

Simultaneous Cervical and Lumbar Unilateral Biportal Endoscopy. A Case Report and a Surgical Technique

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Abstract

Introduction: Tandem stenosis is not uncommon to see in clinic, the traditional way of treating it is to do a staged decompression usually starting with the cervical spine followed by the lumbar stenosis. However, newer technique in minimally invasive surgery including endoscopic decompression is evolving rapidly and it's utilization in managing such disease is noticed to decrease patient morbidity, shorten hospital stay and early return to daily activity.

Case Summary: 66 years old gentleman presented to us with chronic severe left leg pain and mild lower back pain that worsen over the past 6 months. In addition to that he was complaining of left sided forearm pain. Both symptoms were not responding to conservative therapy anymore. He was on anticoagulant post aneurysmal surgery that could not be stopped for a long time.

Outcome: Following both decompressions, the patient was very happy. Immediate reduction in analgesia was noticed. Soon after the surgery, the patient returned to his normal daily life activities with no issues.

Conclusion: Simultaneous decompression of tandem stenosis is feasible and safe. It saves the patient second trip to operative theatre. However, it could be technically demanding and requires high knowledge and skill to manage such patients.

Keywords: Cervical; Lumbar; UBE; Radiculopathy; Decompression

Introduction

Spine degenerative diseases are one of the most common clinical diseases that present with spinal pain and sometimes with radicular symptoms in the affected limbs. Tandem stenosis, characterized by simultaneous narrowing of both the cervical and lumbar spinal canals, presents a unique challenge in the field of spinal surgery. This condition often leads to a complex clinical presentation, with patients experiencing a combination of cervical myelopathy/radiculopathy and lumbar radiculopathy/claudeication. Traditional surgical approaches typically address these pathologies in either separate operative settings, which can prolong recovery and increase the risk of complications or the existing descriptions of same setting surgery have been described via traditional open method [1-4].

In this case report, we describe a novel approach to the management of tandem stenosis using unilateral biportal endoscopic spine surgery (UBESS). This minimally invasive technique allows for the simultaneous treatment of both cervical and lumbar degenerative spinal diseases in a single operative session. By leveraging the advantages of UBESS, including reduced tissue trauma, shorter hospital stays, and faster recovery times, we aim to highlight the potential benefits and feasibility of this approach in complex spinal pathologies.

Case Presentation

We present a 66 years old gentle man with history of low back pain and left leg radiating pain for 10 years duration with recent aggravation for last 6 months. The back and leg pain VAS score was 3 and 9 respectively. The pain was severe enough to restrict his activities of daily living and walking distance of 50 meters. The clinical examination revealed a positive left sided SLR at 60 degree and decreased sensation over L5 dermatome with intact motor power.

His radiological work up included standard lumbar radiography series with dynamic views and CT scan, MRI and EOS evaluation. The overall radiological impression was of L1/2, L2/3, and L3/4 lumbar canal stenosis (Schizas grade: B) without any dynamic instability or any spinal deformity (Figure 1). Alongside he was complaining of left forearm pain and tingling which was consistent with left C6 radiculopathy and confirmed with MRI of C5/6 left neuroforaminal stenosis (Figure 2). Due to the patient medical condition in which he could not be off anticoagulant for a long time that was started following his aneurysm surgery, we opted to do both cervical and lumbar endoscopic decompression at the same time.

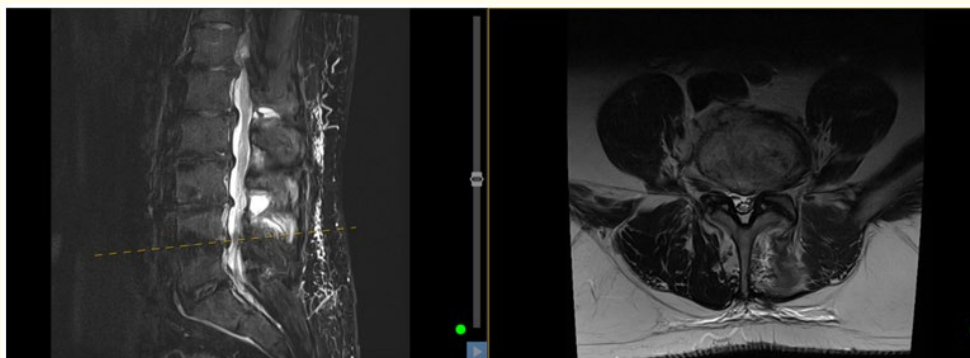


Figure 1

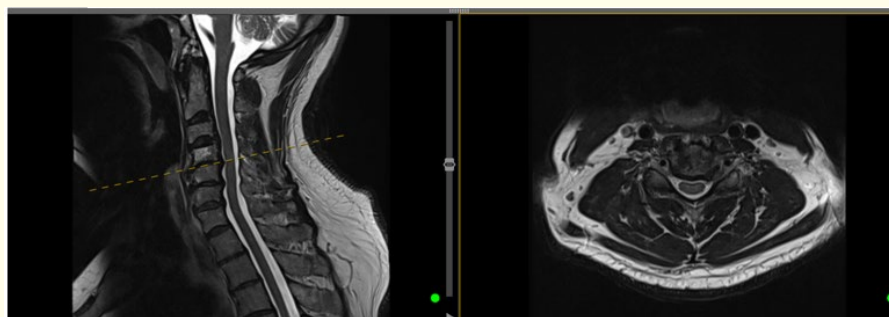


Figure 2

Surgical technique

The surgical team chose unilateral biportal endoscopic spine surgery for its minimally invasive nature and ability to address both cervical and lumbar pathologies concurrently. The procedure was performed in the following sequence:

- **Lumbar decompression:** The lumbar spine was decompressed first using endoscopic techniques, relieving the stenosis and any associated nerve root compression.
- **Cervical decompression:** Following the lumbar decompression, the team performed an endoscopic decompression of the cervical spine to address the stenosis and alleviate pressure on the spinal cord and nerve roots.

We position the patient prone on Wilson frame, with shoulder strapped in pulled down position. Our preferred approach for UBE surgery is a left sided approach with caudal working portal and cranial viewing portal. We typically triangulate both ports at the spinolaminar junction in lumbar spine. The lumbar surgery was completed in 40 minutes and negligible amount of blood loss. At the end of lumbar procedure patient was hemodynamically stable and was green flagged by anesthesia team to go ahead for subsequent cervical decompression. The cervical decompression took 40 mins and negligible blood loss (total 80 mins and minimal blood loss).

Discussion

The case of tandem stenosis involving both cervical and lumbar degenerative spinal disease presents a unique challenge due to the complexity of managing two distinct pathologies within the same operative setting. This report highlights the successful treatment of such a case using unilateral biportal endoscopic spine surgery (UBESS), addressing both cervical and lumbar pathologies simultaneously. By addressing both pathologies concurrently, we aimed to minimize the overall surgical burden on the patient, reduce the need for multiple anesthetic exposures, and potentially facilitate a more rapid and complete recovery.

To our knowledge this is the first reported case report of tandem stenosis managed in same setting via UBE setting.

The surgical team opted for UBESS due to its minimally invasive nature and the potential for simultaneous treatment. The procedure involved:

- **Cervical decompression:** Endoscopic decompression of the cervical spine was performed first, addressing the stenosis and relieving the compression on the spinal cord and nerve roots.
- **Lumbar decompression:** Following the cervical procedure, the lumbar spine was similarly decompressed endoscopically, ensuring adequate relief of the lumbar stenosis.

The sequential nature of the procedure-beginning with cervical decompression-is noteworthy. Addressing cervical pathology first is crucial in tandem stenosis cases because untreated cervical myelopathy poses a greater risk of neurological decline. Additionally, patient positioning during the lumbar procedure was carefully adjusted to ensure optimal access while minimizing strain on the recently operated cervical spine.

Advantages of UBESS in tandem stenosis

Unilateral biportal endoscopic spine surgery offers several advantages in the treatment of tandem stenosis:

1. **Minimally invasive approach:** UBESS is less invasive compared to traditional open surgery, resulting in reduced tissue damage, less postoperative pain, and quicker recovery times.

2. **Simultaneous treatment:** The ability to address both cervical and lumbar pathologies in a single operative session minimizes the need for multiple surgeries, reducing overall surgical risk and patient burden.
3. **Enhanced visualization:** The endoscopic approach provides superior visualization of the spinal structures, allowing for precise decompression of the stenotic segments.
4. **Reduced hospital stay:** Patients typically experience shorter hospital stays and faster return to daily activities, which is particularly beneficial for those with multiple spinal pathologies.
5. Recently, the rise of the unilateral biportal endoscopic technique led to independent observation and working channels. This provides significant advantages of convenience, flexibility, wide view angle and working space, with the potential to use conventional surgical instruments [5].

Adequate decompression and freeing of neural elements is the most critical factor in the surgical treatment. Conventionally, this used to be done through an open laminectomy approach, which involved widespread dissection of paraspinal muscles resulting in their fatty degeneration, atrophy and increased wound related complications. Additionally, extensive dissection of the soft tissue structures and posterior elements can possibly result in increased post-operative back pain and iatrogenic instability [6].

Multiple minimally invasive (MI) approaches are proposed to improve recovery after surgery and minimize surgical wounds and injury to the paraspinal muscles [7-9]. Nonetheless, there are downsides to consider, such as limited visual field, a steep learning curve, limited working space, and possible complications [10]. It is vital to weigh these disadvantages against the advantages when deciding on an appropriate surgical approach. Advances in technology and surgeon experience help overcome some of these challenges; however, the appropriate indications for minimally invasive surgery still need to be determined.

It is important to maintain the integrity of facet joint during resection and preserve more than 50%, otherwise it would lead to instability [11]. Facet undercutting goes hand in hand with minimally invasive techniques such as endoscopy. Using an endoscopic method, such as UBE, the surgeon's visual point may advance into the lamina or into the contralateral lateral recess and foramen, allowing for precise examination of the affected structures without visual constraints.

In general, UBE is safe to use with a randomized controlled study by Park., *et al.* comparing ube with microscopic discectomy, it showed reduced length of stay and surgical time and non statistically different complications in both groups [12]. Furthermore, UBE offers more flexible instrument operation, better decompression while continuous saline irrigation provides a clear field of vision and a safe operation [13]. While our concurrent approach proved successful in this case, it is important to acknowledge potential challenges and limitations. Careful patient selection is paramount, as patients with significant comorbidities or complex anatomical variations may not be ideal candidates for this approach. Furthermore, the surgeon must possess advanced endoscopic skills and experience to effectively navigate the complexities of operating at multiple spinal levels within a single surgical setting.

To our knowledge, attempting endoscopic decompression of both lumbar and cervical spine simultaneously is not described in the literature.

Outcomes

Postoperatively, the patient reported significant improvement in both cervical and lumbar symptoms. Follow-up imaging showed successful decompression at both levels with no complications. The patient was able to resume normal activities within a few weeks, demonstrating the efficacy and safety of UBESS in managing tandem stenosis.

Conclusion

Simultaneous cervical and lumbar unilateral biportal endoscopy offers a safe and feasible treatment option for select patients with tandem stenosis. This approach allows for concurrent treatment of both cervical and lumbar pathologies in a single surgical setting, streamlining recovery and reducing the need for multiple anaesthetic exposures. As demonstrated in this case, unilateral biportal endoscopic spine surgery holds considerable promise for managing tandem stenosis involving both cervical and lumbar degenerative spinal disease. By addressing multiple pathologies concurrently, this technique not only has the potential to improve patient outcomes but also to lessen the overall healthcare burden. Further research and long-term follow-up will be essential to validate the broader applicability and benefits of this approach for similar patient populations. This case contributes to the growing evidence supporting UBE as a versatile and effective approach for complex spinal pathologies. Compared to traditional open surgery, UBE offers the benefits of reduced blood loss, shorter hospital stays, and quicker return to activities of daily living. Furthermore, the ability to address tandem stenosis in a single setting aligns with the principles of enhanced recovery after surgery (ERAS).

Challenges and Limitations

Despite the positive outcome, the approach described in this case is not without challenges. The prolonged operative time associated with addressing two levels in a single session may increase surgeon fatigue and the risk of intraoperative complications. Additionally, achieving adequate decompression in patients with severe stenosis requires advanced surgical skills and familiarity with endoscopic techniques. Further studies with larger cohorts are needed to validate the safety, efficacy, and long-term outcomes of this approach in tandem stenosis cases.

Provenance and Peer Review

External peer review.

Patient Informed Consent

Informed consent was obtained from the patient prior to publication.

Conflict of Interest

No conflict of interest was reported by any of the authors.

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