

Assessing Functional Outcome of Surgical Decompression in the Management of Lumbar Prolapsed Intervertebral Disc

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Conflict of interest: Nil

Abstract

Aim: To examine the functional result of surgical decompression in the management of lumbar prolapsed intervertebral disc using a prospective approach.

Materials and Methods: This study was conducted in the department of Orthopaedics, NMCH, Patna, Bihar, India, 30 patients to evaluate functional outcome of lumbar prolapsed intervertebral disc managed with surgical decompression. The study was conducted in tertiary care centre. We included patients above age 18 years, with less than 3 levels of lumbar inter-vertebral disc prolapse confirmed by clinical and appropriate radiological investigations like X-ray and MRI and these patients failed to respond to non-operative treatment for at least 6 weeks.

Results: Average duration of symptoms before surgery was 8.62 ± 3.86 months. Most of the patients were labourer by occupation (46.7%). Low back pain and radiculopathy was the most common symptoms with which the patients presented (100%). Other complaints were weakness over lower limb (86.7%) and paresthesia (40%) (Graph 3). On examination, most common sign was positive Straight Leg Raising Test (SLRT) (100%) followed by Paraspinal Muscle Spasm with Obliterated Lumbar Lordosis (90%), restricted spinal movements (76.7%), motor deficits (53.3%) and sensory deficits (36.7%). Left side was mostly involved (43.3%) followed by right side radiculopathy (36.7%) and bilateral involvement (20%). L4-5 was the most common disc involved (80%) Majority of the patients (73.3%) presented with protrusion followed by extrusion (16.7%) and sequestration (10%)

Conclusion: Most of the patients benefitted from lumbar discectomy surgery in terms of rapid reduction of pain. Our study established that functional outcome of lumbar prolapsed intervertebral disc managed with surgical decompression has a satisfactory functional outcome and improvement in the patients' quality of life with minimum complications.

Keywords: Posterior Intervertebral Disc prolapse, Radiculopathy, Back Pain, Laminectomy.

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Introduction

Lumbar disc herniation, commonly referred to as prolapsed intervertebral disc (PID), is a prevalent spinal condition characterized by the displacement of intervertebral disc material beyond the normal confines of the disc space. This condition often leads to compression of adjacent nerve roots or the spinal cord, resulting in symptoms such as radicular pain, sensory deficits, and motor weakness. Surgical decompression, aimed at alleviating neural compression and restoring spinal stability, remains a cornerstone in the management of symptomatic lumbar disc herniation. [1,2] Lumbar disc herniation is a frequent cause of lower back pain and radiculopathy, affecting a substantial portion of the adult population worldwide. The condition typically manifests between the third and fourth decades of

life and is more prevalent in individuals engaged in heavy physical labor or those with a history of repetitive spinal trauma. The pathophysiology involves the gradual degeneration of the intervertebral disc, leading to annular tears and subsequent herniation of nucleus pulposus material into the spinal canal or neural foramina. Historically, surgical management of lumbar disc herniation began with open discectomy procedures, which involved extensive muscle dissection and significant tissue trauma. [3] Over time, advancements in surgical techniques and technology have led to the development of minimally invasive approaches aimed at reducing surgical morbidity, preserving spinal stability, and expediting recovery. [4] Microdiscectomy involves the microscopic removal

of herniated disc material through a small incision, typically using tubular retractors to minimize tissue disruption. This approach allows for direct visualization of neural structures and precise removal of compressive elements, thereby alleviating radicular symptoms while preserving spinal anatomy. Endoscopic discectomy represents a minimally invasive alternative to traditional microdiscectomy, utilizing endoscopic visualization and specialized instruments to access and remove herniated disc fragments. This technique offers advantages such as reduced operative trauma, shorter hospital stays, and quicker return to functional activities. The clinical importance of surgical decompression in lumbar disc herniation lies in its ability to achieve prompt relief of radicular symptoms, prevent neurological deterioration, and restore functional mobility. Timely intervention is crucial in mitigating the risk of long-term disability and improving quality of life in affected individuals. [5,6]

Materials and Methods

This study was conducted in the department of Orthopaedics, NMCH, Patna, Bihar, India for 18 months, 30 patients to evaluate functional outcome of lumbar prolapsed intervertebral disc managed with surgical decompression. The study was conducted in tertiary care centre.

We included patients above age 18 years, with less than 3 levels of lumbar inter-vertebral disc prolapse confirmed by clinical and appropriate radiological investigations like X-ray and MRI and these patients failed to respond to non-operative treatment for at least 6 weeks.

We excluded patients with multiple level disc prolapses, patients with vertebral fractures due to trauma, failed back syndrome, spinal metastases, and associated with other pathological conditions of spine. 30 patients were included in the study and were followed up for upto 1 year post-operatively.

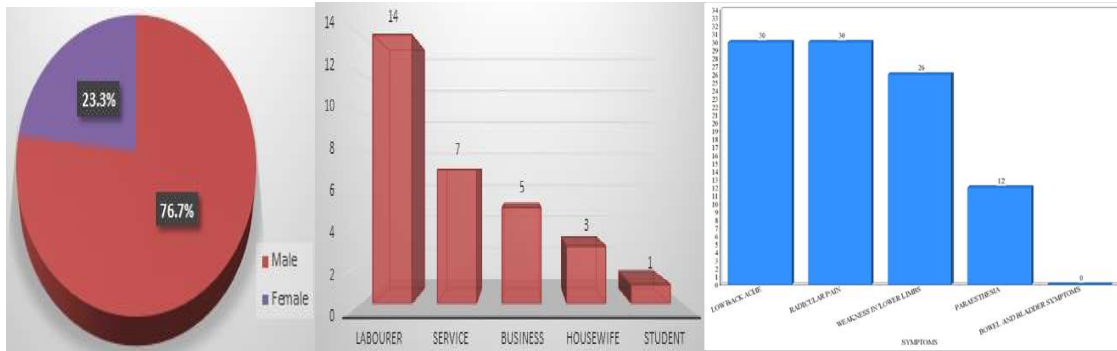
Methodology

All patients underwent standard laminectomy with discectomy. Surgical procedure included a mid-line vertical incision over the affected interspace of 6-8 cm. after deep dissection, the laminae are carefully nibbled and the ligamentum flavum is removed using a Kerrison rongeur. After the cord has been exposed adequately the dura is retracted medially and nerve root is inspected. The nerve root is

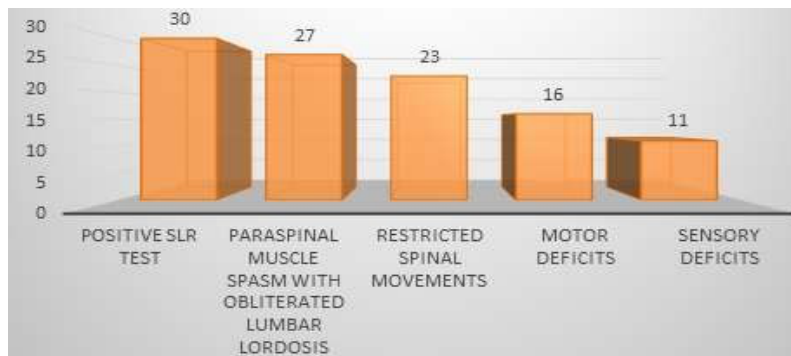
retracted medially using a blunt dissector in order to visualize the underlying disc. It may be seen as an extruded fragment or a bulging posterior longitudinal ligament. Cottonoid patties are used to tamponade the epidural veins once the root is retracted. If an extruded fragment is not seen the posterior longitudinal ligament is carefully examined for any defect or hole in the ligament, laterally. Gently the disc fragments are removed using disc forceps until the bulge has been decompressed. Gel foam is placed over the cord. The wound is closed in layers over a suction drain. Patient were evaluated clinically Postoperatively, X-rays (standard antero-posterior and lateral views) were taken. The patients were discharged on post-op day eleven after suture removal. They were later reviewed at 3, 6, 12 weeks and then at six months and 1 year. At discharge, six months and 1 year the functional outcome was assessed as per the Back Pain function scale (BPFS).

Results

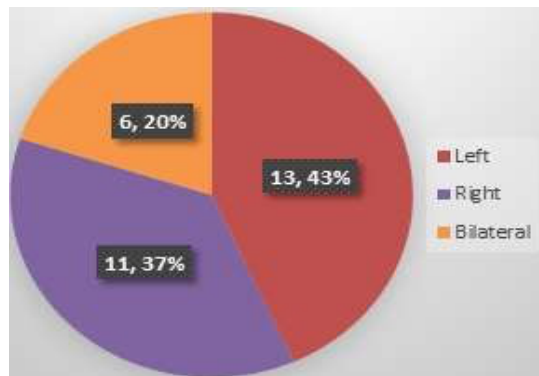
Of 30 patients, 23 were males, 7 were females with mean age of 43.53 ± 12.78 years (Graph 1). Average duration of symptoms before surgery was 8.62 ± 3.86 months. Most of the patients were labourer by occupation (46.7%) (Graph 2). Low back pain and radiculopathy was the most common symptoms with which the patients presented (100%). Other complaints were weakness over lower limb (86.7%) and paresthesia (40%) (Graph 3). On examination, most common sign was positive Straight Leg Raising Test (SLRT) (100%) followed by Paraspinal Muscle Spasm with Obliterated Lumbar Lordosis (90%), restricted spinal movements (76.7%), motor deficits (53.3%) and sensory deficits (36.7%) (Graph 4). Left side was mostly involved (43.3%) followed by right side radiculopathy (36.7%) and bilateral involvement (20%). (Graph 5). L4-5 was the most common disc involved (80%) (Table 1). Majority of the patients (73.3%) presented with protrusion followed by extrusion (16.7%) and sequestration (10%) (Table 2). According to Back Pain Functional Scale, good results were found in 20 (66.7%) cases, fair result in 6 (20%) cases and poor results in 4 (13.3%) cases at discharge. During 6 months follow-up period, good results were found in 25 (83.3%) cases, fair result in 5 (16.7%) cases and none of the patients had poor results (Graph 6). During 1-year follow-up period, all patients showed good results. 3 (10%) patients had complications - 2 (6.7%) patients had superficial surgical site infection and 1 (3.3%) patient had dural tear.



Graph 1: Distribution of patients according to Sex; Graph 2: Distribution of patients according to Occupation;



Graph 3: Distribution of patients according to Symptoms; Graph 4: Distribution of patients according to signs;



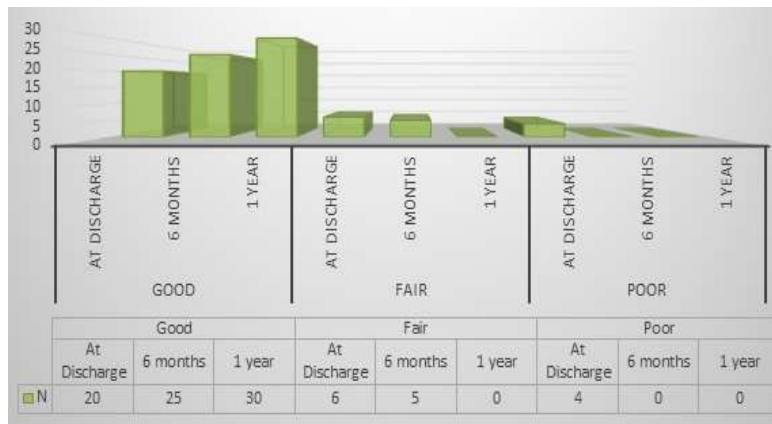
Graph 5: Distribution of patients according to side of lower limb involvement

Table 1: Distribution of patients according to Level of disc prolapse

Level of disc prolapse	N	%
L2-3	1	3.3%
L3-4	1	3.3%
L4-5	24	80%
L5-S1	4	13.3%
Total	30	100%

Table 2: Distribution of patients according to Type of disc prolapse

Type of disc prolapse	N	%
Protrusion	22	73.3%
Extrusion	5	16.7%
Sequestration	3	10%
Total	30	100%



Graph 6: Functional Outcome of patients during Follow-up Period

Discussion

We prospectively followed 30 patients for evaluating functional outcome of lumbar prolapsed intervertebral disc managed with surgical decompression. Majority of patients were male belonging to heavy manual labour. These findings were similar to studies of Mittal A et al. [5] (80% male, 20% female), Singh H et al. [6] (65% male, 35% female), Swamy A et al. [7] (72% males, 28% females) and Chakrabarty PS et al. [8] (68% males, 32% females). Singh H et al. [6] in their prospective study found majority of patients being manual labours (62.5%), Sangwan SS et al. [9] in their study observed that 90% of patients belonged to labour group, Mishra SK et al. [10] in their study on 67 patients found 60% (40 patients) were involved in heavy work. The results of our study and other studies suggest that lumbar PIVD is more common among males who are manual labourers performing heavy work. It was observed in the present study that left side was mostly involved (43.3%) followed by right side radiculopathy (36.7%) and bilateral involvement (20%). This is concordant to the study of Singh H et al. [6] in which left side was most commonly involved (42.5%). The commonest level of disc prolapse in our study was found to be L4-5 (80%). Swamy A et al. [7] conducted a study on 50 patients of which 4 (8%) patients had prolapsed intervertebral disc at L2-L3 level and 10 (20%) patients had disc prolapsed at L3-L4 level, 22 (44%) patients had disc prolapsed at L4-L5 level and 14 (28%) patients had disc prolapsed at L5-S1 level. Singh H et al. [6] in their prospective study observed L4-5 level was most commonly involved level (72.5%). Mittal A et al. [5] randomised prospective analysis observed commonest level of disc prolapse was found to be L-4-L5 (80.5%). Above findings from our and other similar studies suggest L4-5 is the most common level of involvement in lumbar PIVD. It was observed in the present study that majority of the patients (73.3%) presented with protrusion. This is similar to the study of Singh H et al. [6] Who found protrusion in 82.5% patients on MRI. In our study, 3 (10%) patients had

complications - 2 (6.7%) patients had superficial surgical site infection and 1 (3.3%) patient had dural tear. Singh H et al. [6] found complication rate was only 10% out of which 2 patients (5%) had superficial surgical site infection and 2 patients (5%) had dural tear. Sangwan SS et al. [6] study on Lumbar disc excision reported dural tears in 3 cases, retention urine in 3 cases and transient back pain in 5 patients. They had none case of superficial skin infection, neurological disorder and nerve root injury. Wankhade UG et al. [11] study reported complications in 4 (08%) cases, among them 1 had dural tear while 3 (6%) cases had superficial wound infection. The end point of assessment of any therapeutic modality is functional outcome, because that is what matters to the patients. However, the fact is that the good outcome varies from 49- 90% in different studies. This only implies that there should be many factors which influence the outcome. [12] According to Manohara B et al, functional outcome of laminectomy with discectomy results were as good in 90% patients, fair in 6.2% patients and poor in 3.8% cases. [13] Similarly, Nahar et al., showed good to excellent results in 80.42% cases, fair results in 17.2% and poor results in 2.17% cases. [14] While Garg et al., observed good results among 86% cases while fair results in 12% and poor results in 2% cases [15]. In our study According to Back Pain Functional Scale, good results were found in 20 (66.7%) cases, fair result in 6 (20%) cases and poor results in 4 (13.3%) cases at discharge. During 6 months follow-up period, good results were found in 25 (83.3%) cases, fair result in 5 (16.7%) cases and none of the patients had poor results. During 1 year follow-up period, all patients showed good results. This variation in studies may be due to different selection criteria of patients.

Conclusion

Most of the patients benefitted from lumbar discectomy surgery in terms of rapid reduction of pain. Our study established that functional outcome of lumbar prolapsed intervertebral disc managed with surgical decompression has a satisfactory

functional outcome and improvement in the patients' quality of life with minimum complications.

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