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Case Report

Intradural lumbar disc herniations at the L1–L2 level: A case study and literature review

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ABSTRACT

Background: Intradural disc herniations (IDHs) are rare occurrences (0.26–0.30%), and most frequently involve the lumbar spine at the L4–L5 level. Here, we present a patient with an L1–L2 IDH and reviewed the current literature.

Case Description: A 65-year-old female presented with the acute onset of bilateral paraparesis accompanied by urinary dysfunction. The lumbar MRI showed a mass at the L1–L2 level with caudal migration, accompanied by a positive "hawk-beak" sign. At surgery, consisting of a L1–L2 laminectomy, a large IDH was encountered responsible for marked cauda equina/root compression. Postoperatively, the patient immediately fully recovered. The literature we identified cited just seven similar studies of L1–L2 IDH.

Conclusion: In a 65-year-old female, an IDH was anticipated at the L1–L2 level due to the combined MR findings of a large L1–L2 mass with caudal migration and the positive "hawk-beak" sign.

Keywords: Disc herniation, Hawk beak, Intradural, Lumbar, Posterior longitudinal ligament

INTRODUCTION

Intradural disc herniations (IDHs) comprise only 0.26–0.30% of all disc herniations, typically involve the lower lumbar spine (92%), and are mostly located at the L4–L5 level. We identified only seven cases of IDH involving the L1–L2 level.[1,2,3,6,7,8] Here, we presented a 65-year-old female with a L1–L2 IDH accompanied by caudal migration. IDH was anticipated based on the combined MR findings of large obstructive mass at the L1–L2 level and the positive "hawk-beak sign."

MATERIALS AND METHODS

A comprehensive literature search was performed on PubMed, MEDLINE, and Google Scholar databases, using the following MESH terms: "intradural lumbar disc herniation," "intradural lumbar herniated disc," "transdural herniated disc," "transdural disc herniation," "sequestered lumbar disc," and "lumbar intradural disc rupture." Only six (seven patients) out of 63 articles regarding L1–L2 IDH were identified [Table 1].

Table 1: Summary of studies, clinical, surgical treatment, and outcome data of eight patients with intradural L1–L2 intervertebral disc herniation.

Authors and year	Number of patients	Age (years)	Sex	Neurological symptoms	Previous surgery	Treatment	Outcome
Smith (1981)[8]	1	66	M	Low back pain, paraparesis, urinary and fecal retention	No	Laminectomy	Improved, total recovery
Koç *et al.* (2001)[6]	1	65	M	Low back pain, paraparesis, urinary incontinence	No	Laminectomy	Improved, partial recovery (walking with assistance)
Özturk *et al.* (2007)[7]	1	50	F	Low back pain, bilateral sciatica, paraparesis	No	Laminectomy	Improved, total recovery
Carvi y Nievas *et al.* (2007)[3]	1	56	F	Low back pain, incomplete paraparesis	No	Hemilaminotomy, facetectomy	Improved, partial recovery
	1	71	F	Back pain, bladder dysfunction	Yes	Hemilaminectomy	Improved, transient urinary retention
Arnold *et al.* (2011)[2]	1	69	F	Low back pain and left cruralgia	No	Laminectomy	Improved, total recovery
Aprígio *et al.* (2019)[1]	1	57	M	Chronic low back pain and left cruralgia	No	Laminectomy, facetectomy, L1–L2 pedicle screw fixation, and interbody cage placement	Improved, total recovery
Our case	1	65	F	Low back pain, bilateral sciatica, incomplete paraparesis, urinary retention	No	Laminectomy	Improved, total recovery

CASE REPORT

History

A 65-year-old female had a 2-month history of low back pain and intermittent neurogenic claudication. Over the course of a few days, she developed perineal hypoesthesia accompanied by paraparesis and urinary retention. On examination, she had a positive Laségue's sign on the right at 30°, right-sided quadriceps weakness, bilateral lower extremity hyporeflexia (loss of patellar and Achilles responses), and loss of pin appreciation in the perineal region.

Preoperative imaging

The lumbar MR (T2-weighted sagittal and axial images) showed marked dural compression at the at the L1–L2 level with caudal migration to L2, combined with a positive "hawk-beak" sign. The lesion itself at L1–L2 did not enhance with contrast, but there was enhancement of the surroundings tissues [Figure 1].

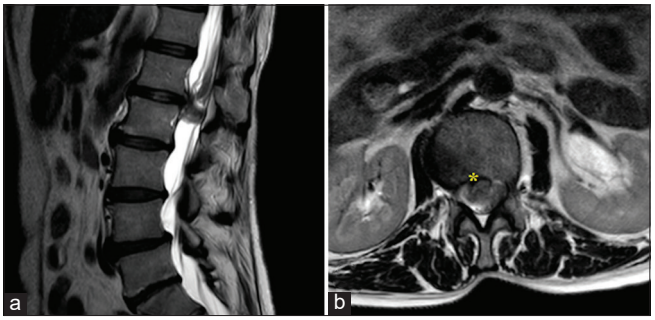

Figure 1: Pre-operative T2-weighted MRI sagittal (a) and axial (b) images show a "hawk-beak like" appearance at L1-L2 level, suspecting an intradural herniated disc (yellow asterisk).

Surgical intervention

At surgery, consisting of a L1–L2 laminectomy, no significant epidural lesion was present. However, when the dura was opened, a large IDH/fragment was encountered measuring 2 × 1 cm. This was carefully teased away under the operating microscope from the surrounding nerve roots of the cauda equina and ventral dura [Figure 2]. Further, the ventral dura had to be sutured closed; fibrin glue was also applied, with care being taken to avoid creating a significant mass. Postoperatively, due to the dural repair, the patient was kept on bed rest for 48 h. One week postoperatively, the lumbar MR confirmed adequate decompression of the spinal canal without any residual disc [Figure 3]. Upon discharge, 13 days postoperatively, the patient fully recovered.

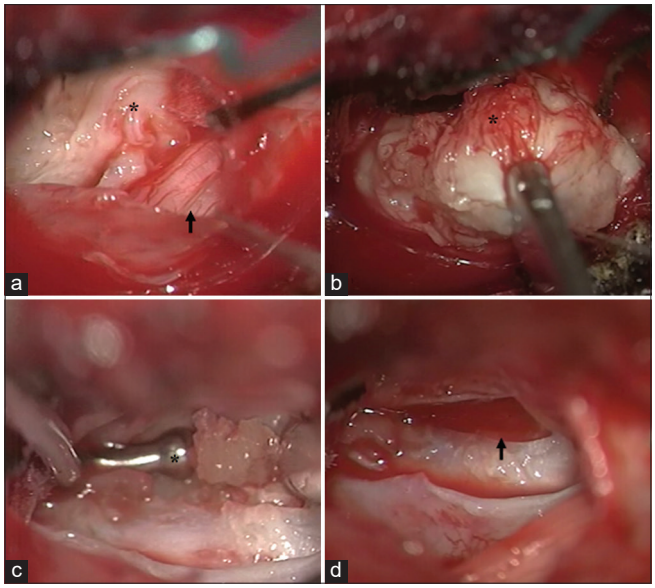

Figure 2: Intraoperative description of the IDH removal. After the L1-L2 laminectomy, a dural incision is made. The roots of the cauda equina (black arrow) appear dislocated by a voluminous migrated intradural disc fragment. (black asterisk) (a) With the use of disc pounches a removal of the voluminous IDH is performed. (b) Microsurgical discectomy is completed with the use of a Cushing's buttoned nerve hook (black asterisk) through the ventral dural defect (c), achieving a macroscopic complete disc removal and decompression of the nerve roots (black arrow). (d).

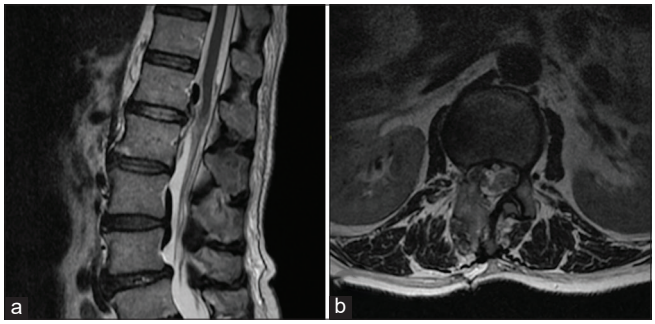

Figure 3: Post-operative T2-weighted MRI sagittal (a) and axial (b) images show an optimal decompression of the conus medullaris and of the roots of the cauda equina with absence of further disc fragments.

DISCUSSION

IDHs are rare, accounting for 0.27–0.33% of all herniated discs. Of the approximate 151 cases of IDH reported, 3% occur in the cervical region, 5% in thoracic region, and 92% in the lumbar spine.[1,2,5] The sites most frequently affected include L4–L5 (55%), L3–L4 (16%), L5–S1 (10%) L2–L3, and L1–L2 in descending order.[1] The main theory regarding the formation of IDH is that adhesions occur between the posterior longitudinal ligament (PLL) and the ventral dura due to some local inflammatory processes, leading to spontaneous perforation or rupture.[1,2,5]

Noncontrast and contrast MR findings for IDH

On T1- and T2-weighted MR images, IDHs are homogeneously isointense. Notably, Hidalgo-Ovejero *et al.*[5] found that gas within the spinal canal was associated with IDH.

Gadolinium-enhanced MR scans demonstrate a positive "Hawk-Beak" sign (e.g., a "Beak-Like" appearance at the level of the lesion sharply compressing the dural sac, especially on T2-weighted axial images). Hida *et al.*[4] further described, at the level of the intervertebral disc space, the positive "Beak-Like" mass, plus the abrupt loss of continuity with the PLL, and focal ring enhancement. In the case presented, the L1–L2 MR documented all three findings consistent with an IDH at the L1–L2 level.

CONCLUSION

IDHs are rare, the authors found only seven such cases reported in the literature involving the L1–L2 level.[1,2,3,6,7,8] Here, the MR scans with/without contrast showed an obstructive L1–L2 lesion with caudal migration, the positive "Hawk-Beak" sign, and ring enhancement highly most consistent with an L1–L2 IDH later surgically excised.

Declaration of patient consent

Patient's consent not required as patient's identity is not disclosed or compromised.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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