

Giant Right Coronary Artery (RCA) Aneurysm

Abdurrahim Çolak,¹ Münacettin Ceviz,¹ M. Hakan Taş,² Hayri Oğul³

Departments of ¹Cardiovascular Surgery, ²Cardiology, and ³Radiology, Atatürk University, Erzurum, Turkey

ABSTRACT

Coronary artery aneurysm (CAA) is a rare type of coronary artery disease. The angiographic incidence of the coronary artery aneurysm is reportedly between 1.5% to 4.9%, and it is more frequent in men. We have successfully carried out a simultaneous “coronary bypass together with aneurysm ligation” operation on a patient with coronary heart disease and an aneurysm within the right coronary artery.

INTRODUCTION

Coronary artery aneurysm (CAA) is defined in the literature as the diameter of related blood vessel 1.5 times greater than the diameter of normal coronary arteries. According to their morphology, they can be classified as fusiform or saccular [Syed 1997; Hoşcan 2004]. It can develop congenitally, but there are many other acquired causes (infection, trauma, vasculitis, Kawasaki disease, catheterization, surgery, spontaneous dissection, metastatic tumors, etc.). Atherosclerosis, in particular, can be behind CAA [Krüger 1999; Hoşcan 2004]. It is generally asymptomatic but may cause symptomatic angina and myocardial infarction.

CASE

A 22-year-old male patient without known cardiac disease was admitted to the cardiology clinic with complaints including sudden onset retrosternal chest and left arm pain, chest tightness, and shortness of breath, beginning approximately 1 month ago. Echocardiographic (ECG) examination revealed mediastinal cyst, and the patient was hospitalized for chest surgery. Magnetic resonance imaging (MRI) and computed tomography (CT) examinations indicated right coronary artery (RCA)-associated pseudoaneurysm; the patient was transferred to our clinic for operation (Figure 1). Physical examination revealed blood pressure 120/70 mmHg and heart rate 85/dk; a clinically

significant cardiovascular and respiratory system examination revealed no pathological findings. Increased cardiothoracic ratio on chest radiography with normal ECG was found. When we detected a 78 × 73 mm thrombosed giant aneurysm arising from the proximal segment of RCA in a multidetector CT, we performed a coronary angiography and saw RCA sourced giant coronary artery aneurysm.



Figure 1. Magnetic resonance imaging (MRI) and computed tomography (CT) examinations indicated right coronary artery (RCA)-associated pseudoaneurysm.

As a result of current findings in patients, we decided to perform coronary artery bypass grafting and to intervene RCA aneurysm. The patient was operated on under general anesthesia. After median sternotomy, the pericardium was opened. The aneurysm sac was approximately 8 × 7 cm in size (Figure 2). We accessed the pump via aortocaval cannulation. After cross-clamp, aneurysm sac was opened, the thrombus cleared, and the walls of the sac removed. The RCA was ligated from proximal and bypassed on distal RCA with distal radial artery (Figures 3 and 4). We exited from the pump without any problems, applied biologic glue to parts of the aneurysm sac, and closed on graft anastomosis. The patient was taken to the intensive care unit. On the second postoperative day, after pathological investigation indicated Behçet's disease-associated vasculitis, the patient began therapy with azathioprine (50 mg) and prednisolone (5 mg). He was discharged on the ninth postoperative day.

Received December 5, 2012; accepted May 20, 2013.

Correspondence: Dr. Abdurrahim Çolak, Atatürk University, Department of Cardiovascular Surgery, 25100 Erzurum, Turkey; +90-442-2318447; fax: +90-442-2318448 (e-mail: colaka@atauni.edu.tr; abdurrahimcolak@hotmail.com).

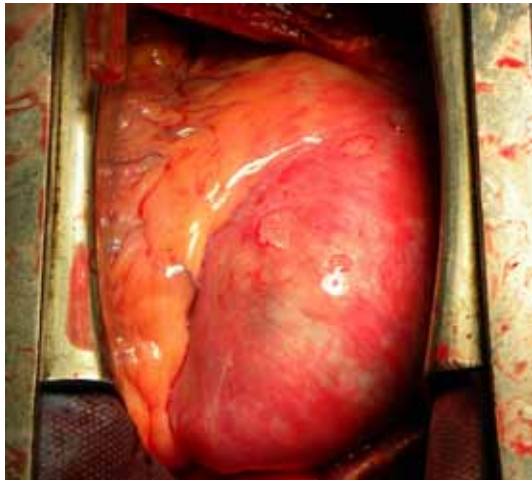


Figure 2. After median sternotomy, the pericardium was opened. The aneurysm sac was approximately 8 x 7 cm in size.

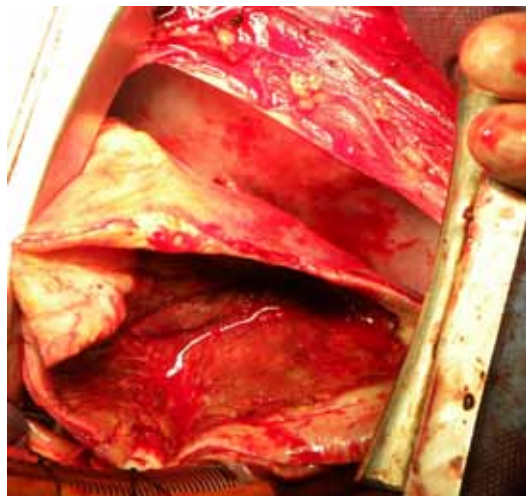


Figure 3. After cross-clamp, the aneurysm sac was opened, the thrombus cleared, and the walls of the sac removed.

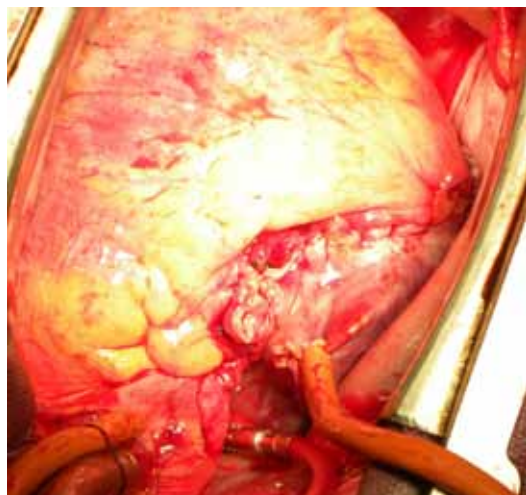


Figure 4. The right coronary artery (RCA) was ligated from proximal and bypassed on distal RCA with distal radial artery

CONCLUSION

Coronary artery aneurysms are rare and usually asymptomatic lesions [Syed 1997; Krüger 1999]. Angiographic studies have reported incidence of 0.4% to 4.9%, and it is seen more frequently in men. Coronary artery aneurysms may be single or multiple. Coronary artery aneurysms can be seen in all segments of the coronary artery system, but in recent studies reported that it is monitored more frequently on the RCA [Syed 1997]. The largest study on this subject is the CASS (Coronary Artery Surgical Study) study, and the incidence of coronary artery aneurysms has been reported as 4.9%. In our case, the RCA aneurysm localization is consistent with the literature [Espinola-Klein 2000]. Patients with symptomatic ischemia or heart failure usually refer to the cardiology clinic [Satran 2005]. In our case, the patient was admitted with retrosternal chest pain typically radiating to the left arm and shortness of breath. An etiology is still not fully defined, although the available evidence is increasing. Known causes are Kawasaki disease, atherosclerosis, congenital malformations, trauma, polyarteritis nodosa, Takayasu's arteritis, rheumatic fever, subacute bacterial endocarditis, syphilis, Ehlers-Danlos syndrome, Marfan syndrome, and iatrogenic herbicide intoxication, which causes chronic nitric oxide stimulation after surgery. Of these potential causes, the first 2 are the most frequently seen [Hartnell 1985]. In our case, vasculitis was thought to be the cause based on the interpretation of the material referred to pathology.

Coronary artery aneurysms can remain silent or can cause significant morbidity and mortality with distal embolization, fistula formation, thrombus, dissection, or rupture [Berkoff 1975; Alford 1976]. Whatever the mechanism responsible for coronary artery aneurysms is, it does not seem "benign." It can cause acute myocardial infarction with spontaneous dissection without stenosis, spasm, or thrombosis [Perlman 1989].

Prognosis of coronary artery aneurysm associated with the presence of obstructive coronary artery disease depends on its severity. Coronary artery aneurysms surgery indications are aneurysm size and the risk of rupture, accompanied by the presence and severity of obstructive coronary artery disease, the presence of fistula in at least 1 heart chamber, and the size of fistula [Hirsch 2000; Gündüz 2004].

Coronary artery aneurysm is a rare but fatal form of coronary artery disease, and the treatment approach will vary depending on the nature of the lesion. It is an important risk factor for rupture or thromboembolic obstruction, so it should be treated surgically. Although there are many surgical methods, the basic principle of surgical intervention is with resection of the aneurysm or repair with ensuring the continuity of coronary blood flow.

REFERENCES

- Alford WC Jr, Stoney WS, Burrus GR, Frist RA, Thomas CS Jr. 1976. Recognition and operative management of patients with arteriosclerotic coronary artery aneurysms. *Ann Thorac Surg* 22:317-21.
- Berkoff HA, Rowe GG. 1975. Atherosclerotic ulcerative disease and associated aneurysms of the coronary arteries. *Am Heart J* 90:153-8.

- Espinola-Klein C, Rupprecht HJ, Erbel R, Nafe B, Brennecke R, Meyer J. 2000. Ten-year outcome after coronary angioplasty in patients with single-vessel coronary artery disease and comparison with the results of the Coronary Artery Surgery Study (CASS). *Am J Cardiol* 85:321-6.
- Gündüz H, Akdemir R, Binak E, Tamer A, Uyan C. 2004. Spontaneous rupture of a coronary artery aneurysm. *Jpn Heart J* 45:331-6.
- Hartnell GG, Parnell BM, Pridie RB. 1985. Coronary artery ectasia: its prevalence and clinical significance in 4993 patients. *Br Heart J* 54:392-5.
- Hirsch GM, Casey PJ, Raza-Ahmad A, Miller RM, Hirsch KJ. 2000. Thrombosed giant coronary artery aneurysm presenting as an intracardiac mass. *Ann Thorac Surg* 69:611-3.
- Hoşcan Y, Doğan A, Altınbaş A. 2004. A case of left main coronary artery aneurysm associated with severe stenosis of left anterior descending artery [in Turkish]. *Anadolu Kardiyol Derg* 4:274.
- Krüger D, Stierle U, Herrmann G, Simon R, Sheikhzadeh A. 1999. Exercise-induced myocardial ischemia in isolated coronary artery ectasias and aneurysms (“dilated coronopathy”). *J Am Coll Cardiol* 34:1461-70.
- Perlman PE, Ridgeway NA. 1989. Thrombosis and anticoagulation therapy in coronary ectasia. *Clin Cardiol* 12:541-2.
- Satran A, Bart BA, Henry CR, et al. 2005. Increased prevalence of coronary artery aneurysms among cocaine users. *Circulation* 111:2424-9.
- Syed M, Lesch M. 1997. Coronary artery aneurysm: a review. *Prog Cardiovasc Dis* 40:77-84.