

Spine

Posterior epidural migration of lumbar disk fragments: report of two cases and review of the literature

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Abstract

Background: Posterior epidural migration of an extruded disk fragment is rare, and posterior migration of the free fragments causing cauda equina syndrome is exceptionally rare. The disk fragment must transgress through numerous anatomical restraints including the nerve roots in such cases. **Methods:** Two cases of migration of the sequestered disk into the posterior epidural space are presented. The first patient complained, over the course of 1 month, of paresthesias and weakness of the lower limbs, with urinary retention. However, in the other case, there was steppage gait and strength score of 3/5 on dorsiflexion of left foot, without bladder or bowel disturbance. **Results:** Lumbar CT scan with sagittal reconstruction showed a posterior epidural mass, which was isodense to the disk. The preoperative differential diagnosis included epidural abscess, hematoma, and neoplasm. An urgent decompressive lumbar laminectomy was performed. At surgery, the lesion proved to be a massive extruded disk fragment. **Conclusion:** Diagnosis of posterior epidural migration of the sequestered disks may be difficult. It may present with subtle clinical features. Magnetic resonance images may mimic those of other more common posterior epidural lesions. Early surgery should be the first choice to prevent severe neurologic deficits. © 2008 Elsevier Inc. All rights reserved.

Keywords: Posterior epidural disk fragment; Cauda equina syndrome; Magnetic resonance imaging

1. Introduction

Some degree of disk fragment migration occurs in 35% to 72% of lumbar disk herniations [1,6,13]. Posterior epidural migration is an interesting but rare path taken by a prolapsed intervertebral disk fragment [7]. We report 2 such cases and review the literature on the posterior migration of the sequestered disk fragments (Table 1).

2. Case 1

A 42-year-old man presented with 3 years' history of intermittent lumbago. Since 1 month ago, he experienced a

progressive left-sided radiculopathy. There were no bladder or bowel symptoms. Clinical examination revealed steppage gait and a strength score of 3/5 on dorsiflexion of left foot, with hypoesthesia of lateral side of the left limb. There was some ill-defined tenderness on palpation of the lower lumbosacral spine. Plain radiographs of the lumbar sacral spine were essentially normal. Lumbar CT scan with sagittal reconstruction showed extensive lateral disk herniation at L5-S1, with an isodense mass level located in the posterior epidural space on the left side (Fig. 1).

An L5 laminectomy was performed. After removal of the ligamentum flavum, the extruded disk fragment embedded in fibrous epidural tissue was readily visible posterior and lateral to the thecal sac. The fragment clearly compressed and was adherent to the thecal sac. It was dorsal to the S1 nerve root from the axilla (Fig. 2). The fragment was removed. The L5-S1 interspace was explored on the left side. Rupture at the posterior longitudinal ligament (PLL) was

Abbreviations: CT, computed tomography; MRI, magnetic resonance imaging.

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Table 1
Summary of reported cases of posterior epidural migration of lumbar disk fragments

Author/s, year (reference)	No. of cases	Level of herniation	Clinical symptoms
Lichter [8], 1989	1	L2-L3	Radicular
Lutz [9], 1990	1	L4-L5	Radicular
Sekerci et al [14], 1992	1	L3-L4	Cauda equina syndrome
Sakas et al [11], 1995	1	L4-L5	Radicular
Bonaroti and Welch [1], 1998	1	L2-L3	Cauda equina syndrome
Saruhashi et al [12], 1999	1	L5-S1	Radicular
Robe et al [10], 1999	2	L3-L4	Radicular
		L3-L4	Radicular
Dosoglu et al [3], 2001	1	L3-L4	Cauda equina syndrome
Eysel and Herbsthofer [5], 2001	3	L3-L4	Cauda equina syndrome
		L4-L5	Radicular
		L3-L4	Acute lumbago
Kuzeyli et al [6], 2003	3	L4-L5	Acute lumbago
		L1-L2	Cauda equina syndrome
		L2-L3	Cauda equina syndrome
Lakshmanan et al [7], 2006	2	L4-L5	Radicular
		L4-L5	Radicular
Tatli et al [15], 2005	2	L3-L4	Cauda equina syndrome
		L5-S1	Cauda equina syndrome
Chen et al [2], 2006	1	L2-L3	Radicular
Present case	2	L4-L5	Cauda equina syndrome
		L4-L5	Radicular

detected, and an L5-S1 discectomy was performed. Inspection of the dura showed no dural rent. Histopathology confirmed the posterior epidural fragments to be the intervertebral disk. The patient was completely relieved of his leg pain, with persistence of discrete dorsiflexion deficit on left foot, when he was seen in the outpatient clinic tow months later.

3. Case 2

A 36-year-old man developed, after lifting a heavy load, intermittent acute lumbago. The pain radiated down to the lateral side of bilateral leg. In the course of 1 month, he complained of paresthesias and weakness of the lower limbs and urinary retention. Physical examination revealed a strength score of 2/5 on dorsiflexion of left and right feet. Reflexes were decreased at the knee and absent at the ankle with anesthesia on saddle.

Plain radiograph films of the lumbar spine showed collapse of the L5-S1 intervertebral disk. Lumbar spine CT scan demonstrated a mass that was located posteriorly and laterally to the left aspect of the dural sac at L5-S1. The lesion was isodense to the lumbar disk, and there was continuity of the fragment with the L5-S1 disk space, which presented extensive lateral disk herniation (Fig. 3).

An urgent decompressive lumbar L5 laminectomy was performed. After removal of the ligamentum flavum, the extruded disk fragment was readily visible posterior and lateral to the thecal sac. The extirpated tissue had a yellowish appearance and a fibrotic consistency, with

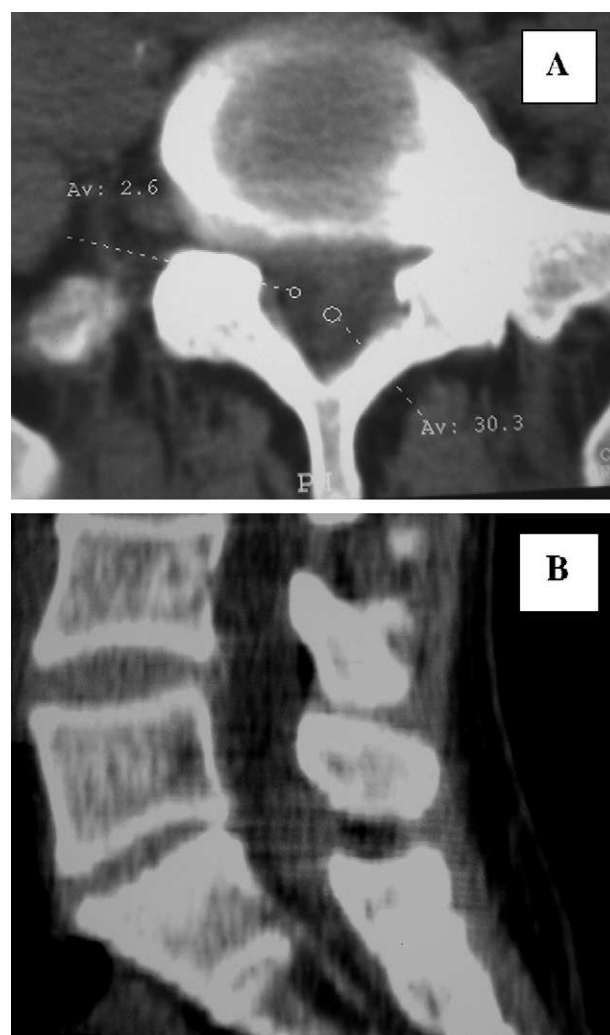


Fig. 1. Lumbar CT scan in the first case. A: Disk material appears posterior to dural sac and isodense to the intervertebral disk. B: Sagittal reconstruction showed collapse of the L5-S1 intervertebral disk and posterior isodense mass.

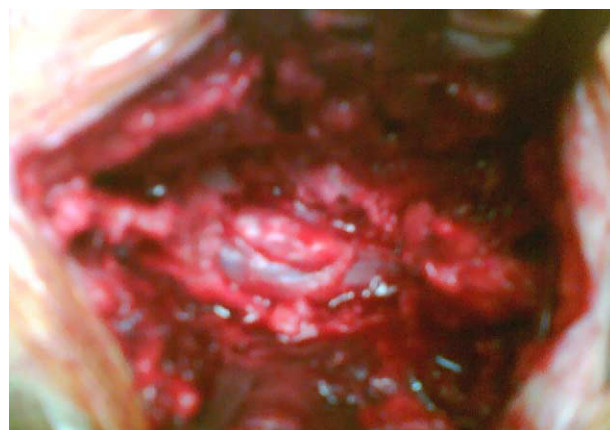


Fig. 2. Preoperative view of the dural sac after L5 laminectomy showed extracted disk fragment with yellowish appearance and attachment to the posterior dural sac.

attachment to the dura. It was dorsal to the L5 nerve root and had continuity through the axilla of the S1 nerve root component anteriorly. The L5-S1 interspace was explored on the left side. A rent in the PLL was observed, and an L5-S1 discectomy was performed. Inspection of the dura showed no dural rent. The pathologic examination confirmed that the specimen was an intervertebral disk. Postoperatively, his lower extremity weakness gradually recovered over a period of 1 year. His symptom of urinary retention required intermittent self-catheterization.

4. Discussion

Sequestered disk fragments account for 28.6% of all disk herniations [6]. It most often migrates in the anterior epidural space. Rostral, caudal, and lateral migration are the most clinically important modes of this migration [1,4,6,13]. Occasionally, sequestered disk fragments may migrate to the

posterior epidural space of the dural sac [1-12,14,15]. This condition is rare, and posterior migration of the free fragments causing cauda equina syndrome is exceptionally rare [1,3,5-7,14,15]. Disk fragment migration patterns are generally limited by the attachments of the PLL and its associated “midline septum” and “peridural” or “lateral membrane” and the nerve root itself [1-3,6,7,13]. A problem with any one of these barriers may facilitate posterior migration of disk fragments, which may be greater when the angle formed by the nerve root and the dural sac is obtuse at the site where the root exits and when the disk space is cranial or caudal to the intervertebral foramen. In this condition, the nerve root is not in its supportive position as a potential key anatomical barrier to posterior migration of disk material [6].

Most symptomatic lumbar disk herniations are noted to be in a lateral position, with resultant nerve root irritation. The posterior migration of the disk may be expected to present clinically with isolated acute or chronic lumbago to significant neurologic symptoms, and to the extent of presenting as cauda equina compression [1]. In the first observation, the patient had a history of intermittent lumbago, and preoperatively, the fragment was embedded by fibrosis tissue. This suggests that the fragment had already migrated, and this was decompensated by disk herniation in the same level to the epidural posterior fragment or in the cranial or rostral interspace. However, this posterior migration of the disk can be alarming, such as in the second observation and in most cases reported in literature, when the clinical condition is serious and acute [1-12,14,15].

Definite diagnosis of posteriorly located disk fragments is difficult because the radiologic images of disk fragments may mimic those of other more common posterior epidural lesions. Magnetic resonance imaging, with gadolinium administration, is considered the method of choice for diagnosis by most authors [2]; this was not used for diagnosis in our patients, who were explored by simple CT scan. However, in the literature, MRI of sequestered disk fragments is well distinguished. It shows fragments as a posterior epidural mass compressing the dural sac; usually, they are hypointense on T1-weighted images, and 80% are hyperintense on T2-weighted images [2,6,13]. The epidural fat is vascular; the presence of a fragment in this space will induce an inflammatory response with granulation tissue and neovascularization around the extruded tissue, causing a ring enhancement with gadolinium in the MRI scan [7]. This may aid in the preoperative diagnosis of such rare disk migration into the posterior epidural space. This enhancement can make differential diagnosis to other common epidural lesions such as neoplasia, abscess, and hematoma [1-12,14,15]. Rare lesions, such as synovial cyst from the facet joint, pigmented villonodular synovitis, or hypertrophic ligamentum flavum, may be evocated [7]. Saruhashi et al [12] have reported a disk fragment located at the dorsal epidural space and extending to the interspace foramen, which simulated a

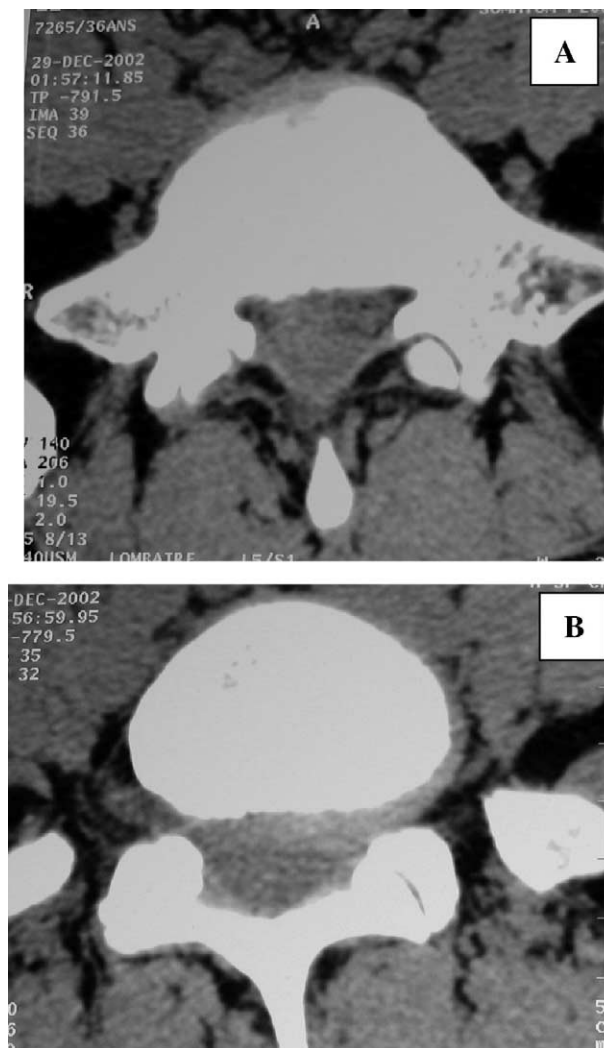


Fig. 3. Lumbar CT scan in the second case showed left lateral herniated disk at L5-S1 (A) and posteriorly located mass, which appears isodense to the intervertebral disk (B).

dumbbell tumor. However, extradural fibrosis is a well-recognized finding in cases of acute lumbar disk herniation and is considered to be an important indicator of possible disk fragment sequestration [6].

As in our patients, lumbar CT scan with sagittal reconstruction can show some direct or indirect sign of this rarity; the fragment appears to have the same density as the intervertebral disk, which was collapsed, and the presumed disk space of origin could not be identified on preoperative imaging. The finding on CT scan is inconclusive because of its limitation in recognizing the extradural migrated fragment as a mass compressing the dural sac [2]. Interestingly, it may be useful in emergency, but with less sensibility and specificity than MRI.

Treatment consisted of removal of the extracted fragment through hemi- or complete laminectomy. Early surgery should be the first choice to prevent severe neurologic deficits such as cauda equina syndrome [6,7].

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Commentary

Posterior migration of a lumbar herniated disk fragment is rare, as the authors of this article point out. The exact mechanism whereby such a migration occurs is unclear, however, and the authors do not resolve this conundrum. Nevertheless, the report serves to remind the spine surgeon that when hoofbeats are heard, occasionally, one must think of zebras, even when out of Africa.

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