Multimodality imaging of a rare type of coronary cameral fistula

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Coronary artery fistulas are defined as abnormal vascular connections between one or more coronary arteries and the cardiac chamber [coronary cameral fistula (CCF)] or a great thoracic vessel. Here, we present multimodality imaging findings of a rare case with CCF between the sinoatrial nodal artery and the left atrium.

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Keywords: Coronary cameral fistula, Left atrium, Sinoatrial nodal artery

Introduction

Coronary artery fistulas are defined as abnormal vascular connections between one or more coronary arteries and the cardiac chamber [coronary cameral fistula (CCF)] or a great thoracic vessel such as venae cavae, pulmonary artery, pulmonary vein, or coronary sinus [1]. CCF is usually discovered incidentally and is seen in approximately 0.1% of patients undergoing coronary angiography [1]. Although most patients are asymptomatic, it may lead to pulmonary hypertension, heart failure, endocarditis, spontaneous rupture, sudden death, thrombosis or myocardial ischemia secondary to steal phenomenon [1,2].

Here, we present the multimodality imaging findings of a rare case with CCF between the sinoatrial nodal artery and the left atrium.

Case report

A 32-year-old male patient was admitted to our hospital due to chest pain and palpitation. The patient was a smoker, which increased his cardiovascular risk. Physical examination findings and blood tests were normal. Electrocardiography was in normal sinus rhythm without ischemic changes. Transthoracic echocardiography revealed an ejection fraction value of 60% without valvular abnormality. There was no rhythm abnormality during ambulatory electrocardiography monitoring. By
contrast, exercise stress test showed ST-segment depressions in inferior leads without symptoms. Because coronary artery disease was suspected, diagnostic coronary angiography was performed. Interestingly, the angiography showed the sinoatrial nodal artery originating directly from the ascending aorta and draining into the left atrium with a fistulous connection (Fig. 1A,B). Coronary computed tomography angiography showed similar findings (Fig. 1C–F). There was no significant ischemia during myocardial perfusion scintigraphy. Because there was no evidence of ischemia or arrhythmia due to CCF, we decided to follow-up the patient without intervention. He had no clinical events for 6 months.

Discussion

Coronary artery anomalies include anomalies of origin, termination, structure, or course [1,2]. Coronary artery fistula is among the abnormalities of termination. CCF usually results from aberrancy in normal embryological development. Trauma, cardiac surgery, or invasive cardiac procedures may also lead to the development of CCF [1,3,4]. Diagnosis can be made using coronary angiography, cardiac computed tomography, or echocardiography.

About 60% of fistulas originate from the right coronary artery, followed in frequency by the left anterior descending artery, the circumflex artery, diagonal branches, and rarely, the left main coronary artery [5]. They drain into the right-sided heart chamber or great vessel in approximately 90% of cases [5]. Fistula draining into the left heart chambers is very rare, with fistula draining into the left atrium, as in this case, being the rarest [5].

CCF is usually asymptomatic and may be followed up clinically or medically. The indications for intervention include the presence of significant
left-to-right shunt, left ventricular volume overload, myocardial ischemia, left ventricular dysfunction, congestive cardiac failure, and prevention of endocarditis/endarteritis [1,6]. Interventions may be percutaneous or surgical. Surgical closure of the fistula may be performed. Percutaneous intervention with various types of occlusion coils, vascular plugs, covered stents, and umbrella devices may be also used [7].

Our case is interesting in a way that the rarest type of fistula (i.e., drainage to the left atrium) is present and the fistula is viewed using different imaging techniques.

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