

## A Prospective Observational Study to Evaluate the Surgical Outcome in the Treatment of Lumbar Disc Prolapse (LDP)

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### Abstract

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

**Methods:** The present study was conducted in the Department of Neurosurgery Fort U Mediemergency Hospital, Patna, Bihar, India for the period of 1 year and 40 patients were selected.

**Results:** Mean follow-up time of our study was  $36.50 \pm 15.60$  months (minimum 12 months). Mean preoperative VAS for radicular pain and low back pain were  $9.18 \pm 1.89$  (standard deviation [SD]) and  $6.90 \pm 4.31$  SD, respectively. Mean preoperative VAS for back pain was higher in women than men. Out of 40 patients, 20(50%) had disc prolapse at level L4-L5, 10(25%) had at L5-S1, 3(7.5%) had L1-L2, 2(5%) patients had disc herniation at L2-L3 and 5 (12.5%) had at L3-L4.

**Conclusion:** Regarding the subjective assessment of current study patients, it was observed that most (75%) of the patients had excellent functional outcome, 15% good, 7% fair and 3% had poor functional out-come according to modified Macnab criteria.

**Keywords:** lumbar disk herniation, surgery, outcome, predictors

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### Introduction

Since it was first described in 1933 [1], lumbar discectomy has become a widely accepted intervention for radiculopathy caused by acute herniation of the lumbar intervertebral disc. [1-5] Although over time numerous technical iterations have been introduced, including microscope-assisted discectomy, use of minimally

invasive tubular retractors, and endoscopic techniques, the underlying principle of the procedure remains unchanged from that proposed by Mixter and Barr [1] removal of compressive and irritant disc material from the vicinity of the affected nerve root.

Sciatica resulting from a lumbar intervertebral disc herniation is the most common cause of radicular leg pain in adult working populations. [6] Such patients have a favorable natural history associated with resorption of extruded disc material, but surgical treatment is frequently considered and performed in those with persistent or severe symptoms. [7] 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. [8]

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. Prolapsed lumbar intervertebral disc (PLID) is an important cause of low back pain and it is one of the frequent cause of disability. Its frequency and annual tool of suffering and disability has been a constant stimulus for investigation in developed countries. When conservative management fails, surgery is the only way to treat these patients and different surgical procedures are there. Micro discectomy, Endoscopic discectomy, Laser discectomy is the operation of developed countries. The prolapsed intervertebral disc is usually seen in fit adults between the ages of 20 and 45, but they can also occur below the age of 20 years and elderly. Males suffer more from intervertebral disc prolapse than females.

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. [9] The precipitating factor, therefore, is mainly injury immediately or shortly before the onset of a symptom. Since the mechanism demands the combination of stress and mobility, the disc herniations commonly occur at a site where a relatively rigid segment of the spine join a flexible segment, which are subjected to greater stress and mobility.

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. [10] The aim of the present study is to evaluate the surgical outcome in the treatment of Lumbar Disc Prolapse (LDP).

### Materials and Methods

The present study was conducted in the Department of Neurosurgery Fort U Mediemergency Hospital, Patna, Bihar, India for 1 year and 40 patients were selected.

### 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.

### Exclusion criteria

- 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

A total of 40 patients with prolapsed lumbar intervertebral disc were operated and followed up routinely. The main objective of the study was to evaluate the prognosis of management of prolapsed lumbar intervertebral disc by laminotomy and discectomy. 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.

### Results

Mean follow-up time of our study was  $36.50 \pm 15.60$  months (minimum 12 months). Mean preoperative VAS for radicular pain and low back pain were  $9.18 \pm 1.89$  (standard deviation [SD]) and  $6.90 \pm 4.31$  SD, respectively. Mean preoperative VAS for back pain was higher in women than men. Other patient data are shown in Table 1.

**Table 1: Patient data**

<b>Sociodemographic characteristics</b>	
Mean age at the time of surgery, $y \pm SD$ (range)	$44.18 \pm 10.50$ (26–70)
<b>Sex</b>	
Males	25
Females	15
<b>Sex distribution for different surgical methods</b>	
Laminectomy	20
Osteotomy	10
MAPN	10
<b>Preoperative symptoms and duration</b>	
Duration from onset of symptoms to time of surgery (mo)	
<1	35%
1–6	30%
6–12	20%
>12	15%
<b>Level of disk herniation</b>	
L1-L2	3
L2-L3	2
L3-L4	5
L4-L5	20
L5-S1	10

The mean age of the patients were  $44.18 \pm 10.50$  years ranging from 26-70 years. The mean age of the male patients was  $38.5 \pm 13.5$  years and a female patient was  $39.8 \pm 16.2$  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 (41.4%) followed by 27.6% in the age group 21-30 years, 24.1% in the age group 31-40 years and 6.9% were in the age group  $<20$  years. Clinical examination of the patients indicated that 14(48.3%) had sensory deficit at the level of L5 and

6(20.7%) of patients had sensory deficit at level S1. However, 9(31.0%) patients had intact sensory function. Out of 40 patients, 20(50%) had disc prolapse at level L4-L5, 10(25%) had at L5-S1, 3(7.5%) had L1-L2, 2(5%) patient had disc herniation at L2-L3 and 5 (12.5%) had at L3-L4.

All the patients were examined for straight leg raising (SLR) on supine position. 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 (72.4%) had excellent function outcome followed by 17.2% had good functional outcome and (6.9%) had fair outcome. However, (3.4%) of patients had poor functional outcome. Subjective assessment of patients indicated that majority (75%) had excellent function outcome followed by 15% had good functional outcome and (7%) had fair outcome. However, (3%) of patients had poor functional outcome.

## Discussion

Lumbar discectomy for the treatment of radiculopathy caused by disc herniation is known to be an effective procedure. Although a number of studies have outlined the advantages of surgery over nonoperative care [2,4,5], it remains that most patients will improve with the latter.

Reasonable practice recommendations endorse an algorithmic approach to management that begins with observation, physical therapy, and possibly epidural injections as the initial steps for treatment, reserving surgery for those who do not respond to these modalities. [4]

Low back pain commonly afflicts the adult population all over the world. It is of prime importance that the cause of low back pain is diagnosed in its early stage since not all cases are innocent. [11] The syndrome where the diagnosis is not in doubt is when root pain extends below the knee (radiculopathy). [12] 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. [8,13,14] 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. [15]

By seven years follow up the surgically treated group had fared better, only in that they had had less episodes of low back pain and had lost less time from work. In a similar study, it was found that at one year the surgical group had fared much better with 92% good results as compared with 60% in the non-surgical group. [16]

Although there is no such comparative study in our country, it can be safely assumed that with the improvement of imaging and surgical techniques, the diagnosis and treatment of lumbar disc prolapses around the world has become more uniform. The key to good results in disc surgery is appropriate patient selection. 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. [17]

Various retrospective studies and some prospective studies showed good results range from 46% to 97%. Several points considered in the analysis of the results of lumbar disc surgery. [18] Patient selection appear to be extremely important. Regarding the subjective assessment of current study patients it was observed that most (75%) of the patients had excellent functional outcome, 15% good, 7% fair and 3% had poor functional out-come according to modified Macnab criteria. [19]

## 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 40 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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