

Outcome of Conservative Vs. Surgical Treatment for Lumbar Disc Herniation

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ABSTRACT

Background: Lumbar disc herniation can cause persistent pain, neurological impairment, functional limitation, and reduced quality of life. Conservative management is commonly used initially, while surgery may be considered for persistent or clinically significant symptoms. **Objective:** To compare short-term clinical and functional outcomes between conservative and surgical management of lumbar disc herniation. **Methods:** This comparative observational study included 34 patients with MRI-confirmed lumbar disc herniation at Nawaz Sharif Social Security Teaching Hospital, Lahore, Pakistan. Seventeen patients received conservative treatment and 17 received surgical treatment. Outcomes included pain severity, pain improvement, motor recovery, reflex status, recurrence, return to daily activities, complications, satisfaction, and quality of life. Exact contingency-table tests were used for categorical comparisons. **Results:** At six weeks, mild pain was reported by 76.5% of surgical patients versus 11.8% of conservative patients ($p<0.001$). Complete pain relief occurred in 58.8% versus 0%, full motor recovery in 82.4% versus 0%, and reflex normalization in 100.0% versus 35.3%, respectively (all $p<0.001$). Recurrence within three months occurred in 5.9% of surgical and 41.2% of conservative patients ($p=0.039$). Full return to daily activities occurred in 82.4% versus 41.2% ($p=0.032$). Eight surgical patients experienced complications, whereas none were recorded in the conservative group. **Conclusion:** Surgical management was associated with more favorable short-term clinical and functional outcomes but also with procedure-related complications. Because treatment allocation was non-randomized, the findings should not be interpreted as definitive evidence of causal superiority. **Keywords:** Lumbar disc herniation; conservative treatment; surgical treatment; pain; motor recovery; functional outcome.

INTRODUCTION

Lumbar disc herniation (LDH) is a common degenerative disorder of the lumbar spine and an important cause of low back pain, radicular leg pain, neurological impairment, activity limitation, and reduced quality of life. The condition occurs when components of the nucleus pulposus displace through or beyond the annulus fibrosus, potentially producing mechanical compression and inflammatory irritation of adjacent spinal nerve roots. Depending on the level and extent of nerve-root involvement, patients may present with low back pain, sciatica, sensory disturbances, reduced muscle strength, altered reflexes, and limitations in mobility and daily activities. Magnetic resonance imaging is commonly used to confirm disc pathology and evaluate its anatomical relationship with neural structures when clinical findings warrant imaging (1,2).

The clinical course of LDH is heterogeneous. Although symptomatic disc herniation may cause substantial pain and disability, spontaneous regression of herniated disc material and improvement with non-operative management are well recognized. Conservative management therefore remains an important first-line approach for patients without indications for urgent surgical intervention. Available conservative strategies include patient education, activity modification, pharmacological pain management, physical therapy, therapeutic exercise, and selected interventional procedures. Previous evidence indicates that a substantial proportion of patients with LDH improve without surgery, including patients with relatively large disc herniations when neurological status remains clinically appropriate for conservative management (3). Contemporary clinical recommendations similarly support an initial conservative approach in the absence of progressive neurological deficit, severe motor weakness, cauda equina syndrome, or other circumstances requiring urgent surgical assessment (4).

The optimal treatment pathway nevertheless remains clinically important because persistent radiculopathy can substantially interfere with mobility, employment, sleep, participation in family and social roles, and overall health-related quality of life. Patients with persistent sciatica generally experience greater disability and healthcare utilization than individuals with localized low back pain alone. When symptoms remain severe despite appropriate conservative management, or when clinically important neurological deficits are present, surgical decompression and removal of the offending disc material may be considered. Surgical management is primarily intended to decompress affected neural structures and achieve more rapid relief of radicular symptoms, although the magnitude and durability of benefit may vary according to symptom duration, neurological involvement, patient characteristics, and the natural history of the condition (5).

Comparative evidence indicates that surgery may provide faster improvement in selected patients with symptomatic lumbar disc herniation, particularly for leg pain and functional recovery, while differences between surgical and non-surgical treatment may become smaller during longer-term follow-up. A prospective cohort study comparing surgical and conservative treatment reported greater short-term symptomatic improvement among surgically managed patients, while emphasizing the importance of treatment selection and the influence of baseline clinical characteristics on observed outcomes (5). Similarly, a systematic review and meta-analysis comparing surgery with conservative management for lumbar disc herniation with radiculopathy found that surgical treatment may offer more rapid clinical improvement in appropriately selected patients, although differences in longer-term outcomes are less consistent (6). These findings highlight that the decision to operate should not be based solely on the presence of disc herniation on imaging but should incorporate symptom severity, neurological status, response to conservative treatment, functional impairment, patient preference, and the balance between expected benefit and procedural risk.

Surgical treatment also carries potential complications that must be considered when comparing treatment strategies. Complications may include wound-related problems, cerebrospinal fluid leakage, neurological injury, recurrent disc herniation, and the possibility of subsequent intervention. Recurrent lumbar disc herniation following primary surgery has been documented during long-term follow-up, emphasizing that surgical treatment does not completely eliminate the possibility of recurrent symptoms (7). Conversely, prolonged unsuccessful conservative treatment may extend pain, neurological symptoms, activity restriction, and time away from work. Treatment decisions therefore require a balanced assessment of the probability of spontaneous or conservative recovery against the expected speed of symptom relief and the risks associated with surgery.

The relative value of conservative and surgical management has also been examined from functional and patient-centered perspectives. Beyond pain reduction, clinically meaningful treatment outcomes include neurological recovery, restoration of reflex and motor function, return to usual activities, recurrence of symptoms, complications, treatment satisfaction, and perceived quality of life. These outcomes may be particularly important because radiological improvement does not necessarily

correspond directly with the patient's functional recovery. Studies of non-surgical treatment choices have demonstrated considerable variation in the management pathways selected by patients with lumbar intervertebral disc herniation, reflecting differences in symptom burden, clinical presentation, treatment preferences, and response over time (8). Surgical outcome studies likewise demonstrate that age, disease characteristics, neurological status, and other patient factors can influence recovery following lumbar disc surgery (9).

Despite the substantial international literature on LDH management, comparative evidence from local clinical populations remains limited. Differences in healthcare access, referral pathways, timing of specialist consultation, availability of rehabilitation services, thresholds for surgical intervention, and patient preferences may affect treatment selection and observed outcomes. Previous local comparative work has suggested differences in pain relief between medical and surgical management, but additional evaluation of broader patient-centered outcomes remains clinically relevant (10). Assessment of pain alone may not adequately capture recovery, particularly where neurological function, recurrence, participation in daily activities, satisfaction, and quality of life are also important to patients and clinicians.

Accordingly, the present study compared outcomes among patients with MRI-confirmed lumbar disc herniation who received conservative or surgical management. The study evaluated pain severity before treatment and during follow-up, overall pain improvement, motor recovery, reflex status, recurrence, treatment-related complications, return to daily activities, patient satisfaction, and quality of life. The objective was to determine whether these short-term clinical and functional outcomes differed between patients managed conservatively and those managed surgically.

MATERIALS AND METHODS

A comparative observational study was conducted among patients with lumbar disc herniation receiving conservative or surgical treatment at Nawaz Sharif Social Security Teaching Hospital, Lahore, Pakistan. The analysis included 34 patients presenting with back pain in whom lumbar disc herniation had been identified on magnetic resonance imaging. Participants were analysed according to the treatment received, with 17 patients in the conservative-management group and 17 in the surgical-management group. Because treatment allocation was not described as randomized, the two groups were treated analytically as naturally occurring clinical treatment groups rather than randomized intervention arms.

Data were collected using a structured questionnaire completed by the study participants. The questionnaire captured treatment received and a range of clinical and patient-reported outcomes relevant to recovery following management of lumbar disc herniation. Pain severity was assessed before treatment and subsequently at six weeks and three months. Reported pain scores were organized into three clinically interpretable categories: mild pain corresponding to scores of 0–3, moderate pain to scores of 4–6, and severe pain to scores of 7–10. In addition to pain severity at individual follow-up points, overall pain improvement was categorized as complete relief, partial relief, or no improvement.

Functional and neurological outcomes were also recorded. Return to daily activities was classified as fully resumed or partially resumed. Motor recovery was categorized as fully recovered, partially recovered, or no improvement, while reflex status following treatment was classified as normalized or still abnormal. Recurrence was assessed during the three-month follow-up period and categorized according to whether recurrence occurred within three months or no recurrence was observed during this period.

Treatment-related complications were recorded and categorized according to the events represented in the study data, including wound infection, cerebrospinal fluid leakage, and re-herniation. Participants without a recorded complication were categorized as having no complication. Patient-centered outcomes included satisfaction with treatment and post-treatment quality of life. Satisfaction was categorized as

very satisfied, satisfied, neutral, or dissatisfied, whereas quality of life was classified as excellent, good, fair, or poor. These categorical outcomes were compared between the conservative and surgical treatment groups to assess differences in short-term symptomatic, neurological, functional, and patient-reported recovery.

The analysis incorporated the complete sample of 34 participants, with equal group denominators of 17 patients in each treatment category. Frequencies and percentages were used to summarize categorical variables and treatment outcomes. Treatment-group comparisons were performed for pain severity, pain improvement, motor recovery, reflex status, recurrence, return to daily activities, complications, satisfaction, and quality of life. Categorical associations were evaluated using chi-square-based comparisons according to the statistical analysis reported for the study. Results were interpreted from the observed treatment-group distributions and corresponding p-values. Data were analysed using IBM SPSS Statistics version 27.

Ethical permission for the study was obtained from the University of Lahore. Informed consent was obtained from participants before data collection, participation was voluntary, and participants were informed of their right to withdraw without adverse consequences. Confidentiality and anonymity of participant information were maintained, and access to research data was restricted to the research team.

RESULTS

A total of 34 patients with MRI-confirmed lumbar disc herniation were included in the analysis, with 17 patients in the conservative-treatment group and 17 in the surgical-treatment group. Treatment groups were compared for pain severity, pain improvement, neurological recovery, recurrence, return to daily activities, treatment-related complications, satisfaction, and quality of life. Categorical data are presented as frequency and percentage. Because of the small sample and sparse expected cell frequencies in several comparisons, exact tests were used for inferential comparisons. Effect size is reported as Cramér's V.

Baseline pain severity was similar between the two treatment groups. Severe pain before treatment was reported by 16 of 17 patients (94.1%) receiving conservative treatment and 14 of 17 (82.4%) receiving surgical treatment, while moderate pain was present in 1 (5.9%) and 3 (17.6%) patients, respectively. The baseline distribution did not differ significantly between treatment groups (exact $p=0.601$; Cramér's $V=0.183$), indicating no statistically detectable difference in the categorized baseline pain distribution.

Table 1. Comparison of Pain Severity and Pain Improvement Between Treatment Groups

Outcome	Category	Conservative, n=17 n (%)	Surgical, n=17 n (%)	Total, N=34 n (%)	p-value	Cramér's V
Pain before treatment	Moderate (4–6)	1 (5.9)	3 (17.6)	4 (11.8)	0.601	0.183
	Severe (7–10)	16 (94.1)	14 (82.4)	30 (88.2)		
Pain at 6 weeks	Mild (0–3)	2 (11.8)	13 (76.5)	15 (44.1)	<0.001	0.717
	Moderate (4–6)	6 (35.3)	4 (23.5)	10 (29.4)		
	Severe (7–10)	9 (52.9)	0 (0.0)	9 (26.5)		
Pain at 3 months	Mild (0–3)	9 (52.9)	14 (82.4)	23 (67.6)	0.060	0.423
	Moderate (4–6)	3 (17.6)	3 (17.6)	6 (17.6)		
	Severe (7–10)	5 (29.4)	0 (0.0)	5 (14.7)		
Overall pain improvement	Complete relief	0 (0.0)	10 (58.8)	10 (29.4)	<0.001	0.705
	Partial relief	11 (64.7)	7 (41.2)	18 (52.9)		
	No improvement	6 (35.3)	0 (0.0)	6 (17.6)		

Data are n (%). The baseline 2×2 comparison was assessed using Fisher's exact test. Three-category comparisons were assessed using the Fisher–Freeman–Halton exact test. Cramér's V represents the magnitude of association between treatment group and outcome category.

At six weeks, pain severity differed markedly between groups (exact $p<0.001$; Cramér's $V=0.717$). Mild pain was reported by 13 surgical patients (76.5%) compared with 2 conservatively managed patients (11.8%). Conversely, severe pain persisted in 9 patients (52.9%) in the conservative group but in none of the surgical patients. At three months, 14 surgical patients (82.4%) and 9 conservative patients (52.9%)

reported mild pain, while severe pain remained present in 5 conservatively treated patients (29.4%) and no surgically treated patients. Although this distribution favored the surgical group descriptively, the exact three-category comparison did not reach the conventional threshold for statistical significance (exact $p=0.060$; Cramér's $V=0.423$).

Table 2. Comparison of Neurological and Functional Outcomes Between Treatment Groups

Outcome	Category	Conservative, n=17 n (%)	Surgical, n=17 n (%)	Total, N=34 n (%)	p-value	Cramér's V
Motor recovery	Fully recovered	0 (0.0)	14 (82.4)	14 (41.2)	<0.001	0.862
	Partially recovered	8 (47.1)	3 (17.6)	11 (32.4)		
	No improvement	9 (52.9)	0 (0.0)	9 (26.5)		
Reflex status	Normalized	6 (35.3)	17 (100.0)	23 (67.6)	<0.001	0.692
	Still abnormal	11 (64.7)	0 (0.0)	11 (32.4)		
Recurrence within 3 months	No recurrence	10 (58.8)	16 (94.1)	26 (76.5)	0.039	0.416
	Recurrence	7 (41.2)	1 (5.9)	8 (23.5)		
Return to daily activities	Fully resumed	7 (41.2)	14 (82.4)	21 (61.8)	0.032	0.424
	Partially resumed	10 (58.8)	3 (17.6)	13 (38.2)		

Data are n (%). Fisher's exact test was used for 2×2 comparisons and the Fisher–Freeman–Halton exact test for the three-category motor-recovery comparison. Cramér's V is reported as the effect-size measure.

Table 3. Comparison of Complications, Treatment Satisfaction, and Quality of Life

Outcome	Category	Conservative, n=17 n (%)	Surgical, n=17 n (%)	Total, N=34 n (%)	p-value	Cramér's V
Complications	None	17 (100.0)	9 (52.9)	26 (76.5)	0.003	0.555
	Wound infection	0 (0.0)	3 (17.6)	3 (8.8)		
	CSF leak	0 (0.0)	2 (11.8)	2 (5.9)		
	Re-herniation	0 (0.0)	3 (17.6)	3 (8.8)		
Treatment satisfaction	Very satisfied	0 (0.0)	13 (76.5)	13 (38.2)	<0.001	0.847
	Satisfied	6 (35.3)	4 (23.5)	10 (29.4)		
	Neutral	8 (47.1)	0 (0.0)	8 (23.5)		
	Dissatisfied	3 (17.6)	0 (0.0)	3 (8.8)		
Quality of life	Excellent	0 (0.0)	14 (82.4)	14 (41.2)	<0.001	0.883
	Good	5 (29.4)	3 (17.6)	8 (23.5)		
	Fair	7 (41.2)	0 (0.0)	7 (20.6)		
	Poor	5 (29.4)	0 (0.0)	5 (14.7)		

Data are n (%). Fisher–Freeman–Halton exact tests were used because several cells contained small or zero frequencies. CSF, cerebrospinal fluid.

The overall pattern of pain improvement differed significantly between treatment groups (exact $p<0.001$; Cramér's $V=0.705$). Complete pain relief was reported by 10 of 17 surgically managed patients (58.8%) but by none of the conservatively managed patients. Partial relief occurred in 7 surgical patients (41.2%) and 11 conservative patients (64.7%), whereas 6 conservatively treated patients (35.3%) reported no improvement compared with none in the surgical group.

Neurological recovery also differed substantially between the groups. Full motor recovery was observed in 14 surgical patients (82.4%) and none of the conservatively treated patients, while 9 conservative patients (52.9%) showed no motor improvement. The overall motor-recovery distribution differed significantly between groups (exact $p<0.001$; Cramér's $V=0.862$). Reflexes normalized in all 17 surgically managed patients (100.0%) compared with 6 of 17 patients (35.3%) receiving conservative treatment. Persistent reflex abnormality was observed in 11 conservative patients (64.7%) and none of the surgical patients, representing a significant between-group association (exact $p<0.001$; Cramér's $V=0.692$).

Recurrence within three months occurred in 7 of 17 patients (41.2%) in the conservative group compared with 1 of 17 (5.9%) in the surgical group. Accordingly, 26 of the 34 patients (76.5%) experienced no recurrence, correcting the previously reported interpretation of 76.5% as the recurrence rate. The treatment-group difference in recurrence was statistically significant (exact $p=0.039$; Cramér's $V=0.416$).

Return to daily activities also differed between treatment groups. Full resumption of daily activities was reported by 14 surgical patients (82.4%) compared with 7 conservatively treated patients (41.2%), whereas partial resumption was reported by 3 (17.6%) and 10 (58.8%) patients, respectively. This difference was statistically significant (exact $p=0.032$; Cramér's $V=0.424$).

Treatment-related complications were confined to the surgical group in the available data. No complication was reported for any of the 17 conservatively treated patients, whereas 9 of 17 surgical patients (52.9%) had no complication and 8 (47.1%) experienced a recorded complication. These comprised wound infection in 3 patients (17.6%), cerebrospinal fluid leakage in 2 (11.8%), and re-herniation in 3 (17.6%). The distribution of complications differed significantly between groups (exact $p=0.003$; Cramér's $V=0.555$). Thus, the supported total number of patients with complications was 8 rather than 13, and the data do not support the previous statement that all 17 surgical patients experienced complications.

Treatment satisfaction was substantially more favorable among surgically managed patients (exact $p<0.001$; Cramér's $V=0.847$). Thirteen surgical patients (76.5%) were very satisfied and 4 (23.5%) were satisfied; no surgical patient reported a neutral or dissatisfied response. In the conservative group, 6 patients (35.3%) were satisfied, 8 (47.1%) were neutral, and 3 (17.6%) were dissatisfied, while none reported being very satisfied.

Quality-of-life ratings likewise differed significantly between groups (exact $p<0.001$; Cramér's $V=0.883$). Fourteen surgical patients (82.4%) rated their post-treatment quality of life as excellent and 3 (17.6%) as good. In contrast, no conservatively managed patient rated quality of life as excellent; 5 (29.4%) rated it as good, 7 (41.2%) as fair, and 5 (29.4%) as poor. Overall, the observed short-term distributions favored the surgical group across several pain, neurological, functional, satisfaction, and quality-of-life outcomes, while surgical treatment was also associated with the recorded treatment-related complications.

DISCUSSION

The present study compared short-term outcomes among patients with MRI-confirmed lumbar disc herniation managed conservatively or surgically. The principal finding was that surgically managed patients demonstrated more favorable distributions across several pain, neurological, functional, satisfaction, and quality-of-life outcomes during follow-up. At six weeks, mild pain was reported by 76.5% of surgical patients compared with 11.8% of conservatively managed patients, while severe pain persisted in 52.9% of the conservative group and in none of the surgical group. Complete pain relief was reported by 58.8% of surgically managed patients but by none receiving conservative management. Similarly, full motor recovery, normalized reflexes, complete return to daily activities, treatment satisfaction, and excellent quality-of-life ratings were more frequently observed in the surgical group. Recurrence within three months was also less frequent among surgical patients. These advantages, however, occurred alongside treatment-related complications that were recorded exclusively in the surgical group. Because treatment was not randomly allocated, these findings indicate associations between treatment pathway and observed short-term outcomes rather than establishing causal superiority of surgery.

The marked difference in early pain outcomes is broadly consistent with previous comparative evidence indicating that surgical decompression can provide faster relief of radicular symptoms in appropriately selected patients with lumbar disc herniation. Gugliotta et al. reported greater short-term improvement among surgically treated patients compared with those receiving conservative care, while emphasizing that longer-term differences may be smaller and that treatment selection influences observed outcomes (5). A systematic review and meta-analysis by Dan-Azumi et al. similarly found that surgical management may provide more rapid symptomatic improvement in patients with lumbar disc herniation and radiculopathy, although the magnitude of benefit varies across follow-up periods and study designs (6). In the present study, the association between treatment and pain severity was

particularly pronounced at six weeks, with a large effect size, whereas the exact comparison at three months did not reach conventional statistical significance despite a clinically notable difference in the distribution of severe pain. This pattern is compatible with the broader literature suggesting that the principal advantage of surgery may be the speed of recovery rather than an invariably superior long-term outcome.

The neurological findings also favored the surgical group. Full motor recovery was observed in 82.4% of surgical patients compared with none of the conservatively treated patients, and reflexes normalized in all surgical patients compared with 35.3% of those treated conservatively. These findings are clinically plausible because decompressive surgery directly addresses mechanical nerve-root compression in patients selected for operative treatment. However, neurological recovery after lumbar disc herniation is influenced by the severity and duration of nerve-root compression, baseline motor deficit, age, anatomical characteristics, and timing of treatment. Large surgical series have demonstrated that outcomes following lumbar disc surgery vary across age groups and clinical characteristics, indicating that postoperative recovery cannot be attributed to the procedure alone (9). Furthermore, because baseline motor and reflex status were not reported separately for the two treatment groups in the present study, the magnitude of treatment-associated neurological recovery should be interpreted cautiously.

Return to daily activities also differed between treatment groups, with 82.4% of surgical patients fully resuming their usual activities compared with 41.2% of patients receiving conservative care. Restoration of activity is particularly relevant because the consequences of lumbar disc herniation extend beyond pain intensity to occupational participation, mobility, self-care, and social functioning. Previous research has shown substantial variation in non-surgical treatment pathways and longer-term outcomes among patients with lumbar intervertebral disc herniation (8). Evidence from athletes has likewise suggested that both surgical and conservative approaches can support return to activity, although surgery may facilitate a faster return in selected populations and the certainty of the evidence is limited by heterogeneity and risk of bias (11). The present findings therefore support the importance of evaluating functional recovery alongside pain rather than relying on symptom intensity alone.

Recurrence within three months occurred in 41.2% of conservatively managed patients compared with 5.9% of surgical patients. This difference should be interpreted within the short duration of follow-up and the study's definition of recurrence. Surgical treatment may reduce persistent or recurrent symptoms when the compressive disc fragment is removed, but surgery does not eliminate the possibility of recurrent herniation. Long-term surgical literature has documented recurrent lumbar disc herniation following primary surgery, including recurrence requiring repeat intervention (7). Consequently, the lower short-term recurrence observed in the surgical group should not be interpreted as evidence that surgery prevents recurrence permanently. Longer follow-up would be required to evaluate whether the observed difference persists over time.

Treatment-related complications represented an important counterbalance to the favorable short-term outcomes associated with surgery. Eight of the 17 surgically managed patients experienced a recorded complication: three wound infections, two cerebrospinal fluid leaks, and three re-herniations. No complications were recorded in the conservatively treated group. This finding reinforces the clinical principle that surgical treatment involves a trade-off between the possibility of more rapid symptomatic and neurological recovery and procedure-related risk. Economic evaluation has similarly demonstrated that treatment decisions for lumbar disc herniation involve not only clinical outcomes but also differences in costs, recovery time, and downstream healthcare utilization (12). Accordingly, management decisions should incorporate symptom severity, neurological impairment, previous response to conservative care, expected functional benefit, patient preferences, and the potential risks of operative treatment.

Treatment satisfaction and quality of life showed some of the strongest treatment-group associations. Among surgical patients, 76.5% were very satisfied and 82.4% rated their quality of life as excellent; no

conservatively managed patient selected either of these highest categories. These patient-reported outcomes are clinically important because treatment success in lumbar disc herniation encompasses more than anatomical decompression or pain reduction. Satisfaction may reflect perceived speed of recovery, restoration of mobility, return to usual activities, expectations, and the burden of persistent symptoms. Nevertheless, satisfaction is particularly susceptible to expectation effects and treatment-selection bias. Patients who undergo surgery may enter treatment with different symptom severity, expectations, previous treatment experiences, or motivation compared with those remaining under conservative management. The absence of baseline quality-of-life and satisfaction measures further limits interpretation of the magnitude of change attributable to either treatment pathway.

Conservative treatment remains clinically important despite the less favorable short-term distributions observed in this study. A substantial proportion of patients with lumbar disc herniation improve with non-operative care, and spontaneous resorption of herniated disc material has been documented, including in patients with large herniations (3). Contemporary clinical recommendations generally favor conservative treatment initially when progressive neurological deficit, cauda equina syndrome, or other urgent indications for surgery are absent (4). Non-operative treatment may incorporate medication, physical therapy, therapeutic exercise, activity modification, and selected interventions. Mechanical traction has also been investigated as a rehabilitation intervention, although evidence concerning its effectiveness remains variable and treatment responses differ across patients (13). The present results should therefore not be interpreted as evidence that all patients with lumbar disc herniation should undergo surgery; rather, they indicate that patients who underwent surgery in this sample experienced more favorable short-term outcomes across several measured domains.

Timing of surgery is another clinically relevant consideration. Patients with prolonged symptoms before decompression may experience different outcomes than those treated earlier, although the relationship between duration of conservative treatment and subsequent surgical recovery is complex. Registry-based evidence examining lumbar decompression has shown that preoperative treatment duration and clinical outcome may not have a simple linear relationship and that patient selection and disease characteristics influence postoperative recovery (14). This issue is particularly important in the present study because the duration of symptoms before treatment and the criteria used to transition patients from conservative to surgical management were not available for comparative analysis. As a result, the observed differences may partly reflect underlying differences in clinical indications rather than treatment modality alone.

Several limitations should be considered when interpreting these findings. First, the sample was small, comprising only 34 patients from a single clinical setting, which limits statistical precision and generalizability. Second, treatment allocation was not randomized, creating a substantial risk of confounding by indication. Patients selected for surgery may have differed from conservatively managed patients in symptom severity, neurological deficit, duration of symptoms, imaging characteristics, previous treatment response, or other clinical factors. Third, detailed baseline comparability beyond categorized pain severity was unavailable, preventing assessment of whether the treatment groups were equivalent before management. Fourth, follow-up was limited to three months, making the study primarily informative about short-term outcomes rather than long-term recovery or recurrent herniation. Fifth, several outcomes, including satisfaction and quality of life, were measured using categorical responses rather than standardized validated scales. Sixth, the small sample generated sparse contingency-table cells, necessitating exact statistical procedures and limiting the feasibility of adjusted multivariable analyses. Finally, treatment protocols were not sufficiently detailed to determine the specific conservative interventions, operative technique, or treatment intensity received by individual participants.

Despite these limitations, the study has several useful features. All participants had MRI-confirmed lumbar disc herniation, equal numbers were available in the two treatment groups, and outcomes

extended beyond pain to include neurological recovery, recurrence, daily functioning, complications, satisfaction, and quality of life. The corrected analysis also demonstrates the importance of examining both benefits and harms: surgical patients showed more favorable short-term outcomes across several domains but experienced all recorded treatment-related complications. These findings support individualized clinical decision-making rather than a universal preference for either treatment pathway.

Overall, the results suggest that surgical management was associated with more favorable short-term pain relief, neurological recovery, functional recovery, satisfaction, and quality-of-life outcomes in this sample, while also carrying measurable procedural complications. Conservative care remains an appropriate initial strategy for many patients without urgent surgical indications, whereas surgery may be considered when symptoms are severe, neurological deficits are clinically important, or adequate conservative management fails to provide acceptable recovery (4,5). Larger prospective studies with standardized treatment protocols, validated outcome measures, detailed baseline characterization, longer follow-up, and adjustment for potential confounders are needed to determine the comparative effectiveness of these management strategies more reliably.

CONCLUSION

Among the 34 patients with MRI-confirmed lumbar disc herniation included in this observational comparison, surgical management was associated with more favorable short-term pain relief, motor recovery, reflex normalization, return to daily activities, treatment satisfaction, and quality-of-life outcomes than conservative management, and recurrence within three months was less frequent in the surgical group. However, treatment-related complications occurred only among surgically managed patients. Because treatment allocation was non-randomized, the sample was small, and follow-up was limited to three months, the findings should be interpreted as treatment-associated differences rather than evidence of definitive causal superiority. Management of lumbar disc herniation should therefore remain individualized according to clinical presentation, neurological status, response to conservative treatment, expected functional benefit, procedural risk, and patient preferences.

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