Cardiovascular Revascularization Medicine xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Cardiovascular Revascularization Medicine

Left anterior descending artery of anomalous origin; Native lad arises from left internal mammarian artery. A case report and article review☆

Yakup Balaban *, Hasan Ali Gümrükçüoğlu, Durmuş Güngör, Selcan Camcı

Vm Medicalpark Kocaeli Hospital, Department of Cardiology, Başiskele, Kocaeli, Turkey

ARTICLE INFO

Article history:
Received 26 July 2017
Received in revised form 7 August 2017
Accepted 14 August 2017
Available online xxxx

Keywords:
Coronary anomaly
Native LIMA LAD
Coronary atresia

ABSTRACT

Coronary artery anomalies are encountered in 2.6% of the population. Left anterior descending artery (LAD) stemming from a separate ostium is seen at a rate of 0.48%. In this case, we reported on a left internal mammarian artery (LIMA) giving rise to LAD. Coronary angiography was performed through the right radial artery in 54-year-old female patient. It did not reveal the presence of left main coronary artery in all three aortic sinuses. Pulmonary angiography also did not demonstrate LAD stemming from the pulmonary artery. Then, the LIMA was selectively visualized, and LAD originating from LIMA was observed. The PubMed database contains no reports of LIMA giving rise to LAD. This is the first case report demonstrating LAD originating from LIMA. Accordingly, if LAD cannot be visualized during angiography, an angiographic image of LIMA should be taken before a diagnosis of atresic LAD. For angiographic examination, the right radial route can be used.

1. Introduction

Apparent coronary anomaly is encountered in 2.6% of all angiographic examinations [1–7]. In these cases, the inability to selectively examine coronary arteries or even misdiagnosis of coronary atresia may result in catastrophic consequences such as acute myocardial infarction.

In cases with coronary arteries of anomalous origin, anomalous vessels cannot be selectively visualized. However, manual shaping of catheters may allow selective visualization of anomalous vessels. The aortic origin of LAD could not be demonstrated, since LAD can arise from the pulmonary artery [8–10]. In this case presentation, we report the left internal mammarian artery (LIMA) giving rise to LAD.

2. Case presentation

A 54-year-old female patient suffered from chest pain after cervical laminectomy operation. Her troponin-1 levels increased, necessitating emergency coronary angiography. She had a history of hypertension and coronary artery disease. She was using 20 mg olmesartan daily. Coronary artery disease was not prevalent in her family.

Physical examination showed blood pressure of 136/77 mmHg. Peak heartbeats were rhythmic, and an apparent pathologic murmur was not auscultated. Electrocardiography revealed normal sinus rhythm with no evidence of ischemia. Echocardiography showed a mild degree of mitral insufficiency, and normal left ventricular ejection fractions were observed. Cardiac wall mobility was not impaired.

Laboratory values were as follows:

Troponin I; 340 pg/mL (normal range (NR): 0–26) creatinine 0.5 mg/dL LDL 116 mg/dL, TG. 84 Hg: 14 gr/L, Htc: 44%, PLT 240 K/uL, ALT: 19 U/L, AST 16 U/L, Na: 140 mmol/L, K:4.1 mmol/L, CK-MB: 5.2 U/L(NR:0–25 U/L).

2.1. Angiographic method

Barbeu and Allen tests were performed on the patient's right wrist to determine suitability of radial artery approach. The radial artery was cannulated using Terumo 5F Radial sheath. Subsequently, RCA was visualized with the aid of a 5F right Judkins catheter. RCA was dominant and well-developed. Left cranial and left caudal views did not show any artery in the region of LAD. During visualization of RCA, Cx arising separately from the right coronary ostium was noted (Fig. 1).

Using Judkins Left 3.5–4.0 diagnostic and EBU guiding catheters, LMCA was not found in the right, left, and noncoronary sinuses. Then, possible origins of the LMCA and LAD were scanned. Radiograms of aortic root were performed, but no sign of LAD was encountered (Fig. 2). Then, one of the right upper extremity veins was cannulated with a 5F sheath to perform pulmonary angiography without any sign of LAD (Fig. 3).

When the origin of LAD could not be found in the aorta or pulmonary artery, we assumed that LAD might stem from LIMA. Using multipurpose catheters, this could not be demonstrated. A 3.5 left Judkins catheter was shaped so as to canalize into LIMA. This reshaped catheter was canalized into left subclavian artery. The angiographic image obtained

☆ Disclosures: The authors confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

* Corresponding author.
E-mail address: yakup.balaban@medicalpark.com.tr (Y. Balaban).

http://dx.doi.org/10.1016/j.carrev.2017.08.004
1553-8389/

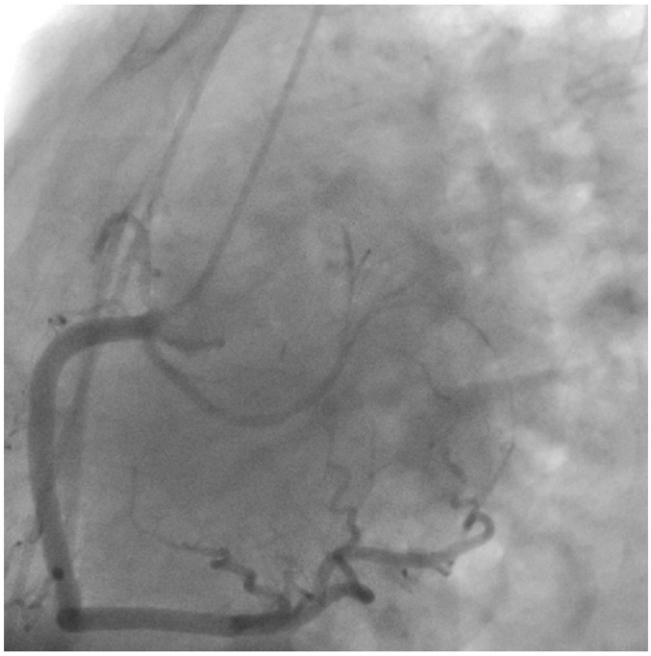

Fig. 1. Left caudal view of RCA as seen during angiographic examination performed through right radial route.

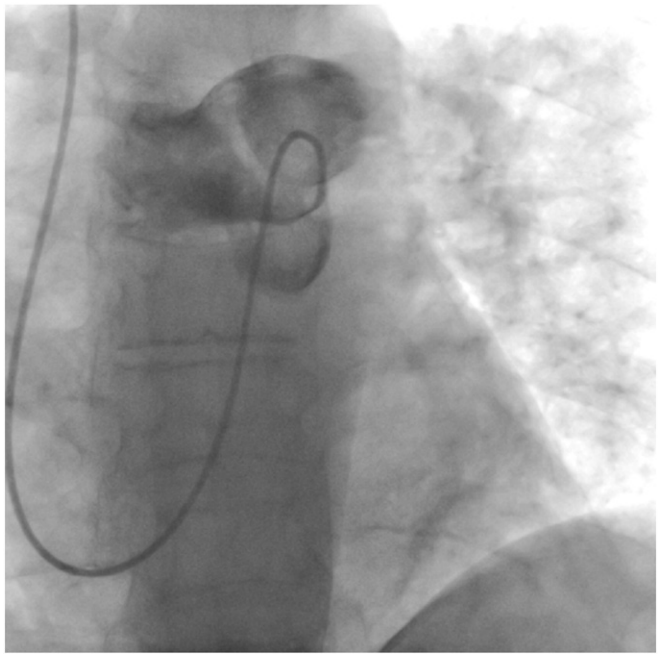

Fig. 3. Pulmonary angiography performed through a right upper extremity vein.

suggests LIMA as the origin of LAD. A 0.014 guidewire was advanced up to distal part of LIMA and a catheter was selectively engaged in LIMA. Then, a 3.0 × 15 mm coronary balloon was inflated up to 4 atm in LIMA, then used as an anchor to facilitate selective delivery of a diagnostic catheter. Thus, LIMA was be selectively demonstrated.

The angiographic video recordings obtained show the artery moving synchronously with heart beats at systole and diastole. This artery also moved around the apex and coursed up to inferior wall. Staining of the myocardium with an radio opaque substance demonstrated that LAD stemmed from LIMA (Fig. 4A–B). One week later the patient underwent coronary CT angiography. Two and three-dimensional CT angiograms showed that LAD arose from LIMA (Figs. 5A, B and 6, Video 1)

In angiograms, the septal branches of this artery are difficult to visualize and are often considered to have developed diagonal branches. However, our angiograms have definitively demonstrated that the artery arising from LIMA was a coronary artery supplying blood to the area perfused by LAD. A scan of web-based medical publications found no case reports on LAD arising from LIMA.

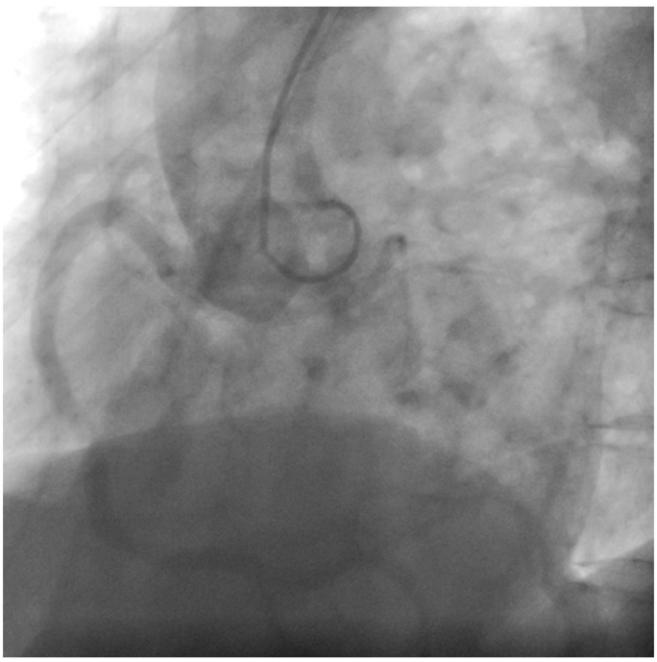

Fig. 2. Angiogram of the aortic root.

3. Discussion

Although most Anomalous aortic origin of a coronary artery subtypes are benign, autopsy studies report an associated risk of sudden death with interarterial anomalous left coronary artery and anomalous right coronary artery [10].

Coronary angiographic examination of coronary arteries of anomalous origin is one of the challenging issues for cardiologists. If such arteries are not scanned and displayed, then misdiagnosis of single coronary artery or coronary artery atresia can be made [11–15].

Based on data gathered from various publications, coronary arteries of anomalous origin, and their incidence rates are presented in Table 1. LAD originating from pulmonary artery is a much more rarely encountered phenomenon (ALPACA Syndrome). In most such cases, standard catheterization during angiography fails to selectively demonstrate coronary arteries [16–18].

Based on this data, the incidence of single RCA has been reported as 0.11%, meaning that it is more frequently seen relative to single left coronary artery (0.02%). In other words, when LIMA of the patients diagnosed as “single RCA” was reviewed, none of the studies have investigated whether LAD stemmed from LIMA or not. In our case, if LIMA could not be examined, then the diagnosis of single RCA would be made. Therefore, diagnosis of single coronary artery also requires close examination of LIMA.

The inability to display coronary arteries of anomalous origin, or even assuming their absence, may lead to irreparable loss. Therefore, if routine catheterization and angiographic methods cannot demonstrate coronary arteries, or if suspicion arises about their absence, then extreme possibilities should be also evaluated. In our case, we evaluated

Please cite this article as: Balaban Y, et al, Left anterior descending artery of anomalous origin; Native lad arises from left internal mammarian artery. A case report and arti..., Cardiovasc Revasc Med (2017), http://dx.doi.org/10.1016/j.carrev.2017.08.004