

## Intradural disc herniation: Radiographic findings and surgical results with a literature review



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### ABSTRACT

**Objective:** To report a series of four cases of intradural disc herniation (IDH) with a review of the literature. **Summary of background data:** IDH is a rare type of disc herniation. Preoperative diagnosis is difficult and IDH is only confirmed during surgery in most cases. Here, we describe four cases of IDH, including three with lumbar hernia and one with thoracic hernia.

**Methods:** A retrospective chart review, surgical database query, and review of radiology reports are presented for each case, along with a literature review of IDH.

**Results:** Two of the four patients had a history of surgery at the same spinal level. Ring enhancement in gadolinium-enhanced MRI, an air image in computed tomography, and complete block in myelography were observed in the series. Surgery was performed with a transdural approach in all patients. One patient underwent transforaminal lumbar interbody fusion after postoperative recurrence. Three patients with lumbar involvement had nerve root symptoms preoperatively, but showed symptomatic improvement in the early postoperative period. In contrast, the patient with thoracic involvement had preoperative muscle weakness due to myelopathy symptoms, and had residual symptoms after surgery.

**Conclusions:** IDH is a rare disease and characteristic imaging findings can be useful for diagnosis. Intraoperative findings lead to a definitive diagnosis in many cases and recognition of the pathological characteristics of IDH is important.

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## 1. Introduction

Disc herniation is a common disease, but cases of intradural disc herniation (IDH) are rare, with an incidence of 0.2–2.2% among all cases of herniated discs [1–3]. IDH was first reported in 1942 by Dandy [4]. The typical symptoms include acute exacerbation of chronic back pain, and there is a higher incidence of cauda equine syndrome in IDH than in extradural herniation [5–7]. Preoperative diagnosis is difficult because of variable clinical and radiological presentations.

## 2. Case reports

A summary of the cases is presented in Table 1.

### 2.1. Case 1

A 33-year-old man presented with lumbago and bilateral L5 radiculopathy for 1 month. He had undergone right L5–S1 disc resection 5 years ago, left L5–S1 disc resection 2 years ago, and right L4–L5 disc resection 1 year ago. A lesion was observed in the canal at the L5 level on MRI (Fig. 1a) and L4–L5 complete block was found in myelography (Fig. 1b and c). Intradural and extradural lesions were not found during surgery, but were confirmed by echo examination. After dural incision, an intradural disc sequestrum was detected and removed. Postoperatively, symptoms improved and the course has been good for 1 year after surgery.

### 2.2. Case 2

A 67-year-old woman presented with continuous bilateral thigh pain for 4 months. Gadolinium-enhanced MRI revealed an extradural mass with peripheral enhancement at the L2–L3 level. The mass

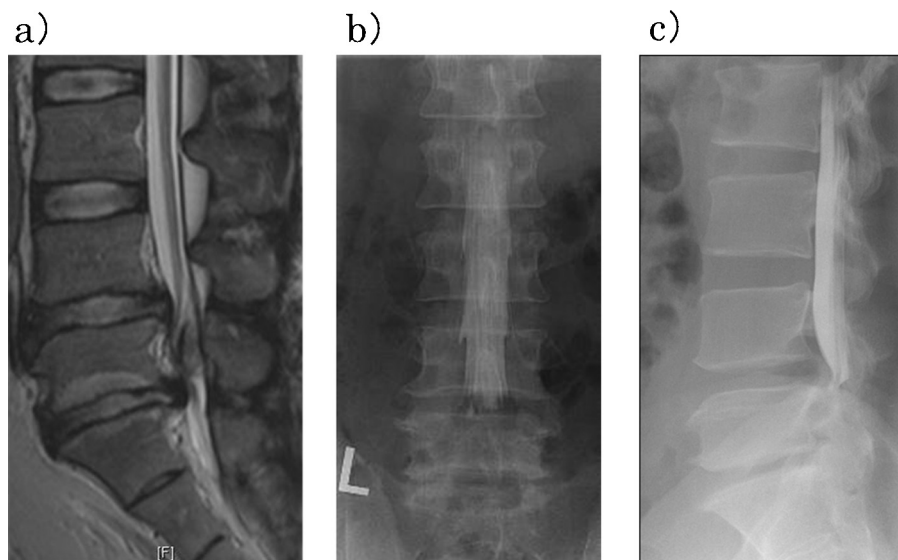
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**Table 1**  
Summary of the cases.

Case	Age (y), Sex	Number of past surgeries	Herniation level	Symptoms (duration)	Duration from previous surgery
1	33, M	3	L4–L5	Lumbago and bilateral L5 radiculopathy (1 month)	12 months
2	67, F	0	L2–L3	Bilateral thigh pain (4 months)	N/A
3	74, M	1	L3–L4	Lumbago and bilaterally L4 radiculopathy (1 month)	1 month
4	85, F	0	Th12–L1	Weakness of bilateral leg muscles, sensory deficit and bladder rectum disorders (1 month)	N/A

N/A, not applicable.



**Fig. 1.** (Case 1): (a) Preoperative sagittal T2-weighted MRI showing a mass in the canal at the L5 level. (b and c) L4–L5 complete block was observed by myelography.

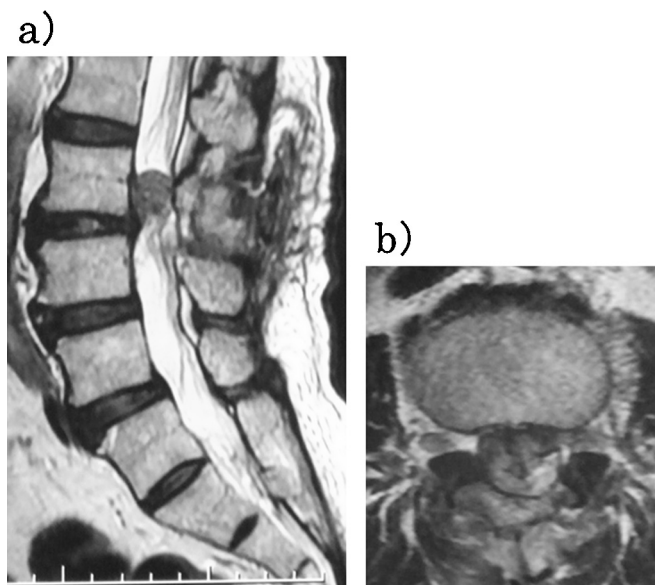
was thought to represent an extruded disc and L2–L3 discectomy was performed. During surgery, after L2–L3 fenestration, a hole was observed in the ventral dura mater due to herniation; therefore, after incising the dorsal dura mater, the intradural disc herniation was resected. The defect in the ventral aspect of the dural sac was subsequently repaired. Postoperatively, pain has improved and there has been no recurrence for 3 years.

### 2.3. Case 3

A 74-year-old man had previously undergone L3–L4 fenestration and discectomy by L3–L4 disc herniation at another hospital. However, after initial improvement, pain increased 1 month after surgery and he consulted our institution. He was suffering from lumbago and bilateral L4 radiculopathy. MRI revealed an intradural mass lesion at the L3–L4 level (Fig. 2a and b) and gadolinium-enhanced MRI showed ring enhancement (Fig. 3a and b). Computed tomography (CT) revealed air in an intervertebral disc (Fig. 3c). In reoperation, a dorsal dural incision was made and a hole was found in the ventral dura that connected to the intervertebral disc. The herniated nucleus pulposus was removed and the ventral and dorsal dura were sutured, with performance of L3–L4 instrumented transforaminal lumbar interbody fusion (TLIF). The high degree of adhesion, protrusion of the hernia into the foramen, and difficulty with adequate preservation of the facet led to the decision to resect the facet and perform TLIF (Fig. 4). Pathological analysis showed degenerative fibrocartilage in the resected herniation, including partial capillary proliferation, interstitial edema, and inflammation in parts of the ventral dura mater (Fig. 5). Two years after reoperation, symptoms have recovered and there has been no recurrence of the hernia.

### 2.4. Case 4

An 85-year-old woman had suffered from gait disorder due to bilateral proximal leg muscle weakness for 1 month, and this condition had deteriorated rapidly. She also had sensory deficit and insensate urinary incontinence. Manual muscle testing of the



**Fig. 2.** (Case 3): Sagittal (a) and axial (b) T2-weighted magnetic resonance imaging showing expansion and an intradural lesion at L3–L4.

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