Section: Orthopaedics

Original Research Article

EFFICACY OF OPERATIVE TREATMENT FOR LUMBAR INTERVERTEBRAL DISC PROLAPSED

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ABSTRACT

Background: Low back pain stands as humanity's most prevalent musculoskeletal ailment, with lumbar disc prolapse serving as a primary and significant driver of this widespread discomfort. Because humans walk upright, the lumbar spine endures intense structural stress and strain, frequently culminating in the mechanical breakdown of the intervertebral disc. This cumulative physical burden is heavily concentrated at the lower spine, making the L4–L5 motion segment uniquely vulnerable to architectural failure and subsequent herniation. Objectives: The need of this study to evaluate the results of laminectomy alone or laminectomy with foramenectomy or laminectomy with discectomy depending on pre-operative evaluation, with regard to patients post-operative subjective evaluation with ODI scoring system and its complications. **Materials and Methods:** A prospective study was carried out on 60 cases of intervertebral disc prolapse came to the Department of Orthopaedics, Navodaya Medical College, Raichur after through clinical and radiological evaluation. The data were collected using detailed clinical proforma, clinical examination, required investigations, pre-operative, post-operative & Follow up 1,3,6 months) assessment, pre and post-operative assessment focused on pain, SLRT, Neurological assessment and ODI score. **Results:** The observation of the study reveals that 80 percent (n=48) subjects showed excellent improvement, another 20 percent (n=12) subjects showed good improvement and no subjects showed poor improvement after the proper surgical treatment by comparing through ODI scoring. **Conclusion:** Accurate preoperative assessment and precise localization of the disc pathology ensure that surgeons select the most appropriate operative procedure for the patient. Combining a meticulous clinical workup with the correct choice of surgical intervention successfully alleviates pain and restores patient mobility. Ultimately, matching the right surgery to the exactly identified spinal level optimizes overall outcomes while minimizing postoperative complications and long-term disability.

INTRODUCTION

Low back pain is a major global issue affecting up to 80% of individuals, with a high incidence of lumbar disc herniation causing significant physical limitations. While surgery is commonly used to treat degenerative conditions, its effectiveness is a subject of ongoing debate in medical research. Studies over the past 15 years have identified key factors for successful surgical outcomes using both retrospective,[1] and prospective methods.[2] Surgical intervention for symptomatic lumbar disc herniation has been reported to have a 70–95% success rate based on patient-reported outcomes.[3]

Clinical evidence indicates that operative intervention provides superior short-term recovery and symptom relief compared to non-surgical management. Comparative data demonstrates that while surgery yields significantly better clinical outcomes at a one-year follow-up. Specifically, individuals who choose surgical treatment report a much faster reduction in pain, quicker functional recovery, and higher overall satisfaction rates than those undergoing conservative therapies. However, despite major advancements in modern spinal surgical techniques, a distinct cohort of patients still experiences suboptimal outcomes and lingering disability.[4]

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A wide variety of clinical outcome metrics are utilized to evaluate patient health, spanning from numerical grading systems to comprehensive assessments of physical and psychosocial factors, such as the Low Back Outcome Score.[5] To simplify the classification of functional limitations into distinct categories of good, fair, and poor, the Oswestry Disability Index,[6] is frequently implemented. Additionally, the severity of a patient's physical suffering is quantified during clinical care using the Visual Analogue Scale (VAS) to measure pain intensity. This specific evaluation tool was originally integrated into medical literature by Clarke and Spear (1964) to gauge patient health status.[7]

Due to its unpredictable nature, diverse origins, and challenging management, low back pain remains one of the most complex and prevalent dilemmas facing orthopaedic specialists today. Structural impairments affecting the back and spine represent the leading driver of activity limitations among individuals under the age of 45, as reported by the National Center for Health Statistics.[8] While lumbar disc prolapse has long been established as a primary source of this discomfort, the underlying vulnerability stems from evolutionary adaptations; specifically, the development of the lumbar lordosis allows the lower spine to absorb and distribute the massive biomechanical loads transferred from the upper body through the pelvis to the lower limbs while simultaneously facilitating spinal flexion, extension, lateral bending, rotation, and postural control.[9]

The peak incidence of intervertebral disc disease and herniation occurs predominantly among otherwise healthy individuals in their thirties and forties, representing a primary source of functional disability and comprising the largest share of low back pain cases managed by orthopaedic surgeons in daily practice. Following the landmark 1934 publication by Mixter and Barr demonstrating that laminectomy combined with decompression and disc fragment extraction significantly relieves sciatic distress, open discectomy has been firmly established as the definitive gold standard of operative care for patients failing non-surgical therapy. Driven by evolving insights into spinal pathology alongside sophisticated diagnostic imaging, refined microsurgical approaches, and superior instrumentation, surgical excision of herniated tissue has transformed into an exceptionally safe intervention yielding consistently high satisfaction rates; consequently, this investigation evaluates the clinical efficacy of this surgical approach at Navodaya Medical College and Research Centre, Raichur, benchmarking local patient outcomes against existing global literature.

MATERIALS AND METHODS

The present prospective study includes 60 cases of lumbar disc prolapse treated during the period of December 2017 to September 2019 in NMC Raichur. Patient assessment was done in the OPD and wards and findings noted in the clinical proforma made for the study. The patients underwent radiological investigations (MRI) to confirm the diagnosis and to know the level of lesion.

Source of data: All cases above 18 years of age with lumbar inter vertebral disc prolapse were admitted at NMC Raichur and those who met the inclusion and the exclusion criteria (as given below) during the study. All patients were treated surgically by open discectomy.

Inclusion criteria:

1. Above 18 yrs of age.
2. Nerve tension signs — positive
3. Associated neurological deficits
4. Confirmed by MRI scanning.

Exclusion Criteria

Thoroco- lumbar injuries, Lumbar — canal stenosis, Spondylolisthesis, Fail back syndrome, Medically unlit for surgery, Peripheral neuropathy, Infective conditions and Tumors (neoplastic) lesion.

Method

All patients admitted at Navodaya Medical College Hospital and Research Center, Raichur those who meet the inclusion and exclusion criteria and ODI score more than 65% were taken up with history and clinical examination. Patients with signs and symptoms of disc prolapse, ODI >65%, MRI showing conclusive disc prolapse and who come under the inclusion criteria were selected and admitted.

1. Investigations required for surgery was done.
2. A pre anaesthetic evaluation was done.
3. Pre-operative preparations were performed and informed written consent was taken.
4. Methods such as laminectomy alone or with foremenotomy or discectectomy were chosen according to the pre-operative evaluation.
5. Follow ups 1, 3 and 6 months were made.

Technical terminology concepts used in the report

Operative procedure: Posterior mid central incision

Anaesthesia: General anaesthesia

Position: Prone position

Prophylactic antibiotics used were a third generation cephalosporin just before the operation and continued after surgery upto 5 days.

Anatomical Localization and Access: Surgeons utilize intraoperative imaging, such as fluoroscopy or image intensifiers, to ensure precise localization of the vertebral level, often using anatomical landmarks like the iliac crest to identify the lumbar spine. The initial phase involves creating a localized incision and carefully separating the paraspinal muscles from the bony structures of the spine

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(spinous processes and laminae). This subperiosteal dissection is performed in specific planes to minimize trauma to the surrounding musculature and reduce potential damage to the local arterial supply.

Decompression and Neural Protection: The primary objective of the decompression is the removal of the lamina or portions of the ligamentum flavum that may be contributing to spinal stenosis or nerve root compression. Specialized surgical instruments, such as rongeurs, are used for the precise removal of bone. Once the dural sac and nerve roots are visualized, surgeons focus on neural protection. This involves the gentle mobilization of nerve roots to access underlying disc pathology, such as herniated fragments or bulging ligaments.

Hemostasis and Completion Criteria

Maintaining a clear surgical field is vital for safety. This is achieved through controlled hemostasis using techniques such as electrocautery, suction, and specialized surgical packing. The procedure is considered successful when the nerve roots are confirmed to have free, unimpeded mobility within the spinal canal and intervertebral foramen, indicating that the source of compression has been adequately addressed.

Wound closure: After removing the disc material and making the nerve root free, the exposed dura surface was covered with gel foam Wound is closed in layers, keeping the vacuum suction drain.

After care: Postoperative IV antibiotics were given for a period of 5 days and later continued orally until suture removal. Allowed only log roll movements on bed, with active hip, knee and ankle movements. Isometric abdominal and lower extremity exercises started immediately after surgey depending upon the patients' tolerance and reaction of the wound. The drain was removed and patient allowed sitting with the lumbar corset on 3rd post-operative day. Post-operative analgesia was continued on as per required basis and stopped after 4' postoperative day. Patients' spine flexion exercises started and allowed to walk with lumbar corset on the 5th post-operative day. Sutures were removed on 12' post-operative day and spine extension exercises were allowed. During this period they were told to avoid bending, sitting for prolonged periods, straining, lifting heavy weight and usage of western commode for defecation till 12 weeks.

RESULTS

40% of my study patients are between the age group in between 20 to 30 years old. 23.3% in 31-40 years age group, 26.7% in 41-50 years age group and 10% in 50 to 55 years age group respectively. Study reveals majority of the patients are fall into 20-30 years age group of about 40%. 60% (n=36) of my subjects were males and 40% (n=24) were females. out of total number of patients 50% of them were farmers, 16.7% were drivers, 10% were housewifes, 6.7% were labour, 3.3% were clerk, 3.3% were tailor, 6.7% were atheles and 3.3% were students. Level of compression occurs 56.7% at L4-L5 and 43.3% at L5-S1 level and most common site of compression is at L4- L5 compare to other levels.

Table 1: Distribution of study patients based on level of compression n=30

Level of compression	No. of cases	Percentage
L4-L5	34	56.7
L5-S1	26	43.3
Total	60	100

Duration of illness before they got operated i.e more 6months in 53.33% of my study patients, upto 3-6 months in 26.67% patients, upto 1-3 months in 20% patients. The study reveals that more than 50% of the patients are suffered from symptoms for more than 6 months before surgery.

Table 2: Distribution of the study patients based on the duration of illness before surgery

Duration of illness (months)	No. of cases	Percentage
<1	0	0
1-3	12	20
3-6	16	26.67
>6	32	53.33
total	60	100

73.33% of my patients are presented with bilateral radicular pain compared to unilateral radicular pain 26.67%. 57% of my patients are right sided radiculopathy more compared with left side 43% which includes unilateral and bilateral radiculopathy [complains of right side radiculopathy more then the left side] patients.

Table 3: Distribution of the study patients based on the duration of conservative management before surgery

Conservative management (Before Operation)	No. of cases	Percentage
<1month	0	0
1-3 months	16	26.27
3-6 months	20	33.33

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>6months	24	40
Total	60	100

Study reveals the patients undergoing surgery are all straight leg raising test and lasegues tests are positive. Patients have 43.33% of paracentraldiscal defect compare to central disc defect 23.33.

Table 4: Distribution of study patients based on side of intervertebral disc bulge

Quadrants of IVDP	No. of cases	Percentage
Central	14	23.33
Parcentral	26	43.33
Foraminal	20	33.33
Total	60	100

Patient's undergone laminectomy with discectomy 23.33% and laminectomy with foramenotomy 33.33% compared to only laminectomy 43.33%. Study reveals laminectomy alone gives desire results, with discectomy and foramenotomy at appropriate patients when needed.

Table 5: Distribution of study patients based on surgery undergone

Operations	No. of cases	Percentage
Laminectomy with discectomy	26	43.33
Laminectomy with foramenotomy	20	33.33
laminectomy	14	23.33
Total	60	100

DISCUSSION

Males are more prone for stress and strainful activities like heavy weight lifting, prolong sitting in their daily activities, and may be the strong relation to more prone to suffers from intervertebral disc prolapsed.

Study	Gender	Percentage
Present study	Male	66%
Sharma and Shankar [10]	Male	76%

Since the young age group 20-40 years who are exposed to more work and stressful activities, may be the strong relation to more prone to suffers from intervertebral disc prolapsed, The maximum amount of movement occurs at the L4-L5 level hence it is subjected to more stress and repeated trauma which leads to degeneration and has an end result of IVDP.

Study	Level of disc space	Percentage
Present study	L4	56.7%
Chan WB Peng and William YEO	L4	66.7%

Most of subjects in the Present study showed right sided postero-lateral disc prolapse therefore involving the right lower limb

Study	Side of sciatic pain	Percentage
Present study	Right	57%
Righesso[11] Orlando MD (2007)	Left	63%

Most of subjects in the Present study showed right sided postero-lateral disc prolapse therefore involving the right lower limb.

Study	Method	Percentage: Excellent
Present study	Open discectomy	80%
Richard Davis[12]	Open discectomy	89%
Pappes et al.[13]	Open discectomy	77.6%

CONCLUSION

With modern, sophisticated instruments for managing soft tissue, dura, and nerve roots under direct vision, we can now significantly minimize complications and improve outcomes. The findings indicate that precise preoperative patient evaluation—focusing on the exact level and extent of disc pathology—combined with selecting the right surgical approach, effectively relieves symptoms and restores function with minimal disability. Open procedures remain highly effective for treating lumbar disc prolapse because they are straightforward to perform, provide a comprehensive view of the pathology, and are cost-effective with low complication rates. Consequently, open surgery continues to be the "gold standard" for managing lumbar intervertebral disc prolapse in the Indian context.

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