Prolonged Conservative Management vs. Early Surgery in Symptomatic Lumbar Disc Herniation: A Retrospective Descriptive Study from a Tertiary Spine Center in Nepal

Ram Krishna Dahal[1], MS; Binod Bijukachhe[1], MS; Aayush Shrestha[1], MS; Arjun Dumre[1], MS; Sohil Neupane[2], MBBS; Prajwal Khanal[3], MBBS; Biraj Baral[4], MBBS; Asim Pandey[5], MBBS

[1]Department of Spine and Orthopedics, Grande International Hospital, Kathmandu, Nepal

[2]Department of General Medicine, Everest Hospital, Kathmandu, Nepal

[3]Department of General Practice and Emergency Medicine, Star Hospital, Lalitpur, Nepal

[4]Department of General Practice and Emergency Medicine, Pokhara Academy of Health Sciences, Pokhara, Nepal

[5]Department of Cardiology, Manmohan Cardiothoracic Vascular and Transplant Center, Kathmandu, Nepal

ABSTRACT

Background

Lumbar disc herniation is a leading cause of low back and radicular pain, often impairing daily function and quality of life. Lumbar discectomy is a commonly performed procedure worldwide, especially in patients with severe or persistent symptoms. However, its long-term superiority over conservative treatment remains a matter of debate. This study aims to describe the clinical outcomes of patients treated conservatively and surgically at a high-volume spine center in Nepal.

Method

This retrospective observational study included 8,231 patients with symptomatic LDH who presented to the spine outpatient department of Grande International Hospital from 2018 to 2024. Patients were managed either conservatively or surgically. VAS and ODI scores were assessed at 6 weeks, 3 months, and 1 year for both groups.

Result

A total of 8,231 patients meeting the eligibility criteria were included. Of these, 196 (2.4%) required surgical decompression, while 8,035 (97.6%) were managed non-operatively. At 6 weeks, VAS scores improved from 8.2 to 4.6 in the surgical group, compared to 6.5 from 8.2 in the non-operative group. By 1 year, VAS scores further decreased to 2.3 in the surgical group and 2.2 in the non-operative group. Similarly, ODI scores at 1 year declined to 27 for both surgical patients and those managed non-operatively.

Conclusion

Surgical treatment showed faster initial improvement, but long-term outcomes were comparable.

While early surgery provides faster symptom relief, long-term outcomes between the two approaches are comparable. These findings highlight the importance of individualized treatment decisions rather than defaulting to conservative therapy for all patients for prolonged period of time.

Keywords: Conservative treatment, Discectomy, Low Back Pain

Corresponding Author :
Sohil Neupane, MBBS
Email: neupanesohil@gmail.com
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Introduction

Lumbar disc herniation (LDH) is a common cause of back and radicular leg pain, affecting the quality of life and daily functioning in a significant portion of the population. The most commonly performed surgical intervention for symptomatic LDH is lumbar discectomy, particularly for patients who do not respond to conservative therapy.[1]

Despite its widespread use, the long-term efficacy of surgical treatment relative to non-operative care remains controversial. Although lumbar discectomy is among the most frequently performed spinal surgeries worldwide, the debate continues regarding its effectiveness compared to conservative treatment, especially over the long term.

This study aims to compare the clinical outcomes of prolonged conservative treatment versus early decompressive surgery in patients presenting with symptomatic lumbar disc herniation at a tertiary care spine center in Nepal. By analyzing patient outcomes in a high-volume referral setting, the study seeks to provide evidence that can guide clinical decision-making in resource-limited environments. The findings may help optimize treatment strategies, improve patient care, and support the development of context-appropriate management guidelines for lumbar disc herniation in Nepal and similar healthcare settings.

Material and Methods

This retrospective descriptive study was conducted in the Department of Spine Services at Grande International Hospital, Kathmandu, Nepal. The study included adult patients diagnosed with symptomatic lumbar disc herniation between January 1, 2018 to December 31, 2024. Patient records were identified through the hospital's medical record system. A total of 8,231 patients meeting the eligibility criteria were included. Patients were eligible if they had a confirmed diagnosis of symptomatic lumbar disc herniation based on clinical evaluation consistent with radiculopathy and supported by MRI findings with a minimum of 12 months of follow-up. Patients who lost to follow-up before one year or diagnosed with degenerative spinal canal stenosis were excluded.

Data collection was performed between March 1 and March 31, 2024, using a convenience sampling method that included all eligible patients from the study period. Extracted variables included demographic information, radiological and clinical characteristics, herniation morphology, containment status, duration of symptoms to assess chronicity, clinical presentations, and the affected nerve root level. Treatment modality was recorded as either conservative or surgical. Pain and disability outcomes were assessed using the Visual Analog Scale (VAS) and Oswestry Disability Index (ODI), both of which are validated tools for clinical outcome measurement in a tertiary spine center.[2,3] Outcome measures (VAS and ODI) at 6 weeks, 3 months, and 1 year were extracted from medical records documented during scheduled follow-up visits. Only patients with complete follow-up data at all these time points were included in the analysis.

All data were entered into Microsoft Excel 2020 and subsequently imported into IBM SPSS Statistics version 20 for analysis. Descriptive statistics were performed, with continuous variables reported as means with standard deviations, and categorical variables expressed as frequencies and percentages.

Results

Of the 8,231 patients, 196 (2.4%) required surgical decompression, while 8,035 (97.6%) were managed non-operatively (Table 1). Surgical intervention was primarily indicated for neurological emergencies and failed conservative treatment. All patients diagnosed with cauda equina syndrome (n = 28) underwent immediate surgical decompression. These cases were characterized by red flag symptoms including bilateral leg pain, saddle anesthesia, and bowel or bladder dysfunction, indicative of cauda equina nerve root compression. Additionally, 21 patients having back pain with severe motor deficits, i.e., acute foot drop, also underwent urgent surgery despite the absence of sensory loss or autonomic involvement. In contrast, the majority of patients presented with either back pain alone 50.88% (n = 4,188) or back pain with motor/sensory symptoms 48.52% (n = 3,994), were primarily managed with non-operative treatments. Among them, only 1.8% (n = 75) from the back pain alone group and 1.01% (n = 72) from the motor/sensory group ultimately required surgery.

Table 1: Clinical Presentations and Surgical Indications

Presentation	Total	Non-Surgical (n, %)	Surgical (n, %)
Cauda equina syndrome	28	0 (0%)	28 (100%)
Back pain with severe motor deficit	21	0 (0%)	21 (100%)
Back pain only	4,188	4,113 (98.2%)	75 (1.8%)
Back pain + motor/sensory involvement	3,994	3,922 (98.99%)	72 (1.01%)
Total	8231	8035 (97.6%)	196 (2.4%)

Age distribution showed that lumbar disc herniation predominantly affected early middle-aged adults (31–45 years, 59.8%), followed by late middle-aged adults (46–60 years, 40.2%). The mean age was 39.2 years, with a strong male predominance (73.5%, n = 6,050) compared to females (26.5%, n = 2,181).

Table 2: Level of Disc Herniation by Group

Level	Non-Surgical (n, %)	Surgical (n, %)
L4/L5	5,020 (62.5%)	137 (69.9%)
L5/S1	3,015 (37.5%)	59 (30.1%)
Total	8,035 (100%)	196 (100%)

Disc herniation at the L4/L5 level was most prevalent in both non-operative and operative groups. Among patients (n = 8,035) managed conservatively 62.5% (n= 5,020) had herniation at L4/L5, while 3,015 (37.5%) had involvement at L5/S1 (Table 2). Similarly, in the surgical group (n = 196), a higher proportion of cases also involved the L4/L5 level (137 patients, 69.9%) compared to L5/S1 (59 patients, 30.1%).

Overall, 51.1% (n = 4,207) of patients had contained herniations, and 48.9% (n = 4,024) had uncontained herniations. In the non-surgical group, contained herniations were more prevalent (n = 4,684; 58.3%) compared to uncontained (n = 3,351; 41.7%).

In contrast, the surgical group showed a reversed trend, with only 26.5% (n = 52) having contained herniations, and 73.5% (n = 144) presenting with uncontained herniations.

Table 3: Pain and Disability Outcomes (Mean ± SD) at Follow-Up Intervals

Time Point	Non-Operative Group (Mean ± SD)	Operative Group (Mean ± SD)
VAS Score		
Initial (Pre-treatment)	8.2 ± 1.4	8.2 ± 1.3
6 weeks	6.5 ± 1.5	4.6 ± 1.3
3 months	3.1 ± 1.2	3.4 ± 1.3
1 year	2.3 ± 1.1	2.2 ± 1.0
ODI Score		
Initial (Pre-treatment)	65 ± 8.0	65 ± 7.8
6 weeks	48 ± 8.2	39 ± 7.5
3 months	32 ± 6.9	35 ± 7.1
1 year	27 ± 6.2	27 ± 6.0

Pain and disability were assessed using the Visual Analog Scale and Oswestry Disability Index at 6 weeks, 3 months, and 1year post-treatment (Table 3). In the non-operative group, mean VAS scores decreased from 8.2 ± 1.4 to 6.5 at 6 weeks to 3.1 at 3 months, and further improved to 2.3 at 1 year. In contrast, in patient undergoing surgical decompression the mean VAS scores reduced to 4.6 at 6 weeks from 8.2 ± 1.3 VAS baseline, rapidly decreasing to 3.4 by 3 months and 2.2 at 1 year.

ODI scores in the surgical group showed a steady decline, decreasing from 65 at baseline to 39 at 6 weeks, 35 at 3 months, and 27 at 1 year. In comparison, the non-operative group also started at 65 ± 7.8, with scores reducing to 48 at 6 weeks, further improving to 32 at 3 months, and eventually equaling the surgical group at 27 by the end of 1 year.

Discussion

Our study shows similar outcomes between surgery and non-surgery groups in the midterm (3–6 months) and long-term (1 year) follow-up based on VAS and ODI scores. Surgery did help reduce pain faster, especially by the 3-month mark, but the difference between the two groups became small after that. The same pattern was seen in terms of quality of life and disability scores.

This large cohort study supports the idea that conservative management remains the primary treatment approach for most patients, with

surgical decompression reserved for those with neurological emergencies or failure of non-operative therapy. Our surgical intervention rate of 2.4% (196 out of 8,231), is consistent with earlier studies, which show that surgery is mostly recommended for conditions like cauda equina syndrome, severe neurological deficits such foot drop, or persistent symptoms despite conservative treatment.[4-6]

Most of the patients consisted of males (74.2%), with a mean age of 36.6 years, indicating a predominance of working-age adults. This matches earlier studies that connect lumbar disc herniation (LDH) with physical and work-related strain in working-age men.[5,7,8] The L4-L5 level was the most commonly affected and treated with surgery. This supports biomechanical research showing that this part of the spine handles the most stress and is linked to more severe symptoms.[5,9]

Regarding symptom duration, 5,456 out of 8,035 (67.9%) non-surgical patients had chronic symptoms prior to treatment, indicating that even long-standing cases can improve with conservative measures. Conversely, 139 out of 196 surgical patients (71%) had persistent symptoms despite non-operative therapy, supporting the rationale for surgery in selected chronic cases. This supports findings from previous research.[10] A much larger share of patients in the surgical group 144 out of 196 (73.5%) had uncontained herniations compared to the 3,351 of 8,035 (41.7%) non-surgical group. This shows that the type of herniation is important for predicting outcomes and deciding treatment. It matches imaging studies that connect uncontained herniations with more nerve compression and worse symptoms.[5]

Pain and disability scores showed that patients who underwent surgery experienced more rapid improvements in the early post-treatment period. This trend was evident at the 6-week and 3-month marks for both VAS and ODI scores. However, by the one-year follow-up, both the surgical and non-surgical groups demonstrated comparable outcomes, indicating that long-term effectiveness was similar regardless of treatment approach. This pattern is consistent with findings from previous studies comparing surgery and conservative therapy, which suggest that while surgery offers quicker symptom relief, both approaches lead to similar results over time.[6,11]

Overall, these results support current guidelines that suggest starting with non-surgical treatment for LDH patients. Surgical intervention should be reserved for severe neurological deficits such as cauda equina syndrome or acute foot drop, or in cases where conservative management fails to provide adequate relief.[4,5,12]

Our study's strength lies in its large sample of 8,231 patients, which makes the results reliable and applicable to similar healthcare settings. Since the data comes from a tertiary care center, it reflects real clinical practice. We also used trusted tools like the Visual Analog Scale and Oswestry Disability Index to measure pain and disability accurately. However, several limitations should be acknowledged. As a retrospective study, it may have biases like selection and information bias, and some factors were not controlled. Treatment wasn't randomly assigned, so doctor's choices could have influenced results. Patients lost to follow-up might be different from those who stayed, affecting how well the results apply to others. Since, it was done at one center, the results might not apply everywhere. Also, using phone interviews for some follow-ups could cause recall errors.

Conclusion

Both prolonged conservative management and early surgical intervention are effective treatment options for symptomatic lumbar disc herniation. While early surgery provides faster symptom relief, long-term outcomes between the two approaches are comparable. These findings highlight the importance of individualized treatment decisions rather than defaulting to conservative therapy for all patients for prolonged period of time.

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