

Prospective Outcome Assessment of Surgical Management in Lumber Disc Prolapses: A Follow-Up Study

Amresh Yadav¹, Ravi Shekhar², Sudhanshu Verma³, Shiv Shankar⁴

¹Senior Resident, Department of Orthopaedic, Institute of Medical Sciences BHU, Varanasi, Uttar Pradesh, India

²Senior Resident, Department of Orthopaedics, AIIMS, Patna, Bihar, India

³Senior Resident, Department of Orthopaedics, United Institute of Medical Sciences, Prayagraj, Uttar Pradesh, India

⁴Senior Resident, Department of Anaesthesia, Indira Gandhi Institute of Medical Science, Patna, Bihar, India.

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Corresponding author: Dr. Sudhanshu Verma

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Abstract

Aim: The aim of the present study was to evaluate the surgical outcome in the treatment of Lumber Disc Prolapse (LDP).

Methods: The prospective study was done in the Department of Orthopaedics, institute of medical sciences BHU, Varanasi, Uttar Pradesh, India, during the period of 1 year. 55 cases were selected during study period but out of them 50 cases were feasible to be included in the study; remaining 5 cases were lost during follow up. Patients of both sexes aged between 18-70 years with prolapsed lumbar intervertebral disc admitted in the Department of Orthopedics.

Results: The mean age of the patients were 38.9 ± 14.0 years ranging from 20-67 years. The mean age of the male patients was 38.5 ± 13.5 years and a female patient was 39.8 ± 16.2 years. Though the mean age of the female patients a little bit higher than the male, but the mean difference was not statistically significant ($p > 0.05$). Data indicated that maximum number of the patients was in age group >40 years (40%) followed by 28% in the age group 21-30 years, 24% in the age group 31-40 years and 8% were in the age group <20 years.

Conclusion: From this study it reveals that management of prolapsed lumbar intervertebral disc by laminotomy and discectomy is an effective method of treatment and it reduces the complications and increases the chances of successful outcome.

Keywords: Outcome, Surgical Management, Lumber Disc Prolapse

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Introduction

Lumbar disc herniation (LDH) has a lifetime incidence of 40%. The condition is thoroughly evaluated in adulthood, both in respect of epidemiology, natural history and outcome, [1-3] with substantial gender differences reported. [4] Most adults with LDH are treated non-operatively, with

surgery being reported with predominantly good results, [1-3] at a frequency of about 20 per 100000 inhabitants in Sweden. [5] It is difficult to assess if the same beneficial outcome occurs with younger patients as in adults owing to the lack of published data, in a condition with a low

incidence in this age group, and an even lower incidence of surgery.

Sciatica is one of the most debilitating types of pain emanating from the low back, with a lifetime incidence of ~30%. [6,7] Sciatica is a disorder caused by pressure on or irritation of the nerve root. Main symptoms and signs include unilateral leg pain that is worse than concomitant low back pain, pain radiating beyond the knee, decreased muscle strength in a myotomal distribution and sensory deficits in a dermatomal distribution. [8,9] Compared with patients with localised low back pain only, those with sciatica generally have more persistent and severe pain, worse prognosis, consume more healthcare resources and are disabled and absent from work for a longer period of time. [6]

Though low back pain and sciatica had affected the human race since time immemorial, until the first quarter of previous century, little knowledge had been acquired about the ways in which the intervertebral disc might cause compression on intra-spinal neural structures. Disc prolapse occurs in the working age adult population as they are the ones most likely to be exposed to trauma due to mechanical stress and strain. The most likely reason for the earlier age of onset of symptoms of low back pain in our studies is the young age at which our people are exposed to manual labour due to their poor socio-economic condition. Almost in 80% of cases, the protrusion is traumatic in origin and there is either a history of sudden severe strain due to heavy weight lifting or patients occupation is one in which flexion strain must be resisted, such as packer, fireman, porter, etc. In 20% of cases the condition is degenerative in origin. [10]

In 1939, Semmes presented a new procedure to remove the ruptured intervertebral disc that included subtotal laminectomy and retraction of the dural

sac to expose and remove the ruptured disc with the patient under local anaesthesia. [11] This procedure is now the classic approach for removal of the intervertebral disc. Finally, through the anatomic dissections and clinical observations, spinal ageing and the development of pathologic process associated with or complication the process of ageing have evolved as a primary theory in disc disease. [12]

The aim of the present study was to evaluate the surgical outcome in the treatment of Lumbar Disc Prolapse (LDP).

Methods

The prospective study was done in the Department of Orthopaedics, institute of medical sciences BHU, Varanasi, Uttar Pradesh, India, during the period of 1 year. 55 cases were selected during study period but out of them 50 cases were feasible to be included in the study; remaining 5 cases were lost during follow up. Patients of both sexes aged between 18-70 years with prolapsed lumbar intervertebral disc admitted in the Department of Orthopedics.

Methodology

Moreover, following variables were studied for clinical evaluation Level of involvement, side of involvement, X-ray of lumbar spine, MRI of lumbar spine, Relief of radiculopathy, Gait, straight leg raising (SLR), muscle power, sensory deficit, Complications: Root injury, dural tear, discitis, Functional outcome variables: Pain status, relief of presenting symptoms, mobility of spine, return to work, level of activity. Data were collected, compiled and tabulated according to key variables. The analysis of different variables was done according to standard statistical analysis by using SPSS. A total of 50 patients with prolapsed lumbar intervertebral disc were operated and followed up routinely.

Inclusion criteria

- Signs of root compression-Sensory, Motor, Reflex.
- Deteriorating signs and symptoms of patients of PLID where leg pain is dominant than back pain
- Restricted straight leg raising test with Positive MRI findings refractory to 2-3 weeks of conservative treatment.
- PLID associated with other spinal pathology e.g., spinal tumor, infection, inflammation etc.
- Repeat lumbar disc surgery due to recurrence of symptoms
- PLID due to direct trauma with fracture-dislocation of vertebra.
- PLID with Cauda-equina Syndrome

Exclusion criteria

Results

Table 1: Age and Gender distribution

Age in years	N%	Mean±SD
<20 years	4 (8)	38.9 ± 14.0
21-30 years	14 (28)	
31-40 years	12 (24)	
>40 years	20 (40)	
Gender		
Male	35 (70)	38.5 ± 13.5
Female	15 (30)	39.8 ± 16.2

The mean age of the patients were 38.9 ± 14.0 years ranging from 20-67 years. The mean age of the male patients was 38.5 ± 13.5 years and a female patient was 39.8 ± 16.2 years. Though the mean age of the female patients a little bit higher than the male, but the mean difference was not

statistically significant ($p>0.05$). Data indicated that maximum number of the patients was in age group >40 years (40%) followed by 28% in the age group 21-30 years, 24% in the age group 31-40 years and 8% were in the age group <20 years.

Table 2: Sensory deficit and level of disc herniation among patients

Sensory deficit	N%
Sensory deficit at the level of L5	24 (48)
Sensory deficit at the level of S1	10 (20)
Intact sensory function	16 (32)
Level of disc herniation	
Disc prolapse	
L4-L5	26 (52)
L5-S1	17 (34)
L4-L5 and L5-S1	3 (6)
Disc herniation	
L4-L5 and L3-L4.	4 (8)

Clinical examination of the patients indicated that 24 (48%) had sensory deficit at the level of L5 and 10 (20%) of patients had sensory deficit at level S1. However, 16 (32%) patients had intact sensory

function. Out of 50 patients, 26 (52%) had disc prolapse at level L4-L5, 17 (34%) had at L5-S1, 3 (6%) had L4-L5 and L5-S1 level and 4 (8%) patients had disc herniation at L4-L5 and L3-L4.

Table 3: Repeated measure of analysis of variance of pain score in different visits

Stage	Pain score	Mean \pm SD	P value
Pre-operative	Absent (0)	3.00 \pm 0.0	
1st visit	Occasional (1)	1.79 \pm 0.62	0.001
2nd visit	Mild (2)	1.07 \pm 0.84	0.001
3rd visit	Moderate (3)	0.24 \pm 0.64	0.001

The mean pain score was 3.0 \pm 0.0 preoperatively, 1.79 \pm 0.62 during 1st visit, 1.07 \pm 0.84 during 2nd visit and 0.24 \pm 0.64 during 3rd visit. Repeated measure one way analysis of variance showing that

pain significantly decreased from preoperative to 1st visit ($p < 0.001$) and also decreased significantly from 1st visit to 2nd visit and subsequent visit ($p < 0.005$) shown as marginal estimated mean score.

Table 4: SLR and Distribution of the patients by subjective assessment of functional outcome

SLR	Mean \pm SD
Preoperatively	42.6 \pm 6.3
1 st visit	50.8 \pm 4.5
2 nd visit	60.55 \pm 5.5
3 rd visit	89.3 \pm 2.6
Subjective assessment of functional outcome	
Excellent	37 (74)
Good	7 (14)
Fair	4 (8)
Poor	2 (4)

Preoperatively, the SLR was 42.6 \pm 6.3 degree. However, following operation the SLR significantly improved from baseline 89.3 \pm 2.6 at 3rd visit. Subjective assessment of patients indicated that majority (74%) had excellent function outcome followed by 14% had good functional outcome and (8%) had fair outcome. However, (4%) of patients had poor functional outcome.

Discussion

A disc herniation is the term given to any uneven out-pouching or bulging of the posterior region (back region) of the intervertebral disc as seen on MRI. The bigger the lumbar/sacral disc herniation, the more likely it is to cause back and/or leg pain--the later of which is called sciatica. [13]

The commonest cause of radicular pain is lumbar disc prolapse. Prior to embarking on surgery for a lumbar disc prolapse it

should be recalled that the long-term natural history for such a patient is likely to be good and that many radiologically proven discs may become or remain asymptomatic. [14-16] Moreover, the outcome of surgical therapy for lumbar disc prolapse was compared to conservative therapy, at six months there was no statistical difference between the two groups. [17]

Some studies reported narrow disc space in 49% of patients at L5/S1 level with positive operative findings of prolapsed disc at that level. [18] In 35% of cases there was narrow disc space at L4/5 level in X-ray but prolapse was found in only 14% of cases. Nabi et al (1982) observed narrow disc space 38.57% in their study. [19] In the present series more than one fourth (27.6%) of the cases showed diminished disc space. In various studies it was reported that 65.2% patients had prolapse at L4/5 level, 22.4% at L5/S1

level and 12.4% at L3/4 level. [20] Khan et al. (1991) observed in their study that 57.25% patients had prolapse at L4/5 level, 34.78% at L4/5 level and 7.97% at L3/4 level. [21]

Lumbar disc prolapse is common at L4/5 level in this current series and in other published series. The L5 vertebra articulates with the S1 segment of the fixed sacrum. Therefore, most of the movement of the lumbar spine occurs at L4/5 disc level, which may be the cause of the high incidence of prolapse disc being found at L4/5 level. O'Connell et al. reported that 3.0% patients developed wound infection, haematoma formation 2.0%, pulmonary embolism 1% and operative pain in the back and groin 1.6%. [22]

Brown and Pont reported in their series of 570 cases-2 post-operative deaths, 6 postoperative superficial infection and 5 other complications e.g., one each of pulmonary infection, thrombophlebitis and CSF leak and, two cases of wound disruption. [20] In the present series there was per-operative dural tear in 2 cases and post-operative disc space infection in one case. The infection might be due to sharing of operations in a common operation theatre due to the unavailability of a separate spinal surgery theatre. Subjective assessment of patients indicated that majority (74%) had excellent function outcome followed by 14% had good functional outcome and (8%) had fair outcome. However, (4%) of patients had poor functional outcome according to modified Macnab criteria. [23]

Conclusion

From this study it reveals that management of prolapsed lumbar intervertebral disc by laminotomy and discectomy is an effective method of treatment and it reduces the complications and increases the chances of successful outcome. This study was done on 50 patients, follow up period was 6-12 months. So, further study with larger

sample size, longer follow up period required to delineate the outcome.

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