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## Operation of coarctation with saccular aneurysm of descending aorta under support of low flow cardiopulmonary bypass

### *İnen aortanın koarktasyon ve sakküler anevrizma birlikteliğinde düşük akımlı kardiyopulmoner baypas desteğiyle operasyonu*

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### Introduction

Coarctation of aorta has an incidence of 5-8% among all congenital heart diseases and it may be accompanied by many other anomalies. The most frequent concomitant congenital anomaly is bicuspid aorta and the others are aortic aneurysms, double aortic arc, persistent left superior vena cava, pulmonary venous return anomalies and ventricular septal defect (1). Aortic coarctation may cause hypertension, myocardial infarction, heart failure, infective endocarditis, intracranial hemorrhage, aneurysm and dissection-rupture of aorta. Life expectancy of these patients is less than 50 years (2). The most common cause of death for untreated patients is aneurysm and rupture of aorta and its branches. Resection of aneurysmatic segment of aorta is necessary to prevent rupture of aneurysm.

We present our safe surgical intervention under support of low flow cardiopulmonary bypass (CPB) in a case of coarctation which is accompanied by a large saccular aneurysm located at the thoracic aorta.

### Case report

A 21-year-old male admitted to our hospital with the complaints of headache and exertional dyspnea. On physical examination, hypertension was detected and his femoral and other distal pulses were non-palpable. Direct measurement of arterial blood pressure was 205/110

mm Hg and 60/25 mm Hg from left radial and left femoral artery, respectively. On his magnetic resonance angiography a postductal coarctation and an aneurysm with a diameter of 6 cm 2 cm below the coarctation were detected (Fig. 1).

Following anesthesia the patient was intubated by using double-lumen Carlens tube. Right femoral artery and vein were cannulated CPB. After deflation of left lung, 6x4x6 cm sized saccular type true aneurysm attaching to lobes of lung was visualized (Fig. 2). Cardiopulmonary bypass by using centrifugal pump was performed with a low flow (quarter of normal) to supply sufficient perfusion to distal aorta. A 6 cm long no:14 Dacron tube graft interposed to the involved aortic segment (Fig. 3).

The patient's postoperative period was uneventful and patient was discharged on 9<sup>th</sup> postoperative day with stable hemodynamics, palpable femoral pulses and acceptable blood pressure.

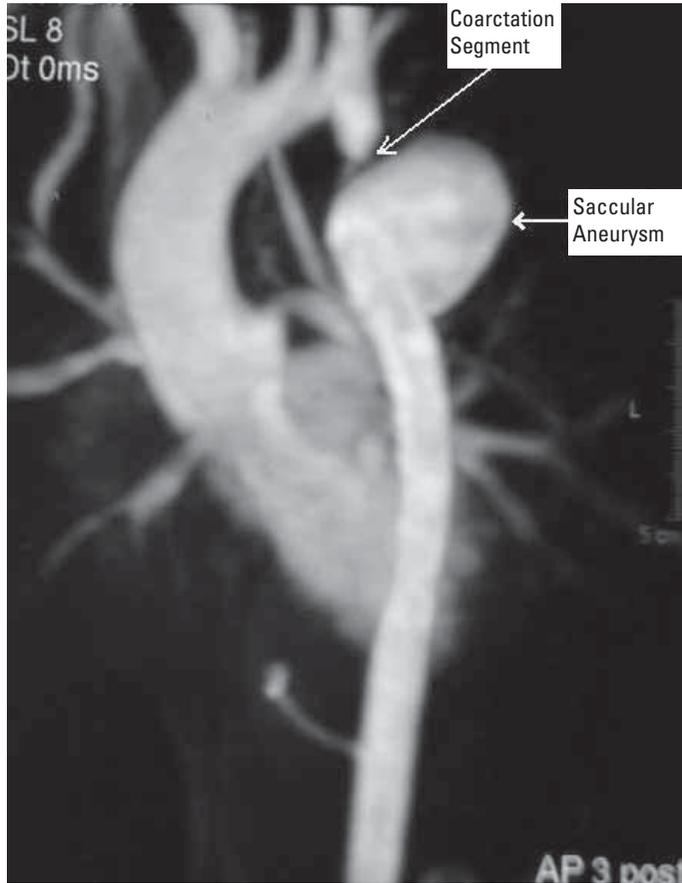
### Discussion

Accompanying anomalies play a vital role in surgical planning for aortic coarctation. Progressive hypertension and pressure gradient, secondary to coarctation of aorta, can cause aneurysm at the aortic wall (3). The association between coarctation and aneurysm is a well-known entity and one-stage or two stage surgical interventions can be applied (4).

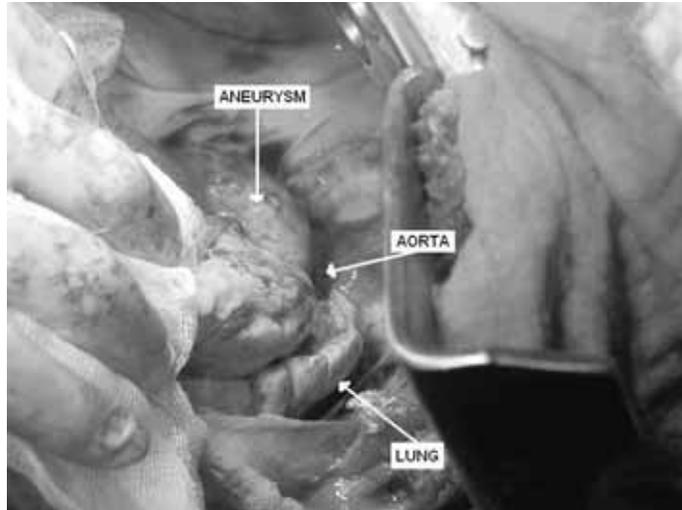
When an aortic aneurysm is present, resection of the involved aortic segment along with the coarctation is necessary, and continuity can establish with a prosthetic graft. There are some methods to main-

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**Figure 1. Magnetic resonance imaging of descending aorta**



**Figure 2. View of saccular aneurysm which has adhesions to left lung and surrounding tissues after left thoracotomy**

tain perfusion of brain, distal organs and spine (to prevent paraplegia) and to prevent proximal hypertension and ventricular afterload during clamping of thoracic aortic aneurysm above and below the involved segment (5-8). Some of these methods are deep hypothermic circulatory arrest (DHCA), passive shunts (PS) and active shunts (AS). Surgeons prefer DHCA especially in replacement of aortic arch and situations which proximal aorta is not suitable for clamping (5, 6). In our case proximal thoracic aorta was suitable for clamping. PS technique



**Figure 3. View of interposed Dacron graft in descending aorta**

has some disadvantages like its maximal flow rate is low and distal perfusion pressure is lower than PS techniques (6, 7). Active left heart bypass with a centrifugal pump is helpful in the management of blood pressure and may reduce the incidence of ischemic damage to the spine (6, 8). We operated our case by a cannulation via femoral artery and vein under support of low flow CPB at mild hypothermia in order to supply enough blood support to the spinal cord and visceral organs in case of longer durations of cross clamp.

## Conclusion

Patients with coarctation at the descending aorta and large saccular aneurysm may be operated more safely under support of low flow cardiopulmonary bypass.

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