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# Sequestrated lumbar disc herniation mimicking intradural spinal tumor: A case report

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**Abstract**

Sequestered disc herniation is characterized by a portion of the nucleus pulposus rupturing and releasing into the spinal canal. The size of this extruded disc fragment can range from small to large. In certain instances, the disc fragment may be large enough to obstruct cerebrospinal circulation, causing it to be confused with intradural pathologies in radiological imaging. This confusion can potentially impact the choice of surgical approach for spinal interventions. This study presents and discusses a case of an atypically located sequestered disc herniation, initially misdiagnosed as an intradural tumor on radiological imaging.

**Keywords:** lumbar disc, sequestered disc herniation, intradural mass, cerebrospinal fluid

## Introduction

A sequestered disc fragment refers to the migration of the nucleus pulposus from the main intervertebral disc into the epidural space. It typically presents as relatively round-shaped and small compared to non-discogenic epidural pathologies [1]. While MRI is effective in diagnosing a sequestered disc, atypical migration and variations in size and shape may lead to misdiagnosis [2,3]. Symptoms and physical examination alone are insufficient to differentiate between epidural space-occupying lesions [4]. A definitive diagnosis requires surgical removal and pathological examination of the specimen.

We present a case of a 67-year-old male with L4-L5 radiculopathy symptoms who was initially misdiagnosed on pre-operative MRI as having an intradural tumor.

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**Informed Consent**
The authors stated that the written consent was obtained from the patient presented with images in the study.

**Conflict of Interest**
No conflict of interest was declared by the authors.

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## Case presentation

The patient presented with persistent left leg pain for 4 months, despite undergoing anti-inflammatory treatment. The initial lumbar MRI suggested a joint cyst (Figure 1A and 1B), and the patient's condition temporarily improved following a facet injection. However, symptoms recurred, resulting in an admission to our hospital. Upon physical examination, the patient tested positive for a left straight-leg raise, showed 4/5 foot dorsiflexion muscle power, and had hypoesthesia in the L5 and overlapping L4 dermatomes. A contrast-enhanced MRI revealed a T1 (Figure 2A) and T2 (Figure 2B) hypointense lesion with peripheral enhancement (Figure 2C), initially interpreted as an intradural tumor. The surgical intervention included a left L4 hemilaminectomy, flavectomy, and foraminotomy, uncovering a cystic mass compressing the L5 root and L4 axillary region. The mass, sticking to the posterior longitudinal ligament, was dissected and removed, revealing fibrocollagenized connective tissue fragments with signs of degeneration upon pathology (Figure 3 and 4).

Immunohistochemical staining exhibited Vimentin-positive fibrotic stroma, along with CD34 and WT-1 staining in vascular structures and a noted absence of epithelial lining or specific staining with Pancytokeratin and Calretinin. The staining of fibrotic stroma was further amplified with PAS (Periodic Acid Schife) and Masson Trichrome, whereas no hemosiderin pigment was identified with Iron stain. The patient granted written consent for the report to include their images.

Figure 3: The appearance of the cyst-like mass during the operation.

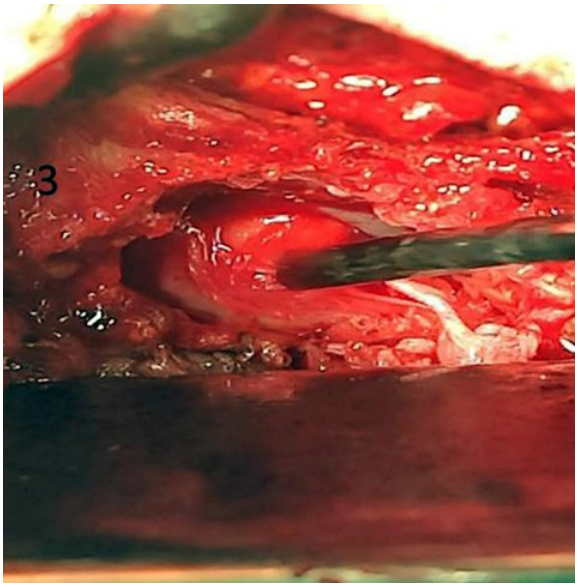



Figure 4: In the prepared sections (hematoxylin and eosin), fibrocollagenized connective tissue fragments, which are rich in elastic fibers, were observed.

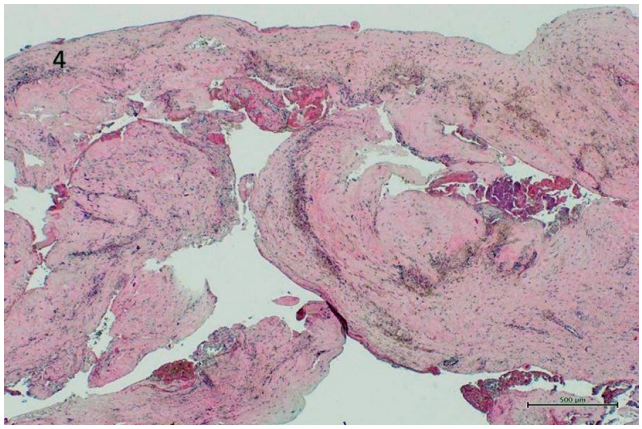



Figure 1: The cyst-like mass is indicated by a blue arrow in sagittal (1A) and axial (1B) t2-weighted sections.

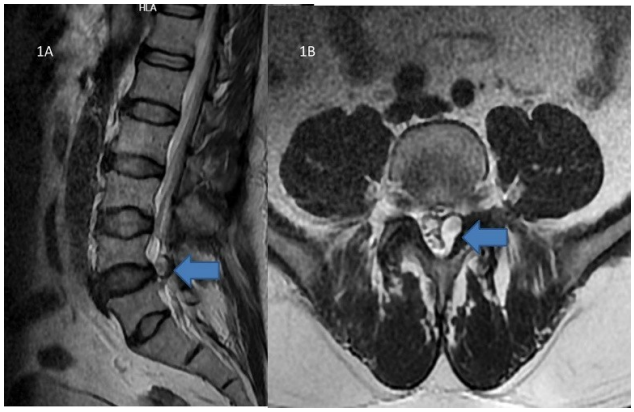
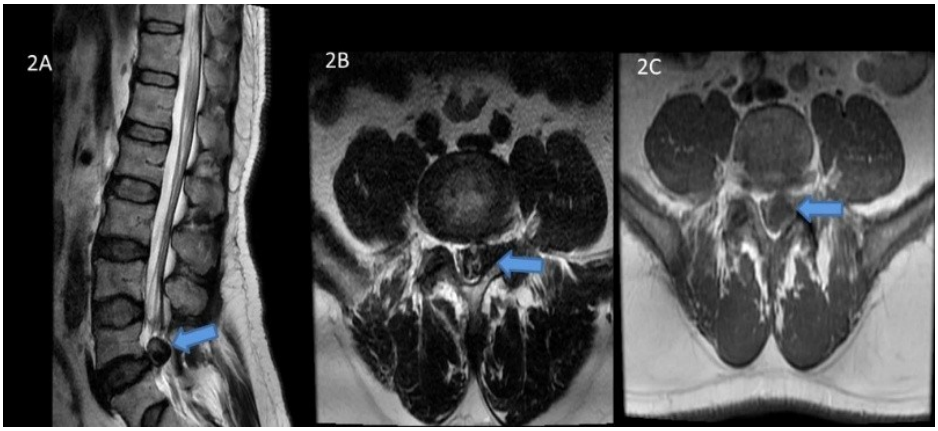



Figure 2: The MRI revealed a T2 sagittal (2A) and T2 axial (2B) hypointense lesion with peripheral contrast enhancement (2C).



## Discussion

More than 28.6% of intervertebral disc herniations are caused by sequestered disc fragments, with the lumbar region being the most frequently affected [4,5]. These sequestered disc fragments can migrate in various directions within the spinal canal, which can lead to multiple root compressions, lumbar stenosis, or in severe cases, cauda equina syndrome due to ischemia and compression. It is generally anticipated that sequestered disc fragments will be small and round-shaped compared to other extradural or intradural pathologies causing similar symptoms [1]. However, an increase in the volume of the fragment and its migration to unusual locations can complicate radiological diagnosis. Akhaddar et al. [7] reported a 60% rate of misdiagnosis of posteriorly sequestered fragments with other pathologies.

MRI is the preferred imaging modality for evaluating spinal pathologies and is considered the gold standard for intraspinal soft tissue pathologies [5]. Computed tomography serves as a supportive diagnostic tool [2]. Although MRI is generally reliable for diagnosing most intervertebral disc cases, sequestered discs can sometimes be mistaken for benign pathologies or tumors such as ganglion cysts, synovial cysts, meningiomas, schwannomas, metastatic malignancies, and abscesses [4,8].

Disc sequestrations exhibit characteristic intensity and contrast enhancement patterns on MRI, which can help distinguish them from other epidural space-occupying pathologies and abscesses. Sequestered discs typically appear hypointense on T1-weighted and hyperintense on T2-weighted MRI scans, though signal patterns may vary with age and degeneration [2]. In some instances, sequestered disc fragments mimicking spinal neoplasms may exhibit isointense, hypointense, or hyperintense signals on both T1 and T2 weighted images [3,8]. Often, peripheral contrast enhancement is observable on gadolinium-enhanced T1-weighted images; this is likely attributable to inflammation and neovascularization surrounding the fragments [1,5]. Moreover, homogenous gadolinium enhancement may be apparent due to the partial granulation of disc fragments [1,3].

Spinal malignancies typically display a homogeneous or heterogeneous post-gadolinium enhancement pattern and rarely exhibit peripheral contrast enhancement [4,9,10]. Benign pathologies, such as schwannomas and meningiomas, usually show homogeneous contrast enhancement [11]. Synovial cysts and ganglionic cysts, which are located posterolaterally, may resemble sequestered disc fragments on MRI. They show similar signal characteristics and peripheral gadolinium enhancement [12,13]. Intraspinal abscesses typically appear isointense on T1-weighted and hyperintense on T2-weighted MRI scans, with variable gadolinium enhancement patterns [4].

In our case, a pathologically confirmed sequestered cyst presented challenges in radiologic diagnosis due to its hypointense signal on both T1 and T2-weighted MRI scans, increased volume, obstruction of cerebrospinal fluid flow, ventral to posterolateral localization, and peripheral gadolinium enhancement. Such factors complicated efforts to differentiate the lesion from other pathologies. Given these findings, pre-operative radiologic diagnoses can be challenging because of the overlapping MRI signals from various pathologies.

Surgery is the preferred treatment for sequestered disc fragments when conservative measures prove ineffective, or if progressive motor deficits or cauda equina syndrome are present. Minimally invasive unilateral approaches are often favored, while intradural pathologies might necessitate more extensive surgical interventions, such as the removal of posterior elements. The primary objective is to gain comprehensive control of the surgical site to safeguard neural tissue. Minimally invasive surgery offers multiple benefits including early mobilization, shorter hospital stays, and financial efficiency in comparison to traditional approaches. Therefore, an accurate pre-operative diagnosis is vital in determining the most appropriate surgical approach. In our case, we decided on a minimally invasive approach based on the lesion's resemblance to an intervertebral disc in imaging. The detected volume increase in the lesion over 4 months might be due to bilateral fluid diffusion from peripheral neovascular structures. Had unilateral fluid absorption occurred, a more advanced degenerative appearance would be expected on T2-weighted imaging in comparison to the adjacent intervertebral disc.

### Conclusion

In summary, it can be challenging to differentiate sequestered disc fragments from other intraspinal pathologies based on their size, shape, and migration patterns. A careful evaluation of radiological findings and consideration of sequestered disc fragments in cases of suspicious appearances are essential for determining the appropriate surgical approach.

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