

## Case Report

## An intradural lumbar disc fragment with free migration: A case of a missed intradural disc herniation



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## ARTICLE INFO

## Article history:

Received 18 October 2016

Revised 1 November 2016

Accepted 13 November 2016

Available online xxxx

## Keywords:

Intradural lumbar disc

Fragment with free migration

## ABSTRACT

**Introduction:** Intradural lumbar disc herniation (ILDH) is a very rare pathological entity. The pathomechanisms and the natural course remain unclear.

**Case presentation:** The authors present the case of a 58-year-old German male with repetitive microdissectomies (MD) and intraoperative missed diagnosis of ILDH. The patient underwent standard MD due to lumbar disc herniation (LDH) at the level L4/5. Incidental durotomy (ID) was sealed with a ventromedial patch. Postoperative course was uneventful. 14 months later the patient presented with a L4 radiculopathy, having his second MD at the level L3/4. At this point the radiological images showed already a free floating intradural fragment at the level S1, clinically not significant. As in the previous surgery, the postoperative course was uneventful. After 18 months, he presented again complaining of low back pain and electric-like attacks of pain along the right L5 root for the prior five months. Contrast-MRI revealed that the known intradural disc-mass migrated from S1 to the level L4/5. A left L4 hemilaminectomy was performed. The durotomy identified a hard, white, shiny mass. The patient was pain-free until the last follow-up at 13 months.

**Conclusions:** Intraoperative manipulation of disc fragments in the presence of an ID potentially leads to iatrogenic ILDH.

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### 1. Introduction

Intradural lumbar disc herniation (ILDH) is a unique complication of relatively frequent spinal degenerative processes with incidence ranges between 0.19 and 1.1%. The pathogenesis of ILDH is not well known [1–4]. Naturally, a disc herniation may penetrate the posterior longitudinal ligament and the anterior wall of the dura and the fragment of disc migrate intrathecaly [5]. Iatrogenic liberation of disc fragment intrathecaly has been also reported after endoscopic lumbar discectomy [6]

Prompt operative treatment of ILDH is highly advocated.

The optimal operative treatment remains a challenge, since the confirmation of diagnosis can often only be accomplished intraoperatively and not anticipating this possibility can lead to missed intradural disc fragments. The present case is another example of a missed intradural disc herniation after a L4/5 microdissectomy. From our case, we learn

that a missed intradural disc fragment can be clinically dormant for years and that migration is a factor leading to subsequent need of surgical extraction, and that a finding of an incidental durotomy during a first ever surgery should ALWAYS makes one wonder whether maybe an intradural disc is also present. With our case we propose potential mechanism of the missed diagnosis and pathological factors for migration of an intradural disc.

### 2. Case presentation

January 2012, a 58-year-old German male patient presented in our outpatient clinic complaining of low back pain radiating to the right leg along L5 root for the prior 12 months. Physical examination demonstrated an active right ipsilateral straight leg raising sign at approximately 30 degrees as with real cross straight leg raising sign; weakness of the right extensor hallucis longus and toe extensors graded as a 4/5 and hypesthesia in the right L5 dermatome. Deep tendon reflexes were preserved and normal bilaterally at the knee and the ankle. The patient had no fasciculations, atrophy or upper motor neuron signs. The MRI of the lumbar spine showed a lumbar disc herniation at level

**Abbreviations:** ID, incidental durotomy; ILDH, intradural lumbar disc herniation; LDH, lumbar disc herniation; MD, microdissectomies; MRI, Magnetic Resonance Imaging.

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L4/5. After failing conservative care, a right L4–5 discectomy was performed.

After interlaminar approach, intraoperative was the disc herniation much bigger compared with MRI scan with massive adhesions along the dura. Standard exploration of the nerve structures showed a great disc material ventromedial to the dural sac with completes ID and CSF leakage. Removal of the disc after separation of the dura from the intervertebral disc with gentle medialization of the dural sac was performed.

Dural tear was closed with a patch (TachoSil) after surgery; the patient was pain-free for 12 months (Fig. 1).

After 14 months, he presented in our outpatient complaining of low back pain and a right leg pain along the L4 root since 2 months. The MRI of the lumbar spine showed a lumbar disc herniation at level L3/4 and an intradural mass at the level S1 without any symptoms.

At this moment, the retrospective diagnosis of ILDH of the first surgery was made. Our explanation of the free intradural disc fragment

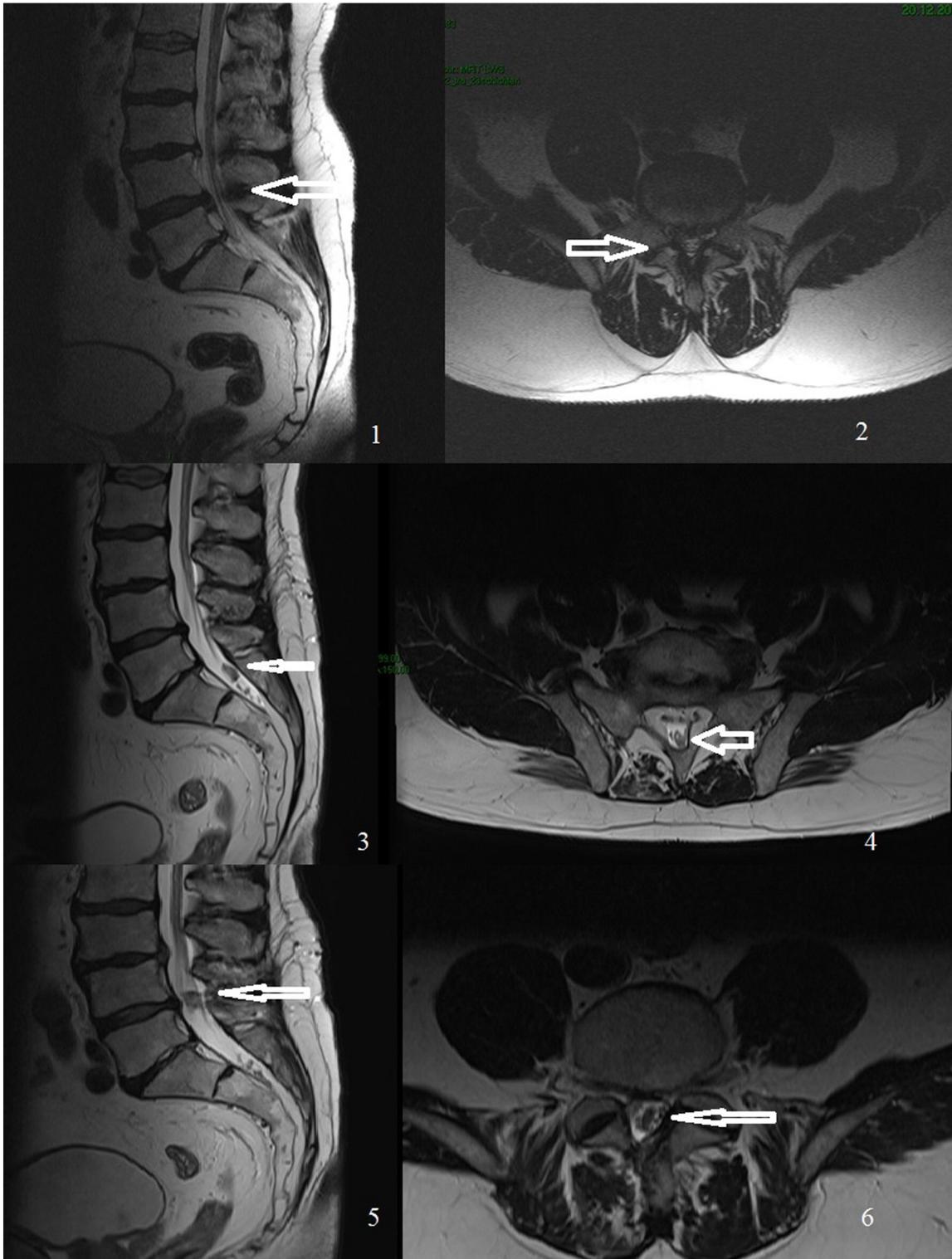
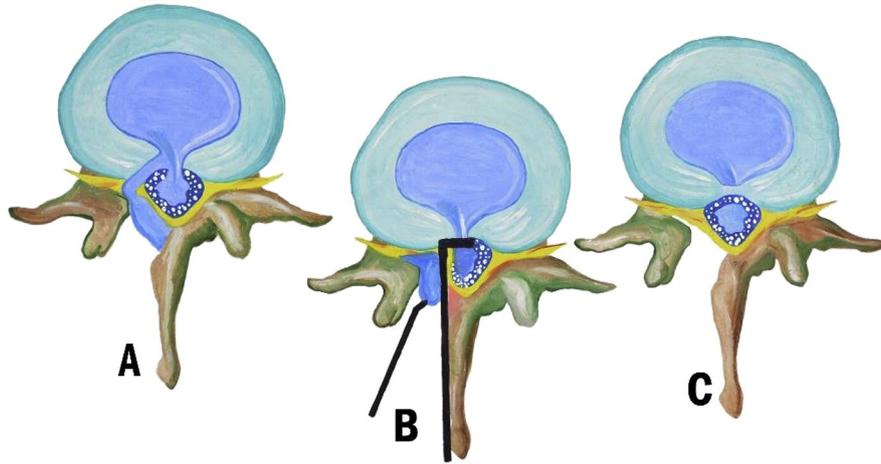


Fig. 1. Preoperative MRI showing a disc herniation at level 4/5 re, 3 & 4 MRI after seven months from surgery showing an intradural mass at the level S1, 5 & 6 2-years after the surgery showing the same position of the intradural disc herniation.



Mohamed Hosny

**Fig. 2.** Artwork showed our explanation to the intradural fragment. Painted by Mohamed Hosny, Egyptian artist.

was that the extradural part of the ILDH had been removed while the intradural part has been liberated during manipulation of the adhesions (Fig. 2).

The patient underwent standard right L3–4 discectomy. After surgery, the patient was pain-free for 18 months.

July 2015, more than three years from index surgery, he presented to our outpatient clinic complaining of low back pain and electric-like attacks of pain along the right L5 root for the prior five months. Physical examination demonstrated an active right ipsilateral straight leg raising sign at 60 degrees as with negative cross straight leg raising sign and residual hypesthesia in the right L5 dermatome from the index surgery. Contrast MRI of the lumbar spine showed a migration of the intradural disc fragment from S1 to the level L4/5. Therefore, surgical removal of the intradural mass was recommended. (Fig. 3). The pathology was approached from the left side to avoid adhesions on the right side. Left L4 hemilaminectomy and durotomy was performed. A hard, white, shiny mass on the right side of the dura was founded. The mass was free in the intradural space and was very hard to catch (Fig. 4). The post-operative period was uneventful. The Patient is still pain-free until the last follow-up in August 2016.

Pathological examination showed a disc tissue with central balloon-type cystic degenerative changes with a ring of healthy tissue about 5  $\mu$ m.

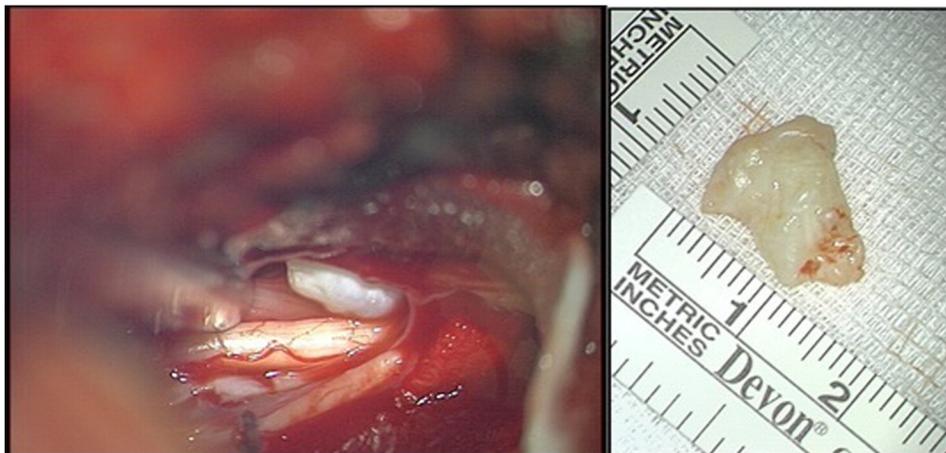
### 3. Discussion

Intradural disc herniation is defined as rupture of a lumbar intervertebral disc with tearing of the posterior longitudinal ligament, dura mater and arachnoid with a displacement of the nucleus pulposus into the dural sac. It is a rare presentation of a relatively common pathology. The most frequently intradural disc herniation occurs at level L4/5 [7].

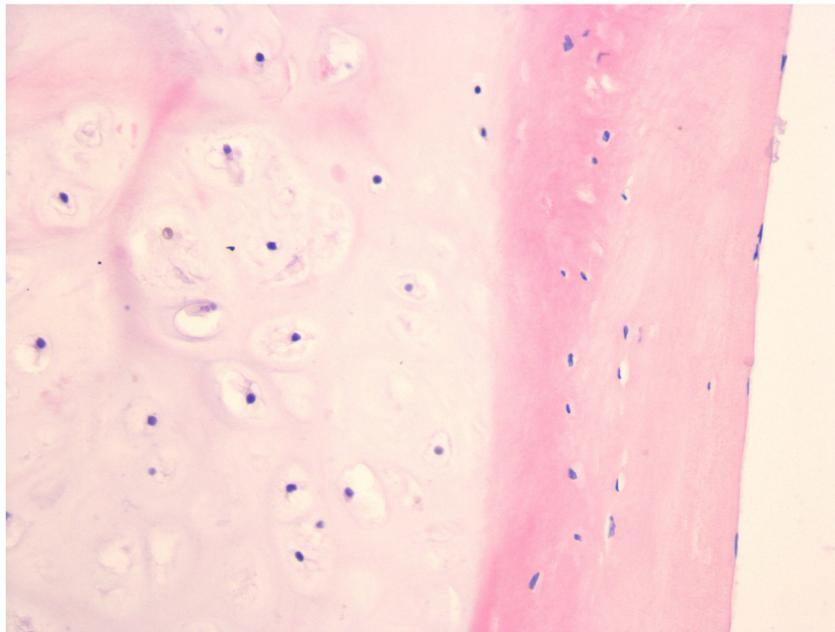
Diagnosis of ILDH is difficult. MRI is the most useful imaging modality in cases of ILDH. Characteristic findings are the loss of PLL continuity, “hawk-beak” sign which show a triangular lesion with a beak-like appearance compressing the dural sac on T2-weighted axial images, and the contrast-enhanced MRI may show ring enhancement of the herniated portion. Despite radiologic findings, most cases of are IDH intraoperatively discovered which is rarely suspected preoperatively [6,8].

The suspicions for IDH rise in the case of the absence of extradural disc material, the presence of the CSF, and the presence of a tense dural sac. In our case, the ILDH was difficult to diagnosis due to the presence of extradural disc material and normal tense dural sac.

We assume two scenarios to explain the presence of the free disc fragment in the intradural sac. First scenario: missing diagnosis of ILDH at the first surgery. The surgeon has not taken into account the intradural part of the herniated disc, removing the extradural part of



**Fig. 3.** Intraoperative picture showing a white shiny intradural mass, 1.2  $\times$  1.2 cm.



**Fig. 4.** Pathological examination showed a disc tissue with central balloon-type cystic degenerative changes with a ring of healthy tissue about 5  $\mu$ m.

herniation. During manipulation of the dura to explore the disc, he liberated the fragment in the dural sac.

Second scenarios: the adhesion and dural tear during the first surgery lead to a new intradural disc herniation not related to the first disc herniation with the loose fragment in the intradural sac.

Intrathecal migration of disc fragment after ruptured disc has been reported [6,8]. The migration of the disc fragment in our case initially caudally then cranially may be explained by the unusual central balloon-type cystic degenerative changes with a vacuum-like effect, which reduces the mass density of the fragment over time which makes the piece floating to the top.

Mut et al. divided intradural disc herniation into two types: A - herniation in the dural sac B - herniation in preganglionic nerve root [9]. The Özer et al. suggest the term “pseudointradural/intraarticular” in cases of only outer layer perforation and “true intradural/intraarticular disc herniation” if both layers are perforated with a cerebrospinal fluid leak [10].

In our case, the intradural disc herniation was type A, with CSF leak from ventral dura. We suggest adding a subtype with combined intradural and extradural components.

Our case is in agreements with published data regarding the site, clinical presentation, and surgical outcome. The published data showed that ID's occur mostly (92%) in the lumbar region, more than half of them at level L4–L5 (55%) [3,7]. Low-back pain and sciatica for more than a year are the most frequently clinical presentation [2,3]. Our patient showed improvement of symptoms after surgery which is in agreement with previously reported cases, which showed that the prognosis of intradural disc herniation is entirely satisfactory [11].

The pathogenesis of IDH is not well known. It is presumed that adhesions between the dura, PLL, and the disc annulus are the crucial predisposing factors [2] [12]. Adhesions may be congenital origin as suggested by Yildizhan et al. [13], due to the observed adhesions in the newborn/ abortion group which were similar in terms of levels of adhesions with the adult group [13], acquired due to previous spine surgery or trauma or spontaneously due to degenerative disc disease with or without association to an ossification of the PLL. The adhesions enable the disc material to erode through the dura into the subdural space [3,5]. In our case, massive adhesions have

been noticed during the first surgery which is in agreement with published data.

#### 4. Conclusions

Our case highlights the fact that ILDH diagnosis may be missed before, during and after surgery. The surgeons must have knowledge regarding this condition and pay attention to difficulty in dissecting the anterolateral element of the dural sac from the annulus fibrosus of the intervertebral disc. Liberation of the intradural part intrathecally LDH is a possible postoperative complication

#### Disclosure

The authors report no conflicts of interest.

The authors report no financial disclosure.

This manuscript has not been previously published and is not under consideration for publication elsewhere.

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