MEGA JOURNAL OF CASE REPORTS

OPEN ACCESS

Case Presentation

Compiled Date: May 23, 2025

Unilateral Bilateral Channel Endoscopic Lumbar Discectomy and Postoperative Spinal Cord Compartment Syndrome: A Case Report

Gulibositan Abudurousuli[1], Manle Qiu[2], Jianwei Chen[2], Renlong Zhou[1], Yanhua Zhao[1*]

[1]Department of Anesthesiology, Renji Hospital, Shanghai Jiao Tong University School of Medicine, China

[2]Department of Orthopaedics, Renji Hospital, Shanghai Jiao Tong University School of Medicine, China

***Corresponding author**: Yanhua Zhao, Department of Anesthesiology, Renji Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, 200127, China

Abstract

This case report details the management of a 71-year-old male patient who underwent elective L4-L5 discectomy using unilateral biportal endoscopy (UBE) under general anesthesia. The patient had a history of chronic lower back pain and left lower limb discomfort, with MRI findings indicating lumbar disc herniation and spinal stenosis. Postoperatively, the patient developed significant hemodynamic instability, including severe hypertension and tachycardia, which persisted despite initial management efforts. The patient was transferred to the ICU for intensive monitoring and intervention. Following appropriate treatments, including corticosteroids and vasodilators, the patient's symptoms resolved within 24 hours, and he was discharged on the sixth postoperative day. This case highlights the rare occurrence of Spinal Cord Compartment Syndrome (SCCS), a transient condition associated with elevated cerebrospinal fluid pressure, and emphasizes the importance of careful perioperative management to avoid complications.

Keywords: Unilateral biportal endoscopy; Lumbar discectomy; Spinal stenosis; Spinal cord

compartment syndrome; Perioperative management

Introduction

Unilateral bilateral channel endoscopic lumbar discectomy (UBE) is a minimally invasive technique used for lumbar disc herniation. It provides a means for surgeons to access the intervertebral discs with minimal muscle dissection, which can result in faster recovery times compared to traditional open surgery. This technique addresses pathology on both sides of the disc through a single-entry point, offering a comprehensive solution for patients with bilateral symptoms. Despite its advantages, complications can arise, one of the rarest being Spinal Cord Compartment Syndrome (SCCS), which results from compression of the spinal cord. This condition can lead to severe neurological deficits such as lower limb weakness, saddle anesthesia, and bowel or bladder dysfunction. Although the risk of SCCS after UBE is low, it emphasizes the importance of careful patient selection and meticulous surgical technique. Identifying patients with pre-existing lumbar canal stenosis or severe disc herniation is crucial. Additionally, postoperative monitoring is essential to detect signs of SCCS, with timely intervention being key to minimizing long-term consequences. This report discusses a case in which a patient underwent UBE and later developed postoperative cauda equina syndrome, highlighting the importance of vigilance in identifying and managing this serious complication in spinal surgery as soon as possible.

Case Presentation

General Information

A 71-year-old male patient, weighing 70 kg and measuring 177 cm in height, presented with three years of chronic lower back pain, worsening over the last three months. His condition was accompanied by left lower limb pain and difficulty walking. Over the past three months, symptoms worsened, with radiating pain in the left lower limb and intermittent claudication. MRI from an external institution revealed lumbar disc herniation with spinal stenosis. Upon admission, his diagnosis was as follows:

- Lumbar spinal stenosis
- Lumbar disc herniation (L4-L5, L5-S1 herniation, and L3-L4 disc protrusion).

The patient was scheduled for elective surgery: L4-L5 discectomy using Unilateral Biportal Endoscopy (UBE) under general anesthesia.

Anesthesia Procedure

Upon entering the operating room, ECG monitoring, peripheral venous access, and radial

artery catheterizations were performed. Initial invasive blood pressure was 168/81 mmHg, heart rate 63 bpm, and SpO2 at 99%.

Induction of Anesthesia (13:20):

- Dexamethasone: 5 mg
- Butorphanol tartrate: 1 mg
- Etomidate: 12 mg
- Sufentanil: 20 μg
- Propofol (TCI at 2 μg/mL)
- Rocuronium: 50 mg

Intubation was completed with a 7.5-mm reinforced endotracheal tube using video laryngoscopy, followed by repositioning the patient to a prone position.

Surgical Procedure Start (13:38):

- Maintenance of anesthesia:
- Remifentanil: 0.3 mg/h
- Propofol: TCI at 1 μg/mL
- Sevoflurane: 1.5%
- Intermittent administration:
- Rocuronium for muscle relaxation
- Vasopressors (norepinephrine 100 μg

The surgery lasted 117 minutes, concluding at 15:35. At 15:40, the patient was transferred to the Post-Anesthesia Care Unit (PACU) **(Figure 1)**.

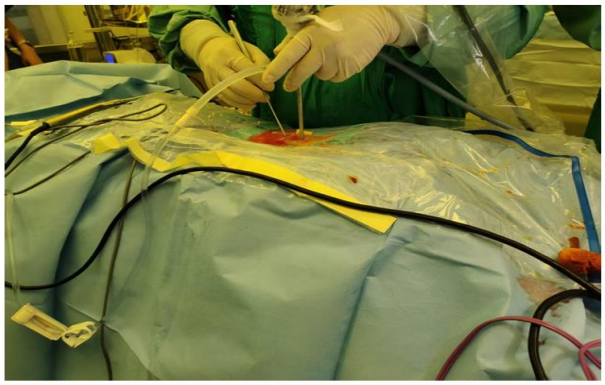

Figure 1: Intraoperative procedure.

Postoperative Management and ICU Admission

Post-surgery, the patient experienced a gradual increase in blood pressure from 120/87 mmHg to hypertensive levels, reaching 187/107 mmHg, with accompanying tachycardia (117 bpm). Despite initial interventions, including further deepened anesthesia, his hypertension persisted. Esmolol and urapidil were administered to manage the elevated blood pressure, but intermittent severe hypertension continued. At 17:00, the patient was transferred to the ICU for closer monitoring and management. Treatments included furosemide (20 mg),

methylprednisolone (80 mg), and dexamethasone (10 mg). The patient regained consciousness approximately 5 hours later, with vital signs stabilizing. Extubation was successfully performed at 21:50, and the patient was transferred back to the general ward the following morning.

Postoperative Outcome

Follow-up at 24 hours post-surgery showed complete resolution of head and neck discomfort and dizziness. Lower limb numbness and pain significantly improved. The patient was discharged on postoperative day 6 following full recovery **(Figure 2)**.

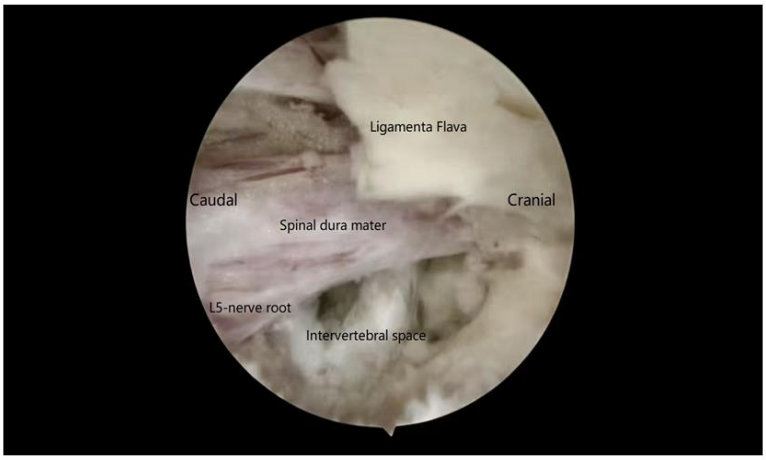

Figure 2: Intraoperative surgical field.

Final Diagnosis

Based on the clinical presentation and management, the patient was diagnosed with pseudo-spinal hypertension syndrome.

Discussion

Pseudo-spinal hypertension syndrome is a rare perioperative complication that mimics true spinal hypertension, marked by a transient rise in Cerebrospinal Fluid (CSF) pressure **[1]**. Contributing factors can include inappropriate patient positioning, intraoperative manipulation, or impaired CSF circulation. In this case, several risk factors were present:

- Intraoperative Fluid Management: Excessive irrigation fluid (20,000 mL) with a high column height may have contributed to increased CSF pressure.
- Prone Positioning: This position can exacerbate venous congestion, raising both intracranial and intraspinal pressures.
- Incomplete Neuromuscular Recovery: Residual neuromuscular blockade worsened airway pressure and impacted respiratory mechanics.

Management involved immediate recognition, sedation with propofol, and vasodilators (e.g., urapidil), all of which helped stabilize the patient. The ICU provided essential monitoring and timely interventions, including corticosteroids to mitigate edema and inflammation. In the postoperative management of UBE, differentiating between spinal cord hypertension syndrome (SCHS) and sympathetic storm is critical, particularly in cases of acute deterioration. SCHS results from elevated intraspinal pressure, typically due to postoperative hematoma or swelling, leading to spinal cord ischemia and neurological deficits such as motor weakness and sensory loss [2]. On the other hand, sympathetic storm is an exaggerated autonomic response, most commonly seen after traumatic brain injury or high cervical spinal cord injury, presenting with systemic symptoms like hypertension, tachycardia, and diaphoresis [3]. Although both conditions may exhibit autonomic instability, SCHS is associated with focal neurological deficits, whereas sympathetic storm is characterized by generalized sympathetic hyperactivity without specific spinal cord involvement [4]. Prompt diagnosis is essential, as SCHS requires surgical decompression, while sympathetic storm management typically involves sedation and pharmacological control of sympathetic activity [5]. In the context of cauda equina syndrome following UBE, clinicians must remain vigilant for signs of SCHS to prevent irreversible neurological damage.

Conclusion

This case report underscores the importance of recognizing and promptly managing postoperative spinal cord compartment syndrome (SCCS) following unilateral biportal endoscopic lumbar discectomy (UBE). Although rare, SCCS can present with significant hemodynamic instability and neurological symptoms, requiring high vigilance from both surgical and anesthesia teams. Early identification, appropriate perioperative management, and timely interventions, including intensive monitoring and pharmacological therapy, are crucial to prevent irreversible neurological damage. This case highlights the need for careful fluid irrigating pressure management, optimal patient positioning, and vigilant postoperative surveillance to minimize the risk of such complications and ensure favorable outcomes. Future studies are warranted to better understand the risk factors and preventative strategies for SCCS in minimally invasive spinal procedures.

Prognosis

The patient's condition improved within 24 hours, indicating a favorable prognosis with early intervention. However, future cases require careful perioperative planning to prevent recurrence of such complications.

Ethical Statement

Informed consent for publication of this case report was obtained from the patient.

References

1. Lee SH, Kang SH. The impact of irrigation pressure on cerebrospinal fluid dynamics during spinal surgery. J Orthopaed Surg. 2019;27(1):1-6.
2. Fehlings MG, et al. Pathophysiology of spinal cord injury. Neurosurgical Focus, 2017;42(5):E2.
3. Baguley IJ, et al. Autonomic dysregulation following traumatic brain injury: The syndrome of paroxysmal sympathetic hyperactivity. Neurocritical Care. 2008;8(2):299–305.
4. Blackman JA, et al. Paroxysmal sympathetic hyperactivity. Arch Phy Med Rehabil. 2004;85(4):686–693.
5. Rabinstein AA. Paroxysmal sympathetic hyperactivity in the neurological intensive care unit. Neurologic Clin. 2007;25(3):813–825.

Citation of this Article

Abudurousuli G, Qiu M, Chen J, Zhou R, Zhao Y. Unilateral Bilateral Channel Endoscopic Lumbar Discectomy and Postoperative Spinal Cord Compartment Syndrome: A Case Report. Mega J Case Rep. 2025;8(5):2001-2006.

Copyright