

Iliocaval Arteriovenous Fistula Following Lumbar Disc Surgery: Endovascular Treatment with a Stent-Graft

Lomber Disk Cerrahisini Takiben Ortaya Çıkan İliokaval Arteriovenöz Fistül: Endovasküler Stent Greft ile Tedavi

ABSTRACT

Arteriovenous (AV) fistulae, pseudoaneurysms, and lacerations may occur during disc surgery. AV fistula after lumbar disc surgery is rare. Early diagnosis and treatment of vascular complications associated with disc surgery is essential due to their high mortality and morbidity rates. We report a case report who was presented with fistulous shunt between right common iliac artery and inferior vena cava fifteen days after operation for herniated discs at L4-L5 and L5-S1 levels. Treatment was transcatheter covered stent placement at the fistulous site of right common iliac artery using a self expandable stent-graft. We suggest use of minimally invasive interventional techniques in the management of suitable vascular injuries following lumbar disc surgery.

KEY WORDS: Arteriovenous fistulae, Vascular complication, Lumbar disc surgery, Endovascular, Stent graft

ÖZ

Disk cerrahisinden sonra arteriovenöz fistül, psödoanevrizmalar ve laserasyonlar görülebilir. Lomber disk cerrahisinden sonra AV fistül görülmesi nadirdir. Yüksek mortalite ve morbiditenin önlenmesi için disk cerrahisine bağlı vasküler komplikasyonların erken tanı ve tedavisi zorunludur. Biz L4-L5 ve L5-S1 seviyelerinden lomber diskektomi ameliyatı yapıldıktan yaklaşık 15 gün sonra sağ ana iliak arter ve inferior vena cava arasında fistül ve şant nedeniyle kliniğimize başvuran bir hastanın tedavisini sunduk. Hastanın tedavisi sağ ana iliak arterin fistülize olan kısmına katater içerisinden kendinden açılan stent greft yerleştirilerek yapıldı. Biz lomber disk hernisi cerrahisi sonrasında görülen uygun vasküler yaralanmaların tedavisinin minimal invazif girişimsel teknikler kullanılarak yapılmasını öneriyoruz.

ANAHTAR SÖZCÜKLER: Arteriovenöz fistül, Vasküler komplikasyon, Lomber disk cerrahisi, Endovasküler, Stent greft

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INTRODUCTION

The vascular complications associated with disc surgery were first reported by Linton and White in 1945 (11). The incidence of vascular injuries is 1-5 per 10.000 during disc surgery (8) and it is seen more at the L4/5 level than other interspaces (10). Arteriovenous (AV) fistulae, pseudoaneurysms, and lacerations may occur during disc surgery. AV fistula after lumbar disc surgery is rare (5). Early diagnosis and treatment of vascular complications associated with disc surgery is essential due to their high mortality and morbidity rates (3). The frequent mortality of 40%–50% after these vascular injuries is often related to acute blood loss into the retroperitoneal or intraperitoneal space. Open vascular surgical repair and endovascular techniques may be chosen for treatment of these complications. Recently, endovascular treatment as a minimal invasive method has been recommended for the repair of these AV fistulae (5,11). We report a case of AV fistula between the right common iliac artery and the inferior vena cava after lumbar disc surgery that was successfully treated with the endovascular technique.

CASE

A 21-year-old man was operated for herniated discs at the L4-L5 and L5-S1 levels. He was discharged in good clinical condition four days after the surgery. Approximately fifteen days after surgery, the patient presented at our clinic with pain and ecchymosis in the right inguinal region. Abdominal distention and a systolic and diastolic murmur in the lower right abdominal area were noted on clinical examination. There were no signs of cardiac failure such as tachycardia, basal rales or hepatomegaly. Peripheral pulses of the right lower limb were not palpable. The hemoglobin level was 8.7 g/dl. Abdominal ultrasonography revealed fluid (likely blood) in the peritoneal space.

Contrast enhanced abdominal computed tomography revealed an abnormal connection between the right common iliac artery and inferior vena cava, and confirmed blood-density fluid around this fistula. DSA confirmed the fistulous shunt between the right common iliac artery and inferior vena cava (Figure 1). Following faculty agreement on the endovascular management of this complication, the patient was brought back to the angiography suite and transcatheter covered stent

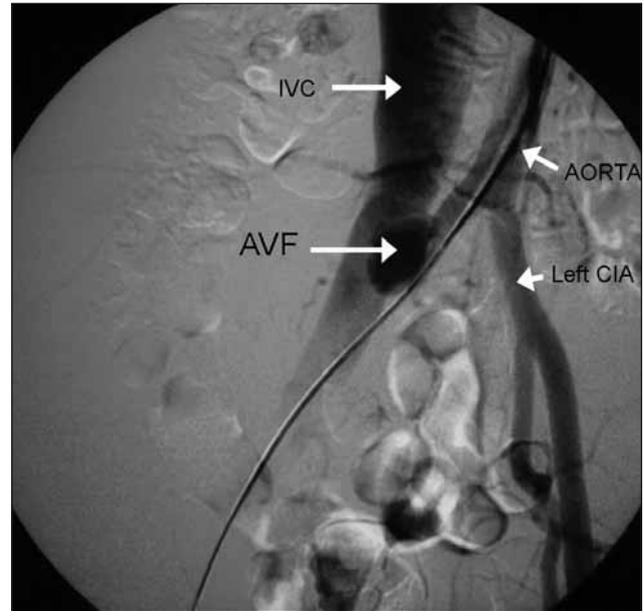


Figure 1: Anteroposterior view of the abdominal aorta angiogram showing an arteriovenous fistula (AVF) between the right common iliac artery (CIA) and inferior vena cava (IVC).

placement was achieved at the fistulous site of right common iliac artery using a self expandable Gore Hemobahn® Endoprosthesis 13 mm x 10 cm (W.L.Gore&Associates, Inc. Flagstaff, Arizona, USA) (Figure 2). A week later patient suffered from deep venous thrombosis at the contralateral leg. Coumadin treatment was applied for three months. Vascular follow-up was performed with vascular ultrasonography and physical examination. One year follow-up is completed without any other complication.

DISCUSSION

Abdominal vascular injury during lumbar disc surgery as a major complication can be seen because of the intimate anatomical relation between the lumbar vertebrae and major vessels (7). The incidence of vascular injuries, including AVF, lacerations, and pseudoaneurysms during disk operations, is one to five per 10,000 (8,10). As a complication of lumbar disc surgery, 73% of AV fistulas are seen following L4/5 lumbar disc surgery and 21% in L5/S1 (5). The cause of injury is thought to be due to combination of the tear in anterior annulus fibrosis and pressure upon the soft abdomen forcing the vessels tightly against the vertebral bodies (9). The mechanism of AV fistula formation following spinal surgery is penetration of

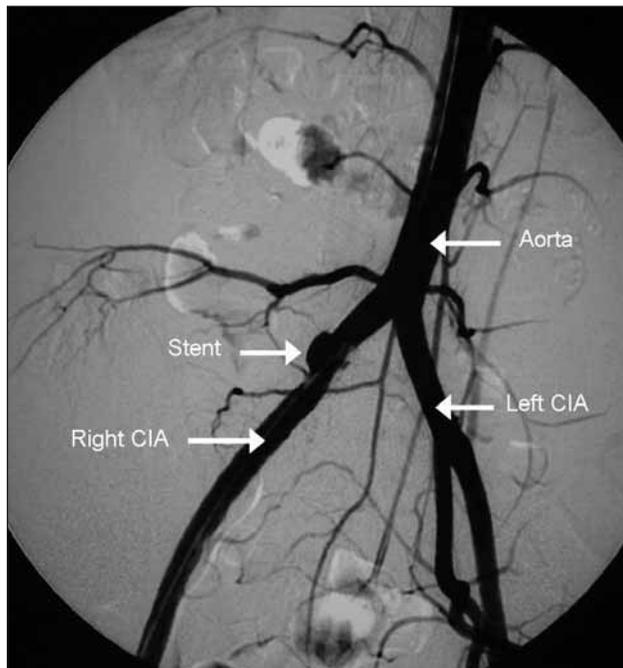


Figure 2: Successfully treatment of the fistulous shunt was achieved using a self expandable Gore Hemobahn® Endoprosthesis 13 mm x 10 cm (W.L.Gore&Associates, Inc. Flagstaff, Arizona, USA). AVF: Arteriovenous fistula, CIA: Common iliac artery.

the anterior longitudinal ligament with dissection instruments, injuring the aorta, vena cava, or iliac vessels (5). Risk factors include anterior annulus and longitudinal ligament degeneration, improper positioning of the patient, and history of previous disc or abdominal operations leading to adhesions between the retroperitoneal vessels and vertebral body. Interestingly, Papadoulas et al. reported that a vascular injury is not necessarily correlated with poor operative technique during disc surgery (8). The vascular complications associated with disk surgery can be classified as early and late complications. The excessive bleeding usually appears as an early complication after the vascular laceration. Early complications presenting with acute blood loss may be the cause of sudden shock or even death with a 40-80% mortality rate (4). Hypotension with decreased haematocrit level during or after operation is an indicator of vascular injury and suggests bleeding that requires exploration (8). Late complications include development of pseudoaneurysms and arteriovenous fistulas (8). Symptoms of AV fistulae usually appear at 24 hours to 1 year. Late pseudoaneurysms may manifest with lumbar pain

and recurrence of neurological symptoms (2). Chronic AV fistulae mimic congestive heart failure accompanied by an abdominal bruit and leg edema. In our patient, there were no signs of vascular injury during and early following the disc surgery, and the AV fistula was diagnosed approximately fifteen days following the disc surgery.

Anatomically, the fistulae reported after lumbar disc surgery may be ilioiliac (69%), right iliac artery to inferior vena cava (22%), and aortocaval (9%) (5). In our case, it was between the right common iliac artery and the inferior vena cava, corresponding to the operated disc level (L4/5 interspace).

The clinical features are important for the diagnosis of AV fistulae. However, classic features of this condition may be absent in approximately one half of the patients (7). Angiography is the "gold standard" for diagnosing vascular complications after disc surgery. Color Doppler ultrasonography and Dynamic CT scan should be performed for correction in suspicious cases, due to invasiveness of angiography technique.

The pseudoaneurysms and AV fistulae following disc surgery can be treated with surgical exploration or endovascular techniques (7). Surgical exploration may be complicated with extensive blood loss and intra-operative blood transfusion may be needed (7). Recently, some authors have recommended less invasive endovascular techniques rather than surgical approaches (10). Endovascular repair is simpler, quicker, and cosmetically more acceptable than surgical repair (1). The endovascular covered stent application was performed as first line treatment successfully in our patient.

In conclusion, we suggest the use of minimally invasive interventional techniques in the management of suitable vascular injuries following lumbar disc surgery.

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