DUAL LAD CORONARY ARTERY - A RARE CONGENITAL ANOMALY

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ABSTRACT

Coronary anomalies are one of the most common cardiovascular causes of sudden death in young patients[3], although the dual LAD remains a benign one. Dual LAD involves two distinct segments of LAD artery - Short and Long - that occupies the anterior interventricular septum. Until now, ten different variants of dual LAD system have been reported in different studies.

Keyword: Left Anterior Descending, Computed tomography angiography, Non ST elevation myocardial infarction.

INTRODUCTION

Dual Left Anterior Descending (LAD) coronary artery is a rare congenital anomaly. The reported incidence of dual LAD is approximately 0.64-1.3% in various coronary angiographic studies[1,2]. Coronary anomalies are one of the most common cardiovascular causes of sudden death in young patients[3], although the dual LAD remains a benign one.

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We are reporting type-1 dual LAD system. In this, the main LAD originates from the left main coronary artery which then bifurcates into short and long LAD. Short LAD runs in the anterior interventricular groove, giving rise to septal perforator and ends in the proximal anterior interventricular groove. The long LAD also runs in the anterior interventricular groove, descends on the left ventricular side of it, giving rise to LV diagonals, and then reenters the distal anterior interventricular groove down till apex.

CASE REPORT

Fifty five years old, male, hypertensive patient presented in the emergency department with typical chest pain. Electrocardiograph showed t-wave inversion in anterior chest leads. Trop-T was positive. He was diagnosed as having Non ST elevation myocardial infarction. Transthoracic echocardiography showed fair left ventricular systolic function. No wall motion abnormality was noticed. He underwent coronary angiography that revealed dual LAD system (fig-1 & 2) with critical lesion in LAD and left circumflex coronary artery. Patient was planned for CABG surgery. Conventional CABG was done; LIMA was anastomosed to long LAD, saphenous vein graft to short LAD and obtuse marginal artery. Patient made an uneventful recovery and was discharged on 6th post-operative day.

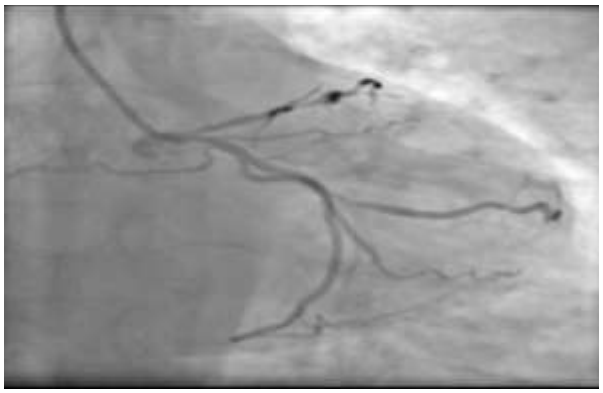

Figure-1: Dual LAD 1.

DISCUSSION

Malformation during the formation of cardiac sinusoids, coronary budding on aortopulmonary trunk and connection between the two systems may lead to development of coronary artery anomalies[4]. Coronary artery anomalies, predominantly in the male population, are uncommon findings during

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coronary angiography with incidence rate of 0.64 to 1.3%[1,2]. Often it causes no signs and symptoms, but can lead to sudden cardiac death. According to the Sudden Death Committee of the American Heart Association, coronary anomalies are responsible for 19% of death in athletes[5]. Coronary CT angiography remains the primary imaging modality for evaluation of coronary artery anomalies in recent years. The course of LAD is almost constant amongst all other major coronary arteries[6]. It courses in the anterior interventricular groove down towards the apex and gives off septal perforators to the interventricular septum and diagonal branches to the anterior wall of the left ventricle. Dual LAD was first described and classified by Spindola-Franco et al in 1983[7]. Four subtypes of dual LAD system were reported. In type 1-3, both short and long LAD originates from the left main coronary artery. Short LAD travels along the proximal part of the anterior interventricular groove but stops well short of the apex (short LAD), long LAD artery joins the anterior interventricular groove distally and reaches the apex after originating elsewhere (long LAD) as shown in fig-3. In type 4 dual LAD, short LAD is formed by the LAD proper, whereas the long LAD originated from the right coronary artery that later enters into the anterior interventricular groove. Type 3 dual LAD system was the least common that was reported by Spindola-Franco et al, with only one of twenty three cases described[7]. In the dual LAD system, short LAD give rise to septal perforators and the diagonals originates from the LAD proper or long LAD.

In our case, the left main coronary artery originates from the left coronary sinus which divides into left anterior descending artery and left circumflex artery. LAD proper then bifurcates into short and long LAD. Short LAD gave septal perforator branches and terminated higher up in the anterior interventricular groove, whiles the long LAD gives diagonal branches and enters late in the anterior interventricular groove. The long LAD was epicardial and towards the left ventricular side. These fndings were consistent with type 1 of dual LAD system that was described by Spindola-Franco's classification.

One of the positive attribute suggested of dual LAD system is that in case of significant atherosclerotic disease the binary distribution may limit the extent of ischemic insult to the myocardium[8].

It is extremely important for a surgeon to know the exact coronary anatomy especially when considering anomalous origin and course of anomalous LAD and the variants of dual LAD system before proceeding with any intervention. Lack of this knowledge may lead to incomplete revascularization of the anterolateral wall or the interventricular septum. The presence of short LAD can be mistaken for total mid-LAD occlusion. In case if both the LADs are critically diseased, graft to both vessels is important to revascularize anterolateral wall, interventricular septum and apex.

Figure-2: Dual LAD 2.

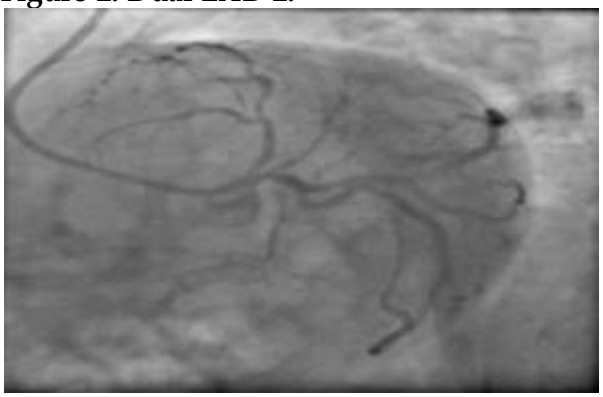

Figure-3: Dual LAD 3.

CONFLICT OF INTEREST

This study has no conflict of interest to be declare by any author.

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