

Research Article



Lumbar Intradural Disc Herniation: A Case Report and Review of Literature

Pulin B. Das¹, Debahuti Mohapatra², Pradipta Tripathy³, Mahesh C. Sahu⁴

¹Department of Orthopaedics, IMS and SUM hospital, Siksha 'O' Anusandhan University, K8, Kalinganagar, Bhubaneswar, Odisha, India.

²Department of Pathology, IMS and SUM hospital, Siksha 'O' Anusandhan University, K8, Kalinganagar, Bhubaneswar, Odisha, India.

³Department of Neurosurgery, Aush Hospital, Bhubaneswar, Odisha, India.

⁴Central Research Laboratory, IMS and SUM hospital, Siksha 'O' Anusandhan University, K8, Kalinganagar, Bhubaneswar, Odisha, India.

*Corresponding author's E-mail: puhin_bdas@yahoo.ca

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ABSTRACT

Lumbar intradural disc herniation (LIDH) is very rare and the incidence is reported as 0.04-0.33% of lumbar disc herniations¹. LIDH is hardly being diagnosed pre operatively. In recent times with high resolution magnetic resonance imaging (MRI), it is possible to predict exact location of disc in relation to dura. We describe a case with clinical diagnosis of cauda equina syndrome whose MRI lumbar spine was reported as an intradural postero-central L4-L5 disc herniation. At operation, after laminectomy, no disc was found extradurally, so the dura was incised and an intradural disc was found compressing and displacing the roots laterally.

Keywords: Intradural disc, surgery, cauda equina syndrome.

INTRODUCTION

Rupture of inter vertebral disc material into the intradural space is a rare event. The incidence of intradural disc herniation comprise 0.26 to 0.30% of all herniated disc.² In all 3% are found in cervical, 5% in thoracic, and 92% in the lumbar region.³ The site most frequently affected in lumbar region is L₄₋₅(55%), followed by L₃₋₄ (16%) and L_{5-S₁} (10%).⁴ The first report of an intradural disc herniation was presented by Dandy in 1942.⁵ The pathogenesis of lumbar intradural disc herniation is not known clearly.⁶ Pre-operative diagnosis of this entity is now possible with the high resolution MRI scan. We describe a case of a 39 years old male presented with cauda equina syndrome. His MRI lumbo-sacral spine report was an intradural disc herniation at L₄-L₅ level. He was operated and the intradural disc was removed resulting in excellent post operative neurological recovery. The purpose of this paper is to convey the importance of diagnosing preoperatively intradural disc herniation by MRI scan as found in our case and review the literature.

CASE REPORT

A 39 year old man was admitted with the complaints of lower back pain for last 2 years, pain radiating to left lower limb for the last 2 months, numbness in bilateral foot for last 1½ months, inability to stand and walk properly for the last 1 month, foot drop left side-20 days. Acute retention of urine for last 2 days. There were no history of trauma to spine or fever in the recent past.

His general physical examinations were normal. His neurological examinations revealed power: bilateral hip: grade 4-5/5, knee: grade 3-4/5, ankle: right grade 1-2/5 and left 0/5. 50% loss of touch and pain sensation in L₄, L₅ & S₁ dermatome bilaterally. Deep tendon reflexes:

bilateral knee normal but ankle reflex was absent including plantar. He was on a catheter.

MRI of lumbosacral (LS) spine revealed annular tear with a large postero-central disc extrusion at L₄-L₅ level causing thecal indentation (Figure-1). It was iso intense on T1 weighted image, iso to hypointense with loss of continuity of PLL and a sharp, beak like appearance on T2 weighted image (Figure-2), and bilateral neural compromise seen as a complete cut off in MR myelogram (Figure-3). MRI report was intradural postero-central disc herniation at L₄-L₅ level.

He was operated, L₄-L₅ laminectomy was done. Bilateral L₄, L₅ roots were exposed but no disc was found extradurally. Dura was palpated which was found bulging and firm at L₄-L₅ level, so a dural incision was given. On opening the dura a large disc was seen in the centre compressing and displacing the nerve roots laterally. It was a glistening white, firm disc having continuity with the L₄-L₅ intervertebral disc space. Following removal of the disc material, a small rent in the midline ventral dura was seen. The rent was closed with 4-0 silk and over it small pieces of gelfoam was kept and then water-tight dorsal dural closure done. The biopsy came as degenerated disc material. Immediately following surgery patient got relief from radiating pain, numbness in foot disappeared and motor power in lower limbs also showed improvement. There was no CSF leak from the wound and patient did not have any postural headache. By the time of discharge patient started walking with support and his catheter was out. On follow up visit at 3 months he came walking with left foot support and the power in his left foot has improved to grade 3/5.



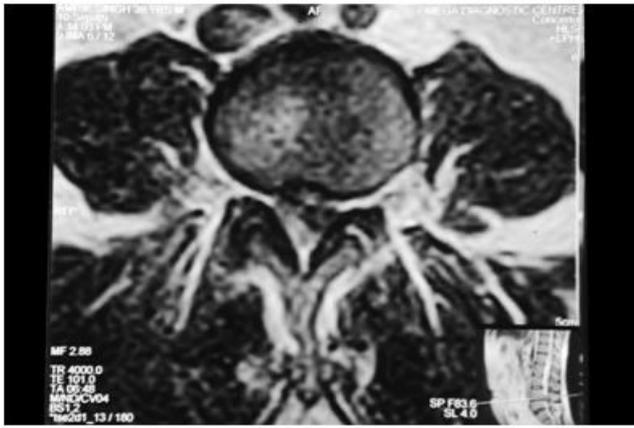


Figure 1: MRI. LS spine axial view showing annular tear with a large postero-central disc extrusion at L₄-L₅ level causing thecal indentation.

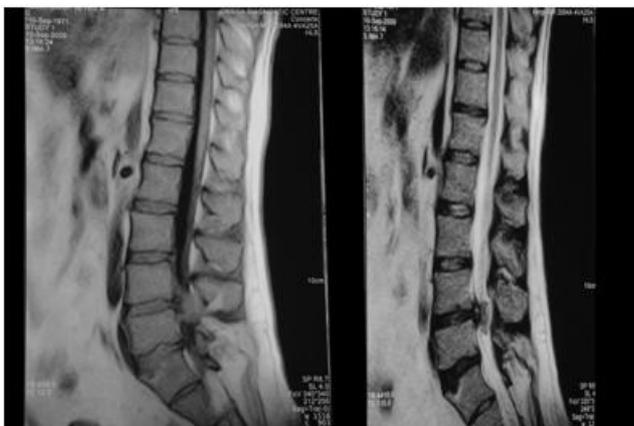


Figure 2: MRI. LS spine sagittal view, the disc was appearing iso intense on T1 weighted image, iso to hypointense with loss of continuity of PLL and a sharp, beak like appearance on T2 weighted image.

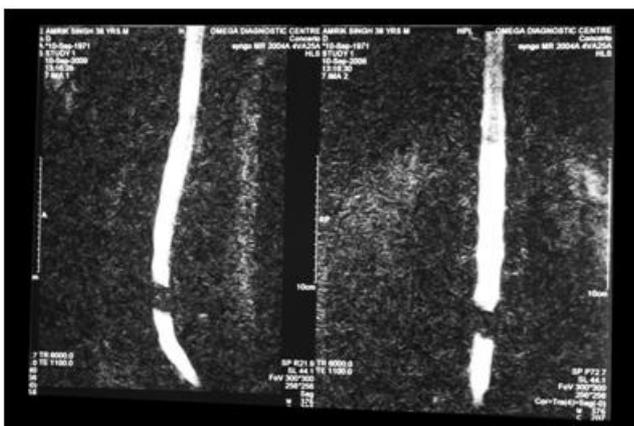


Figure 3: MR myelogram. LS spine sagittal and coronal view showing a complete cut off bilateral neural structures at L₄-L₅ level.

DISCUSSION

Intradural disc herniation comprise 0.27% of all herniated disc.⁷ Approximately 123 cases of intradural disc herniation have been reported in the literature since 1942.⁸ In 92% of cases, intradural disc herniations occur in the lumbar region and the most affected site is the L₄-

L₅ level (55%).^{3,4} In our case the intradural disc herniation was at L₄-L₅ level.

Here, a 39-year-old man with the complaints of lower back pain for last 2 years, pain radiating to left lower limb for the last 2 months and urinary incontinence. Noncontrast MRI exam showed the intradural disc with caudal migration of an excluded fragment at the L4-5 level. At surgery, the L4 and L5 laminae were removed and after dura had been opened, a nucleus pulposus was seen which compressed the conus medullaris to the right and left of the spinal canal. Every neurosurgeon involved in spinal surgery must be aware of this rare pathology which, when overseen during the intervention, could have disastrous consequences for the patient.

Migration of the disc into the intradural space requires perforation of the annulus fibrosus of the posterior longitudinal ligament (PLL) and the dura mater. Although the pathogenesis of intradural disc herniation is not certain, congenital or acquired adhesion between the dural sac and PLL has been accepted as a predisposing factor.^{1,2,8} Yildizhan et al., suggested prenatal adhesion formation between the PLL and dural sac in cadaver study. However, congenital union as the cause of intradural disc herniation is controversial because it is difficult clinically to prove the existence of a congenital union in patients with LIDH.^{6,7} Instead, acquired adhesion through previous surgery or chronic herniated disc may be accepted as the main cause of intradural disc herniation. Previous surgery is the definite predisposing factor for intradural disc herniation and approximately 15% of patients in reported cases had past history of previous lumbar surgery.⁸ Chronic herniated disc is another possible cause of adhesion. Chronic inflammation on herniated disc can cause adhesion and thinning of the dura, which results in intradural rupture.^{6,7}

In our case, the adhesions were prominent. Pre-existing degenerative spondylitic changes and the chronic herniated disc may have contributed to adhesions. Perhaps the most likely cause was mechanical irritation due to the chronic disc herniation against the ventral wall of the dura.

Acute cauda equina syndrome with sphincter disturbance have an incidence of 30% of all reported cases. In our case a clinical diagnosis of cauda equina syndrome was made. Acute retention of urine was very late in our case which was due to compression of central S₂, S₃, S₄ roots by the intradural herniated disc. Intradural disc herniation above the conus medullaris seems to produce bowel and bladder dysfunction early.⁸

It is easier now to differentiate lumbar disc herniation from other conditions with help of current high resolution MRI scan. Contrast-enhanced MRI scans are useful to differentiate a herniated disc from a disc space infection or tumor.⁸ The intradural disc appears iso intense in T1 weighted image, iso to hypointense on T2 weighted image on plain MRI. On contrast MRI study it takes a rim

enhancement.⁹ Choi et al. presented loss of continuity of PLL and a sharp, beak like appearance on T2 –weighted image for the prediction of intradural disc herniation.¹⁰ In the myelographic examination, intradural disc herniation of the lumbar region usually show a complete block.^{2,10} MRI plain and MR myelogram findings of our case were corroborating to the classical MRI description of an intradural disc in the literature.

The treatment of intradural disc herniations basically involves surgical removal. At surgery, the dura and the roots must be carefully explored. Closure of the ventrally located dural rent is necessary to avoid risk of CSF leak.^{2,6,7} In our case the intradural disc was completely removed. The ventral dural defect was closed primarily and a small piece of gelfoam was placed over it. In summary with the help of high resolution MRI scan it is possible to diagnose intradural disc herniation preoperatively. This before hand information helps the surgeon in proper planning and execution of operation resulting in good surgical outcome and also prevent the common complication of lumbar disc surgery like failed back syndrome.

CONCLUSION

Intradural disc herniation is a rare presentation of spinal degenerative processes, comprise 0.26-0.30% of all herniated discs. Imaging can be non-specific but can also help evoke the diagnosis on the basis of an irregular intrathecal defect associated to root enhancement. Depending on the duration of disease, the disc fragment can be non-enhancing (as in our case) but more chronic cases will show a strongly enhancing intradural component. If not recognized, this pathology may result in failure of lumbar disc surgery. The preoperative knowledge of an intradural herniation is important because it has an influence on the operative strategy.

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