Case Report

An unusual cause of atrial fibrillation in a young active duty soldier

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Abstract

Coronary artery fistula (CAF) is an abnormality in which the coronary artery has an anomalous connection with a venous structure such as the coronary sinus or atrium. CAF is usually congenital, but may be acquired. The prevalence in the general population is low with many asymptomatic and discovered incidentally. When symptomatic, CAF may present with dyspnea, decreasing functional capacity, and/or arrhythmia. We report a case of a young otherwise healthy active duty male with progressive symptoms of dizziness and exertional fatigue with paroxysmal atrial fibrillation. An electrically negative, but symptomatically positive stress test led to further workup with coronary computed tomography angiogram, which unexpectedly revealed large coronary fistulas between the aneurysmal right coronary artery and coronary sinus and the dilated left circumflex artery with probable collateralization to the coronary sinus. Cardiac magnetic resonance imaging and cardiac catheterization supported these findings and demonstrated no evidence of significant shunting.

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History and physical examination

The patient is a 36-year-old active duty male otherwise in good health, with decrease in functional capacity over the past several years to include exercise intolerance, recurrent dizziness, and sensation of irregular heart beat for which he had not previously sought medical attention. Further workup revealed paroxysmal atrial fibrillation.

Laboratory testing and imaging

To facilitate treatment with flecainide, an exercise stress test was obtained to rule out ischemic heart disease. Although the stress test was electrically negative, it provoked his symptoms to include dizziness. Therefore, a coronary computed tomography angiography (CTA) was requested for further evaluation of this otherwise healthy young adult male. The CTA
unexpectedly revealed large coronary fistulas between the aneurysmal right coronary artery (RCA) and the coronary sinus (Figs. 1 and 2). The tortuous and dilated left circumflex artery (LCx) was noted with probable collateralization to the RCA or coronary sinus (Fig. 3). Cardiac catheterization confirmed these findings with additional note of RCA and LCx also communicating with the floor of the right atrium. Cardiac magnetic resonance imaging demonstrated no evidence of significant arteriovenous shunting.

**Treatment, outcome, and follow-up**

Therapeutic options for symptomatic coronary artery fistulas (CAFs) include medical management, surgical correction, or transcatheter embolization. Because the patient failed medical management with multiple medications and his risk of developing a significant arteriovenous shunt because of large fistulae size, he underwent a transcatheter coil embolization procedure of his coronary fistula. Following the procedure, many of his symptoms improved to include exercise tolerance and symptoms of dizziness. The patient did report residual occasional palpitations.

**Discussion**

Coronary fistulas are relatively rare anomalous connections between a coronary artery (high pressure) and the venous system (low pressure), pulmonary artery and/or chamber of the heart, bypassing the capillaries [1]. Its prevalence in the general population is about 0.3%-1.3%. However, it is seen in about 4%-15% of young individuals who experience death [2]. Although usually asymptomatic, presence of a shunt can lead to symptoms of heart failure, coronary steal, dyspnea, and arrhythmia [1,2]. If symptoms occur, onset is typically after the second decade of life. According to the literature, only 5% of all coronary fistulas arise from both the RCA and LCx, as in
this case. Treatment options include surgical ligation or transcatheter embolization [3]. Historically, CAF has been evaluated using conventional angiography. However, with advancements in computed tomography technology, coronary CTA can play a more reliable and noninvasive role in the evaluation coronary anomalies to include CAF. Although uncommon in the general population, coronary anomalies (including coronary fistula) are an important diagnosis for patients presenting with cardiac symptoms in the second decade of life.

**REFERENCES**

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