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CASO CLÍNICO

Aortic Rupture in Lumbar Discectomy: A Case Report

Rotura Aórtica em Discectomia Lombar: Relato de um Caso

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Afiliação
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ABSTRACT

Abdominal aortic rupture is a rare complication in lumbar discectomy, one of the most common procedures in neurosurgery. Although rare, knowledge of such possibility is crucial to prevent fatal consequences. We present a case of a 53-year-old woman, ASA III, with an abdominal aortic injury during lumbar discectomy. After anesthetic emergence, hemodynamic instability associated to a significant drop of hemoglobin made the senior anesthesiologist suspect of an iatrogenic vascular injury, which a computer tomography angiography later confirmed. The patient was promptly transferred to a vascular surgery operating room, where the hemorrhage was controlled by endovascular placement of a stent at the aortic rupture site.

A quick diagnosis is of the essence for such a serious complication and a multidisciplinary approach is essential to the successful management of these patients.

RESUMO

A rotura da aorta abdominal é uma complicação rara na discectomia lombar, um dos procedimentos mais comuns em neurocirurgia. Embora rara, o conhecimento de tal possibilidade é crucial para prevenir consequências fatais. Apresentamos o caso de uma mulher de 53 anos, ASA III, com uma lesão da aorta abdominal durante uma discectomia lombar. Após a emergência anestésica, a progressão para instabilidade hemodinâmica associada a um decréscimo significativo de hemoglobina fez o anestesiologista suspeitar de uma lesão vascular iatrogénica, posteriormente confirmada por tomografia computorizada angiográfica. A doente foi prontamente transferida para o bloco operatório de cirurgia vascular, onde a hemorragia foi controlada com a colocação de um *stent* endovascular no segmento da lesão. É vital que o anestesiologista conheça e diagnostique com celeridade esta complicação com consequências tão graves, sendo essencial uma abordagem multidisciplinar.

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INTRODUCTION

Lumbar discectomy surgery is a routine procedure in neurosurgical practice. Iatrogenic injury of major vessels during the procedure, although rare (incidence varies between 0.01% and 0.17%), is a life-threatening complication which demands prompt diagnosis and treatment.[1] A high index of suspicion is crucial in the diagnosis of intraoperative complications, as many may be concealed and only manifest by indirect signs such as hemodynamic instability.[2]

CASE REPORT

We present the case of a 53-year-old-woman, ASA III, with personal history of non- medicated hypertension, admitted for elective posterior L3-L4 discectomy surgery in a tertiary center. Prior to induction, an intravenous (IV) access was established with an 18G cannula for drug and fluid administration. Standard routine monitoring with continuous electrocardiogram, pulse oximetry and intermittent noninvasive blood pressure (BP) measurement was performed, as well as additional monitoring with train-of-four (TOF) and Bispectral Index (BIS). General anesthesia was induced with 2 $\mu g.kg^{-1}$ of fentanyl, 2 $mg.kg^{-1}$ of propofol and 0.6 $mg.kg^{-1}$ of rocuronium intravenously. Intubation was performed uneventfully and the patient was placed in the prone position for the procedure. Anesthesia was maintained with sevoflurane and additional doses of rocuronium were administered according to TOF monitoring.

The patient remained hemodynamically stable during most of the procedure, becoming suddenly hypotensive (BP 78/35 mmHg) and tachycardic (heart rate 110 bpm) immediately after the posterior discectomy was performed. There was no evidence of bleeding in the surgical field and there were 200 mL of blood in the surgical aspirator. Hemodynamical stability was restored after a push of crystalloid fluids and 150 µg of phenylephrine.

At the end of the surgery, the patient was placed in the supine position and successfully extubated, after meeting the required criteria. Just before being transferred to the recovery room, the patient became progressively hypotensive (BP 80/45 mmHg) and uncooperative. Blood gas analysis revealed hyperlactacidemia (lactate 2.0 mmol/L) and anemia (with a decrease of hemoglobin from 13.3 g/dL to 9.3 g/dL). In this setting, the anesthesiologist suspected an iatrogenic intra-vascular injury had occurred during the surgery. A second IV access was established and volume resuscitation was initiated as the patient was reintubated, connected to the ventilator and transported to the radiology department.

An abdominal computed tomography (CT) angiography was performed, revealing an extensive retroperitoneal hematoma, extending from the diaphragm to the pelvic cavity, with at least 1700 mL. Active contrast leakage was present in the posterior aspect of the infrarenal aorta, at the level of the L3-L4 intersomatic space, compatible with aortic rupture (Fig. 1).

The patient was admitted to the intensive care unit (ICU) for supportive care while awaiting emergent aortic repair. Massive transfusion protocol and vasopressor support with noradrenaline (with a maximum 23 $\mu g.kg.min^{-1}$) were initiated. The patient was promptly transferred to the operating room where, under general anesthesia, was submitted to an endovascular repair with a stent (Fig. 2), resulting in hemodynamic stability as the hemorrhage was controlled. In the immediate perioperative period a total of 6 units of packed red blood cells, 3 units of fresh frozen plasma, 1 g of fibrinogen and 1g of tranexamic acid were administered.

The patient was transferred to the ICU in the immediate postoperative period and remained sedated, ventilated and hemodynamically stable without vasopressors. Successful extubation occurred 12 hours after endovascular stent placement, without further complications in the postoperative period. Ten days after the procedure, the patient was discharged from the hospital and remains to date clinically well.

DISCUSSION

Hemodynamic changes in spinal surgery are most commonly associated with procedures involving cervical and dorsal segments, but unusual following lumbar and sacral spine surgery.[3] In lumbosacral procedures, hemodynamic disturbances are limited to a few possible mechanisms, such as major bleeding, spinal shock, autonomic dysreflexia, parasympathetic nerve root activation and venous air embolism.[3]

The patient remained hemodynamically stable during most of the procedure. However, at the end of surgery, after being placed in the supine position and extubated, she became progressively hypotensive with a rapidly evolving anemia. Because of the timing of these events, a vascular injury was the main differential diagnosis, which was later confirmed on the CT angiography scan.

Following the first case report of a major vessel injury following spine surgery in 1945,[4] several cases have been published in the literature, with an estimated incidence of 0.01%-0.17%.[1,2,5] Although rare, these complications can have devastating consequences,[6] leading to a mortality rate as high as 65%.[7] There are some known risk factors associated with these injuries, which the anesthesiologist in charge must be aware of. They include: history of previous disc or abdominal operations, chronic disc pathology, malposition of the posterior rongeur and vertebral anomalies.[5]

Major vessel injury during lumbar spine surgery may be explained by the close relationship between the vertebral bodies and the aorta, iliac vessels and the inferior vena cava.[2] which occur most frequently in L4–L5 disc surgery.[8] The location of the injury is usually related to the level of the discectomy,[5] as was shown in this case. Catastrophic bleeding may be overlooked due to the hemorrhagic blood flowing into the retroperitoneal space instead of the surgical field, leading to a critical delay in the diagnosis. A cardiovascular collapse upon emergence of anesthesia is on many occasions the first sign of a major vascular disruption.[5]

With a variable timing of presentation, these vessel injuries can be divided into early and late complications.[5,7] Examples of early complications include vessel wall laceration and rupture of major retroperitoneal vessels, leading to hemorrhagic shock and cardiovascular collapse,[6,7] whereas pseudoaneurysms and arteriovenous fistulas often develop later in the postoperative period, and many may remain undetected for years.[5]

Early diagnosis of such injuries is essential owing to the necessity of emergent surgical intervention in patients with early-onset injuries. Diagnosis is usually confirmed with imaging studies, such as Doppler ultrasound, CT and angiography.[5]

Depending on the type of lesion identified, surgical treatment may vary from primary closure and end-to-end ligation to endovascular embolization or graft interposition[5]

Angiographic procedures have emerged in recent years, with good results, in an attempt to avoid the morbidity and mortality rates associated with an open approach.[8]

This case reflects how the anesthesiologist can make a crucial difference in the perioperative care, especially when adverse events occur. A swift diagnosis by the anesthesiologist, early resuscitation measures and bringing a multidisciplinary team together prevented a major disaster for the patient.

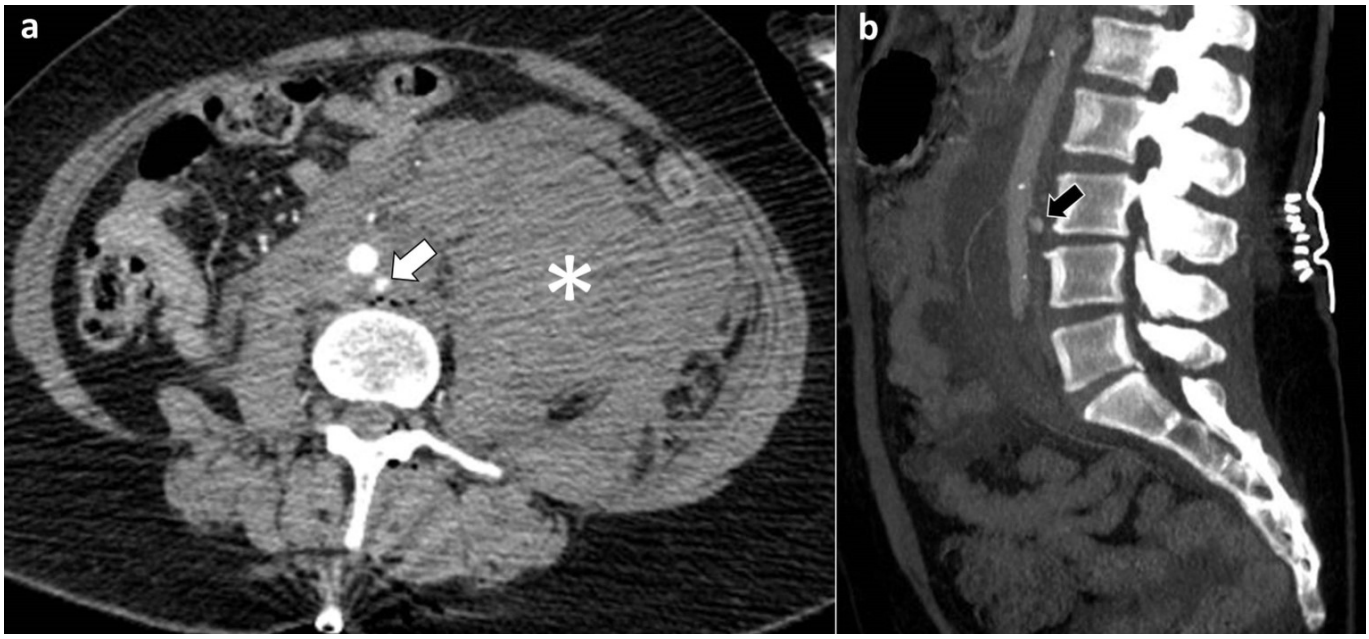

Figure 1. CT angiography depicting aortic rupture following lumbar discectomy. (a) Axial view showing contrast leak in the infrarenal aorta (white arrow), with massive retroperitoneal hematoma (asterisk); (b) Sagital view showing contrast leak of the infrarenal aorta (black arrow) at L3-L4 level, relating to recent surgery site. Cutaneous staples are noted at this level.

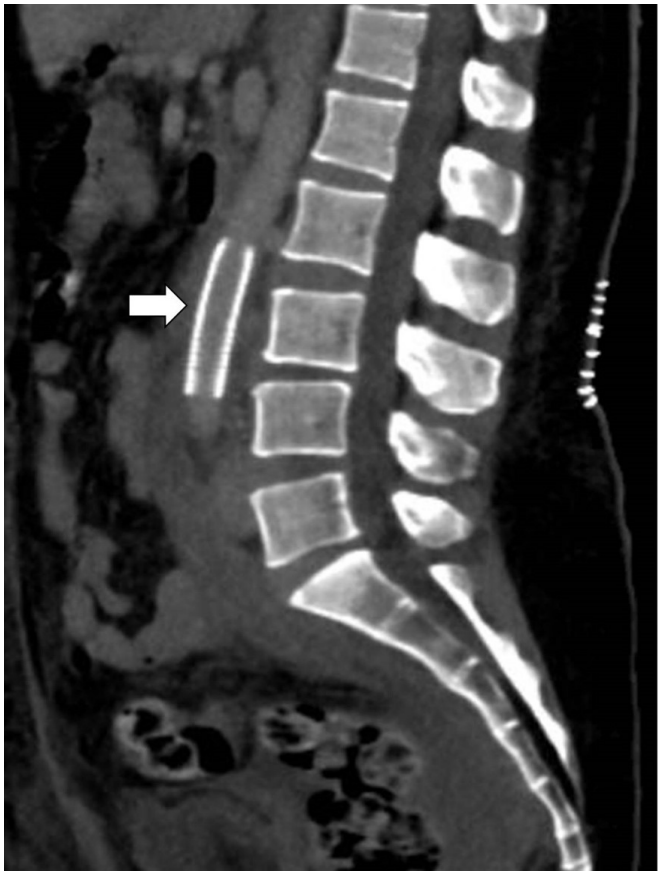

Figure 2. CT angiography performed after endovascular treatment showing a correctly placed aortic stent (arrow) at L3-L4 level.

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