

## Case Report

# Fatal Vascular Complication and Autotransfusion System Use After Lumbar Disc Surgery: A Rare Case

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### ABSTRACT

Vascular injuries are extremely rare after lumbar disc surgery, but have high mortality. Nonetheless, early diagnosis and treatment of these injuries are lifesaving.

We present the case of a 38-year-old male patient with no history of disease or surgery. Our patient underwent microsurgical discectomy at the L4-L5 level and showed no evidence of intraoperative vascular injury, but vascular injury was later considered due to complications in the early postoperative period. Intraoperative autotransfusion was performed, and the operation was performed successfully. The patient was discharged on the 6th postoperative day with full recovery.

Hence, in lumbar disc surgery, the possibility of vascular injury should be considered, even when no findings of clinical significance are observed during the operation.

**Keywords:** Lomber Discectomy, Vascular Complication, Vascular Injury.

### ÖZ

#### Lomber Disk Cerrahisi Sonrasında Ölümcül Vasküler Komplikasyon ve Ototransfüzyon Kullanımı: Nadir Bir Olgu

Lomber disk cerrahisinden sonra vasküler yaralanmalar oldukça nadirdir. Ancak erken teşhis ve tedavi yüksek mortaliteleri nedeniyle hayat kurtarıcıdır.

Amacımız 38 yaşında kronik hastalığı ve başka ameliyat öyküsü olmayan bir erkek hastayı sunmaktır. Hastamıza L4-L5'de mikrocerrahi diskektomi uygulandı ve intraoperatif dönemde vasküler yaralanma belirtisi göstermedi. Ancak postoperatif erken dönemde bozulan klinik bulgulara bağlı olarak vasküler hasar düşünüldü. Vasküler yaralanma intraoperatif ototransfüzyon kullanılarak başarıyla tamir edildi. Hasta postoperatif 6. günde iyileşerek taburcu edildi.

Lomber disk cerrahisinde operasyon sırasında herhangi bir bulguya rastlanmasa bile vasküler yaralanma olasılığı düşünülmelidir.

**Anahtar Sözcükler:** Lomber Diskektomi, Vasküler Yaralanma, Vasküler Komplikasyon.

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Vascular injuries are rare complications of lumbar disc surgery, with their incidence ranging from 0.01% to 0.17% (1). Although they are rare, delays in their diagnosis and treatment may result in mortality (2, 3). Severe vascular injury may present with signs of hemodynamic compromise, severe abdominal pain, and, rarely, lower extremity ischemia in the postoperative period. Cases with no clinical signs in the early postoperative period may present as pseudoaneurysms or arteriovenous fistulas in the late postoperative period (4).

### CASE REPORT

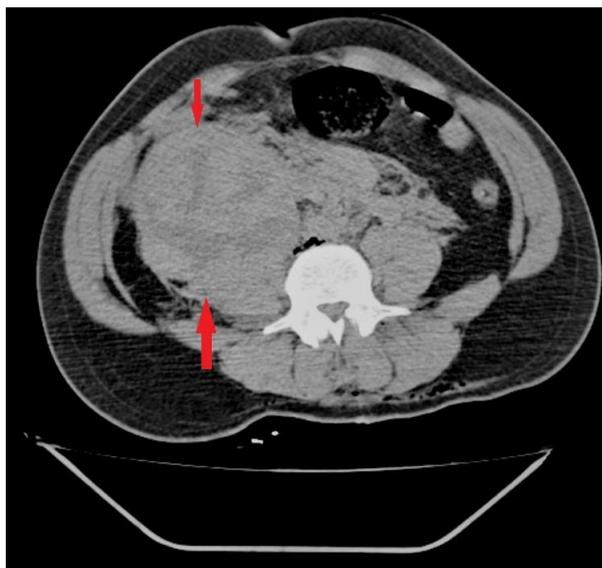
A 38-year-old male patient was admitted to another health institution with a 4-month history of pain and

numbness in his left leg. The patient was diagnosed with lumbar disc herniation and underwent discectomy with lumbar microsurgery under general anesthesia. During the surgery, the L4-L5 vertebrae were located using a scope, and the paraspinal muscles were stripped subperiosteally from the left. The left L4 was removed by hemipartial laminectomy until the lamina was free from the ligamentum flavum anterior region, again by using a scope. The lateral ligamentum flavum was excised toward the left L4-L5 foramen using a microscope. A left L4-L5 microdiscectomy was performed using disc forceps. The dural sac was compressed due to the protruded disc and was relieved by microdiscectomy. The left L4-L5 foraminotomy was then enlarged. Surgical bleeding was controlled with no complications, and the surgical site was sutured. During the postoperative follow-up, the patient initially

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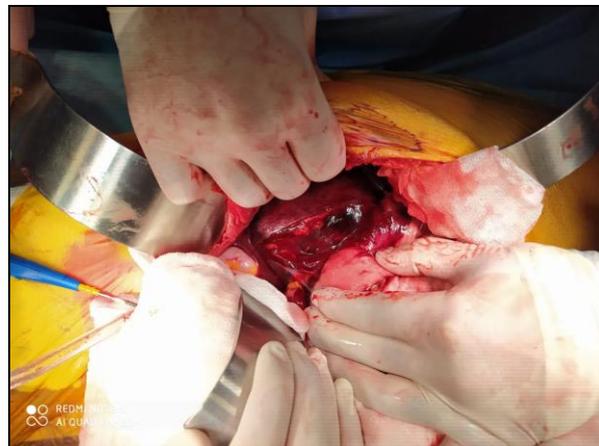
had abdominal pain. After a significant decrease in blood hemoglobin (from 13.5 g/dL to 8.2 g/dL) measured by laboratory examinations, abdominal ultrasonography (USG) and, subsequently, computed tomography (CT) were done. During the examinations, the patient received 2 units of erythrocyte suspension (ES) and 2 units of fresh frozen plasma (FFP). After a large region of retroperitoneal hematoma was detected (Figures 1A and B), vascular injury was considered, and the patient was admitted to our hospital because the previously applied hospital did not have a cardiovascular surgery clinic.



**Figure 1A, B.** Retroperitoneal hematoma area in computerized tomography.

When the patient was admitted to the intensive care unit (ICU), he had signs of hypovolemic shock. The pulse was 130 beats per minute, and the blood pressure was 65/40 mmHg. Severe metabolic acidosis was present (pH: 7.035, bicarbonate:10.01 mEq/L, BE(Base Excess): -18.5, lactate: 7.1 mmol/dL ). The patient was

operated on under emergency conditions. A laparotomy was performed with a right paramedian incision. When the peritoneum was opened, a clear region of hematoma was observed at the level of the right iliac artery and vein (Figure 2).



**Figure 2.** Operation image of retroperitoneal hematoma.

A significant number of clots and approximately 1000 mL of hemorrhagic fluid were removed. After opening hematoma covered area, active bleeding was observed. The blood aspirated from the abdomen prior to aortic clamping was filtered, and then approximately 1600 mL was autotransfused back to the patient. Severe vascular injury was observed in the right internal iliac artery. End-to-end anastomosis was done with a 7 mm dacron graft. The partial injury in the iliac vein was repaired. During the postoperative period, the patient was observed in intensive care for about 32 hours and was given an additional 2 units of ES and 2 units of FFP during this period. There was no problem in the clinical follow-up of the patient. He was then discharged on the 6<sup>th</sup> day with full recovery.

## DISCUSSION

Lumbar disc surgery is a very common procedure. Complications are rare, apart from neurological ones, but major vascular injuries are a serious complication. Despite advances in surgical techniques, vascular injuries may still occur. The literature even includes cases identified in the 1950s (5). Similar cases have also been reported recently (6, 7, 8). The patient's position during surgery, history of similar surgical procedures, presence or absence of pillows placed in the abdominal area, degeneration in the ligament, and annuli fibrosi during the disease process all influence the probability of vascular injury (9, 10).

Most cases of vascular injury result from lumbar disc surgery at the L4-L5 and L5-S1 levels (11). The surgical intervention on our patient is similar to that reported in the literature. Since vascular complications are extremely rare during lumbar disc surgery, they are not a main area of concern for surgeons performing the operation. Depending on the type and location of the

injury, the bleeding occasionally does not present as active bleeding during the operation and may instead present as abdominal pain, abdominal distension, and lower extremity ischemia in the hours following the operation (12). In young patients, diagnosis may be delayed due to compensatory mechanisms. In our patient, examinations for vascular injury were initiated approximately 5-6 hours after the operation ended. In the late period, vascular injuries may result in complications, such as pseudoaneurysms and arteriovenous fistula formation. The diagnoses for these can be made during the investigation of symptoms, such as thrombosis in cases of localized compression, and swelling in the legs, murmurs, and shortness of breath in cases of fistulas.

In patients referred for emergency operations due to vascular injury, adequate fluid replacement is crucial, especially in patients with hypovolemic shock. These patients can lose about 30% of their total blood volume in a very short period and require a large amount of blood replacement. Studies have investigated the use of autotransfusion systems to reduce the need for blood from blood banks in patients who are expected to bleed

excessively (13, 14). Since autotransfusion systems do not require extensive preparation, they can be easily used in emergencies (15). These systems consist of a reservoir where the aspirated blood is collected and sections where the blood is heparinized, washed, and reinfused. In our patient, we aspirated and filtered a total of 1600 mL of blood from the surgical site using an autotransfusion system and then transfused it back into the patient. We believe that this was effective in ensuring the patient's rapid discharge from the hospital (on the 6th postoperative day) with full recovery.

### Conclusion

The early diagnosis of vascular complications which are rarely seen after lumbar disc surgery is lifesaving. Vascular injury should definitely be considered in cases of postoperative abdominal pain and significant decreases in blood pressure, even in the absence of findings in the intraoperative period. It may be beneficial to use autotransfusion systems to reduce the use of blood from blood banks in patients who are expected to bleed significantly during surgery.

### REFERENCES

- Shih PY, Lau HP, Jeng CS, Hung MH, Cheng YJ. Iatrogenic left internal iliac artery perforation during lumbar discectomy. *Acta Anaesthesiol Taiwan* 2009; 47: 196-9.
- Dosoglu M, Is M, Pehlivan M, Yildiz KH. Nightmare of lumbar disc surgery: Iliac artery injury. *Clin Neurol Neurosurg* 2006; 108:174-7.
- Chang CP, Lee WS, Lee SC. Left internal iliac artery and vein tear during microendoscopic lumbar discectomy - a case report. *Minim Invasive Ther Allied Technol* 2006; 15: 155-8.
- Akhaddar A, Alaoui M, Turgut M, Hall W. Iatrogenic vascular laceration during posterior lumbar disc surgery: a literature review. *Neurosurgical review* 2021; 44: 821-42.
- DeSaussure RL (1959) Vascular injury coincident to disc surgery. *J Neurosurg* 1959; 16: 222-9.
- Altun G, Hemsinli D, Kutunis D, Gazioglu G. Silent killer: A scalpel in the aortic wall after spinal surgery. *Neurologia I Neurochirurgia Polska* 2016; 50: 294-6.
- Jung HS, Kim DJ, Kim HS, Lee HK, Choi SJN, Chung SY. Vascular complications related to posterior lumbar disc surgery. *Vascular Specialist International* 2017; 33: 160.
- Sahinoglu M, Arun O, Orhan A et al. Iliac artery injury during lumbar disc hernia surgery. *World Neurosurgery* 2019; 125: 347-51.
- Bojarski P, Sobstyl M. Vascular iatrogenic injury during lumbar disc surgery: a literature review. *Polski Merkuriusz Lekarski: Organ Polskiego Towarzystwa Lekarskiego* 2021; 49: 231-4.
- Alomari S, Planchard R, Lo SFL, Witham T, Bydon A. Aortic injury in spine surgery: What a spine surgeon needs to know. *Neurosurgical Review* 2021; 14: 1-8.
- Anda S, Aakhus S, Skaanes KO, Sande E, Schrader H. Anterior perforations in lumbar discectomies: a report of four cases of vascular complications and a CT study of the prevertebral lumbar anatomy. *Spine* 1991; 16: 54-60.
- Sugimoto Y, Tanaka M, Gobara H, Misawa H, Kunisada T, Ozaki T. Management of lumbar artery injury related to pedicle screw insertion. *Acta Med Okayama* 2013; 67: 113-6.
- Bowley DM, Barker P, Boffard KD. Intraoperative blood salvage in penetrating abdominal trauma: a randomised, controlled trial. *World J Surg* 2006; 30: 1074-80.
- Kozek-Langenecker A, Afshari A, Albaladejo P et al. Management of severe perioperative bleeding: guidelines from the European Society of Anaesthesiology. *Eur J Anaesthesiol* 2013; 30: 270-382.
- Jewell AE, Akowuah EF, Suvarna SK, Braidley P, Hopkinson D, Cooper G. A prospective randomised comparison of cardiotomy suction and cell saver for recycling shed blood during cardiac surgery. *Eur J Cardiothorac Surg* 2003; 23: 633-6.