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Emergency Hybrid Treatment Strategy in Abdominal Aortic Injury during Microdiscectomy Operation: A Rare Case Report

Mikrodiskektomi Operasyonu Sırasında Abdominal Aort Yaralanmasında Acil Hibrit Tedavi Stratejimiz: Nadir Görülen Olgu

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ABSTRACT

Iatrogenic abdominal aortic injuries were previously reported during classical lumbar disc hernia repair. Microdiscectomy technique begun to used widely with time instead classical lumbar disc hernia due to its minimally invasive nature. Recently, microdiscectomy method is preferred more frequently among these methods. Small incisions, good exposures and low risk of bleeding are known advantages of the microdiscectomy method compared to the classical method. There was no iatrogenic abdominal aortic injury during microdiscectomy surgery reported in literature, as our knowledge. In this report, it is aimed to present a 62-year-old female patient who underwent an operation due to lumbar disc herniation and who had aortic injury during microdiscectomy in the neurosurgery clinic and emergently treated with endovascular aortic repair method.

Keywords: Emergency hybrid treatment; microdiscectomy; abdominal aortic injury.

ÖZ

Daha önceleri klasik lomber disk hernisi operasyonlarında, abdominal aort yaralanma olguları bildirilmiştir. Zamanla klasik disk hernisi operasyonu yerine, minimal invazif olması dolayısıyla mikrodiskektomi operasyonu yaygın olarak kullanılmaya başlandı. Son zamanlarda bu yöntemlerden mikrodiskektomi yöntemi daha sık tercih edilmektedir. Küçük cerrahi insiziyon, düşük kanama oranı ve iyi expojur sağlaması mikrodiskektomi yönteminin klasik yönteme göre bilinen avantajlarıdır. Literatürde, mikrodiskektomi operasyonuna bağlı olarak bildirilmiş abdominal aort yaralanması vakasına rastlayamadık. Bu olgu sunumunda, lomber disk hernisi nedeni ile operasyon planlanan, beyin cerrahisi kliniğinde mikrodiskektomi işlemi yapılırken aort yaralanması gelişen ve tedavide acil olarak endovasküler yöntem ile aort tamir uyguladığımız 62 yaşında kadın hastanın sunulması amaçlanmıştır.

Anahtar kelimeler: Acil hibrit tedavisi; mikrodiskektomi; abdominal aort yaralanması.

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INTRODUCTION

Lumbar disc herniation is a common disease nowadays. In recent years, minimally invasive methods have been used widely. Among these methods, microdiscectomy is the most effective method. Small incisions, good exposures and low risk of bleeding are known advantages of the microdiscectomy method (1). Abdominal aortic injuries are very rare to be occurred during the microdiscectomy.

In this case report, we aimed to present a 62-year-old female patient who underwent surgery due to lumbar disc herniation. She developed aortic injury while undergoing microdiscectomy in the neurosurgery clinic and was treated with endovascular method, emergently.

CASE REPORT

A 62-year-old female patient was diagnosed with disc herniation with complaint of low back pain. Microdiscectomy procedure was decided to be performed by the neurosurgery clinic. The patient underwent a microdiscectomy under spinal anesthesia and had massive bleeding from the abdominal aorta. The bleeding was immediately stopped via Floseal®. The patient was sent to a computerized tomography (CT) and the CT scan detected findings considered as extravasation-pseudoaneurysm, and emergent consultation to cardiovascular surgery clinic was requested (Figure 1).

The bleeding was stopped and hemodynamics was stable, it was decided to take the patient to a hybrid operating table for rapid treatment. As soon as the right femoral artery was explored, severe hypotension and abdominal distention developed. Upon this, we decided to perform open surgery immediately. Since the patient was in a hybrid operating room and the right femoral artery was exposed; we planned to introduce and inflate an occlusion balloon through femoral artery for temporary clamping until the abdomen was opened and aorta was clamped. Emergent angiograph was performed. For this purpose, angiography was performed immediately and it was seen that the infrarenal part of the abdominal aorta was long and the ruptured area was in the middle and posterior section (Video 1). It was thought that this rupture area could be closed with tubular graft. Measurements were made quickly. The injury in the abdominal aorta was repaired with endovascular method by Medtronic Endurant tubular aortic stent graft with dimensions of 25x25x49 mm. The graft was placed covering 20 mm below and 20 mm above the ruptured area on the intact aorta. Bleeding stopped after the procedure (Video 2). Following the operation, blood pressure values were brought to normal levels with appropriate fluid replacement and blood product transfusion.

General surgery consultation was requested in consequence of abdominal distention. As the pressure within the abdomen was too much, it was decided to open the abdomen and retroperitoneum for hematoma drainage to prevent abdominal compartment syndrome. The abdomen was opened; there was no free fluid and blood in the abdomen. When the retroperitoneum was opened, a large amount of hematoma and 2500 cc defibrinated blood were aspirated to cell saver. The aspirated blood was returned to the patient after washing. There was no bleeding from the aorta. The aorta was seen to be adherent to the paravertebral tissue. Retroperitoneum and abdomen were closed and the operation was terminated. There was no complication in the patient who was extubated on postoperative first day. The patient was transferred to the neurosurgery clinic.

On the 30th postoperative day, computed tomography showed no extravasation (Figure 2).

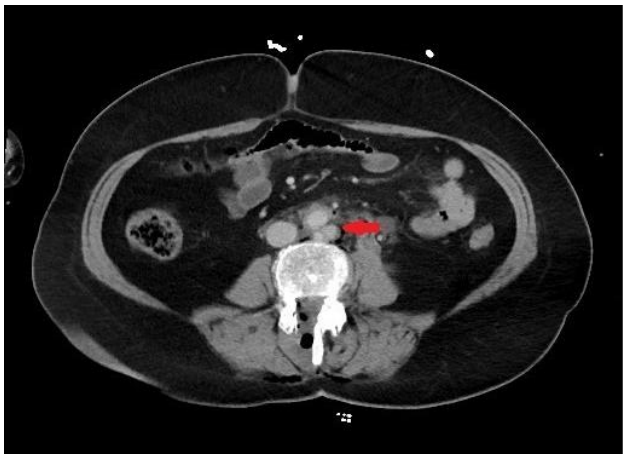
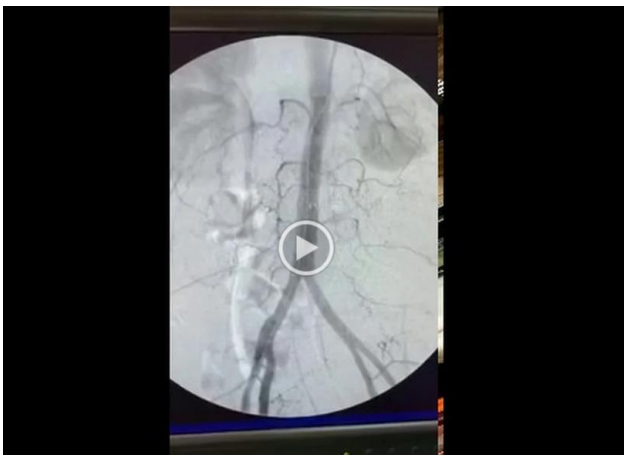


Figure 1. Preoperative CT image (arrow indicates the injured segment)

Video 1. Preprocedural angiographic view showing aortic injury

Figure 2. CT image on 30th postoperative day



Video 2. Postprocedural view

DISCUSSION

Endovascular treatment methods are performed by using catheters and radiological facilities. Hybrid procedures are performed in an operating room with C-arm scopy. Widespread use of hybrid operation rooms has led to a significant increase and progress in endovascular treatment of peripheral arterial diseases and aneurysms. As successful results were obtained, endovascular methods were used in the emergency treatment of ruptured aneurysms. Evidence of successful treatment of emergency procedures with endovascular methods has led to the idea that endovascular methods can be used in traumatic vascular injuries. Even complex vascular emergencies which can only be treated surgically in the past periods can be treated very quickly and successfully with hybrid procedures. There is no large series of studies using endovascular methods related to traumatic vascular injuries. Results are usually reported as case reports or case series. Sahin et al. (2), in a case series including 9 patients, showed that endovascular treatments can be applied in traumatic vascular injuries. These series of cases reported in the literature were usually pseudoaneurysm or arteriovenous fistulas and were relatively elective cases. In our case, it is unquestionable that when we consider rupture of abdominal aorta and bleeding even after hemostasis with Floseal, we are faced with a very emergent picture. In the literature, endovascular treatments have been reported for thoracic aorta injuries in such emergency situations but have not been reported for abdominal aorta. Today, endovascular treatment is successfully applied in traumatic injuries of the thoracic aorta (3). Abdominal aorta (due to its anatomical features, celiac trunk, renal artery side branches and bifurcation of aorta),is a disadvantageous region for placing tubular graft immediately in a traumatic injury. In our case, the injury was located in the middle and posterior of the infrarenal segment of the abdominal aorta (Video 1). In addition, the infrarenal segment of the abdominal aorta was long and the injury was in the middle section. These anatomical features and localization were some of the most important parameters that enabled the success and speed of the procedure. The guidelines of aortic surgery have been reported that an intact landing zones of minimum 20 mm in the proximal and distal region of the injury site should be covered with graft on the solid aorta. In our case, this distance was adjusted to be 22-23 mm from the proximal and distal. It would be time consuming to use bifurcated grafts or chimney technique in cases which iliac arteries or renal arteries were involved and it would be controversial for endovascular treatment to be the first choice. In addition, the absence of these materials in the hospital warehouse is a separate problem. The most important advantages of hybrid interventions compared to classical surgeries are being more minimally invasive, less mortality and morbidity. Mortality and morbidity were not observed in our case.

However, due to the serious retroperitoneal hematoma, the general surgery clinic decided to drain the hematoma and laparotomy was performed. For this reason, endovascular treatment was not minimally invasive for our case. On the other hand, when the retroperitoneum was opened, it was observed that the infrarenal abdominal aorta was highly adherent to the paravertebral tissue. If endovascular treatment would not be possible to perform for this case, it can be foreseen that open surgery will be technically challenging considering the adhesions in the aorta and the location of the ruptured part. Although laparotomy was performed for hematoma, we believe that it is possible to perform a faster operation with less mortality and morbidity by using the endovascular treatment method. On the other hand, it should not be overlooked that defibrinated blood aspirated with a cell saver during laparotomy was given back to the patient.

The most important drawback of endovascular treatment is the problems that may occur in the long term. The most common of these problems are endoleaks, which are commonly seen in stent grafts used in aneurysms (4). Although there are many reasons for this, the most common cause in the long term is aneurysmatic enlargement in the neck part of the stent graft due to the progressive nature of the aneurysm. In our case, there was no aneurysm in the etiology and there was no atherosclerotic pathology of the aorta.

In conclusion, if there is anatomic compliance and adequate equipment and an experienced team is available, endovascular treatment methods can be applied as the first choice for the traumatic injuries of the abdominal aorta.

Informed consent: Written informed consent was obtained from the patient.

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