Case Reports

Giant Right Coronary Artery Aneurysm

Associated with a Fistula Draining into the Superior Vena Cava

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Giant coronary artery aneurysm associated with a coronary–cameral fistula is an uncommon condition. Such aneurysms are usually associated with other cardiac diseases, such as coronary atherosclerosis, and therefore might augment myocardial ischemia in adults. The main indications for surgical intervention are severe coexisting coronary artery disease, evidence of embolization, and aneurysmal enlargement or rupture.

We describe a large right coronary artery aneurysm and a coronary–cameral fistula that drained into the superior vena cava. The surgical repair was successful. ***(Tex Heart Inst J 2016;43(4):360-2)***

A coronary artery aneurysm (CAA) is a focal dilation of a coronary artery to at least 1.5 times its normal diameter. These aneurysms are not common, having an incidence of up to 5% in the cardiac surgical population.[1] They more characteristically affect the right coronary artery (RCA) than any single artery in the left coronary system. A giant CAA (>50 mm in diameter) associated with a coronary–cameral fistula (CCF) is particularly rare, for it is observed in only 0.02% of the cardiac surgical population.[2,3] The usual sites for a coronary fistulous connection are the right ventricle, right atrium, and pulmonary artery; connection to the superior vena cava (SVC) is highly unusual. We describe the successful treatment of a large RCA aneurysm, which was associated with a CCF that drained into the SVC.

Case Report

A 47-year-old man was referred to our service after a right-sided cardiac mass was found incidentally on computed tomography (CT) (Fig. 1) during the evaluation of kidney stones. He was asymptomatic and previously healthy. Coronary angiography showed a giant RCA aneurysm with a heavily tortuous branch that appeared to drain into the SVC (Figs. 2 and 3). The posterior descending artery and posterolateral branch were supplied through the aneurysm from the right coronary system. The left main coronary artery and its branches were normal.

The patient underwent elective surgery via a median sternotomy, with the aid of general anesthesia. Operative findings confirmed that the aneurysm was confined to the middle portion of the RCA and had an extremely tortuous branch that drained into the SVC. We cannulated the ascending aorta and both venae cavae, then instituted standard cardiopulmonary bypass (CPB). After cross-clamping the ascending aorta, we stopped the heart by administering cold-blood cardioplegic solution. Myocardial protection was achieved by means of topical cooling and the intermittent antegrade and retrograde administration of cold-blood cardioplegic solution. We opened the aneurysmal sac and oversewed the main inlet and outlet branches of the aneurysm (Fig. 4). The aberrant branch vessel was ligated with pledgeted polypropylene sutures. We performed an aortotomy, evaluated the RCA orifice, and observed that it was of normal size. The main portion of the RCA was ligated proximally, via simple closure, to prevent hidden communication between the high-proximal segment of the RCA and other venous structures. Coronary artery bypass grafting (CABG) was then performed with a saphenous vein graft between the ascending aorta and the distal RCA. The remaining aneurysmal sac was closed with a 3-0 polypropylene running suture. The patient was easily weaned from CPB in sinus rhythm and without inotropic support. He had

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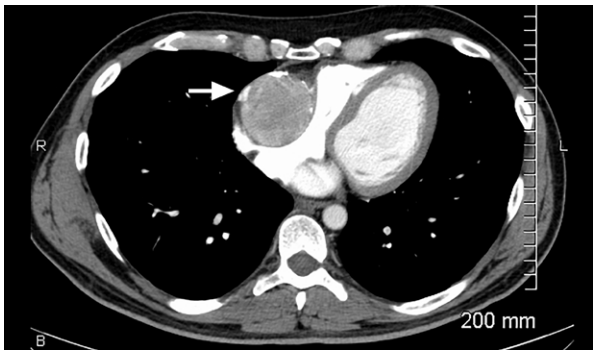

Fig. 1 *Contrast-enhanced computed tomogram shows the 5 × 5 × 5-cm right-sided cardiac mass (arrow).*

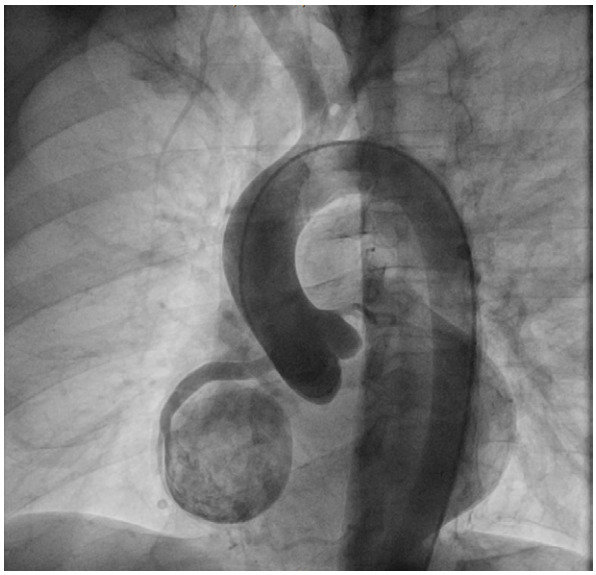

Fig. 2 *Coronary angiogram of the aortic root shows the right coronary artery aneurysm, which supplies the posterior descending coronary artery and the posterolateral branch.*

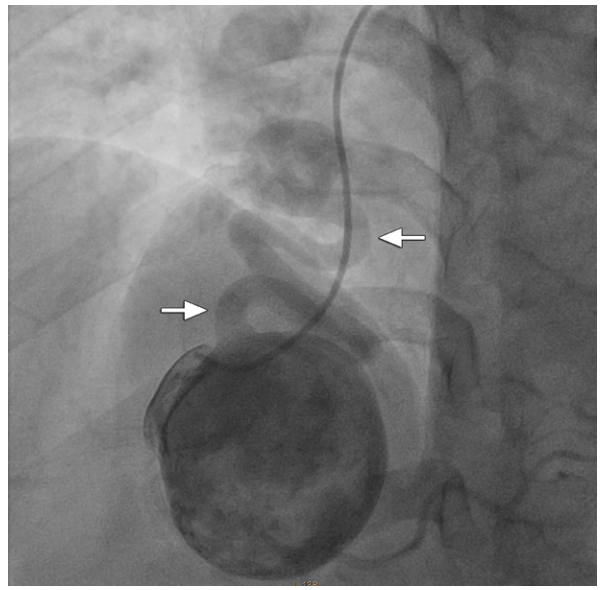

Fig. 3 *Selective coronary angiogram of the right coronary artery shows a tortuous branch (arrows) that arises from the aneurysm and drains into the superior vena cava.*

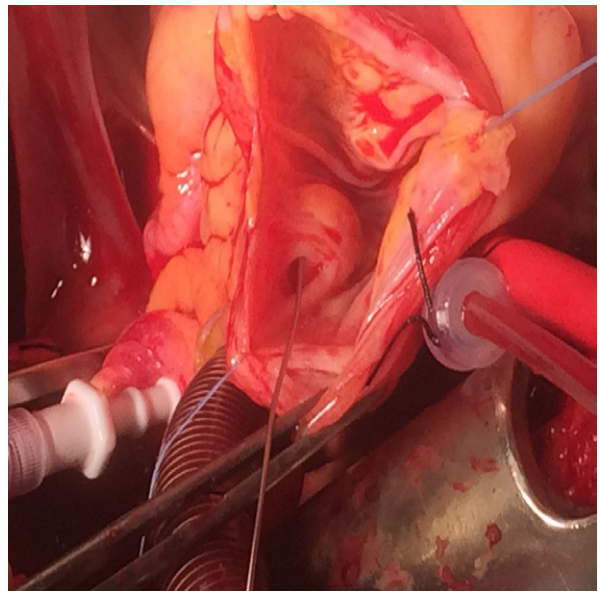

Fig. 4 *Intraoperative photograph shows the proximal part of the giant right coronary artery aneurysm and its inlet orifice.*

no perioperative or postoperative complications. Eleven weeks postoperatively, he continued to do well.

Discussion

Since the introduction of coronary angiography, CAAs have been diagnosed with increasing frequency.[1] A fistulous communication can occur between the RCA and the right atrium, right ventricle, pulmonary artery, coronary sinuses, or SVC—the most common site of drainage being the right ventricle.[4] Whereas Kawasaki disease is the major cause of CCF in children, atherosclerosis is the main cause in the adult population. Other causes include trauma, polyarteritis nodosa, systemic lupus erythematosus, syphilis, and idiopathic disease. None of these affected our patient.

Clinically, most CAAs are asymptomatic unless they instigate such sequelae as thrombosis, myocardial infarction (MI), heart failure, or rupture. The most important clinical predictors of MI are the size of the aneurysm and the presence of a fistula. In cases involving a large fistula and marked flow, myocardial ischemia occurs because of a coronary steal phenomenon.[5]

To avoid rupture, thrombus formation, or MI, large CAAs associated with a CCF should be surgically treated. Smaller asymptomatic aneurysms can be managed conservatively, but giant or symptomatic aneurysms (even in the absence of a CCF) should be considered

for surgical repair or interventional therapy with stent implantation. Because of the rarity of these aneurysms, no evidence-based guidelines for their optimal management exist, but resection of the aneurysm, combined with fistula closure and CABG, is considered the standard treatment.

In our case, the patient was completely asymptomatic, and the aneurysm was found incidentally. Elective surgical repair was chosen for the aforementioned reasons. At surgery, it was obvious that the branch vessel was a fistula between the aneurysm and the SVC. The vessel and main portion of the RCA were ligated to prevent the steal of blood flow from the artery.

Ipek and colleagues[6] and Ahmad and associates[7] described giant RCA aneurysms associated with CCFs involving dilated proximal RCAs and fistulae opening, respectively, into the right ventricle[6] and the right atrium.[7] Tada and associates[8] described an RCA aneurysm associated with an SVC fistula. In that case, the fistula was ligated without aneurysmorrhaphy. The case that we report here involved a rare giant RCA aneurysm associated with a CCF consisting of a branch of the RCA that drained into the SVC. Ligation of the main coronary artery proximal and distal to the aneurysm, with ligation of the fistulous tract and bypass to the distal right coronary artery, provided a simple resolution of the anatomic defect.

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