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CASE REPORT

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Intra-atrial course of right coronary artery – case report

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Summary

Background: Intra-atrial course of the right coronary artery is a rare anomaly. The recognition of this entity is crucial to avoid potential hazards related to vessel injury during interventional procedures such as right heart catheterization, pacemaker implantation, invasive electrophysiology testing or atrial flutter ablation.

Case Report: We present a case of a 62-year old female with paroxysmal atrial flutter and atrial fibrillation, whose cardiac computed tomography revealed an anomalous course of the right coronary artery through the right atrium.

Conclusions: Cardiac computed tomography examination enables an accurate assessment of morphology and location of the anomalous vessel course.

Key words: intra-atrial right coronary artery • cardiac CT angiography

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Background

Intra-atrial course of the right coronary artery is a rare developmental anomaly. [1–5]. Up to now most of such cases were identified during open heart surgery or at autopsy due to the asymptomatic character of this anomaly [1–4]. Anomalous intracavitary right coronary artery may be injured during right heart catheterization, pacemaker implantation, during invasive electrophysiology testing and ablation. For this reason, it is very important to identify this anomaly.

Nowadays, due to the frequently conducted cardiac CT, the number of the new cases identified with the use of this method increases.

We present a case of a 62-year old female patient with paroxysmal atrial flutter and atrial fibrillation, whose cardiac computed tomography before ablation revealed an anomalous course of the right coronary artery through the right atrium.

Case Report

A 62-year old female patient with paroxysmal atrial flutter and atrial fibrillation accompanied with fainting episodes and hypotension was admitted to Department of Arrhythmia for a planned ablation. The ablation was preceded by cardiac CT in order to assess anatomy of the left atrium, pulmonary veins and their ostia. Simultaneously, in order to exclude coronary artery disease, coronary arteries were assessed.

ECG-gated cardiac CT was performed using the dual source Somatom Definition Scanner. The patient was given a dose of 80 ml iodinated contrast medium (370 mg/ml), followed by 60 ml saline solution at a rate of 5 ml/sec. The optimal scan delay was determined by using a test bolus.

The following acquisition parameters were used: detectors configuration: 64×0.6 mm, 120 kV, 360 mAs, gantry rotation time: 0.33 s, pitch 0.2–0.5 depending on heart beat.

CT coronary angiography showed normal anatomy of ostia of pulmonary veins. It also revealed the right coronary artery going through the right atrium (in the segment 3), length: approximately 5 cm (Figure 1) along atrial cavotricuspid isthmus.

The examination revealed minimal nonobstructive coronary artery disease and myocardial bridge in the course of LAD Calcium score was zero.

TEE (Transesophageal Echocardiography) revealed small mitral regurgitation and minor aortic regurgitation.

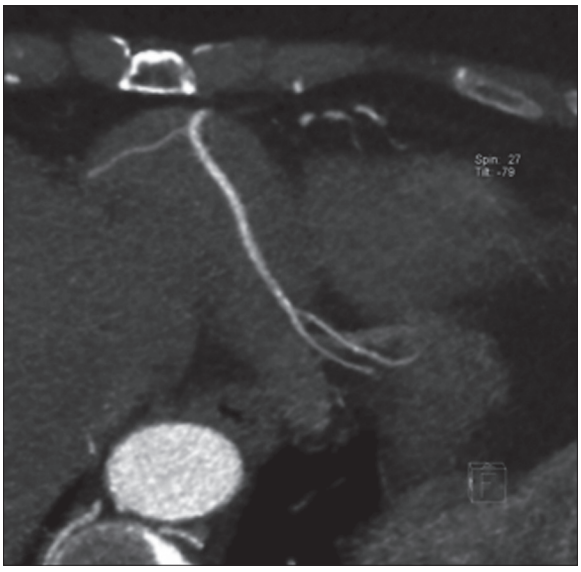

Figure 1. Cardiac CT. Maximum intensity projection (MIP) image shows the intra-atrial portion of the distal right coronary artery.

Figure 2. Cardiac CT. Curved multiplanar reformated (MPR) image shows the normal origin and intra-atrial course of the right coronary artery.

The patient underwent radiofrequency ablation with the use of electroanatomical mapping system (CARTO). After transseptal puncture isolation of 4 pulmonary veins and the cavotricuspid isthmus block was performed.

Description

The frequency of anomalous course of the right coronary artery through the right atrium in population is approximately 0.09–0.1% [1,3]. Andrade et al. emphasize its asymptomatic character and this is the reason why it is incidental finding [2]. The example of another anomaly is intracavitary course of proximal segment of left anterior descending artery in the right ventricle, which occurs in approximately 0.3% of the population [1,2].

Anomalous course of the coronary artery may cause the risk of its injury during right heart catheterization, pacemaker implantation and ablation preceded by the electrophysiology testing [1–3]. An intracavitary right coronary artery could be disrupted, especially during ablation of typical atrial flutter which is performed along the cavotricuspid isthmus [1,2]. The disruption of left anterior descending artery going through the right ventricle is possible during ablation of right ventricular outflow tract [2].

Complications caused by the injury of the arterial wall may result in myocardial ischemia or left-to-right shunt [2,3].

The right coronary artery originates from the right aortic sinus. It has an epicardial course in the right atrioventricular groove and continues toward the crux, where it divides into posterior descending artery and posterior left ventricular branch. Posterior descending artery runs in the posterior interventricular groove to the heart apex [6].

In the presented case, cardiac CT revealed normal course of the proximal, mid segment of the right coronary artery and posterior descending artery (Figure 2). The distal segment of the right coronary artery had an intra-atrial course of 5 cm. Previously published case reports of intra-atrial right coronary artery evaluated by CT angiography have shown variable lengths of 2.5 to 5.5 cm [2–4].

Identification of the intra-atrial course of the right coronary artery in conventional coronary angiography may be difficult [3]. Some authors emphasize that difficulties in vessel localization can occur during coronary artery bypass surgery. Cardiac CT examination enables accurate assesment of morphology and location of the anomalous vessel course [2,3].

Conclusions

In conclusion, the recognition of this rare anomaly during cardiac CT examination is crucial to avoid potential hazards related to vessel injury during interventional procedures.

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