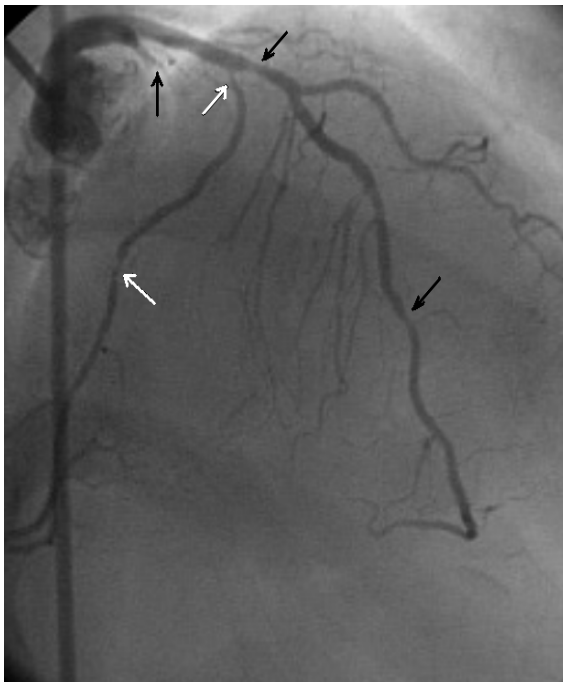


Figure 3. Right anterior oblique-cranial view of coronary angiography demonstrates atherosclerotic lesions in the LAD and Cx (*dark arrows*). Note that there is also atherosclerotic process in the anomalous right coronary artery (*white arrows*.)

Discussion

Anomalous origin of the right coronary artery is a rare congenital anomaly that was first reported in 1948 by White and Edwards¹ The prevalence of this anomaly from autopsy studies is 0.026%² It was noted a prevalence of 0.25% by Kaku and colleagues who studied 17731 patients undergoing coronary angiography between 1948 and 1994³ In the largest angiographic study by Yamanaka and Hobbs who studied 126595 patients over a 28 –year period, the incidence was reported to be 1.3%. In their review, most anomalies were benign, did not result in signs or symptoms and found incidentally at coronary angiography.⁴

Garg et al. examined the presence of atherosclerosis in anomalous coronary arteries.⁵ They found that it is not associated with an increased risk for coronary artery atherosclerosis, but it is well established that it can lead to angina pectoris, myocardial infarction and sudden cardiac death, which usually occur during or immediately after exercise even in the absence of atherosclerosis.⁶ The pathophysiologic basis for this association remains unclear but mechanical compression of the right coronary artery by the great vessels, acute angle take-off and kinking of the RCA as it originates from the LAD are the usual explanations.⁷

The choice of treatment for this coronary anomaly is controversial with some advocating revascularization in all cases. Suggested treatments include translocation of

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the right coronary artery to the aorta,⁸ ostioplasty⁹ (excision of the common wall between the right coronary artery and the aorta), bypass grafting of the anomalous right coronary artery with optional ligation of the native artery proximal to the graft anastomosis to prevent competition.¹⁰ However, the long term benefits of such therapies have not yet been showed.

In our case, possible mechanism responsible for myocardial infarction was due to coronary atherosclerosis, which was caused by unregulated hypertension and diabetes mellitus rather than coronary anomaly. It was deemed that this coronary anomaly was an innocent by-stander. We suggest surgical revascularization for the patient as there were multiple atherosclerotic lesions, but the patient refused any intervention.

Conclusion

We reported a rare variety of single coronary artery, RCA arising from LAD. In this case report we believe that recognition of coronary anomalies, especially in the event of atherosclerosis is important in these group of patients as the surgical treatment, if possible, will be curative.

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