Intradural Disc Herniation: Report of Three Cases

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ABSTRACT

Intradural disc herniations are a rare subgroup of lumbar disc herniations. They may manifest themselves with a variety of clinical signs, including sciatica, radiculopathy, and cauda equina syndrome. MR imaging may diagnose these herniations. However, exact diagnosis can be made during the surgery. In this study, three cases of intradural disc herniations are presented. It is concluded that diagnosis of intradural disc herniations is difficult, and careful evaluation of MR images may help the diagnosis. Surgical removal of these herniations may require dural repair.

KEY WORDS: Intradural disc herniation, Intradural disc herniation, Lumbar disc herniation

INTRODUCTION

Intradural disc herniations (IDDH) are a rare subgroup of disc herniations, seen in less than 1% of all operated disc herniations. IDDHs were reported for the first time by Dandy in 1942 (7). The clinical picture is more severe than in other disc herniations. They were diagnosed using myelography in pre-MR imaging era. Nowadays, ISHs may be diagnosed using MR imaging. However, the diagnosis and surgery of IDDHs are still challenging. In this study, three cases with IDDH are presented. The diagnostic and surgical aspects of IDDHs are reviewed.

CASES

Table 1 shows the clinical and radiological details of our cases. There were three cases with IDDH. This was 0.2% of all lumbar disc herniations operated at our clinic.

Case 1

A 62-year-old male was admitted to our hospital because of right and left leg pains for 1.5 months. Neurological examination revealed weakness of EHL on both sides (3/5), and right L5 hypoesthesia. There was urinary incontinence. Preoperative VAS score was found to be 8. MR imaging showed 16x12x11 mm mass-like lesion at the level of L4-5, which was enhanced after contrast medium injection. The lesion was assessed as tumour or IDDH before surgery (Figure 1). An L4 total laminectomy revealed an IDDH. Disc fragments were removed carefully under microscopy and the dura was repaired. Postoperative course was uneventful and VAS score decreased to one. Neurological deficits regressed in few days. Postoperative MR imaging revealed total discectomy (Figure 2).

Table 1: Finding of all cases (UI: Urinary incontinence, TLD: Total laminectomy and discectomy, EHL: Extensor hallucis longus)

<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>Level</th>
<th>Symptom duration</th>
<th>Symptom</th>
<th>Neuro</th>
<th>Op</th>
<th>PO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>62</td>
<td>L4-5</td>
<td>1.5 months</td>
<td>Pain, UI, weakness</td>
<td>Bilateral EHL 3/5</td>
<td>TLD</td>
<td>Normal</td>
</tr>
<tr>
<td>2</td>
<td>48</td>
<td>L4-5</td>
<td>12 months</td>
<td>Pain, weakness</td>
<td>Bilateral EHL 4/5</td>
<td>TLD</td>
<td>Normal</td>
</tr>
<tr>
<td>3</td>
<td>67</td>
<td>L1-2</td>
<td>6 months</td>
<td>Pain</td>
<td>Normal</td>
<td>TLD</td>
<td>Normal</td>
</tr>
</tbody>
</table>
Case 2

A 48-year-old female patient was admitted to our clinic. His history revealed intractable pain in both legs, more on the right one, for one year. On neurological examination, the right EHL was found to be 4/5. Preoperative VAS score was 7. MRI showed narrowing of the spinal canal at level

Figure 1: Preoperative MR images of case 1 (A: Sagittal T2 W, B: Sagittal T1 W non-contrast, C: Sagittal T1 W with contrast, D: Axial T1 W non-contrast, E: Axial T1 W with contrast)

Figure 2: Postoperative MR images of case 1 (A: Sagittal T2 W, B: Sagittal T1 W non-contrast, C: Sagittal T1 W with contrast, D: Axial T2 W, E: Axial T1 W with contrast)
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Figure 3: Preoperative MR images of case 2 (A: Sagittal T2 W, B: Sagittal T1 W non-contrast, C: Sagittal T1 W with contrast, D: Axial T1 W non-contrast, E: Axial T1 W with contrast)

Figure 4: Postoperative MR images of case 2 (A: Sagittal T2 W, B: Sagittal T1 W non-contrast, C: Sagittal T1 W with contrast, D: Axial T2 W, E: Axial T1 W with contrast)
of L4 (Figure 3). Contrast MRI showed a non-enhancing mass lesion, 14x12x10 mm in size. An interdural disc herniation located at the level of L4 was removed after L4 total laminectomy. Postoperative VAS score was found to be zero and neurological examination became normal.

Postoperative imaging confirmed total removal of disc herniation (Figure 4).

Case 3

A 67-year-old female patient was admitted to our clinic. She complained of pain in the waist and both legs since 6 months. Neurologically, there was no deficit, and her VAS score was found to be 8. MRI showed a mass with smooth contours at the level of L1-L2, 18x11x10 mm in size, showing peripheral contrast enhancement after contrast medium injection (Figure 5). The mass-like IDDH was excised totally, and the dural opening was repaired. Postoperatively the VAS score decreased to 2 and the neurological examination was normal. Postoperative images showed total removal of IDDH (Figure 6).

DISCUSSION

Lumbar disc herniations are commonly extradural pathologies. IDDHs are quite rare subgroup of disc herniations, seen in less than 1% of all cases with herniations that require surgery. IDDHs are seen mostly in L4-5 and L5/S1 level and approximately in 0.2-2.0% of cases. Since the

![Figure 5: Preoperative MR images of case 3 (A: Sagittal T2 W, B: Axial image)](image)

![Figure 6: Postoperative MR images of case 3 (A: Sagittal T2 W, B: Sagittal T1 W non-contrast, C: Sagittal T1 W with contrast, D: Axial T2 W, E: Axial T1 W with contrast)](image)
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first report by Dandy, nearly 150 IDDH case of IDDH have been published (12,13,19,22).

IDDHs are seen most commonly (95%) in lumbar region. There are, however, some reports of IDDHs in the cervical and thoracic regions (5,16,17). IDDHs are mostly seen at the level of L4-5 (55%), at the level of L3-4 (16%), and at the level of L5-S1 (10%) (6).

The pathophysiology of IDDHs is not fully clear. It was attributed to the herniation of large fragments through weak posterior longitudinal ligament into the anterior dura, particularly in the cases of advanced ages and cases with congenital thin dura. It is proposed that large disc fragment replaces to the intradural space by tearing the dura (3,18,22). The other potential causes included osteophyte formation, previous surgery, and immune reactions in extruded disc fragments (10,18,20). However, there is not enough data supporting aforementioned theories because of the small number of cases and the absence of pathological studies done. In all three of our patients, there was a ligamentous defect at the posterior longitudinal ligament. However, the ligament showed standard thickness.

IDDHs have been classified as intradural, interdural and intraradicular types (15,22). In the interdural herniation, herniated fragment is located inside the dural leaves, and there is no dural opening requiring dural repair (1,15,11). The interdural herniation may be the first phase of IDDHs. While two of our cases were completely IDDH, one case was interdural.

Clinically, there is high incidence of cauda equina syndrome among cases with IDDH (3,8,13,22). This can be attributed the high volume of intradural disc causing direct compression to the nerve fibers (8). However, the symptoms may be limited to the slight sciatica with slight neurological deficits (4,8,21). It is of note that there was no cauda equina in our cases, and there were only preoperative radicular symptoms in our cases and the symptoms regressed soon after surgery.

MRI is golden standard for the diagnosis and differential diagnosis of IDDHs. The differential diagnosis should be performed to separate extradural/intradural sequestrated disc herniations, extradural/intradural tumours or cystic lesions. The contrast enhancement pattern of the pathology may facilitate differential diagnosis. Whereas a sequestered disc fragment shows peripheral enhancement, neoplastic lesions shows homogenous enhancement (2,14,15). However, radiological differential diagnosis of spinal tumours, intradural, interdural and extradural disc herniations is not always possible (1).

Treatment of IDDHs is surgical. Although the herniated disc can be removed using hemilaminectomy, the difficulty in diagnosis dictates a total laminectomy for removal of disc. Dural repair is an important part of surgery in cases with dural defect.

In summary, clinical aspects of IDDH's are more severe than those of regular extradural disc herniations. MR imaging may be helpful for preoperative diagnosis. In cases with a dural defect with risk of CSF fistula, dural repair may be required.

REFERENCES


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