

Intradural Disc Herniation, an Infrequent Spine Disease, Case Report

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Received: 07 Oct 2023

Accepted: 08 Nov 2023

Published: 17 Nov 2023

J Short Name: ACMCR

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Citation:

Ferraz VR, Intradural Disc Herniation, an Infrequent Spine Disease, Case Report. Ann Clin Med Case Rep. 2023; V11(13): 1-4

Keywords:

Intradural disc herniation; Spine surgery; Neurosurgery; Case report

1. Abstract

1.1. Introduction: Intradural disc herniation (IDH) is a rare disease that affects the spine, difficult to diagnose clinically and radiologically and easily mistaken with other types of disc herniations. In this article is presented the case of a patient diagnosed and treated with IDH and reported it to share the diagnostic process as well as treatment performed, so that we can contribute to the proper management of these patients.

1.2. Case Presentation: This is a 40-year-old woman, with no history of physical activities that overload her lumbar spine, who underwent L4-L5 discectomy at another hospital in 2021, evolving with progressive worsening of symptoms, mainly paresthesia and hypoesthesia in the territory of L4-L5-S1 and bilateral flexion and extension loss of strength of the feet, associated with lumbosciatic pain. She was then diagnosed in our hospital with IDH and underwent extensive posterior bone decompression, intramedullary decompression, dural injury repair, fixation, and lumbar arthrodesis with a pedicle screw. The postoperative period was uneventful, with significant improvement of symptoms in the outpatient follow-up.

1.3. Conclusions: Because it is a rare disease, IDH must be correctly diagnosed for its effective treatment, even so the therapy is a great challenge for the Spine Surgery team. Some alterations in the MRI should draw the attention of the medical team to this condition, such as the “Hawk-beak sign”, which is present in this description. Thus, according to the medical literature, bone and medullary decompression can lead to a good recovery of the pa-

tient and even reversal of eventual neurological deficits.

2. Introduction

Intradural disc herniation (IDH) is defined as displacement of the nucleus pulposus from the disc through the dural sac [1]. Its first description was Dandy in 1942 [2], currently there are reports of approximately 200 cases in the medical literature.

IDH comprises only 0.2 - 0.3% of all disc herniations in the spine, with a higher incidence between the fifth and sixth decades of life and mainly affecting the lumbar region (92%) [3-5]. Less than 9% of IDH affect the cervical or thoracic region. In the lumbar region, the L4-L5 segment is the most affected (55%), followed by the L3-L4 segment (16%) and the L5-S1 segment (10%) [6,7].

The pathophysiology is still not fully understood, however, a chronic inflammatory process and adhesions caused by degenerative disease of the intervertebral disc led to erosion of the dural sac and subsequent migration of the nucleus pulposus to its interior. Another hypothesis is that a fusion may occur between the anterior portion of the dural sac and the annulus fibrosus of the disc, thus leading to a thinning of the dura mater and its greater propensity to rupture. Genetic factors that regulate dura mater thickness are also thought to contribute to IDH [8-10].

3. Case Report

This is a 40-year-old woman, with no history of physical activities that overload her lumbar spine, who underwent L4-L5 discectomy at another hospital in 2021, evolving with progressive worsening of symptoms, mainly paraesthesia and hypoesthesia in the territory of L4-L5-S1 and bilateral flexion and extension loss of strength of

the feet, associated with lumbosciatic pain.

Magnetic resonance imaging (MRI) was performed, which showed extruded and median disc herniation, at the L4-L5 level, causing medullary and radicular compression on the right side. The “Hawk-beak sign” can be observed in MRI images (Figure 1). The patient underwent extensive posterior bone decompression,

spinal cord decompression, dural injury repair, L4-L5 total discectomy, placement of a TLIF peek cage, fixation and lumbar arthrodesis with a pedicle screw at L4-L5-S1 (Figure 2). The post-operative period was uneventful, with significant improvement in symptoms, the patient was discharged 3 days after surgery and is still being followed up.



Figure 1:

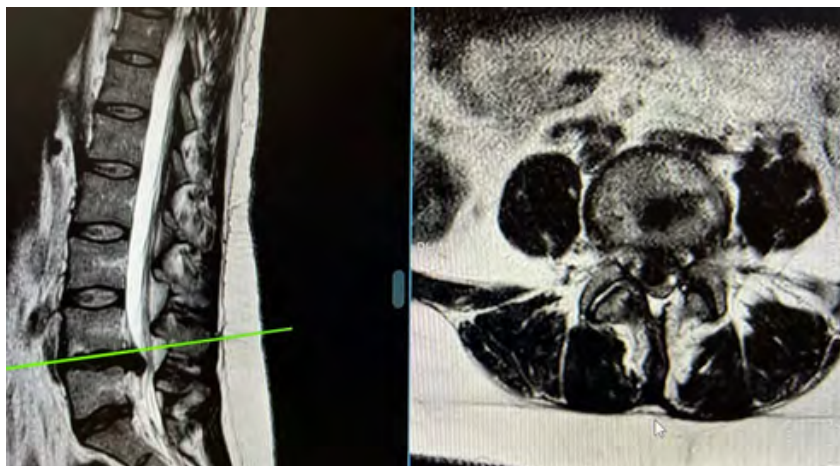


Figure 2:

4. Discussion

Intradural disc herniation (IDH) is a rare phenomenon, which accounts for only 0.2%–0.3% of all disc herniations with the lumbar region being the most common site of occurrence [3-5].

A two-type classification has been proposed for this type of herniated disc: type A, in which the disc protrudes through the dura mater and does not compress the nerve root; type B, in which the disc protrudes through the dura mater and compresses the root [12].

According to the cases available in the literature, IDH manifests itself clinically with a great possibility of symptoms, most of the times of a progressive nature and predominantly sensitive and motor alterations caused by the involvement of the roots of L4 and

L5, other symptoms are also described, such as: urinary incontinence, gait disturbances (secondary to sensorimotor alterations) and classic pictures of cauda equina syndrome [9,11,13].

Since IDH is an uncommon condition, other spinal pathologies such as neurofibroma, lipoma, meningioma, epidermoid tumor, arachnoid cyst, archnoiditis and metastasis should be considered as differential diagnosis. Given that IDH can mimic an intradural tumor MRI is mandatory for the proper diagnostic [14].

Some radiological findings are described in IDH, (1) absence of dural tent sign, (2) complete block of the spinal canal, (3) hawk-beak sign, (4) double layered disc herniation across the dura, (5) increased distance between the dura and cauda equina in non-en-

hanced MRI, (6) rim enhancement of disc herniation, (7) absence of enhancement of dural tent in enhanced MRI. In 2019, Kang et al., proposed a model for predicting TDH, based on each imaging finding. That is, if two or more imaging findings are present, the probability of predicting TDH is 86%, and if there are less than 1 imaging finding, the probability of predicting TDH is 9% [15].

The herniated discs reveal homogeneously isointense lesions on T1- and T2-weighted MRI or a beak-like mass with ring enhancement caused by chronic granulation tissue and peripheral neovascularization at the intervertebral disc level [16].

In T2-weighted images, IDH can be revealed by posterior longitudinal ligament (PLL) discontinuity, a “Y” sign, which is caused by splitting of the ventral dura line. It can also be revealed as a voluminous disc without signs of CSF surrounding the disc, poor disc margin, or increased signal intensity surrounding the herniation, which is caused by an inflammatory reaction [17,18].

For lumbar IDH surgical treatment may requires bilateral laminectomy with durotomy to remove intradural disc material, followed by dural closure to prevent CSF leakage, some authors suggest that the primary repair of the ventral dura may be necessary [18]. Other authors place haemostatic material at the ventral dural surface to occlude the possibility of dural leakage [8]. Additionally, chronic inflammation leads to dural fragility. Therefore, avoiding unnecessary retraction of the dural sac is essential. A surgical microscope or loupe can provide clearer vision to minimize the risk of rootlet injury and enable adequate decompression. Posterior interbody fusion and fixation are recommended for lowering the segment movement and thus preventing recurrent disc herniation [19].

For thoracic IDH, it is generally believed that an anterolateral or anterior approach is relatively safe [20]. For IDH in the cervical spine some surgeons advocate the posterior approach have varying degrees of postoperative neurological damage, and posterior surgery may aggravate the neck and increase the risk of spinal cord injury [21]. In the other hand, some authors indicate the use of posterior surgery, because a large part of the patients who receive the posterior approach have improved their recovery. These procedures are safer when performed with the assistance of a microscope. As these procedures involves operations in the spinal canal, they can be completed with neurosurgical assistance when necessary [22,23].

5. Conclusions

Despite being a rare disease IDH has already some described radiological and clinical features that can help future spine surgeons to improve their research.

If the correct diagnosis and surgical procedure are performed in a timely manner and the intraoperative decompression is thorough, low back pain and lower extremity pain can be significantly relieved, and symptoms affecting lower extremity sensation and muscle strength can be partially or completely resolved, resulting

in a satisfactory surgical effect. Finally, the spine surgeon’s expertise plays a major role to a satisfactory outcome.

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