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Anomalous origin of the left anterior descending coronary artery from the right coronary artery with an interarterial and intramyocardial course: a long-term follow-up

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ABSTRACT

The left anterior descending coronary artery (LAD) originating from the proximal part of the right coronary artery (RCA) is a rare anomaly. An interarterial course for this anomaly is accepted as a 'malign course' and surgical treatment is recommended. In a 66-year-old male patient, coronary angiography showed that the LAD originated from the proximal part of the RCA. Coronary computed tomographic angiography revealed that the LAD had an interarterial and intramyocardial course. The patient refused surgical treatment and has been followed-up without symptoms for the last 4 years with medical treatment. We wanted to contribute to the literature by reporting the long-term results of the medical treatment option for this anomaly with a malign course.

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Keywords: Coronary anomaly; coronary angiography; coronary computed tomographic angiography; interarterial course

Introduction

The angiographic incidence of a left anterior descending coronary artery (LAD) developing from the proximal part of the right coronary artery (RCA) has been reported as 0.05% [1]. A malign intramural course is associated with myocardial ischemic syndromes and sudden death, making surgical repair mandatory [2]. We presented our case who had ischemia on scintigraphy and an interarterial and intramyocardial course on coronary computed tomographic angiography (CTA) but who refused surgical treatment and who has been followed up without symptoms for the last 4 years on medical treatment.

Case Presentation

A 66-year-old male presented with shortness of

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breath on exertion and easy fatigue. Electrocardiography revealed anterior T negativity. Echocardiography showed normal left ventricle systolic functions with no wall motion abnormality. Coronary angiography showed that the circumflex (CX) and RCA had plaques while the LAD originated from the RCA (Figure 1). CTA was performed to demonstrate the LAD course and its relationship with the heart and large vessels and revealed that the LAD originated from the proximal part of the RCA and then advanced between the aorta and the pulmonary artery (interarterial), passing the interventricular septum obliquely (intramyocardial) to reach the anterior interventricular sulcus (Figure 2). The scintigraphy showed ischemia of the left ventricle apical section. The patient did not accept surgery and has been followed up without symptoms for the last 4 years on medical treatment (beta-blocker, nitrate, acetylsalicylic acid).

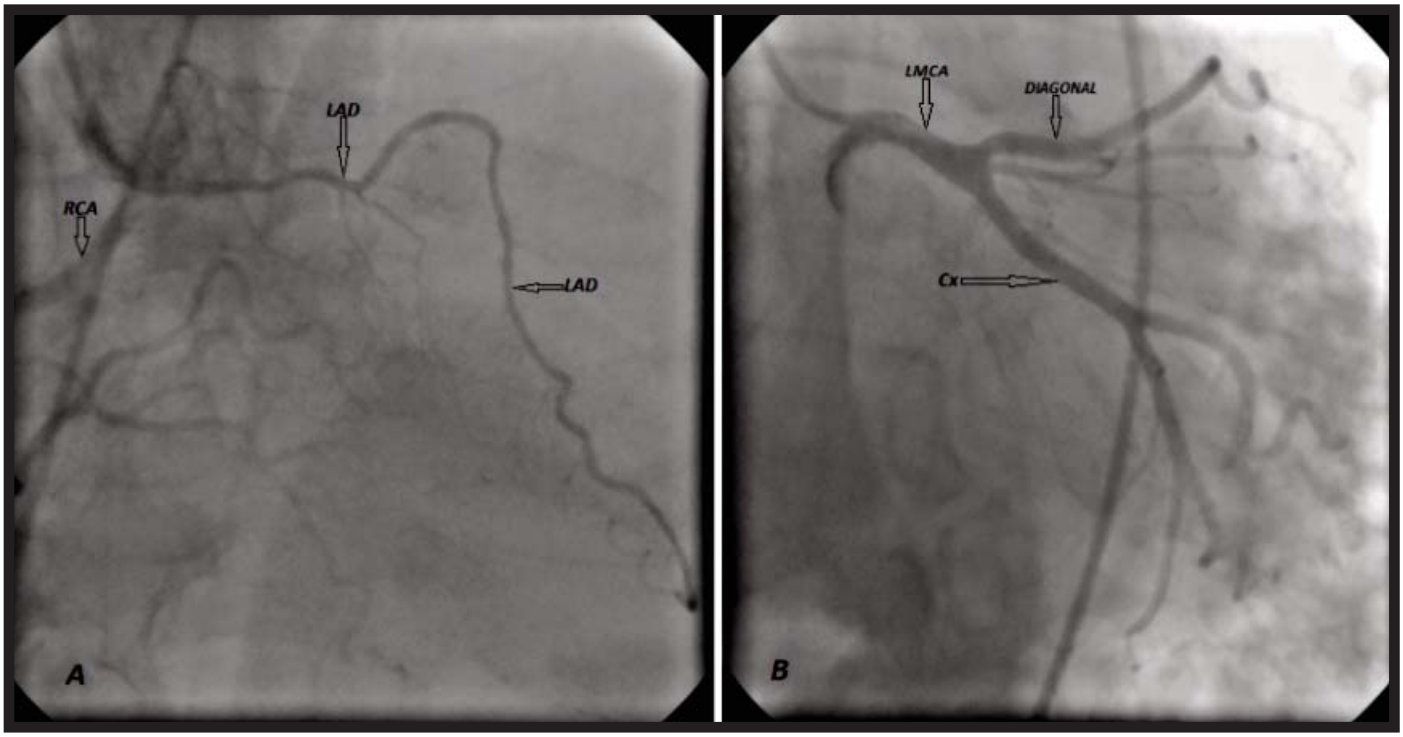

Figure 1. Angiographic view of the LAD. The LAD originated from the RCA.
LAD=left anterior descending coronary artery, RCA=right coronary artery, LMCA=left main coronary artery, Cx=circumflex coronary artery

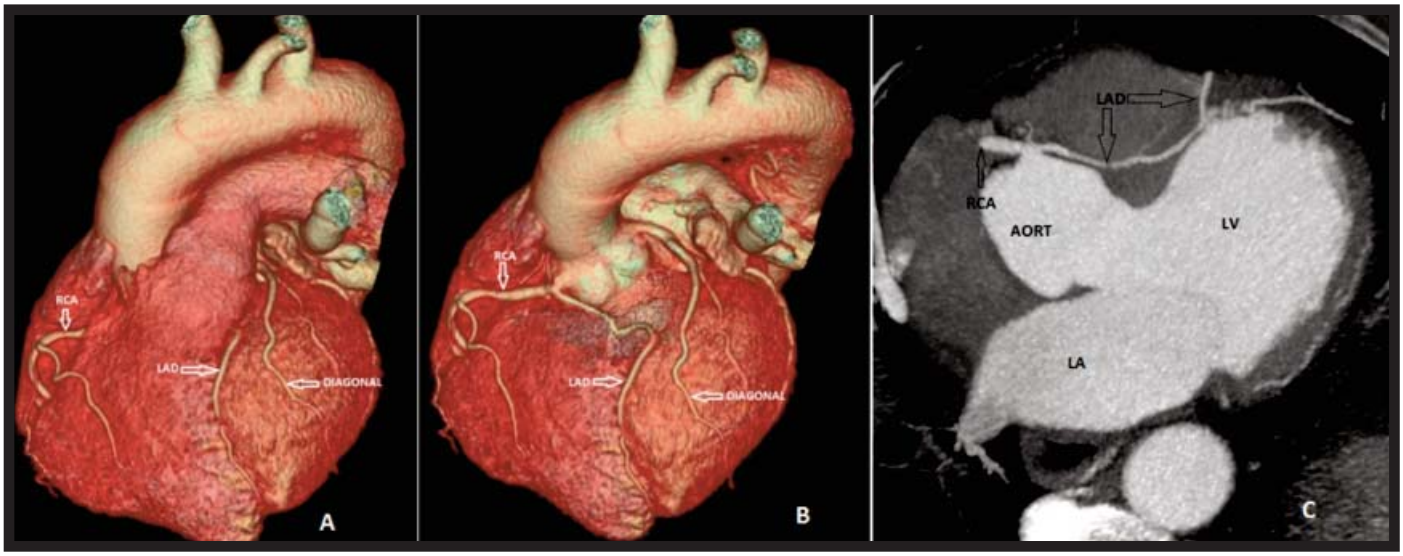

Figure 2. Heart surface rendering (A, B) and curve (C) reconstructions demonstrating the LAD developing from the proximal portion of the RCA with inter-arterial and intra-myocardial course.
LAD=left anterior descending coronary artery, RCA=right coronary artery, LA=left atrium, LV=left ventricle

Discussion

Hemodynamically significant abnormalities include coronary artery atresia, coronary artery originating from the pulmonary artery, a coronary artery with an interarterial course between the aorta and the pulmonary artery, and coronary artery fistulae [3]. The passage of a coronary artery between the aorta and pulmonary artery is named as an interarterial course and can lead to cardiac signs and symptoms such as chest pain, shortness of breath, syncope, arrhythmia, sudden cardiac death (SCD), myocardial infarction and heart failure. SCD is the most important preventable and unexpected event of coronary anomaly. The association between an interarterial course and SCD is ischemia and fatal arrhythmias as a result of compression of great arteries to the anomalous coronary artery [4]. In addition, intramural coronary course of the coronary anomaly may lead to ischemia. Angelini *et al.* [5] demonstrated that an interarterial course is associated with intramural course which is defined as the proximal segment of the coronary artery runs within the aortic wall using intravascular ultrasound. Slit-like lumen [6], ostial occlusion due to aortic expansion during exercise [7], additional anomalies such as myocardial bridging may contribute to myocardial ischemia. Conventional angiography still plays an important role in the definition of cardiac anomalies. However, the recent advances in CTA technology have enabled high sensitivity. The possibility of 3D evaluation and determining the relationship of coronary vessels with the heart and large vessels with CTA make it superior to conventional angiography. CTA is considered the gold standard in the preoperative evaluation of coronary anomalies [8].

Surgery is generally recommended for coronary anomalies with a malign course despite the lack of a consensus [9, 10]. Most of the patients with clinical features similar to ours in the literature have undergone surgery [8, 10]. The guidelines recommend implantable cardioverter defibrillator (ICD) implantation in patients with SCD secondary to ventricular arrhythmias [11]. In addition, ICD implantation may be useful for the primary prevention of SCD in patients with coronary anomaly. Non-invasive and invasive tests may be helpful for the selection of the patients who refuse the surgical therapy. There is no information on the long-term follow-up of these patients and our case report is therefore a first. Although most of the sudden death patients are asymptomatic at the time of unexpected death, long-term results of the medical treatment option can be valuable in part for this anomaly with a malign course. Our 66-year-old male patient with a malign course anomaly has remained without symptoms with medical treatment throughout the continuing follow-up and is currently 70 years old.

Conclusion

Should we insist on surgery for coronary anomaly patients with a malign course or follow-up with medical treatment? We believe that one must evaluate the medical treatment option as well after considering the patient's age, clinical picture and expectations.

Informed consent

Written informed consent was obtained from the patient for the publication of this case report.

Conflict of interest

The authors declared that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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