

Aortic coarctation treated with a self-expandable stent graft

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In this article, we presented a 19-year-old patient with juxtaductal aortic coarctation. The coarcted segment was observed with angiographic study. We planned to implant a self-expandable stent graft. At the angiography laboratory, endovascular aortic stent graft was implanted through the right femoral artery with direct small femoral incision. Then, we dilated the narrowed stent segment by balloon catheter. After the procedure, the patient had a significantly dilated aorta distal to the previously coarcted segment. A stent graft was used to treat coarctation. No access site complications were observed.

Keywords: Neosinus; pericardial patching; right ventricular outflow tract stenosis.

Aortic coarctation describes wide spectrum of diseases with the congenital narrowing of any part of the descending thoracic or abdominal aorta.^[1] It typically refers to the narrowing of the proximal thoracic aorta at the level of the ductus or ligamentum arteriosum.^[1,2] Surgical treatment has been used for more than 70 years and coarctation is defined as primary (native) phenomenon or secondary to previous corrective surgery.^[2] Currently, endovascular techniques have become more widespread for adult patients, in particular, and these techniques are less invasive than conventional surgery. Endovascular techniques are either balloon angioplasty or primary stent implantation. Today, catheter intervention is an established treatment option for adult coarctation with a good success rate and safety profile.^[3]

CASE REPORT

A 19-year-old female patient with juxtaductal aortic coarctation was admitted to our clinic. Physical examination revealed no femoral pulses. The upper extremity blood pressure was measured 160/80 mmHg and 3/6 systolic murmur was heard over precordial and interscapular areas. The laboratory test results were normal. Echocardiography did not reveal any associated abnormality. The coarcted segment was demonstrated with the angiographic study (Figure 1). The sufficient diameter of the coarcted segment and sufficient length of proximal pre-coarcted segment was shown for direct stent graft implantation.

We planned to implant a self-expandable stent graft (Medtronic Valiant Thoracic Stent Graft with

the Captiva Delivery System, USA). We prepared the patient under epidural anesthesia and bilateral femoral exposure. After the femoral exposure, we observed both of the femoral arteries which were 4-5 mm in diameter due to less blood supply of lower half of the body. At the angiography laboratory, endovascular aortic stent graft was implanted through the right common femoral artery with direct small femoral artery incision (Figure 2). Left femoral artery exposure was used for angiographic control views. We implanted the graft with 22 mm in radius and 112 mm in short and 124 mm with anchoring system in length. Then, we dilated narrowed stent segment by balloon catheter application (Medtronic Reliant Stent Graft Balloon catheter; 12 F) (Figure 3).

After the procedure the patient had a significantly dilated aorta in comparison with the previously coarcted segment (Figure 4). One stent graft was enough to dilate the coarcted segment. There were no access site complications. We observed no complications. Blood pressure in the upper extremity was decreased to normal and the patient was discharged without any complication. At six months, a computed tomography angiographic image was obtained. The preoperative and postoperative images were then compared (Figures 5-7). There was no coarcted segment at the

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Figure 1. Aortic coarctation preoperative angiographic view.



Figure 2. Aortic coarctation postoperative angiographic view just after direct stent implantation.

postoperative views. The blood pressure measurements were within normal range.

DISCUSSION

Patients with primary adult aortic coarctation have a decreased life expectancy, unless treated. Surgical repair was the only effective treatment option available in the past and was demonstrated to improve the

postoperative treatment of hypertension.^[1] These patients with primary adult aortic coarctation may suffer from upper extremity hypertension, exercise intolerance and shortness of breath. These patients may have many associated cardiovascular comorbidities such as pulmonary hypertension, left ventricular hypertrophy and arrhythmias. After surgery, serious complications requiring revision can be seen. These are paradox hypertension, postcoarctation syndromes



Figure 3. Aortic coarctation angiographic view during balloon dilatation.



Figure 4. Aortic coarctation postoperative angiographic view.



Figure 5. Aortic coarctation preoperative computed tomographic image, white arrow shows coarcted segment.

characterized by abdominal complaints, paraplegia, stroke. Hemothorax, chylothorax, left recurrent nerve paralysis, left phrenic nerve paralysis, Horner's syndrome also occur. As late complications restenosis, ischemia of the left arm and aneurysm formation at the surgically corrected site could be seen. For this reason, less invasive methods like balloon angioplasty or stent implantation were preferred for primary adult aortic coarctation instead of surgery. Since recurrent coarctation might have seen or complications such as pseudoaneurysm at the anastomosis or aneurysm formation around the aortic tissue after the primary surgical correction, less invasive endovascular interventions have been described with good results despite high operative risk.^[5] However, aortic coarctations in older adults have thicker, more resilient and extensive calcifications which increase the theoretical risk of rupture with vigorous balloon dilatation.^[4] Furthermore, appropriate patient selection may decrease complication ratio.

Wheatley et al.^[1] reported a single center case series with 16 patients in an eight-year period in 2010. The authors observed no perioperative complications and no open surgical conversions, however, further long-term follow-up results were needed. Fink-Josephi et al.^[5] reported an endovascular repair of thoracic adult aortic coarctation experiences with 12 patients without complications.

In this case report, we performed direct stent implantation, as there was enough diameter to permit the stent placement into the coarcted segment. Then, we opened the self-expandable stent. We also performed



Figure 6. Aortic coarctation postoperative six months computed tomographic image, white arrow shows corrected segment.

balloon dilatation to the previously coarcted segment to prevent mismatch between the post-stenotic dilated segment and coarcted segment diameter and we observed no complication. Balloon dilatation was a simple procedure following the endovascular stent implantation. The patient had no problem related to the coarctation. Hypertension was not observed during the six-month follow-up period.

In conclusion, as long-term results of stenting have not been fully reported in the literature, this method should be restricted to selected cases. Our primary criterion for primary stent implantation is the enough diameter of the coarcted segment to pass through endovascular stent graft device, being at least 5-10 mm.

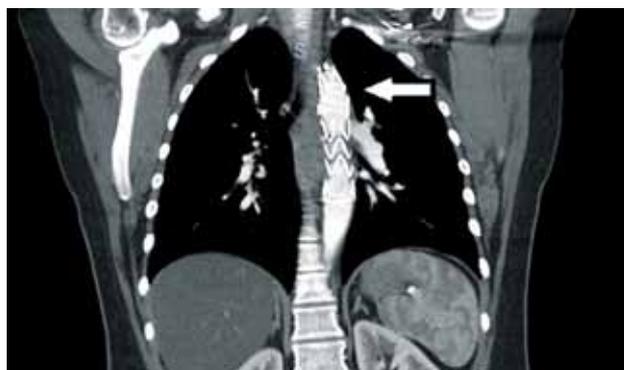


Figure 7. Aortic coarctation postoperative six months computed tomographic image, white arrow shows corrected segment.

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