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A Rare Case: Type IV Dual LAD Anomaly with LAD-Pulmonary Artery- D1 Fistulas

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Abstract: Type IV dual left anterior descending (LAD) coronary artery with pulmonary artery -D1 fistulization is a very rare anomaly. The article discusses this rare anomaly with a patient's coronary angiogram findings. It was detected on CT Angiogram during research for additional anomalies after seeing dual LAD arterial segments with pulmonary artery fistula at the conventional angiography.

Keywords: Conventional angiography, Coronary anomaly, Coronary arteriovenous fistula, CT Angiogram, Type IV dual LAD anomaly.

INTRODUCTION

Dual left anterior descending coronary artery (LAD) is a rare congenital anomaly with four subtypes. The incidence of dual LAD of individuals in otherwise normal hearts is about 1% [1]. Coronary arteriovenous fistula (CAVF) is another rare anomaly which consists of abnormal relation between coronary artery and one of the cardiac chambers or vessels. Coronary arteriovenous fistulas (CAVFs) are present in 0.002% of the general population and are detected in nearly 0.25% of patients undergoing conventional angiography [2]. The majority of fistulas originate from the LAD and drain into the pulmanory artery. In this article we aimed to present a rare case of type IV dual LAD anomaly with pulmonary artery- D1 fistulization with CT angiography findings.

CASE REPORT

A 56 - year - old man admitted to our cardiology policlinic with history of 35 years smoking one pack of cigarettes per day and having exertional dyspnea complaints in the last week was hospitalized for further examination and treatment . According to the test results of the patient whom mitral valve prolapse and 1st degree AV block pathology detected; diagnosed with Unstable angina pectoris . At the conventional angiography; the RCA was originating from the right sinus of valsalva and dual LAD arterial segments showing pulmonary artery fistula formation was seen; for demonstration of the findings and researching additional anomalies ; Coronary CT angiography examination was requested.

Coronary CT angiography examination was performed with 64 -MDCT scanner (the brand is CT inverter toshiba) by a ECG-gating method. The sections was performed while patient holding breath; craniocaudally, 0.5 mm section thickness with using second gantry rotation speed of 0.35 and flow rate of 120 kVp, 750 mA. Nonionic contrast agent in bolus (5ml/sec) was used (iohexol: omniupaque). After injection of contrast agent; saline solution of 50ml was rapidly given with 5ml /s velocity. CT angiogram images was evaluated after being reconstructed.

At the CT angiography: Total calcium score was 0 and it was consistent with the terms of the minimal risk of coronary artery disease. LMCA: normal / LCX non-dominant and patent (figure 1). The RCA originating from the right sinus of valsalva was dominant and patent.

There was a second LAD with RCA origin; feeding LAD watershed and ending close to the apex (Fig. 2:a,b). Second LAD was situated in the anterior of the right ventricula associating with many fistulas to conus of the pulmonary artery (Fig. 3).

Native LAD was situated in the left interventricular groove reaching to the apex and the second LAD was fistulized at the same time with D1 branch. Distal Second LAD was tortuous and presented aneurysmal dilatation (Fig. 4:a,b). Left ventricular wall thickness and movements were normal. İn the functional examination: Ejection fraction was: 70%, End diastolic volume: 172ml, End systolic volume: 52ml, Stroke volume: 120ml and cardiac output was 74 liters / min. The patient was dischaged with medical

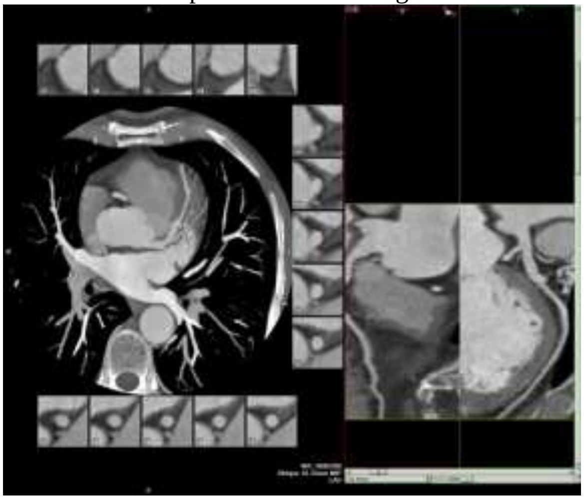

Fig. 1: Axial MIP imagede Sol sinus valsalva orjinli LMCA ve Native LAD izlenmekte

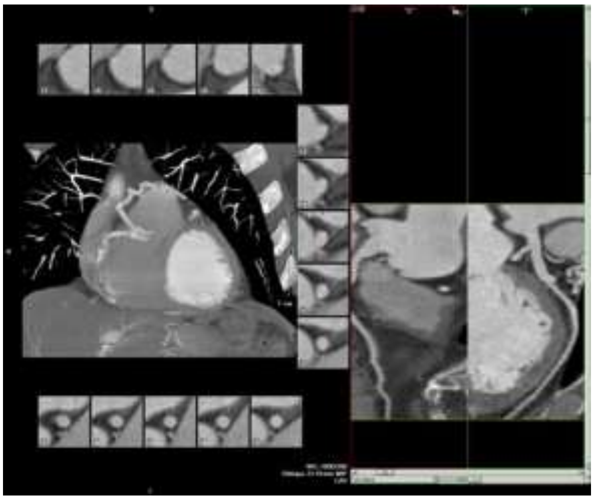

Fig. 2:a) Coronal MIP imagelarda sag sinus valsalva orjinli RCA ve ikinci LAD izlenmekte

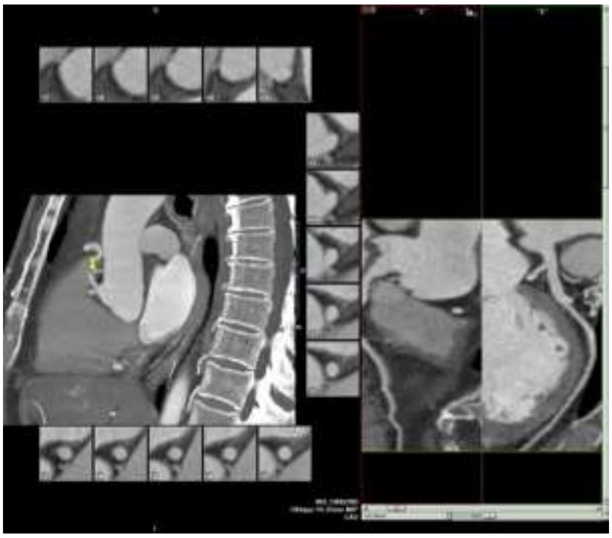

Fig. 2: b) Sagittal MIP image da sag sinus valsalva orginli ikinci LAD (ok isareti)

treatment and follow-up were taken.

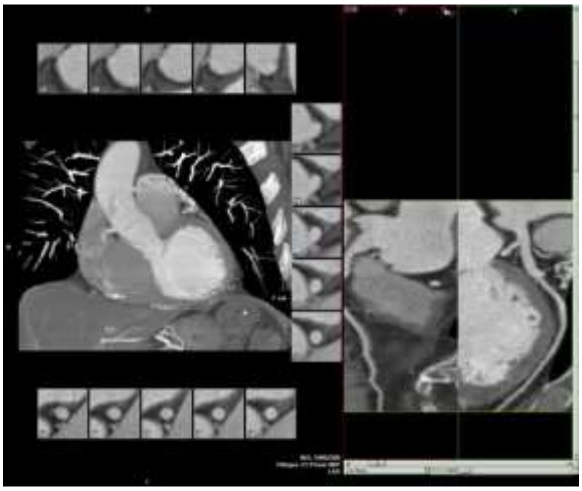

Fig. 3: Coronal MIP imagelarda pulmoner konus anteriorunda pulmoner arter ile iliskili fistuller izlenmekte

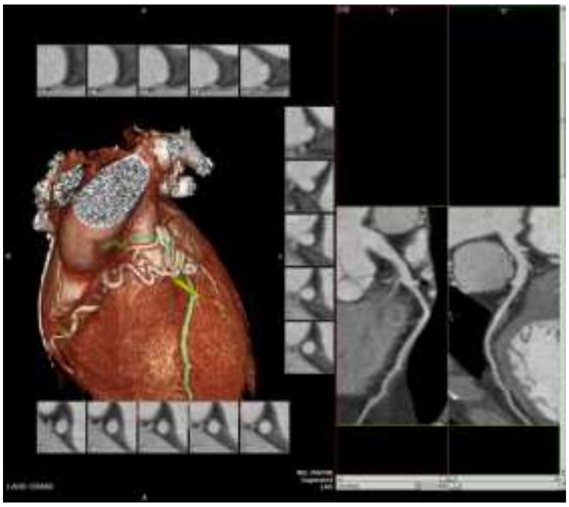

Fig. 4: a) Dilate ve tortuoze ikinci LAD –D1 fistulleri (ok isareti)

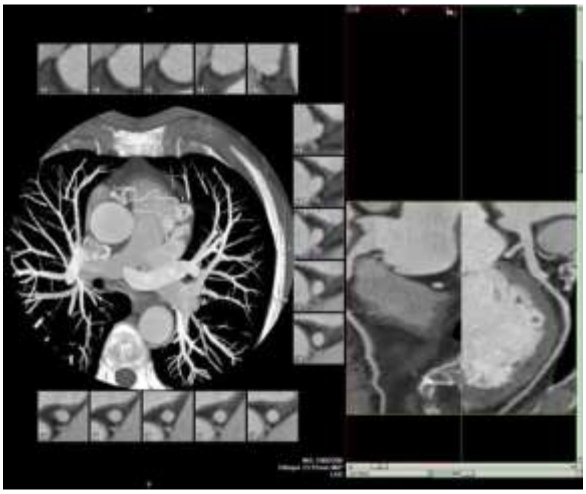

Fig. 4: b) Axial MIP imagelarda ikinci LAD-D1 fistulleri Ve ikinci LAD nin distalde dilate ve tortuoze gorunumu

DISCUSSION

In recent years, CT angiography for visualization of coronary artery anomalies plays an important role. There is an advantage of CT angiography especially detecting the undetectable additional findings in conventional angiography accompanying coronary artery anomalies. Coronary artery anomalia is seen %0.60 = 1.55 in the patients who underwent coronary angiography [3].

The most common species of the anomalies are the origin anomalies of the coronary arteries [4]. LAD anomalies are more common than RCA anomalies [5].

Dual LAD anomalies are very rare. Spindol-Franco and friends has classified Dual LAD anomaly as :

In types 1 and 2, a long LAD artery originates as a branch from the proper LAD artery, follows a course parallel to the short LAD artery in its proximal course on either the left (type 1) or the right (type 2) ventricle, and reenters the end of anterior interventricular groove. Type 3 dual LAD arteries are extremely rare and were detected in only 1 of the 23 cases of dual LAD arteries in an angiographic series described by Spindola-Franco *et al*. [1].

We have reported type 4 dual coronary artery anomalies presented with many fistulas in our patient. The coronary artery fistulas was defined in 1865 by Krause for the first time. Coronary artery fistulas are observed between coronary arteries and the cardiac chambers or blood vessels and is rarely seen (0.1 to 1 %). These fistulas are occured as a result of dilatation in capillary network or incomplete separation of the pulmonary artery from main coronary arteries during cardiac emriyogenesis [6]. The incidence of fistula in the right main coronary artery fistula is a little more often. Fistulas originating from both coronary arteries are detected in only 5% of all fistulas [7-9].

Angina pectoris in dual coronary artery fistula occurs secondary to pathologies such as; coronary artery atherosclerosis causing stenosis, aortic stenosis or obstructive hypertrophic cardiomyopathy. Indication for surgery should be considered only in conditions such as myocardial ischemia in coronary artery fistula, large left- to- right shunt, or the patient has congestive heart failure [10]. In Operations only for fistula treatment without cardiopulmonary bypass mortality and morbidity rate is lower [11].

Because our patient's cardiac functions were in normal limits and there were not any findings consistent with myocardial ischemia, he was discharged with medical treatment by the department of cardiology.

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