L2/L3 Intradural Disk Herniation Mimicking Spinal Cord Tumor: A Case Report and Review of the Literature

Vijay Sundar Ilangovan, Thanga Thirupathi Rajan Vivakaran, Senthil Kumar Aiyappan, Vimal Chander

ABSTRACT

Intradural disk herniation (IDH) is a rare variant of a common spine problem which occurs most often at fourth and fifth lumbar (L4, L5) level but is rare at higher levels. It is often difficult to diagnose preoperatively and differentiate from other spinal lesions. We describe a case of IDH at L2, L3 level and review the pathogenesis, radiological findings and intraoperative findings of IDH with emphasis on early recognition of the entity. We also review the literature of reported cases of IDH at L3 and L4 level.

Keywords: Disk herniation, Intradural, High lumbar, Contrast MRI.


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INTRODUCTION

Lumbar disk herniation is one of the commonest indications for spine surgery. Intradural disk herniation (IDH) is a relatively uncommon variant, first described by Dandy in 1942. It comprises about 0.3% of lumbar disk protrusions. Although more than hundred cases have been described, very few cases have been described at (L2, L3) level. We report a case of IDH at L2, L3 level and review the available literature.

CASE REPORT

A 45-year-old male presented to us with complaints of pain in the left thigh. The patient had been evaluated elsewhere for these complaints and a magnetic resonance imaging (MRI) lumbosacral spine revealed an intradural space occupying lesion at L2 and L3 level (Fig. 1) which was diagnosed as intradural en plaque meningioma. A contrast-enhanced MRI was performed which showed dural-based ring enhancing intradural lesion (Fig. 2). A provisional diagnosis of meningioma/intradural disk was made and patient was taken up for surgery. L2 and L3 laminectomy was done, and midline durotomy was done which showed dural-based whitish tumor displacing roots to either side. On incision, disk-like material was excised. Tumor was completely dissected off the dura and excised. Histopathological examination revealed hyaline cartilage. A final diagnosis of L2 and L3 intradural disk herniation was made. Patient recovered uneventfully from surgery and, at last follow-up of 3 months, pain and numbness had disappeared.
DISCUSSION

Intradural disk herniation, though not the rarest of spine pathologies, merits mention by virtue of being an unusual and unexpected variant of an extremely common problem, lumbar disk herniation.

The majority of them occur at the L4 and L5 levels which is also one of the commonest sites for lumbar disk herniation. Of all intradural disk herniations, 5% are found in the thoracic region, 3% in the cervical region and 92% in the lumbar region. In the lumbar spine, the site most frequently affected is L4, L5 (55%), followed by L3, L4 (16%) and L5, L1 (10%).

We did a review of the available literature (Table 1) and found that ours was only the 8th case of lumbar intradural disk herniation occurring at L2, L3 level. All reported cases are aged above 40 years and have presented with pain and/or bladder symptoms. It has occurred evenly in males and females. All cases except one have shown contrast enhancement on MRI except In-Ho Han et al which was also the youngest reported case. Intradural gas was noted in two cases.

Intraradicular disk herniation is a variant of intradural disk herniation wherein the extruded disk material perforates the radicular sheath, this variant seems to be more frequently associated with previous surgery. The pathogenesis of intradural herniation is unclear. Dural erosion seems to be a critical step for its occurrence and this may be facilitated by intradiscal calcification, previous herniation or spinal canal stenosis. Additionally, anatomical studies by Blikra have demonstrated adhesions between the dura and the posterior longitudinal ligament at the L4, L5 level.

Clinically, intradural disk herniation has a similar but often more severe presentation. Cauda equina syndrome occurs significantly more frequently (30%) as compared to higher level extradural herniation (<1%). Average age of presentation is usually in the fifth and sixth decades. Males represent 76% of the reported cases.

Many times, the diagnosis of intradural disk herniation has been an intraoperative finding. However, with the current MRI protocols and resolution, it is become possible to preoperatively diagnose intradural disk herniation thus avoiding intraoperative surprises or negative surgical exploration.

A CT finding of gas within the spinal canal is said to be strongly associated with IDH. Discography though not routinely performed may show leakage of contrast medium into the subdural space.

Noncontrast MRI may show ruptured posterior annulus with continuity of the intradural herniated material with the intradiscal contents and abrupt interruption of posterior longitudinal ligament at the level of the herniation.

Magnetic resonance imaging signs, such as ‘hawk-beak sign’ and ‘Y’ sign, have been reported to help to diagnose IDH. However, these findings may not be specific to IDH.

The most extensively studied radiological sign in IDH has been the peripheral rim enhancement seen on contrast-enhanced MRI. The possible mechanism proposed is infiltration of peripheral blood vessels, migration of phagocytes and, finally, phagocytosis of disk material. Rim enhancement though has been reported in extradural disk herniations too thus losing its specificity as a diagnostic tool. Further, the rim enhancement has been shown to decrease in size or spontaneously disappear in both extradural and intradural disk herniations.

It must be borne in mind that nonenhancing intradural mass does not rule out IDH. Acute IDH which have not yet developed granulation tissue are unlikely to reveal rim enhancement.

Several differential diagnosis have to considered in the evaluation of intradural spinal lesion. These include: schwannomas, meningioma, ependymoma and dermoid. Schwannomas are isointense on T1 and hyperintense on T2, whereas meningiomas are isointense on both T1 and T2-weighted images. Both these lesions demonstrate a homogenous enhancement. Ependymomas are hyper-intense on T2 and enhance markedly. Epidermoid and dermoid tumors do not enhance on contrast imaging.

Table 1: List of reported cases of IDH at L2 and L3 level

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Age/sex</th>
<th>Presentation</th>
<th>Radiology</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cantini et al (1986)</td>
<td>72/F</td>
<td>Paraparesis/bladder dysfunction</td>
<td>Myelogram</td>
<td>Partial block</td>
</tr>
<tr>
<td>Whittaker et al (1994)</td>
<td>NA</td>
<td>NA</td>
<td>CT, MRI, myelogram</td>
<td>Homogenous enhancement</td>
</tr>
<tr>
<td>Alonso-Bartolomé et al (2001)</td>
<td>NA</td>
<td>Pain, weakness right lower limb/sexual dysfunction</td>
<td>Contrast MRI</td>
<td>Ring enhancement</td>
</tr>
<tr>
<td>Sei et al (2009)</td>
<td>67/F</td>
<td>Right thigh pain</td>
<td>CT discography, contrast MRI</td>
<td>Intradural gas, cyst and ring enhancement</td>
</tr>
<tr>
<td>In-Ho han et al (2009)</td>
<td>40/M</td>
<td>Cauda equina</td>
<td>CT, contrast MRI</td>
<td>OPPL, bone spur, no enhancement</td>
</tr>
<tr>
<td>Hyeong-Suk Kim et al (2012)</td>
<td>54/M</td>
<td>Pain in low back and right leg</td>
<td>Contrast MRI</td>
<td>Partially enhancing</td>
</tr>
<tr>
<td>Present case</td>
<td>45/M</td>
<td>Left thigh pain</td>
<td>Contrast MRI</td>
<td>Ring enhancing</td>
</tr>
</tbody>
</table>
The treatment of intradural disk herniations basically involves surgical removal of ruptured disk material. During surgery, the dura and root must be carefully explored. If the intraoperative findings do not match the extent of compression seen on the MRI, a suspicion of intradural migration of disk fragment should be entertained, and a radiograph is advisable to rule out wrong level surgery. A tense swollen dura in the absence of extradural herniation and sometimes CSF leak from the ventral aspect of the dura are characteristic intraoperative signs.

CONCLUSION

Intradural disk herniation is a rare variant of a very common disease of the spine and, therefore, merits mention. As evidenced by the literature review, IDH is being reported at all levels and, hence, the spine surgeon must be aware of such a possibility irrespective of the site of surgery. Magnetic resonance imaging especially contrast-enhanced MRI can give diagnostic clues, such as rim enhancement but they are not specific to IDH. Thorough intraoperative exploration of the dura and roots, especially in case of mismatch of preoperative imaging and intraoperative findings is a must to avoid failure of surgery.

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7. Reema C, Prabodhan P, Kshitij C, Mihir B. Magnetic resonance imaging especially contrast enhanced MRI can give diagnostic clues, such as rim enhancement but they are not specific to IDH. Thorough preoperative investigation of the dura and roots, especially in case of a mismatch of preoperative imaging and intraoperative findings is a must to avoid failure of surgery.