

# Recurrent Radiculopathy Caused by Epidural Gas After Percutaneous TLIF Spine Surgery

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## ABSTRACT

An Epidural Gas (EG) containing pseudocyst is an unusual finding after surgery. We present a case of 72 years old woman presenting with recurrent radiculopathy due to Epidural Gas (EG) accumulation two weeks after percutaneous lumbar spine surgery with posterior fixation. Transforaminal Lumbar Interbody Fusion (TLIF).

After the failure of Conservative treatment, the patient underwent revision spinal surgery to remove the gaseous cyst.

**Keywords:** Epidural gas; Lumbar spine surgery; TLIF; Recurrent radiculopathy

## INTRODUCTION

An Epidural Gas (EG) containing pseudo cyst is an unusual finding after surgery on the lumbar spine causing radicular pain [1]. Its pathogenesis is still unclear [2]. It can be caused by the carbon dioxide and nitrogen gases released from the degenerative disc entrapped in the epidural space when the annulus fibrosus is ruptured [2,4]. Mini-invasive TLIF is one of the procedures that traverse the annulus fibrosus to access the disk space. To the best of our knowledge, this is the first case of postoperative symptomatic EG that co-occurred after percutaneous Transformational Lumbar Interbody Fusion (TLIF) surgery. A CT scan and open procedure confirmed this case to release compression.

## CASE PRESENTATION

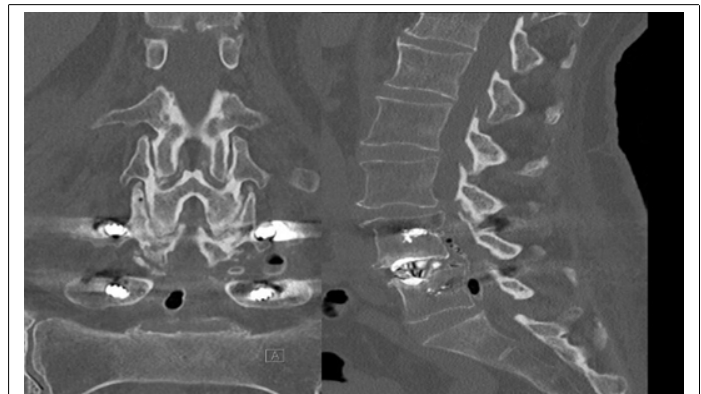
### Presentation and examination

A-72-years old woman was admitted with low back pain for ten years. The pain intensity increased last year disabling her daily activity. The preoperative neurologic assessment revealed hypoesthesia in the L5 dermatome without motor deficits. CT scan showed an L4-L5 degenerative spondylolisthesis found to be unstable on sagittal dynamic X-rays.

### Operation and postoperative course

Surgery was performed with the percutaneous procedure by posterior stabilization via trans pedicle screw instrumentation at L4 and L5 with TLIF by phosphate tricyclic bone substitute

around and inside a PEEK straight cage at the same level. Her symptoms resolved entirely postoperatively, and low back pain decreased intensely. Three weeks after discharge, the patient started to have radicular left L5 pain in her left leg. She received conservative treatment with pain killer class 3 (opioids) for two weeks, but her neurologic condition did not improve. She was readmitted at day 40 postop. The biologic report didn't find any infectious markers C reactive protein <5 mg/l, Leucocyte <11.0 × 10<sup>9</sup> L, blood culture (2) negative. CT scan showed a signal void indicating a blister-like encapsulated gas bubble, left paramedian, at the anterior epidural space at L5 level (Figure 1). A dense capsule was seen surrounding the gas bubble.



**Figure 1:** A postoperative sagittal and coronal reconstructed computed tomography (40 days post-op) image reveals an encapsulated EG. The collection was compressing the thecal sac and the left L5 nerveroot. The trans pedicle screw instrumentation at L4-L5 and the TLIF L4/L5 cage are also visible.

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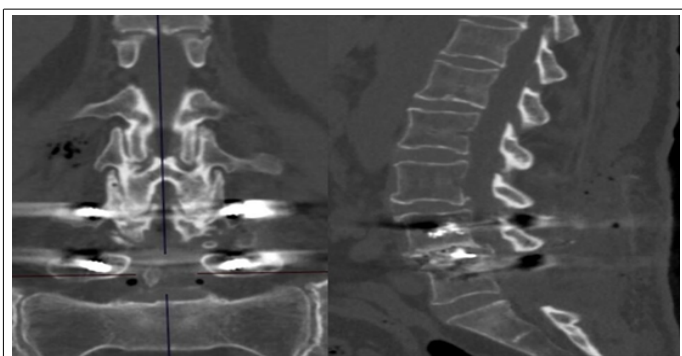
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## Revision surgery/postoperative course

Surgery was advised. The L5 laminectomy approach was used to expose the area around the affected left L5 nerve root. A thin, blister-like membranous structure containing the gas was observed on the inferior aspect of the nerve root, this membrane was fenestrated and the trapped gas flowed out, then it was dissected off and removed. Pathologic studies showed fragmented connective tissue with the presence of micro calcification inside. Postoperatively the patient improved significantly, her radiculopathy disappeared utterly. Immediate postoperative CT revealed the disappearance of gas in the epidural space (Figure 2). The Patient was discharged home on two post-operative days.



**Figure 2:** A postoperative sagittal and coronal reconstructed computed tomography (day 1 after the revision surgery) reveals the total disappearance of the encapsulated EG and partial disappearance of the calcified pseudo cystic layer.

## RESULTS AND DISCUSSION

Epidural gas may be seen after certain spine surgeries, but normally soft tissues regarding the surgical site can absorb this air [2]. Furthermore spinal gas could also be located within intervertebral spaces or facet joints, which can be identified by CT scan easily [5]. In exceptional cases, due to annulus rupture, an epidural gas bubble may be trapped in a non-specific fibrous cyst that is generated by binding the soft tissue margins utilizing the blood in the surgical field. This cyst encases the gas collection and may become compressive [4]. On the other hand, sources of EG might be due to local pyogenic infections and intestinal necrosis [6]. Whereas differential diagnosis of symptomatic EG includes: hematoma, recurrent disc herniation, meningeal cyst, malpositioned pedicle screw, and various inflammatory processes [7].

EG after TLIF is not described in the literature. Thus we presented our case. TLIF approach traverses the annulus fibrosus making a tear and enlarging the channel between intra discal and epidural space [8]. Through this channel, the intervertebral gas is transferred and trapped into the anterior epidural space. Gas trapping leads to the formation of a blister-like and constraint to nerve root [1,9]. Other sources of EG such as infectious and more serious conditions should be ruled out depending on the clinical presentation as well as the biological report that were expected in this case, and also clinical signs and symptoms are the major determinants in treatment selection [2]. The [9,10] showed spontaneous EG resorption with conservative treatment including absolute bed rest, steroid, nonsteroidal anti-inflammatory drug medication, When EG confirmed.

radiologically [1,11,12], however, [13-15] considered surgical management as the mainstay of treatment, furthermore, four cases of sciatica caused by chronic encapsulated blister-like EG were treated operatively [16] by ensuring adequate foraminotomy, removing the membranous soft tissue attentively near the nerve root, and irrigating the surgical field well with normal saline. Moreover, others in the literature say that needle aspiration or surgery is needed after the failure of conservative management [1,11,17].

We proceeded to open surgery after no response to the conservative therapy and the presence of blister-like capsulated EG on the CT scan shown in Figure 1. The open approach through laminectomy removes the capsulated EG shown on Figure 2.

## CONCLUSION

Although symptomatic EG after lumbar surgery is rare, it should be considered a possible cause of radiculopathy. Spine surgeons should be aware of this potential complication to target their treatment accordingly. The open approach is the most efficient treatment. Other sources of EG such as infectious and more serious conditions should be ruled out depending on the clinical presentation as well as the biological report that were expected in this case. This is a case of postoperative symptomatic EG which occurred simultaneously after percutaneous (TLIF) is considered the first one to be described in the literature. Despite the different point of views regarding the management in such cases the surgical management showed a high potential on the clinical outcome; the patient recovered completely on the first post-operative day. Alternatively symptomatic EG after lumbar surgery is a rare complication; it should be kept in mind as it might be a possible cause of radiculopathy after a Lumbar spine surgery. Spine surgeons should be aware of this potential complication, other differential factors should be ruled out and then targeting their treatment accordingly. To our knowledge the open approach is the most efficient surgical treatment.

## CONFLICT OF INTEREST

The Author declares that there is no conflict of interest. iii. Consent of participation. Oral consent had been taken

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