

**Endovascular Treatment of Aortic Pseudoaneurism due to Gunshot in a Child *****Latif ÜSTÜNEL¹**
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Traumatic pseudoaneurysm of abdominal aorta is a rare life-threatening condition. Most of the lesions develop as a result of intraabdominal penetrating injuries and may not be detected at first evaluation. Endovascular stent graft repair pulls attention as an alternative to open surgery. A 13-years-old child who developed 2 aortic pseudoaneurysms at celiac trunk level as the result of gunshot wound was transferred to hybrid operating room for endovascular aneurism repair (EVAR). A thoracic endovascular stent graft (GORE, TAG, Thoracic Endoprosthesis USA) measuring 21 mm in diameter and 10 cm in length was implanted through the right femoral artery under general anesthesia.

Key Words: Aorta, pseudoaneurism, endovascular, gunshot

Ateşli Silah Yaralanması Olan Bir Çocukta Aortik Psödöanevrizmanın Endovasküler Tedavisi

Abdominal aortanın travmatik psödöanevrizmaları nadir görülse de hayatı tehdit eden bir durumdur. Lezyonların çoğu intraabdominal penetran yaralanmalar sonucu olup ilk değerlendirme esnasında ortaya çıkarılamayabilmektedir. Endovasküler stent greft onarımı acil cerrahiye bir alternatif olarak dikkat çekmektedir. Çölyak trunkus seviyesinde ateşli silah yaralanmasına sekonder gelişmiş olan iki aortik psödöanevrizması olan 13 yaşında bir çocuk hasta hibrit operasyon odasına Endovasküler Anevrizma Tamiri operasyonu amaçlı alındı. Torasik endovasküler stent greft (GORE, TAG, Thoracic Endoprosthesis USA) 21 mm çapta ve 10 cm uzunluğunda sağ femoral arterden genel anestezi eşliğinde yerleştirildi.

Anahtar Kelimeler: Aorta, psödöanevrizma, endovasküler, yaralanma

Introduction

Traumatic pseudoaneurysm of abdominal aorta is a rare life-threatening condition. Most of the lesions develop as the result of intraabdominal penetrating injuries and may not be detected at the first evaluation. Signs and symptoms may emerge months or years later. Endovascular stent graft repair pulls attention as an alternative to open surgery in treatment of many aortic diseases, due to being safe and minimally invasive. Endovascular aneurism repair (EVAR) treatment is recommended for only the patients in whom open surgery is contraindicated (1).

After the patient consented to publication of this report, we present our experiences about a successful endovascular stent graft treatment in a 13-year-old child who developed 2 aortic pseudoaneurysms at celiac trunk level as the result of gunshot wound.

Case Presentation

A 13-years-old girl was referred to a private hospital on postoperative day 8 with complaint of paraplegia and urinary incontinence following laparotomic splenectomy, hepatic segmentectomy and primary aorta repair at an another institute, due to gunshot wound at epigastric region. Thoraco-lumbar magnetic resonance imaging (MRI) obtained for investigating the etiology of paraplegia revealed spinal cord edema and hematoma measuring 39x22 mm neighbouring to the aorta. Thoraco-lumbar MRI was repeated 15 days later as abdominal pain developed in the patient. She was applied medical treatment and physical therapy and transferred to our hospital for further investigation and treatment for 73x43 mm of pseudoaneurysm neighbouring to abdominal aorta. Her general condition was moderate-good, arterial blood pressure

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was 100/55 mmHg, fever was 37.5°C, heart rate was 78 bpm on physical examination, there was an abdominal tenderness and pain, paraplegia in lower extremities. Her system examinations were otherwise normal. On the neurological examination, American Spinal Injury Association (ASIA) motor score was detected as 10 (For one extremity ASIA score was calculated as 0 the worst, and as 50 the best.) (2). Laboratory examinations were normal except leukocytes in urine and elevated white blood cells (WBC-15600 mm³). Aorta diameter was 16 mm at the proximal part of the pseudoaneurysm. Spiral CT detected 2 pseudoaneurysms; one measuring 8x5 cm at the right antero-lateral of the proximal to the celiac trunk, another measuring 2x1.5 cm at the posterior of the aorta which showed contrast in arterial phase (Figure 1). Urine and blood cultures were obtained due to fever. Imipenem 30 mg/kg/day was started by the infectious disease specialist due to pseudomonas aeruginosa growing in the urine culture. Because of the emergency the operation started immediately at the following day and imipenem treatment was administered until urine culture became negative for pseudomonas aeruginosa for 14 days after the operation. The patient was transferred to hybrid operating room for EVAR. Right femoral artery exploration was used for implantation. After 7500 IU heparinization a thoracic endovascular stent graft (GORE, TAG, Thoracic Endoprosthesis USA) measuring 21 mm in diameter and 10 cm in length was implanted through the right femoral artery under general anesthesia.

Endoleak was not observed in control angiographs and the procedure was terminated (Figure 2). Abdominal aorta was found to be completely normal on control tomographic angiography (CT) obtained one month later (Figure 3). She controlled one year later, the aorta was normal and stent graft was patent on tomographic angiography, paraplegia improved to the score of 30 compared to one year before (10 score).



Figure 1. Spiral CT detected 2 pseudoaneurysms, one measuring 8x5 cm at the right antero-lateral of the proximal of celiac trunk, another measuring 2x1.5 cm at the posterior of the aorta which showed contrast catch in arterial phase (Patient consent is obtained).



Figure 2. Endoleak was not observed in control DSA and the procedure was terminated (Patient consent is obtained).



Figure 3. Abdominal aorta was found to be completely normal on control tomographic angiography obtained one month later (Patient consent is obtained).

Discussion

Gunshot wound and stabwound injuries are together with high mortality rates. This condition usually requires open surgery due to organ injuries and active hemorrhage. Endovascular repair of abdominal aorta injuries were rarely reported and these cases include the hemodynamically stable, pseudo aneurysms, traumatic arterio-venous fistulas and dissections (3).

Retroperitoneal position of abdominal aorta and the large amount of surrounding tissues may result in local hemorrhage's stopping with local tamponate formation. Fibrosis of the surrounding tissues and absorption of the hematoma content may lead to chronic pseudoaneurysm formation in some of the cases (4). Abdominal and low back pain, pulsatile mass, compression on neighbouring

tissues, gastrointestinal hemorrhage and death due to sudden rupture can be seen (5). Clinical symptoms may appear either a short time after the injury, weeks, months or years later (6-8). Thoracic CT angiography is an effective screening modality in patients with penetrating injuries to the child (9). In this case we detected two pseudoaneurysms originating from aorta at the celiac trunk level on CT angiography obtained due to detection of a mass lesion on MRI taken for investigating the etiology of paraplegia 28 days after the injury too.

Endovascular treatment may have many advantages in aortic trauma including effective and sufficient treatment of the regions which are difficult to reach, shorter operative time, using less heparin, less hemorrhage particularly in multipl trauma patients, less complications like paraplegia or visceral organ injury related with cross-clamping ischemia time (10-11).

White et al. (3) successfully closed the aortic pseudoaneurysm developing between superior mesenteric artery and renal arteries due to a stabwound injury with endovascular method and they reported no complications on their follow up of 16 months. Singh et al. (12) applied endovascular repair to the pseudoaneurysm at the proximal of celiac trunk due to a stabwound injury and reported no complications on their follow up of one year. Tucker et al. (13) applied pseudoaneurysm repair using aortic cuff in a patient who developed a pseudoaneurysm in supra-celiac aorta and

fistulized to vena cava as the result of stabwound injury and reported no complications on follow up.

In our case, we applied endovascular repair to 2 pseudoaneurysms located in anterior and posterior sides of the aorta including celiac trunk in a 13-year old child. In the literature, it was reported that they did not apply coil embolization before the procedure due to 98% stenosis at celiac trunk. Coil embolization was not performed due to 80% stenosis in celiac trunk due to the compression of pseudoaneurysm also in our case.

The reason for preferring endovascular repair was the patient's and the family's refusal of an open surgery again and pseudomonas growing in wound culture. Goretex 21 mm TAG was considered to be proper as the diameter of proximal aorta was 16 mm. The shortest length, 100 mm was chosen. A long graft was used as it was considered not to change the clinical condition of the patient who was already paraplegic and had urinary incontinence.

Long term results of endovascular surgery are not known in penetrating aorta injuries. Penetrating injuries usually occur in the young. Therefore durability of endografts is very important and further studies are required. In conclusion, endovascular repair should be preferred in only the patients in whom open surgery is risky and these patients should be monitored closely, as reported in literature.

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