

Surgical Treatment of Posterior Epidural Migration of Herniated Lumbar Disc Fragment: A Clinical Series

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ÖZET

Giriş: Serbest disk fragmanının posterior migrasyonu nadir görülen bir durumdur ama MRI teknikleri tanıyı kolaylaştırmaktadır. Bildirilen PEM olguları kauda ekuina sendromu ya da radikülopatiler ile karşımıza çıkmaktadır. Literatürde sadece olgu sunumları vardır. Erken tanı ve yeterli cerrahi tedavi önemli nörolojik kayıpların önlenmesinde önemlidir.

Yöntem ve Bulgular: 1995-2008 yılları arasında opere edilen sekiz posteriora migre disk hernisi olgusu gözden geçirildi, semptomların varoluş süresi (ortalama 4.2 gün), yaş dağılımı (ortalama 52.7) ve erkek / kadın oranı (6:2) araştırıldı. Sekestre disk fragmanı 5 hastada (%62.5) L3-L4 seviyesinde saptandı. Manyetik rezonans görüntüleme yöntemleri ile hastaların çoğunda sekestre fragman çevresinde tümör benzeri halkasal kontrast madde tutulumu gözlemlendi. Hastalar postoperatif dönemde Vizüel analog skala (VAS) ağrı skoru ve modifiye Odom's kriteri kullanılarak değerlendirildi.

Bulgular: Tüm olgular mikrocerrahi yöntem ile opere edildi. Minimal hemilaminotomiye takiben serbest disk fragmanı çıkarıldı ve operasyon sonlandırıldı. Odom's kriterleri postoperatif dönemde 6 hastada mükemmel ya da iyi olarak bulundu.

Sonuç: Cerrahi, ciddi nörolojik komplikasyonların önlenmesi için olabildiğince erken uygulanmalıdır. Cerrahi tedavi olarak hemilaminotomi ve serbest fragmanın çıkarılması yeterlidir ve cerrahi sonlanım operasyon öncesi semptom süresi ile ilişkili bulunmuştur. Bu çalışma literatürde klinik seri olarak ilk olma özelliği taşımaktadır.

Anahtar Kelimeler: Sekestre disk, Posterior migrasyon, Cerrahi teknik

SUMMARY

Running title: Surgical Technique for Treatment of Posterior Sequestered disc Fragment

Introduction: Posterior epidural migration (PEM) of sequestered disc fragment is rare, but magnetic resonance imaging (MRI) technics facilitate to diagnosis. Reported PEM patients presented with radiculopathy or cauda equina syndrome (CES). There are only case reports in the literature. Early diagnosis and adequate surgical treatment are important to prevent for severe neurologic deficits.

Methods and Findings: Between 1995 and 2008, eight cases who had posterior migrated lumbar disc fragment were evaluated. Duration of symptoms (mean 4.2), age distribution (mean 52.7) and male female ratio (6:2) were investigated. Sequestered disc fragment in five patients (62.5%) were shown L3-L4 disc level. In more of the patients, tumor like ring contrast enhancement around sequestered fragment in magnetic resonance images (MRI) were shown. Postoperative outcomes are evaluated by modified Odom's criteria and visual analog scale (VAS) pain score.

Results: Microsurgical approaches were applied all cases. As a treatment, minimal hemilaminotomy and to remove a free fragment was performed. Six patients had excellent or good Odom's criteria in postoperative period.

Conclusion: Surgery should be performed early to prevent severe neurologic deficits. As a surgical treatment, removed a free fragment with hemilaminotomy and sequestrectomy were adequate. The surgical outcome is depended on preoperative symptom's duration. As a clinical series, this study is first in literature.

Key Words: Sequestered disk, Posterior epidural migration, Lumbar.

INTRODUCTION

Lichter reported posterior epidural migration (PEM) of sequestered disc fragment case at 1989 for the first time (1). Posterior epidural migration of an extruded disc fragment has been reported very rarely (2,3). PEM is usually like to space occupying lesion in the lumbar epidural region. In our clinic, eight cases of posterior migration of sequestered disc fragment are operated between 1995-2008. Clinical manifestations, postoperative outco-

mes and, surgical techniques in these cases are reviewed with literature.

METHODS

Eight patients with posteriorly migrated sequestered epidural disc herniations were evaluated with clinic symptoms, radiologic findings, underwent surgery and postoperative outcomes. Age distribution was 39-72 years (mean 52.7), male female ratio is 6:2. Two patients had radiculopathy. Modified Odom's criteria and visual analog scale (VAS) score were used to evaluate patients. Modified Odom's criteria is represented in Table 1 (4).

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| Grade | Definition |
|-----------|---|
| Excellent | Improvement of preoperatif symptoms and signs |
| Good | Minimal persistence of preoperative symptoms, abnormal findings and improved or unchanged |
| Fair | Definite relief of some preoperative symptoms, other symptoms slightly improved |
| Poor | Symptoms and signs unchanged or exacerbated |

Table 1: Modified Odom's criteria

Twenty three PEM of sequestered disc herniation cases have been reported in the literature so far (5,6,7,8,9). In patients with protruded discs, CES has been estimated to range from 1.2% to 6%. Cauda equina syndrome (CES) is a rare situation after disc herniation. In the literature there are 31 cases included our 8 new cases. Age distribution was 28-75 years (mean 49, mean for woman 43, mean for man 51), male female ratio is 24:7 in 31 cases. CES was established 17 patients with PEM of free disc fragment in the literature cases. Sequestered disc fragments in 21 patients were shown L3-L4 and L4-5 levels (Table 2) (5,6,7,9).

| Studies | Number of cases | Age Disturbance | Level of herniation | CES | Gender |
|------------------------------------|-----------------|-----------------|---|----------------|-------------|
| Previous reports between 1989-2008 | 23 | 25-75 | L1-L2 L2-L3 L3-L4 L4-L5 L5-S1 | CES (+) 60% | F:M 5:18 |
| Present cases | 8 | 39 | L3-L4 | - | M |
| | | 42 | L4 | CES | M |
| | | 43 | L4 | CES | F |
| | | 44 | L3-L4 | CES | F |
| | | 54 | L3-L4 | CES | M |
| | | 55 | L3-L4 | CES | M |
| | | 72 | L3-L4 | CES | M |
| | | 34 | L4-L5 | CES | M |

Table 2: Summary of presented cases of PEM of sequestered disc fragments in literature.

Radiological examination is first to illustrate the posterior epidural migrated disc fragments. In the operation, minimal hemilaminotomy and flavectomy were performed and the sequestered disc fragment was removed by microsurgically technics. Fragmentectomy was decreased the pressure on the dural sac. Discectomy was not performed and spinal instrument was not used. In early postoperative period, motor, sensory, sexual, and urological functions were evaluated .

An illustrative case are presented with details.

Case: A 34 year-old man presented with 3 years' history of intermittent lumbago. For 2 months, he referred bilateral leg pain. In the course of two days, he complained of weakness of the lower limbs, perianal hypoesthesia and urinary incontinence. Lumbosacral MRI demonstrated a sequestered disc fragment that was almost completely filling the spinal canal at the level of L4-L5 (Figure 1 A and B). Preoperative VAS score was 6. An emergency L4 minimal hemilaminotomy was performed. After removal of the ligamentum flavum, the sequestered disc fragment was visible. The disc material was extirpated. The histopathological examination confirmed that the specimen was a disc material. At the three-month postoperative follow-up examination, the patient had recovered urologic and sensory functions. Postoperative VAS score was two.

RESULTS

The patients were follow-up to along postoperative period. Only one patient had fair and one (12.5%) had poor Odom's criteria. All eight cases summarized in Table 3.

Table 3: Summary of the patients and results.

Urinary incontinance signs were subsided on late postoperative period in 6 patients. Intestinal bladder reconstruction and intermittent catheterization were performed to seventh case. A case with radiculopathy with poor Odom' score were taken to physical therapy programme for paresis.

DISCUSSION

Disk sequestration can be defined as a herniated disk with perforation of the fibrous ring and posterior longitudinal ligament with migration of the disk fragment to the epidural space (10). Disc fragment migration patterns

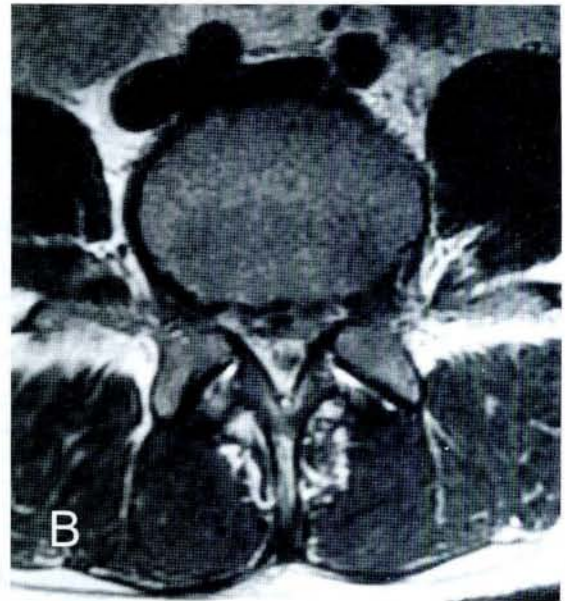


Figure 1A, 1B: T2-weighted sagittal and axial images (A and B) show a sequestered fragment that was migrated posteriorly and superiorly to the dural sac at L4-L5 level.

are generally limited by the posterior longitudinal ligament and nerve root itself (5). Sequestered disc fragments generally tend to migrate laterally due to anatomical properties of the vertebral column but sometimes the fragment can be migrate posteriorly. The reasons why extruded disc fragments migrate posteriorly are not well understood (8). Any structural failure may allow PEM of

disc fragment. The most common clinical symptoms of a free fragment are repeated lumbar pain and radicular complaints and posteriorly migrated fragments may also cause the CES rarely. If a free fragment migrates posterior and compresses to dural sac the complaints exacerbate promptly (5). Most of the previously reported cases with PEM presented with a relatively short duration of symptoms of radiculopathy and muscle power deficit of the affected lower extremities in a middle-aged individual (2,5,10).

Definitive diagnosis of posteriorly located disk fragments is difficult. Differential diagnosis of posterior epidural lesions includes a lot of titles- metabolic disorders, infections, tumors, degenerative diseases, trauma and iatrogenic disorders (5,9).

MRI is the first choice to evaluate for cauda compression (7,9,10,11). Contrast enhancement and mass effect of the lesion on

| | Case 1 | Case 2 | Case 3 | Case 4 | Case 5 | Case 6 | Case 7 | Case 8 |
|----------------------------|--------|--------|--------|-----------|-----------|--------|-----------|-----------|
| Duration of symptoms (day) | 4 | 10 | 2 | 7 | 3 | 5 | 1 | 2 |
| Radiculopathy | + | - | - | - | - | - | + | - |
| CES | - | + | + | Partial + | Partial + | + | Partial + | + |
| Odom's criteria | Poor | Fair | Good | Good | Excellent | Good | Excellent | Excellent |
| VAS (preop./postop.) | 7/6 | 7/6 | 7/3 | 6/3 | 8/2 | 7/3 | 8/3 | 6/2 |

Table 3: Summary of the patients and results.

MRI may confuse the diagnosis (2,8). Sequestered disc can induce an inflammatory reaction and neovascularisation around the fragment and this may enhance with gadolinium in the MRI scan. Free disc material is confused with other more common epidural lesions such as synovial cysts from the facet joint, ligamentum cysts, pigmented villonodular synovitis, cystic neurinomas, neoplasms, abscesses, and hematoma (7,9).

Treatment consisted of removal of the extracted fragment through minimal hemilaminotomy. Rapid surgery intervention is recommended for all patients of posteriorly migrated disc fragments, to avoid severe CES or radiculopathies.

CONCLUSION

Postoperatif outcome is related to be CES and duration of the symptoms in preoperative term. The diagnosis is difficult due to mass effect of the lesion on MRI. Sequestered disc fragments in patients were shown L3-L4 or L4 levels. As an adequate treatment minimal hemilaminectomy and to remove a free fragment were performed. Surgical results of sequestered disc fragments after early diagnosis are encouraging.

REFERENCES

1. **Lichter T:** Posterior epidural migration of extruded lumbar disk. *Surg Neurol* 32 (4): 311-312, 1989
2. **Bonaroti EA, Welch WC:** Posterior epidural migration of an extruded lumbar disc fragment causing cauda equina syndrom. *Spine* 23: 378-381, 1998
3. **Eysel P, Herbsthofner B:** Dorsal compression of the epidural cord due to the free sequestered lumbar prolapse: diagnostic problems in magnetic resonance imaging and computed tomography. *Arch Orthop Trauma Surg* 121: 238-240, 2001
4. **Rihn JA, Makda J, Hong J, ve arkadaşları:** The use of RhBMP-2 in single-level transforaminal lumbar interbody fusion: A clinical and radiologic analysis. *Eur Spine J* 18: 1629-1636, 2009
5. **Dosoglu M, Is M, Gezen F, ve arkadaşları:** Posterior epidural migration of a lumbar disc fragment causing cauda equina syndrom: case report and review of the relevant literature. *Eur Spine J* 10(4): 348-351, 2001

6. **El Asri AC, Naama O, Akhaddar A ve arkadaşları:** Posterior epidural migration of lumbar disc fragments: report of two cases and review of the literature. *Surg Neurol* 70 (6): 668-671, 2008
7. **Lakshmanan p, Ahuja S, Lyons K, ve arkadaşları:** Sequestered lumbar intervertebral disc in the posterior epidural space: a report on two cases and review of the literature. *Spine J* 6: 583-586, 2006
8. **Sen O, Aydan V, Erdogan B, ve arkadaşları:** Cauda equina syndrome caused by posterior epidural migration of an extruded lumbar disc fragment. *Turk Neurosurg* 11: 108-110, 2001
9. **Tatli M, Guzel A, Ceviz A, ve arkadaşları:** Posterior epidural migration of sequestered lumbar disc fragment causing cauda equina syndrom. *Br J Neurosurg* 19: 57-59, 2005
10. **Chen CY, Chuang YL, Yao MS, ve arkadaşları:** Posterior epidural migration of sequestered lumbar disk fragment: MR imaging findings. *AJNR Am J Neuroradiol* 27 (7): 1592-1594, 2006
11. **Kuzeyli K, Cakir E, Usul H, ve arkadaşları:** Posterior epidural migration of lumbar disc fragment. *Spine* 28 (3): 64-67, 2003