

Debranching in a Case of Malformation in Association with Aortic Coarctation: A Rare Case

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Abstract Aortic coarctation is a congenital cardiac disease which is typically diagnosed and treated in childhood. If left untreated, aortic coarctation may lead to complications such as myocardial infarction, aortic aneurysm, aortic dissection and intracranial hemorrhage. In this study, we aimed to present the combined surgical and endovascular method that we performed in a 32-year-old male patient who had hypoplastic aortic arch, aortic coarctation and aortic aneurysm starting from the proximal left subclavian artery.

Keywords: aortic coarctation, congenital cardiac disease, aortic aneurysm

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1. Introduction

Aortic coarctation is the fifth most common congenital cardiac disease in adults [1]. Aortic coarctation can be associated with many cardiac anomalies, particularly bicuspid aortic valve. If left untreated, aortic coarctation may lead to complications such as myocardial infarction, aortic aneurysm, aortic dissection and intracranial hemorrhage [2].

In this study, we aimed to present the combined surgical and endovascular method we applied to a 32-year-old male patient who had hypoplastic aortic arch, aortic coarctation and aortic aneurysm starting from the proximal left subclavian artery.

2. Case Report

A 41-year-old male patient was admitted to our clinic with the complaints of pain radiating to his back for about the last 1 month and a palpable mass in his left neck. The physical examination revealed difference between the pulse rates from the right and left arms, and pulse rate could not be obtained from the femoral artery. The results of the CT scanning performed by another center revealed aortic arch, aortic aneurysm starting from the proximal left subclavian artery and aortic coarctation (Figure 1). It was planned to perform TEVAR for the aortic aneurysm and balloon angioplasty for the aortic coarctation during the same session following the left carotid axillary bypass intervention.



Figure 1. The results of the angiography scanning performed by another center revealed aortic arch, and aortic coarctation

3. Surgical Technique

The patient underwent a carotidocarotid bypass operation 2 years ago. The patient was placed onto the operating table in the supine position under general anesthesia. A vertical cut was performed along the edge of the sternocleidomastoid muscle. The carotid artery was explored. The common carotid artery (CCA), external carotid artery (ECA) and internal carotid artery (ICA) were exposed and encircled. The axillary artery was exposed through an incision under the left clavicle, and

circumferentially mobilized. Following intravenous administration of heparin at a dose of 50 IU/kg, the carotid artery and its branches were clamped. An end-to-side anastomosis was performed using a PTFE graft with a 6-0 prolene suture. The proximal and distal axillary artery were clamped. The axillary artery was anastomosed using a graft with a 6-0 prolene suture. After bleeding control, the subcutaneous tissue and skin were closed in an appropriate manner. The patient was transferred to the angiography and catheterization laboratory for endovascular grafting (Figure 2).



Figure 2. After surgical intervention the patient was transferred to the angiography and catheterization laboratory for endovascular grafting



Figure 3. Angiography was performed. Since no complications were observed, the procedure was terminated

4. Endovascular Stent Graft Implantation Technique

For the aneurysm starting from the proximal left subclavian artery, after insertion of a graft into the aorta from the proximal left subclavian artery (TEVAR) and supraaortic debranching, endovascular grafting was performed. One 6f sheath was inserted in the right brachial artery, and in the right femoral artery with cutdown. An angiography was performed by inserting a pigtail catheter in the brachial artery. A guide wire was passed through the right catheter into the right femoral artery, across the coarcted segment. 5000 units of heparin was administered. An andra balloon xl 28-40 was sent over the guide wire and inflated. Then a 34x200 mm medtronic valiant stent graft was advanced. It was opened at the proximal quarter segment. An angiography was performed. Since the endoleak and aneurysmal part were not completely closed off at the proximal end, a second 34x150 mm medtronic valiant stent graft was implanted. A follow-up angiography was performed (Figure 3). Since no complications were observed, the procedure was terminated.

5. Discussion

Aortic coarctation is a congenital cardiac disease which is typically diagnosed and treated in childhood [3] and seen at a rate of 5-8% among congenital cardiac diseases [1].

Aortic coarctation can be associated with various cardiac anomalies such as ascending aortic aneurysm, double arcus aorta, right descending aorta, persistent left superior vena cava, abnormal pulmonary venous return anomaly and ventricular septal defect, particularly bicuspid aortic valve. If left untreated, aortic coarctation may lead to complications such as myocardial infarction, congestive cardiac failure, infective endocarditis, aortic aneurysm, aortic dissection, aortic rupture and intracranial hemorrhage [2]. Our patient who had hypoplastic aortic arch, aortic coarctation and aortic aneurysm starting from the proximal left subclavian artery.

In aortic coarctation, the imaging method is very important to monitor the clinical course and to determine the operation method [4]. MRI should be performed to obtain precise information about the location of the aortic coarctation and the size and diameter of the aortic aneurysm. Computerized tomography can be an alternative to MRI since it provides information especially about the aneurysm branching, and whether an acute or

subacute rupture is present [5]. The CT of our patient revealed hypoplastic ascending aorta, an aortic aneurysm starting from proximal subclavian artery and an aortic coarctation in the isthmus aorta.

Various surgical methods are used to treat patients with aortic coarctation that had not been treated in childhood [6]. Some surgeons performed interventions for aortic coarctation and cardiac anomaly at the same session while others firstly repaired aortic coarctation and as performed intervention for cardiac malformation as a second step to reduce cardiac preload [7]. Today aortic coarctation is tried to be treated using different methods such as surgery or balloon angioplasty with or without stent [8]. We used a balloon without stent for the coarcted segment.

In fact, the nature of the accompanying anomalies play an important role in the determination of the surgical method to be applied to coarcted segments. Our patient had many complications accompanying the aortic coarctation, but since we had the opportunity to use newly developed techniques, we firstly performed carotid axillary bypass to protect the left arm from ischemia, and then performed an intervention for the coarcted segment at the angiography laboratory, and as the final step, performed a TEVAR procedure for the aortic aneurysm. So our patient returned to his daily life with fewer complications.

References

- [1] Cetta F, Lichtenberg RC, Clark SE. Adults with congenital heart disease. *Compr Ther* 1992; 18: 33-7.
- [2] Pedra CA, Fontes VF, Esteves CA, Arrieta SR, Braga SL, Justino H, Kambara AM, Moreira SM, Sousa JE. Use of covered stents in the management of coarctation of the aorta. *Pediatr Cardiol* 2005; 26: 431-9.
- [3] Yilmaz M, Polat B, Saba D. Single-stage repair of adult aortic coarctation and concomitant cardiovascular pathologies: a new alternative surgical approach. *J Cardiothorac Surg* 2006; 1: 18.
- [4] Hiller N, Verstanding A, Simanovsky N. Coarctation of the aorta associated with aneurysm of the left subclavian artery. *Br J Radiol* 2004; 77(916): 335-7.
- [5] Celik T, Iyisoy A, Kursaklioglu H, Unlu M, Kose S, Ozmen N, Isik E. A large calcified saccular aneurysm in a patient with aortic coarctation. *Int J Cardiovasc Imaging* 2006; 22(1): 93-5.
- [6] Morris RJ, Samuels LE, Brockman SK. Total simultaneous repair of coarctation and intracardiac pathology in adult patients. *Ann Thorac Surg* 1998; 65(6): 1698-702.
- [7] Sampath R, O'Conner WN, Noonan JA, et al. Management of ascending aortic aneurysm complicating coarctation of the aorta. *Ann Thorac Surg* 1982; 34: 125-31.
- [8] von Kodolitsch Y, Aydin MA, Koschyk DH, Loose R, Schalwat I, Karck M, Cremer J, Haverich A, Berger J, Meinertz T, Nienaber CA. Predictors of aneurysmal formation after surgical correction of aortic coarctation. *J Am Coll Cardiol* 2002; 39: 617-624.