Dual left anterior descending coronary artery: a rare coronary anomaly

Çift sol ön inen koroner arter: Nadir bir koroner anomali

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Dual left anterior descending artery (LAD) originating from the left and right coronary arteries is an extremely rare congenital coronary artery anomaly. A 65-year-old male patient was admitted with inferior acute myocardial infarction. Coronary angiography showed normal left main coronary artery, a short LAD artery terminating proximally after bifurcating a few diagonal branches, and total occlusion of the proximal left circumflex artery. Selective right coronary angiography showed a vessel arising just after the origin of the right coronary artery, travelling to the left side. Primary angioplasty and stent implantation were successfully performed. The origin and course of the anomaly was also documented by 16-slice multidetector spiral computed tomography, which confirmed angiographic findings.

Key words: Coronary angiography; coronary vessel anomalies/radiography; tomography, spiral computed.

Sol ve sağ koroner arterlerden kaynaklanan çift çıkışlı sol ön inen (LAD) koroner arter son derece nadir bir doğuştan koroner anomalidir. İnferior akut miyokard infarktüsü geçiren 65 yaşında bir erkek hastaya yapılan koroner anjiyografide normal sol ana koroner arter, birkaç diyagonal dala ayrıldıktan sonra proksimalde sonlanan kısa bir LAD arter ve sol sirkumfleks arter proksimalinde tam tıkanma saptandı. Selektif sağ koroner anjiyografide sağ koroner arter başlangıcından hemen sonra çıkan ve sol tarafa yönelen ikinci bir damar gözlendi. Hasta primer anjiyoplasti ve stentle başarılı bir şekilde tedavi edildi. Anomalinin kökeni ve seyri ayrıca 16 kesitlik multidetektör spiral bilgisayarlı tomografiyle de incelendi ve koroner anjiyografi bulguları doğrulandı.

Anahtar sözcükler: Koroner anjiyografi; koroner damar anomalisi/radyografi; bilgisayarlı tomografi, spiral.

Coronary artery anomalies are detected in 0.64% to 1.3% of patients undergoing coronary angiography.[1] The incidence of dual left anterior descending coronary artery (LAD) in normal hearts has been reported to range from 0.13% to 1%.[2]

Type IV dual LAD artery, with one originating from the left main stem and the other from the right coronary artery or right aortic sinus, is an extremely rare congenital coronary anomaly.

It is important to know the anatomic variants of this anomaly in patients undergoing either surgical myocardial revascularization or coronary angioplasty for coronary artery disease. Recognition of the aberrant course of the coronary artery with an anomalous origin is also important. The presence of an interarterial course, which runs between the aortic root and the right ventricular outflow tract, is believed to be associated with sudden cardiac death. Thus, it represents an indication for surgical correction in the presence of myocardial ischemia or previous syncope.[3]

We report a case of type IV dual LAD coronary artery detected incidentally in a man with acute myocardial infarction (AMI).

CASE REPORT

A 65-year-old male patient was admitted to our clinic with inferior AMI and immediately transferred to the catheterization laboratory. After informed consent was obtained, cardiac catheterization was performed via the right femoral artery by means of the Judkins technique. Coronary angiography and angioplasty were performed using standard techniques. Coronary angiography showed normal left main coronary artery, a short left anterior coronary artery terminating proximally after bifurcating a few diagonal branches, a big normal high lateral

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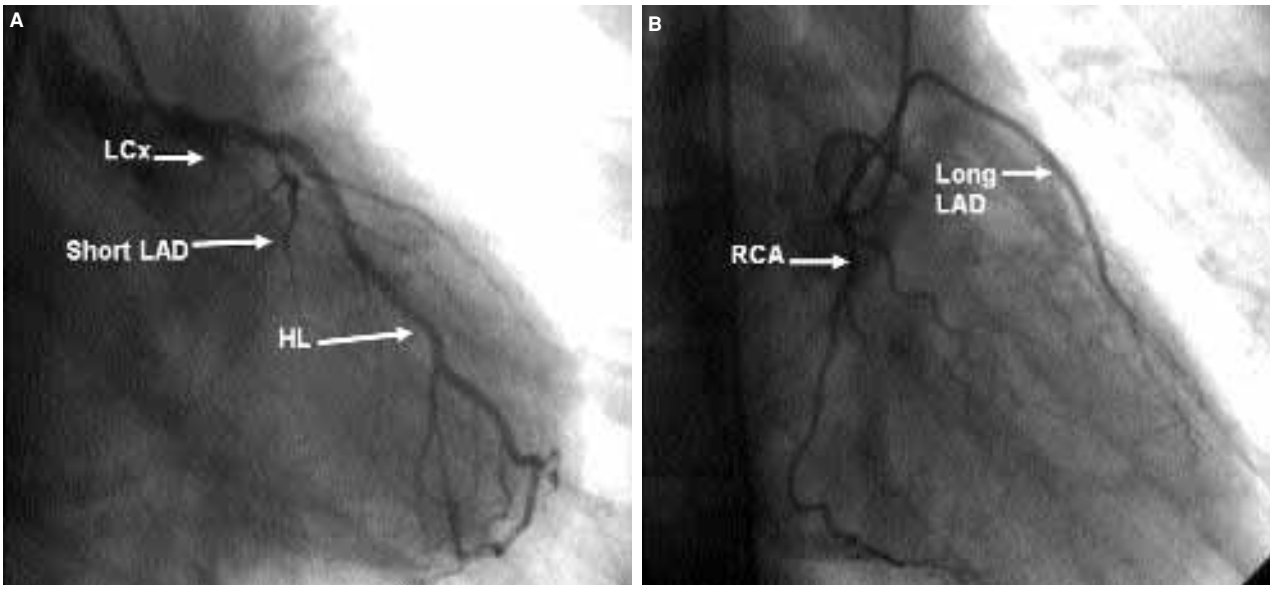

Figure 1. (A) Selective left coronary angiography showing a short left anterior descending (LAD) coronary artery that terminated proximally after bifurcating a few diagonal branches, a big normal high lateral (HL) artery, and total occlusion of the proximal left circumflex (LCx) artery (right anterior oblique projection). **(B)** Selective right coronary angiography showing right coronary artery and another vessel arising just after its origin (right anterior oblique projection).

artery, and total occlusion of the proximal left circumflex artery (Fig. 1a). Selective right coronary angiography showed the right coronary artery and another vessel arising just after the origin of the right coronary artery. This vessel travelled to the left side and turned downward in the midportion of the anterior interventricular groove (Fig. 1b). Primary angioplasty and stent implantation were successfully performed.

Coronary angiographic findings were consistent with type IV dual LAD coronary artery. On the fifth day of hospitalization, 16-slice multidetector spiral computed tomography (MSCT) was performed to determine the origin and course of the anomalies of the coronary artery system. Volume-rendered MSCT images revealed a short left anterior coronary artery terminating proximally after bifurcating a few diagonal branches, a big normal high lateral artery, and

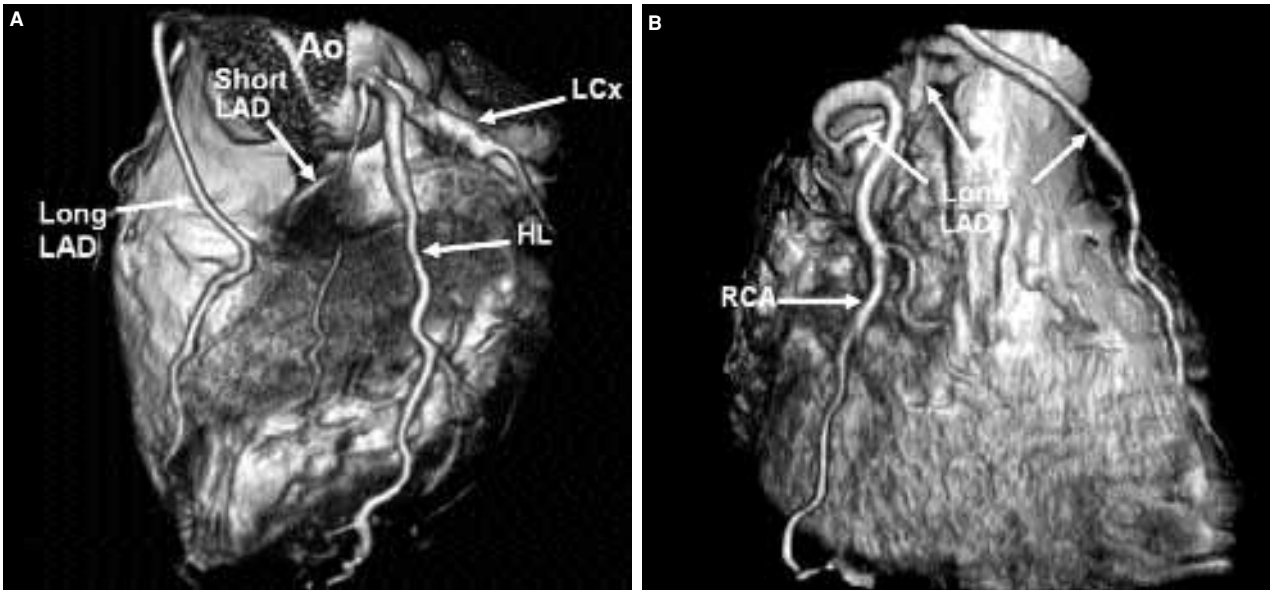

Figure 2. (A, B) Course of the coronary artery system on volume-rendered multidetector spiral computed tomographic images showing dual left anterior descending (LAD) artery. The long LAD originate from the proximal part of the right coronary artery and the short one originate from the left main coronary artery. (Ao: Aorta; LCx: Left circumflex artery; HL: High lateral artery)

normal course of the left circumflex artery. The right coronary artery bifurcated just after its origin into the right coronary artery and the LAD artery coursed from the right to the left (Fig. 2).

DISCUSSION

Dual LAD coronary artery is a very rare congenital anomaly, consisting of two branches that supply the usual distribution of the LAD. While the short LAD terminates in the proximal aspect of the anterior interventricular sulcus (AIVS), the long LAD has a variable course outside the AIVS and returns to the inside distally.

Spindola-Franco et al.[2] classified dual LAD into four subtypes according to the origin and course of the long LAD. In the first three, early bifurcation of the LAD into two vessels is a common feature; thus, both the short and long segments originate from the left main system. Type IV is characterized by the presence of two separate arteries, a proper LAD artery and a long LAD originating from the right coronary artery or right sinus of Valsalva. In type IV, the long LAD traverses the right ventricular infundibulum and enters the AIVS.[2-5] Angiographic and MSCT findings of our case were consistent with type IV dual LAD.

Recognition of dual LAD, in particular the long LAD is very important in some aspects. This anomaly may be discerned as total occlusion at the midportion of the LAD when the long LAD could not be visualized by routine coronary angiographic techniques. Identification of the course of the long LAD is important, because it may be an important cause of sudden cardiac death when it travels through the interarterial course.[6] The course of the long LAD can invasively be identified by angiography after insertion of a catheter into the pulmonary artery and another into the aorta.[4] However, MSCT is a noninvasive tool for detecting coronary anomalies.[7,8] We utilized MSCT in our patient to delineate the course of the coronary arteries. The course of the long LAD to the left side was anterior to the right ventricular outflow tract. Knowing the course of the long LAD is also important before cardiac surgery to avoid inadvertent cutting or ligation during operation.[4,6]

In conclusion, type IV dual LAD is a very rare coronary artery anomaly and, besides angiography, MSCT is helpful in identifying these coronary anomalies.

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