

SINGLE-STAGE TRANSPERICARDIAL REPAIR OF ACUTE AORTIC DISSECTION ASSOCIATED WITH RECOARCTATION

Suat Büket, MD, Tahir Yağdı, MD, Mustafa Çıkrıkçıoğlu, MD, and E. Alp Alayunt, MD, *İzmir, Turkey*

The combination of coarctation of the aorta and acute aortic dissection is a rare condition. This combination requires sophisticated operative management. We report a case of recoarctation complicated with acute DeBakey type II aortic dissection that presented with pericardial tamponade, which was treated by a single-stage transpericardial approach.

Clinical summary. A 16-year-old patient was admitted to another institution with sudden onset of severe substernal chest pain and increasing dyspnea. Echocardiography revealed an aneurysmal dilatation and intimal flap of the ascending aorta, with effusion in the pericardial cavity. Computed tomographic scanning revealed an ascending aortic aneurysm with type II dissection and coarctation of the aorta (Fig 1). The patient was referred to our hospital for emergency surgical repair.

On admission, the patient had severe chest pain and shortness of breath. His history indicated that he had undergone coarctation repair at the age of 5 years. On physical examination, he was confused, sweaty, and cyanotic. Severe respiratory distress prompted early intubation in the intensive care unit. Cardiac catheterization was not performed because of the urgency of the situation and supposed danger of aortic rupture. The patient was taken immediately to the operating room. Cardiopulmonary bypass was commenced before median sternotomy through the right axillary artery and femoral vein because of the presence of hemodynamic deterioration from pericardial tamponade. A median sternotomy was performed. A total of 1000 mL of hemorrhagic pericardial fluid and clotted blood was drained from the pericardial cavity. The superior vena cava was selectively cannulated for retrograde cerebral perfusion. Body temperature was reduced to 18°C, and circulation was arrested after achievement of electrocerebral silence on the electroencephalogram. Ascending aortic aneurysm and annular dilatation with acute type II dissection were detected. The inner curvature of the arch and distal ascending aorta was replaced with a 26-mm Dacron graft. Cardiopulmonary bypass was commenced again, and a composite valved graft was implanted under the crossclamp. During the rewarming period, a 16-mm Dacron graft was anastomosed to the descending thoracic aorta below the coarctation segment through the incision of the posterior

pericardium with a side-biting clamp. The other end of the graft was anastomosed to the ascending aortic graft. The patient was discharged on the 11th postoperative day in good condition. Two months after the repair, the patient has continued to do well, and a follow-up angiogram revealed a satisfactory repair (Fig 2).

Discussion. Management of proximal aortic dissection in the presence of coarctation poses difficult problems. The stress of hypertension on the aortic wall constitutes an enormous risk to the patients. There are few reports of successful surgical treatment of dissections of the ascending aorta in patients with coarctation or recurrent coarctation. Lawson and Fenn¹ reported the first successful repair of this combination using a staged procedure. They first corrected the coarctation and later dealt with the ascending aortic dissection. Since then, some authors have advocated staged procedures to repair of these complex lesions.²⁻⁴ Sampath and associates² advocated initial repair of coarctation to relieve proximal hypertension, thereby decreasing the chance of progressive dissection or rupture. In their opinion this permits safe perfusion during correction of the dissection in the second stage, either through the femoral artery or through the aortic arch. This approach may be applicable in the presence of aortic aneurysm or chronic dissection. However, the untreated aorta remains exposed to the risk of rupture during the wait for second-stage replacement. Immediate repair of the acute dissection was mandatory for survival. Some authors replaced the ascending aorta as an initial procedure and repaired the coarctation as a second operation.^{3,4} Replacement of the ascending aorta without coarctation repair has an increased risk of perioperative hemorrhage from friable aortic suture lines because of the high blood pressure. Also, there would have been a risk of high afterload affecting cardiac performance. It seems that both techniques pose specific drawbacks. Svensson⁵ performed the first single-stage operation in 1994.

Body perfusion during repair of dissection is a major concern. Havoguimian and associates³ stated that they were able to maintain a right radial artery pressure above 40 mm Hg with standard femoral arterial cannulation. Tesler and Tomasco⁴ used proximal aortic arch cannulation and evaluated the adequacy of the perfusion of the lower body by continuous monitoring of urine output, which was satisfactory throughout the perfusion.

Svensson⁵ placed a Y in the arterial line, perfusing the lower torso through a tube graft attached to the supraceliac aorta and perfusing the upper torso and head through a cannula in the distal aortic arch. This allowed for the maintenance of adequate flow through both areas of the body. Obviously in this technique supraceliac anastomosis should be performed first, and an extended midline incision is needed to enter the

From Ege University Medical Faculty, Department of Cardiovascular Surgery, İzmir, Turkey.

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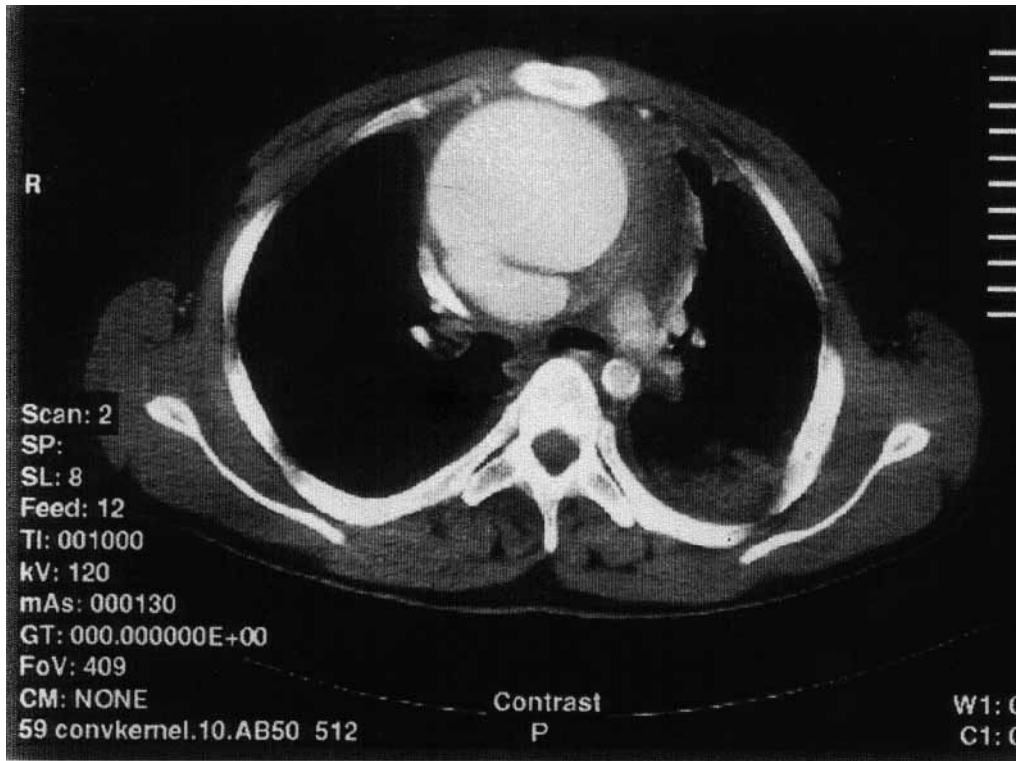


Fig 1. Computed tomographic scan of thorax showing type II aortic dissection and coarctation.

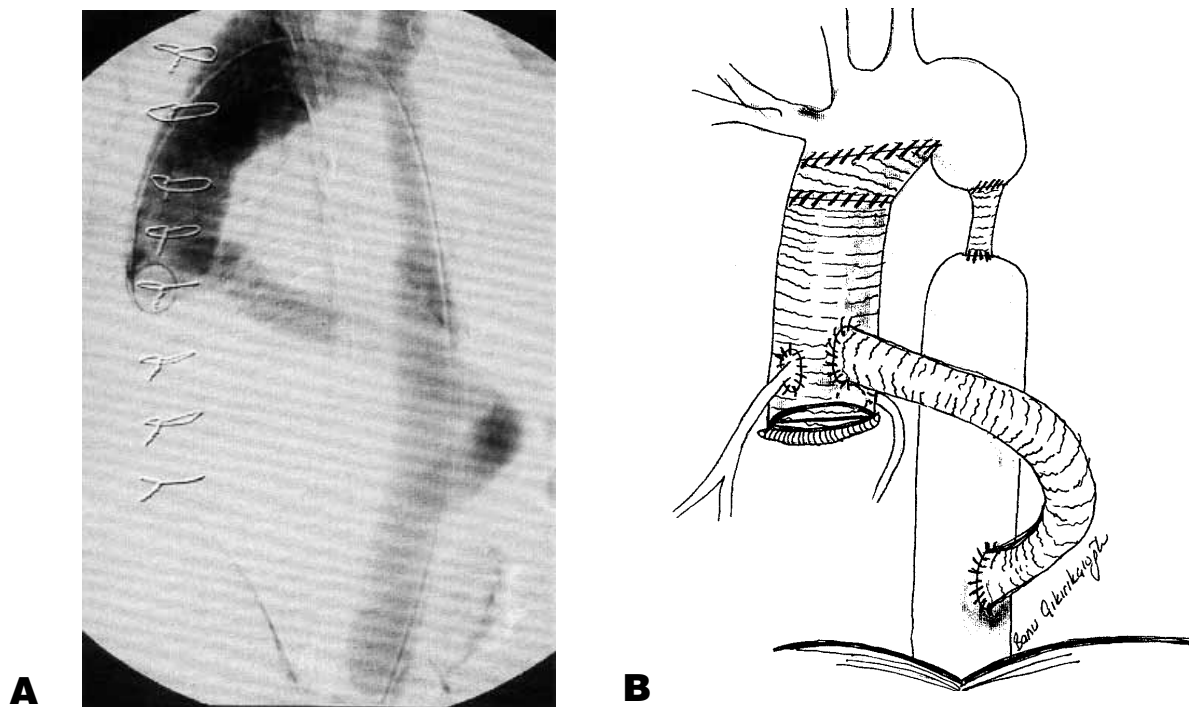


Fig 2. Postoperative aortogram and diagram showing ascending aorta repair and ascending-to-descending aortic bypass grafting.

abdominal cavity. If the patient's hemodynamic status is not stable or if the aorta had already ruptured, this procedure could not be safely performed. In most patients with coarctation, increasing numbers of collateral vessels and collateral circulation develop around the coarctate segment. Therefore, we used the right axillary artery for arterial cannulation. Throughout the operation and postoperative period there was no complication related to ischemic end-organ damage. The simultaneous repair of coarctation was achieved by an additional graft routed from the ascending aortic prosthesis to the descending aorta through a window in the posterior pericardium. A standard median sternotomy incision was adequate to repair both lesions.

In conclusion, the single-stage approach of transpericardial repair of proximal aortic dissection and coarctation with hypothermic circulatory arrest appears to be a safe and simple method. Single right axillary artery cannulation can be used to perfuse upper and lower parts of the body in the presence of a well-developed collateral circulation.

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Address for reprints: Suat Büket, MD, Department of Cardiovascular Surgery, Ege University Medical Faculty, 35100, Bornova, İzmir, Turkey (E-mail: tyagdi@hotmail.com).

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