Posterior Epidural Migration of a Sequestered Lumbar Intervertebral Disc Fragment

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ABSTRACT

AIM: Posterior epidural migration of a sequestered lumbar intervertebral disc fragment (PEMSLIDF) is an extremely rare condition published so far only as case reports or small case series (ranging between 2 to 8 cases). Diagnosing this condition is often challenging and the diagnosis is usually made intraoperatively. The affected patients usually suffer cauda equina syndrome (CES). In the present study, we aimed to discuss the clinical and radiological findings, types and features of surgical therapies, and outcomes of 9 patients with PEMS-LIDF.

MATERIAL and METHODS: This study included 9 (0.36%) patients with PEMS-LIDF among 2470 patients who underwent lumbar disc hernia surgery between August 2002 and September 2012. The preoperative clinical and radiological properties of the patients were evaluated. The postoperative outcomes were assessed using neurological examination, radiological imaging, visual analog scale (VAS) and modified Odom criteria.

RESULTS: As far as we know, this study is the largest case series examining the characteristics of PEMS-LIDF. Seven (77.8%) of our patients were male and 2 (22.2%) were female and they had a mean age of 49.5 years (range 28-70 years). The mean duration from symptom onset to hospital admission was 7.4 days. Seven patients had CES. All patients underwent sequestrectomy and discectomy via posterior microsurgery. The patient outcomes were evaluated by the Modified Odom criteria and the outcome was excellent in two (22.2%) patients, good in 4 (44.5%), fair in 2 (22.2%), and poor in 1 (11.1%).

CONCLUSION: The entire free fragment can usually be excised via the posterior microsurgery technique. Early surgical treatment is of great importance to prevent more serious neurological deficits.

KEYWORDS: Cauda equina syndrome, Sequestered intervertebral disc, Posterior epidural migration, Lumbar disc herniation, Spinal surgery

INTRODUCTION

Lombardi reported the first posterior epidural migration of a sequestered lumbar intervertebral disc fragment (PEMS-LIDF) case in 1973 (33). Lumbar disc herniation (LDH) can theoretically migrate in virtually any direction in the spinal canal, and superior, inferior, lateral, interdural, and intradural migrations have all been described (2, 3, 8, 28, 35, 40, 45, 46, 57). Nevertheless, a herniation with posterior epidural migration away from the site of extrusion has been only rarely reported (12). Patients with the latter condition may have serious neurological deficits. The radiological examinations reveal a lesion appearance that is similar to other mass lesions...
of the lumbar region. As far as we know, our 9-case series of PEMSLIDF represents the largest to date. A detailed literature search yielded 60 cases with similar features since the original description of the condition (1, 6, 8-10, 12, 14, 15, 17, 19, 20, 22, 24-34, 36, 37, 41-43, 45, 47-54). This study aimed to assess the clinical and imaging properties of PEMSLIDF and to discuss its surgical treatment and postoperative outcome.

**MATERIAL and METHODS**

A total of 2470 patients underwent LDH surgery in our department from August 2002 to September 2012. Nine (0.36%) of them were diagnosed with PEMSLIDF and underwent a surgical operation for that condition. Sex, age, symptom duration, neurological and radiological findings, disc level, and postoperative outcome were recorded for each patient.

One patient was diagnosed by computed tomography (CT) rather than magnetic resonance imaging (MRI) due to having an MRI-incompatible pelvic prosthesis. The remainder of the patients were diagnosed with the help of MRI. All patients were immediately operated with sequestrectomy and discectomy via posterior microsurgery after establishing the diagnosis. It was observed that compression on dura and nerve roots was relieved and decompression was achieved after sequestrectomy and discectomy. None of the patients were applied spinal instrumentation. The patients were both clinically and radiologically evaluated at the postoperative period. The postoperative outcomes were assessed with the help of Modified Odom criteria (Table I) and visual analog scale (VAS) (38). Each patient generally underwent a follow-up examination within 3 months of surgery. The follow-up examinations were performed at 6th and 12th months when patients reported no symptoms during follow-up. The patients were followed for a mean duration of 24.4 months (range 12 months to 3 years).

**RESULTS**

Seven (77.8%) of our patients were male and 2 (22.2%) were female. Their mean age was 49.5 years (range 28-70 years). The mean duration between symptom onset and hospital admission was 7.4 days (range 2-21 days). All patients had severe symptoms, with 7 patients having cauda equina syndrome (CES) and 2 having radicular syndrome.

PEMSLIDF was diagnosed with the help of CT in one patient due to having an MRI-incompatible pelvic prosthesis. The remaining patients were diagnosed by MRI. The MRI appearance of PEMSLIF was iso/hypointense on T1-weighted images and of variable intensity on T2-weighted images. According to the radiological imaging data, 4 (44.5%) patients had PEMSLIDF at the level of L3-4, 3 (33.3%) at the level of L4-5, 1 at the level of L5-S1, and 1 (11.1%) at the level of L2-3. MRI examination of 6 patients visualized a tumor-like contrast uptake in an annular pattern around the free disc fragment. Its localization was at the right posterolateral space in 4 patients, left posterolateral space in 4, and median in 1.

After establishing the diagnosis, all patients were urgently operated with sequestrectomy and discectomy via the posterior microsurgery technique (Figure 2A-D). The compression on dura and nerve roots was removed and these structures were decompressed after sequestrectomy and discectomy. None of the patients underwent spinal instrumentation. No patient developed intraoperative complications such as dural laceration or cerebrospinal fluid (CSF) leakage.

The patients were periodically followed clinically by neurological examination, primarily for sphincter functions, and radiologically by performing imaging tests. Their postoperative outcomes were assessed according to the Modified Odom Criteria (38) and VAS. Each patient underwent a follow-up examination within the first 3 months after surgery. The later follow-up visits were at the 6th and 12th months as long as the patients did not experience any problem. The mean follow-up duration after surgery was 24.4 months (range 12 months to 3 years). According to the Modified Odom Criteria, an excellent result was achieved in 2 (22.2%) patients, a good result in 4 (44.5%), a fair result in 2 (22.2%), and a poor result in 1 (11.1%). The two most important factors that affected the patient outcomes were the time from symptom onset to surgery and whether CES was partial or not. As such, partial CES that was operated within 3 days or less was associated with a better outcome. The clinical findings of the patients are summarized on Table II.

Of the 7 cases of CES, 3 were prominent and 4 were partial. The Odom criteria indicated that 1 of 3 patients with prominent CES had an excellent outcome, 1 had a good outcome, and 1 had a fair outcome. Of the 4 patients with partial CES, on the other hand, three had a good outcome and 1 had an excellent outcome. Patients complaining of urinary incontinence were assessed by urological examination early after surgery. Urinary incontinence existed in 7 out of 9 patients in the preoperative period. The patients did not experience any problem during follow-up examination within 3 months of surgery. The follow-up visits were at the 6th and 12th months as long as the patients did not experience any problem. The mean follow-up duration after surgery was 24.4 months (range 12 months to 3 years). According to the Modified Odom Criteria, an excellent result was achieved in 2 (22.2%) patients, a good result in 4 (44.5%), a fair result in 2 (22.2%), and a poor result in 1 (11.1%). The two most important factors that affected the patient outcomes were the time from symptom onset to surgery and whether CES was partial or not. As such, partial CES that was operated within 3 days or less was associated with a better outcome. The clinical findings of the patients are summarized on Table II.

### Table I: Modified Odom Criteria

<table>
<thead>
<tr>
<th>Grade</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>excellent</td>
<td>all preop symptoms relieved, patient is able to perform daily occupations &amp; activities without impairment</td>
</tr>
<tr>
<td>good</td>
<td>minimal persistence of preop symptoms, patient is able to perform daily occupations &amp; activities without significant interference</td>
</tr>
<tr>
<td>fair</td>
<td>relief of some preop symptoms, but daily occupations &amp; activities remain significantly limited</td>
</tr>
<tr>
<td>poor</td>
<td>symptoms &amp; signs unchanged or worse</td>
</tr>
</tbody>
</table>
According to Modified Odom criteria, one was started on physical therapy program for paresis.

This study is the largest case series assessing the characteristics of PEMSLIDF. Since the original description by Lombardi in 1973, a total of 74 patients (mean age 53.11 years) including our 9 cases of whom 57 (77.02%) were male and 17 (22.98%) were female were reported in the English literature (1, 6, 8-10, 12, 14, 15, 17, 19, 20, 22, 24-34, 36, 37, 41-43, 45, 47-54). Clinically, 38 (51.35%) of the 74 patients had CES, 30 (40.54%) had radicular pain, and 6 (8.11%) had lumbar pain. To determine the disc localization, MRI was used in 57 (77.02%) patients. PEMLF had an iso/hypointense appearance on T1-weighted images while it appeared with variable intensity on T2-weighted images. Gadolinium contrast application made 85.71% of the lesions acquire a peripheral ring-like contrast uptake pattern. According to radiological imaging results, the PEMSLIDF level was L1-2 in 2 (2.7%) patients, L2-3 in 12 (16.2%), L3-4 in 29 (39.2%), L4-5 in 24 (32.4%), and L5-S1 in 7 (9.5%). Despite some missing elements in the records of 2 patients, and considering that the terminology used by each author to assess outcomes is different, an assessment of the surgical outcomes of 72 patients revealed that 53 (73.62%) patients had total recovery, 3 (4.17%) had subtotal recovery, 15 (20.83%) showed improvement, and 1 (1.38%) had unchanged clinical signs. The data of all reported cases are shown on Table III.

**Illustrative Cases**

**Case 1:** A 41-year-old man presented with intermittent lower back pain for 5 years and urinary incontinence, bilateral leg pain with the left-sided pain being more intensive, mild weakness, and numbness for 3 days. Neurological examination revealed mild weakness in foot dorsiflexion and plantar flexion as well as bilateral hypoesthesia in the L5, S1 dermatomes. Patellar and Achilles reflexes were absent in both lower extremities. Reduced anal tonus and perianal sensory loss were also noted. MRI showed a sequestered disc fragment at the level of L4-L5, which almost completely filled spinal canal and compressed the dural sac from its posterior aspect (Figure 1A-C). Postoperative VAS scores for both leg and back pain were 8. The patient was taken to urgent posterior microsurgery operation. Following left hemilaminectomy and flavectomy, a sequestered disc fragment localized to the left posterolateral region, which compressed the dura and nerve root, was visualized (Figure 2A-D). Sequestrectomy and discectomy were then performed and the dura and nerve root were decompressed. No postoperative complication occurred.

Urinary incontinence abated early in the postoperative course (on the 7th day). Motor functions on neurological examination also recovered and the quality of life was improved three months after the operation. VAS scores for leg and back pain were 1 and 2, respectively. Postoperative follow-up lumbar MRI revealed no pathological finding with the exception of mild granulation tissue at the area of the operation (Figure 3A-C).

**Case 2:** A 32-year-old woman presented to our hospital with sudden-onset, excruciating low back pain, bilateral leg pain more severe on the right-side, and urinary incontinence for 5 days. She gave a history of intermittent low back pain for 6 months that had partially responded to medical therapy. On neurological examination, the straight leg raising test was 30° positive on the right side and 45° on the left side. There were also loss of Achilles reflex, hypoesthesia corresponding to the L5 and S1 levels, and perianal sensory loss. Lumbar MRI demonstrated a sequestered disc fragment with posterior localization at the level of L5-S1, which almost completely filled the spinal canal and compressed the dural sac (Figure 4A-C). The mass lesion had contrast uptake in a ring-like pattern (Figure 4-C).

**Table II: Summary of Clinical Findings and Outcomes of 9 Patients with PEMSLIDF**

<table>
<thead>
<tr>
<th>Case No</th>
<th>Age (Yrs), Sex</th>
<th>Radiculopathy</th>
<th>CES</th>
<th>Duration of Symptoms</th>
<th>Imaging Diagnostic Device</th>
<th>Lumbar Level</th>
<th>VAS† (preop/postop) Back</th>
<th>VAS† (preop/postop) Leg</th>
<th>FU Period</th>
<th>Outcome*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>41, M</td>
<td>yes</td>
<td>partial</td>
<td>3 days</td>
<td>MRI</td>
<td>L4-5</td>
<td>8/2</td>
<td>8/1</td>
<td>12 mos</td>
<td>excellent</td>
</tr>
<tr>
<td>2</td>
<td>51, M</td>
<td>no</td>
<td>yes</td>
<td>2 days</td>
<td>MRI</td>
<td>L3-4</td>
<td>7/2</td>
<td>7/2</td>
<td>28 mos</td>
<td>excellent</td>
</tr>
<tr>
<td>3</td>
<td>56, M</td>
<td>yes</td>
<td>no</td>
<td>2 days</td>
<td>MRI</td>
<td>L3-4</td>
<td>8/3</td>
<td>7/2</td>
<td>22 mos</td>
<td>good</td>
</tr>
<tr>
<td>4</td>
<td>48, F</td>
<td>yes</td>
<td>partial</td>
<td>3 days</td>
<td>MRI</td>
<td>L4-5</td>
<td>6/1</td>
<td>7/2</td>
<td>2 yrs</td>
<td>good</td>
</tr>
<tr>
<td>5</td>
<td>32, F</td>
<td>yes</td>
<td>partial</td>
<td>5 days</td>
<td>MRI</td>
<td>L5-1</td>
<td>7/3</td>
<td>7/2</td>
<td>1 yr</td>
<td>good</td>
</tr>
<tr>
<td>6</td>
<td>70, M</td>
<td>no</td>
<td>yes</td>
<td>3 wks</td>
<td>CT</td>
<td>L3-4</td>
<td>7/5</td>
<td>7/3</td>
<td>3 yrs</td>
<td>fair</td>
</tr>
<tr>
<td>7</td>
<td>62, M</td>
<td>yes</td>
<td>no</td>
<td>10 days</td>
<td>MRI</td>
<td>L3-4</td>
<td>8/6</td>
<td>8/4</td>
<td>3 yrs</td>
<td>poor</td>
</tr>
<tr>
<td>8</td>
<td>28, M</td>
<td>no</td>
<td>partial</td>
<td>1 wk</td>
<td>MRI</td>
<td>L4-5</td>
<td>8/3</td>
<td>7/2</td>
<td>18 mos</td>
<td>good</td>
</tr>
<tr>
<td>9</td>
<td>58, M</td>
<td>yes</td>
<td>no</td>
<td>2 wks</td>
<td>MRI</td>
<td>L2-3</td>
<td>7/5</td>
<td>8/3</td>
<td>32 mos</td>
<td>fair</td>
</tr>
</tbody>
</table>

**CES:** Cauda equina syndrome *: According to Modified Odom criteria, **FU:** Follow-up, †: Postoperative VAS pain scores were obtained 12 months after surgery.
VAS scores for leg and back pain were both 7 at the postoperative period. Hemilaminectomy and flavectomy were performed on an emergent basis and the sequestered, posteriorly migrated disc material was visualized. Discectomy was also added to the emergency sequestrectomy. At the end of the operation, the dural sac and nerve root were freed of the compression. Neurological examination at the 2-month follow-up revealed full recovery and an MRI examination showed complete normalization of the anatomical structure (Figure 5A-C). VAS scores for the lower back and leg were 3 and 2, respectively.

Table III: Summary of Reported Cases of PEMSLIDF in the Literature Including Present Cases to Date

<table>
<thead>
<tr>
<th>Authors &amp; Year</th>
<th>No. of Cases</th>
<th>Age (Yrs), Sex</th>
<th>Clinical Presentation</th>
<th>Duration of Symptoms</th>
<th>Imaging Diagnostic Device</th>
<th>Lumbar Level</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lombardi, 1973</td>
<td>2</td>
<td>58, M</td>
<td>CES</td>
<td>2 yrs</td>
<td>myelo</td>
<td>L2–3</td>
<td>total recovery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>54, M</td>
<td>radicular pain</td>
<td>2 mos</td>
<td>myelo</td>
<td>L4–5</td>
<td>total recovery</td>
</tr>
<tr>
<td>Lichtor, 1989</td>
<td>1</td>
<td>61, M</td>
<td>lumbago</td>
<td>1 mo</td>
<td>myelo-CT</td>
<td>L2–3</td>
<td>total recovery</td>
</tr>
<tr>
<td>Lutz et al., 1990</td>
<td>1</td>
<td>55, M</td>
<td>radicular pain</td>
<td>2 mos</td>
<td>myelo-CT</td>
<td>L4–5</td>
<td>improvement</td>
</tr>
<tr>
<td>Hirabayashi et al., 1990</td>
<td>1</td>
<td>58, M</td>
<td>CES</td>
<td>4.5 mos</td>
<td>myelo-CT, MRI</td>
<td>L3–4</td>
<td>improvement</td>
</tr>
<tr>
<td>Sekerci et al., 1992</td>
<td>1</td>
<td>58, M</td>
<td>CES</td>
<td>2 mos</td>
<td>myelo</td>
<td>L3–4</td>
<td>improvement</td>
</tr>
<tr>
<td>Sakas et al., 1995</td>
<td>1</td>
<td>70, M</td>
<td>radicular pain</td>
<td>10 wks</td>
<td>CT</td>
<td>L4–5</td>
<td>total recovery</td>
</tr>
<tr>
<td>Bonaroti &amp; Welch, 1998</td>
<td>1</td>
<td>51, M</td>
<td>CES</td>
<td>2 days</td>
<td>MRI</td>
<td>L2–3</td>
<td>total recovery</td>
</tr>
<tr>
<td>Hodges et al., 1999</td>
<td>1</td>
<td>56, M</td>
<td>lumbago</td>
<td>1 wk</td>
<td>MRI</td>
<td>L4–5</td>
<td>asymptomatic</td>
</tr>
<tr>
<td>Neugroschl et al., 1999</td>
<td>2</td>
<td>57, M</td>
<td>lumbago</td>
<td>2 wks</td>
<td>myelo-CT, MRI</td>
<td>L2–3</td>
<td>total recovery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>64, M</td>
<td>radicular pain</td>
<td>2 wks</td>
<td>myelo-CT, MRI</td>
<td>L2–3</td>
<td>total recovery</td>
</tr>
<tr>
<td>Saruhashi et al., 1999</td>
<td>1</td>
<td>44, F</td>
<td>radicular pain</td>
<td>NR</td>
<td>MRI</td>
<td>L5–S1</td>
<td>NR</td>
</tr>
<tr>
<td>Robe et al., 1999</td>
<td>2</td>
<td>68, M</td>
<td>radicular pain</td>
<td>acute</td>
<td>myelo-CT, MRI</td>
<td>L3–4</td>
<td>NR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>41, F</td>
<td>CES</td>
<td>2 wks</td>
<td>myelo-CT, MRI</td>
<td>L3–4</td>
<td>total recovery</td>
</tr>
<tr>
<td>Lisai et al., 2000</td>
<td>1</td>
<td>63, M</td>
<td>CES</td>
<td>3 days</td>
<td>MRI</td>
<td>L2–3</td>
<td>total recovery</td>
</tr>
<tr>
<td>Dösoğlu et al., 2001</td>
<td>1</td>
<td>47, M</td>
<td>CES</td>
<td>2 wks</td>
<td>MRI</td>
<td>L3–4</td>
<td>total recovery</td>
</tr>
<tr>
<td>Eysel &amp; Herbsthofer, 2001</td>
<td>3</td>
<td>45, M</td>
<td>CES</td>
<td>8 wks</td>
<td>CT, MRI</td>
<td>L3–4</td>
<td>total recovery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>37, F</td>
<td>radicular pain</td>
<td>7 wks</td>
<td>CT</td>
<td>L4–5</td>
<td>total recovery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>41, M</td>
<td>lumbago</td>
<td>11 wks</td>
<td>CT</td>
<td>L3–4</td>
<td>total recovery</td>
</tr>
<tr>
<td>Şen et al., 2001</td>
<td>1</td>
<td>36, M</td>
<td>CES</td>
<td>10 hrs</td>
<td>MRI</td>
<td>L4–5</td>
<td>total recovery</td>
</tr>
<tr>
<td>Kim et al., 2003</td>
<td>1</td>
<td>60, F</td>
<td>radicular pain</td>
<td>1 yr</td>
<td>MRI</td>
<td>L3–4</td>
<td>subtotal recovery</td>
</tr>
<tr>
<td>Kuzeyli et al., 2003</td>
<td>3</td>
<td>49, M</td>
<td>lumbago</td>
<td>15 days</td>
<td>MRI</td>
<td>L4–5</td>
<td>total recovery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>62, F</td>
<td>CES</td>
<td>25 days</td>
<td>CT, MRI</td>
<td>L1–2</td>
<td>total recovery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>47, F</td>
<td>CES</td>
<td>4 mos</td>
<td>MRI</td>
<td>L2–3</td>
<td>total recovery</td>
</tr>
<tr>
<td>Şenel et al., 2003</td>
<td>1</td>
<td>44, M</td>
<td>lumbago</td>
<td>5 days</td>
<td>MRI</td>
<td>L3–4</td>
<td>total recovery</td>
</tr>
<tr>
<td>Kim et al., 2004</td>
<td>1</td>
<td>44, M</td>
<td>CES</td>
<td>6 hrs</td>
<td>CT</td>
<td>L4–5</td>
<td>subtotal recovery</td>
</tr>
<tr>
<td>Walsh et al., 2004</td>
<td>1</td>
<td>62, M</td>
<td>CES</td>
<td>3 wks</td>
<td>MRI</td>
<td>L3–4</td>
<td>total recovery</td>
</tr>
<tr>
<td>Tatli et al., 2005</td>
<td>2</td>
<td>53, M</td>
<td>CES</td>
<td>2 days</td>
<td>MRI</td>
<td>L3–4</td>
<td>total recovery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>54, M</td>
<td>CES</td>
<td>2 days</td>
<td>MRI</td>
<td>L5–S1</td>
<td>improvement</td>
</tr>
<tr>
<td>Chen et al., 2006</td>
<td>1</td>
<td>75, M</td>
<td>radicular pain</td>
<td>2 wks</td>
<td>MRI</td>
<td>L2–3</td>
<td>improvement</td>
</tr>
<tr>
<td>Lakshmanan et al., 2006</td>
<td>2</td>
<td>58, M</td>
<td>radicular pain</td>
<td>1 mo</td>
<td>MRI</td>
<td>L4–5</td>
<td>total recovery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28, F</td>
<td>radicular pain</td>
<td>3 mos</td>
<td>MRI</td>
<td>L4–5</td>
<td>total recovery</td>
</tr>
</tbody>
</table>

**DISCUSSION**

The disc is sequestered in 28.6% of all cases of disc herniation. However, migration into the posterior epidural space is a fairly rare occurrence (4, 42). PEMSLIDF was first described by Vincenzo Lombardi (33) in 1973. Since then, a total of 74 cases including this study have been reported in the English literature.

It has been advocated by some authors that certain anatomic barriers limit the emergence of these lesions (37, 46, 56). Posterior migration of disc fragments is thought to be limited...
Table III: Cont.

<table>
<thead>
<tr>
<th>Authors &amp; Year</th>
<th>No. of Cases</th>
<th>Age (Yrs), Sex</th>
<th>Clinical Presentation</th>
<th>Duration of Symptoms</th>
<th>Imaging Diagnostic Device</th>
<th>Lumbar Level</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobbs et al, 2007</td>
<td>1</td>
<td>32, M</td>
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<td>3 mos</td>
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**NR:** not reported.
or prevented by some anatomical structures including the sagittal midline septum, peridural membrane, the nerve root, the dura, epidural vascular structures, and epidural fat (5, 7, 9, 13, 15, 23, 29, 30, 40, 42, 46). Hence, PEMSLIDF may emerge when any of these structures are defective (11, 18, 52).

Some researchers have pointed that unusual physical movements including heavy labor, traction, spinal manipulation, and conditions of hypermobility in a patient may also facilitate LDH migration (36, 40). Kim et al. (26) hypothesized that a significant contributing force on top of the ipsilateral severe adhesion of the anterior epidural space may end up with contralateral posterior epidural migration.

PEMSLIDF is more prevalent in men with a male-to-female ratio of about 4/1. It more commonly involves the middle age group (mean age 53.11 years), possibly owing to altered spinal dynamics with aging (1, 15, 30, 42, 48, 52). The clinical
Figure 3: (Case 1)
Postoperative sagittal T1-weighted MR image (A).
Postoperative sagittal (B) and axial (C) T2-weighted MR images.

Figure 4: (Case 2)
Sagittal T1-weighted MR image (A).
Sagittal T2-weighted MR image (B). The ring-like enhancement (white arrow) is well demonstrated on the axial Gd-enhanced T1-weighted image (C).

Figure 5: (Case 2)
Postoperative sagittal T1-weighted MR image (A).
Postoperative sagittal (B) and axial (C) T2-weighted MR images.
picture of PEMSLIDF is not remarkably different from that of LDH, although the majority (51.35%) of cases have CES. The remaining group predominantly has clinical characteristics of radiculopathy.

MRI is the most useful radiological imaging tool for the diagnosis of PEMSLIDF. It appears isointense with the intervertebral disc on T1-weighted images. T2-weighted images, on the other hand, reveal a variable intensity of the lesion, with about 80% of all lesions appearing hypointense and the remaining 20% being isointense (1, 8, 9). On contrast-enhanced MRI images, it appears like a cyst with enhanced rims, especially if a couple of days have passed after contrast administration. The latter image characteristics are believed to be secondary to the encasement of the sequestrated disc by newly formed vessels, that is neovascularization (8, 9, 15, 30, 39, 42). However, the above-mentioned radiological appearances are not specific and they are also found in other posterior epidural lesions; thus, a definitive diagnosis can at times be made only in the operating room (9, 42). Clinical and radiological differential diagnoses include synovial cyst, epidural hematomata, some cartilaginous tumors such as chondrosarcoma, hemorrhagic facet cysts, goit, cystic schwannomas, primitive or metastatic epidural tumors, and abscess (1, 8, 9, 14-16, 21, 30, 42-44, 55).

Fragmented disc lesions are usually characterized by Gd enhancement in their periphery that is a result of inflammation and neovascularization encircling the sequestrated disc tissue (8, 9, 30, 39). It is a rare event for diffuse enhancement to appear in the lesion. Despite being extremely sensitive, MRI is not specific to such disc hernia migration.

PEMSLIDF can only be definitively diagnosed surgically by visualising the disc material after flavectomy. It is most commonly observed at the upper lumbar levels, especially at the L3-L4 level (39.2%). This is possibly due to a different relationship between the disc and nerve root at that level than at other levels.

Surgery should be carried out without delay in patients with intense pain and neurological deficits; it is particularly important in those having cauda equina syndrome. The sequestrated disc fragment can be removed either via hemilaminectomy or laminectomy involving one or two levels, based on the lesion size (1, 15, 16). An extra discectomy may be reasonable, particularly when a defect is present in the posterior longitudinal ligament.

Fortunately, the majority of patients suffering PEMSDF do well after corrective surgery. Of note, the prognosis of CES secondary to PEMSDF is considerably better than that resulting from an anteriorly extruded disc fragment. Thanks to a fairly large amount of epidural fat that provides suitable space at the posterior portion, most PEMSLIDF patients usually recover within weeks to a couple of months after surgery (1, 6, 8, 14, 16). In the formerly published reports 53 (73.62%) patients had a total recovery, 3 (4.17%) had a subtotal recovery, 15 (20,83 %) showed improvement, and 1 (1.38%) had unchanged clinical condition. PEMSLIDF should be operated early in the course to avoid serious CES or radiculopathy.

**REFERENCES**


**CONCLUSION**

It is rare to observe a lumbar intervertebral disc fragment migrated to the posterior epidural space, occurring mainly in the working-age population. The majority of the patients were past their middle age and the L3-L4 level was the most commonly involved level. This condition produces a nearly identical clinical picture to that of a typical LDH, although symptoms of CES are much more prevalent. Higher lumbar vertebral levels are more commonly affected. Unfortunately, this condition shares many clinical and radiological similarities with other space-occupying lesions, complicating the diagnosis. MRI features are sometimes indistinguishable from those of other various lesions. Gadolinium contrast enhancement in a ring-like pattern is typical for these lesions. Compared to typical anterior compression, CES as a result of these lesion are more favorable. Patients being operated within the first 3 days of symptoms or having symptoms consistent with partial CES usually have a favorable outcome. This special condition deserves further research to shed light on its causes, diagnosis, and management.


