MANAGEMENT OF MULTILEVEL LUMBAR DISC HERNIATION

Muhammad Junaid Khan, *Muhammad Asif Aziz, **Anisa Shaukat

Combined Military Hospital Rawalpindi, *Army Medical College Rawalpindi, **MH Rawalpindi

ABSTRACT

Objective: To identify and document more then one level symptomatic lumbar disc herniation and to find its frequency presentation and outcome.

Design: Descriptive study

Place and Duration of Study: Combined Military Hospital Rawalpindi from 2001 to 2002.

Patients and Methods: A total number of 260 male patients were selected from out patient department over a period of 1 year. After clinical evaluation, confirmation was done by nonenhanced Electro-resonance imaging (MRI) of the lumbar spine. All the patients with multilevel disc herniation on MRI underwent never conductions (NCS) electromyography (EMG) studies.

Results: All the patients were males. Maximum number of patients was between 32 - 40 years of age; mean age was 35 with a standard deviation of 2. 48 belonged to military setup and 82 were civilians. Out of all, 14 had multilevel lumbar disc herniations, the frequency being 5.8 in our study. All the patients with multilevel disc herniations underwent surgery. Only 4 patients had multilevel discectomy where 10 had discectomy at single level. Mortality was nil and there were no postoperative neurological deficits. All the patients were back to work at 6 weeks. Data was analyzed using the descriptive SPSS package.

Conclusions: The identification of symptomatic multilevel disc herniation is extremely important in order to manage the patients with multilevel disc herniation as single level discectomy in such patients will not ameliorate the symptoms and may require another difficult surgery.

Keywords: Lumbar disc herniation, multiple, MRI/lumbar spine, discectomy

INTRODUCTION

Although there are references to lumbago and leg pain in the bible and even earlier sources, the scientific evolution of lumbar disc herniation as surgical disorder began in 1934 when Mixter and Barr published the first clinically adequate description of lumbar disc herniation as the cause of leg pain [1]. In many parts of the world, the treatment of lumbar disc disease takes most of the neurosurgeons time. Clearly lumbar disc herniation is a significant medical and social problem. At this time the most common initial diagnostic test for patients with suspected disc lesion is MRI [2].

Knowledge of the natural history of discal herniation, and of the mechanisms leading to the changes of the extruded discal tissue, would be of great help in planning the therapeutic procedure [3].

Symptomatic degenerative disc disease (DDD) may lead to significant deterioration of quality of life and increased disability.

The importance of this study lies in the fact that if more than one disc herniations are present and is symptomatic, they have to be addressed and surgically corrected otherwise the patient will remain symptomatic for the leftover disc herniation. This study was conducted to document identify more than one level symptomatic disc herniation and to find its frequency, presentation and outcome.

Correspondence: Major Muhammad Junaid Khan, Neurosurgeon, Combined Military Hospital Quetta

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PATIENTS AND METHODS

A total number of 260 patients who presented with backache / leg and thigh pain at Neurosurgical Center CMH Rawalpindi over a period of one year from 2001 to 2002 were included in the study. Data collection was done using non-probability convenient sampling. Only male patients with disc herniation confined to lumbar region were included in the study. Patients with traumatic disc herniations were excluded. Similarly patients with cauda equina syndrome, neurogenic and ischemic claudication were also excluded from the study. The presenting complaints and signs of these patients were recorded on the ordinary form on which they were referred and MRI lumbar spine (plain) was requested for confirmation. After confirming multilevel disc herniation preoperative functional assessment was done in terms of maximum sitting, standing and walking time in one go, also the sleepless nights in a week because of pain were included in preoperative functional assessment. NCS/EMG studies were also requested for all those patients who had multilevel disc herniation on MRI. All the patients with multilevel disc herniation underwent surgical intervention; only 4 patients had multilevel discectomy where 10 had discectomy at single level. Fenestration was performed for lower lumbar disc herniations while extended fenestration was done for upper lumbar levels, as the interlaminar space is narrow here. All the patients were discharged on second postoperative day; stitches were removed on 7th postoperative day. Complications in the form of cerebro spinal fluid (CSF) leak, discitis and wound infection were recorded if present. Follow up was done every two weekly with functional assessment as already described for one and a half month.

RESULTS

Out of 260 patients 14 had multilevel disc herniation the frequency being 5.38% in our study. The age distribution of patients in our study was between 30 to 50 years. Most were young adults. The presentation of patients with multilevel disc herniation (table-1). The site distribution (table-2). L3/L4, L4/L5 Levels were involved in six patients, two patients had three level disc herniation being at L3/L4, L4/L5, L5/S1.Two patients had higher disc herniation being at L2/L3, L3/L4. L4/L5, L5/S1 disc herniations were present in two patients. Two patients had incongruous multilevel herniation being at L2/L3, L5/S1. The presentation in patients with multilevel disc herniations was sciatica in 10 patients, pain anterior thigh in 2 patients and pain both thigh and legs in 2 patients respectively. Four patients with multilevel disc herniations underwent discectomy at 2 levels while 10 patients at single level. All these patients with multilevel disc herniations were associated with excessive cumulative work activities or activities involving heavy axial loading, repetitive bending or rotation of the lumbar spine. Eight patients with multilevel disc herniation were smokers. None was obese, above 6 ft of height or having strong family history.

Table-1: Presentation of Patients (n=14)

Presentation	No. of Patients	%
Sciatica	10	71.4
Pain anterior thigh	2	14.2
Pain both thigh and legs	2	14.2

Table-2: Site distribution in Lumbar spine (n=14)

Site	No. of Patients	%
L3/L4, L4/L5	6	42.8
L3/L4, L4/L5, L5/S1	2	14.2
L4/L5, L5/S1	2	14.2
L2/L3, L3/L4	2	14.2
L2/L3, L5/S1	2	14.2

DISCUSSION

This study has evaluated the frequency of multilevel disc herniations in lumbar spine. There has been no national/regional study exclusively on incidence/frequency of multilevel disc herniations, though there are case reports of multilevel disc herniations in the thoracic and lumbar spine and coexistance of lumbar and cervical disc herniations.

Various theories have been proposed regarding lumbar disc herniation. Proteolytic enzymes reside in the disc and have been implicated in disc degeneration. The matrix metalloproteinases (MMP's) are regulated by specific inhibitors (TIMPS), cytokines (interleukins) and growth factors [4]. Spinal loading may interfere with diffusion into disc by reducing the gradient across vertebral end plate. As disc metabolism becomes anaerobic, there is accumulation of lactic acid, fall in pH, loss of chondrocyte and fibroblast factor and activation of metalloproteinases [5].

Of all lumbar disc herniations, less than 5% occur in the upper lumbar area. Even more unusual is the occurrence of multilevel disc herniations in this area. The coexisting pathologies such as end plate defects, spondylolisthesis, retrolisthesis, spondyloepiphysial dysplasia, reversal or loss of lumbar lordosis were not present in any patient [6]. Similarly osteophyte formation was rarely seen in this age group. Tt allele of the vitamin-D receptor gene is more frequently associated with multilevel and severe disc degeneration and disc herniation than TT allele but we didn't perform karyotyping in our patients [7].

Cervical and lumbar disc herniation can coexist and autoimmune basis has been suggested for that [8] but we didn't study this association. In our study no patient was younger than 20 years however multilevel disc herniations has been described in as young as 12 years [9]. There was no intraspinal cyst in our patients with multilevel disc herniations but it may coexist [10]. Similarly non of our patient had demyelinating disorder but surgeons should be aware of the uncommon simultaneous presence of symptomatic multilevel disc herniation and demyelinating diseases which may confuse the diagnosis [11].

Multilevel disc herniations may occur in thoracic region and it may coexist with spondyloepiphyseal dysplasia tarda but we confined our study to lumbar region.

All of our cases were diagnosed by plain MRI of the lumbar spine. MRI provides a good quality image over the entire length of spine and can assess the morphology of the discs and cord [12]. None of our patients with multilevel disc herniation was treated conservatively however disc herniations whether solitary or multiple may resorb spontaneously [13, 14]. We performed fenestration/extended fenestration in all of our patients with as much conservation of ligamentum flavum as possible [15]. Intradiscal thermal annuloplasty is also recommended for the treatment of lumbar discogenic pain in patients with multilevel degenerative disc disease [16]. However this facility is not yet available in our set up. Similarly WARP (Wide Abdominal Rectus Plication) is another modality of treatment for patients with symptomatic multilevel lumbar disc herniation but we have no experience with this approach.

None of our patients had postoperative complications in form of CSF leak, wound infection or neo sensory-motor deficits. Similarly none of our patient had postoperative depression however, it may occur in patients who are obese, recipients of worker's compensation or unmarried. We did use Lasigue's test pre and postoperatively as a prognostic indicator in the functional outcome and there are studies in which it has been used as a prognostic indicator [17]. We also assessed the functional outcome in terms of improvement in sitting, standing and walking time along with improvement in sleep.

The complication rate was nil and all patients were back to work in six weeks.

RECOMMENDATIONS

We must go for a meticulous history, a detailed neurological examination, looking for any coexisting pathologies as discussed and an accurate diagnosis to identify multilevel disc herniation by correlating clinical, radiological and peroperative findings to reduce the incidence of failed back syndrome and physical and social disabilities. In this regard we have devised certain

guidelines, which may help our contemporaries.

For congruous levels, clinical assessment including symptoms and signs along with radiological correlation and peroperative confirmation poses no confusion in decision making for multilevel discectomy, for instance patient with pain in anterior thigh and sciatica would have positive femoral stretch and Lasigue's, depressed knee and ankle jerks and decreased pin prick sensations accordingly and if in this situation radiological confirmation is done there must be no confusion in performing discectomies through separate incisions. One important thing to remember here is if both the discs are producing symptoms on one side patient may be operated upon in lateral position otherwise prone.

For incongruous level, a clever and intelligent patient may describe the exact dermatome pattern of his/her pain, but still for congruous multilevel disc lesions and with unilateral symptomatology decision making becomes difficult, for instance patient having pain in one leg in L5 dermatomal pattern is found to have L4/L5 and L5/S1 disc lesion on radiological confirmation, both spaces have disc protrusions towards symptomatic side, in this situation discectomies at both levels should be done after having per operative confirmation also i.e. explore both spaces through same incision as the discs are congruous and see whether both are causing root or cauda equina compression if so, perform discectomies at both levels, however if disc protrusion at one level is towards right and another towards left do discectomy towards symptomatic side.

Another situation would be if patient has got bilateral radicular pain and radiological evidence is suggestive of disc lesion at 2 levels both towards one side or one disc lesion towards right and another towards left in this case discectamy at both levels should be performed.

CONCLUSION

If patient has got central disc protrusion at one level and unilateral disc at another level, discectomy at both levels should be done if patient has bilateral symptoms and if peroperative suggests too and if in the same scenario patient has unilateral symptoms discectomy towards the symptomatic side should be performed.

There could be numerous situations and each should be considered individually on its own merits.

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