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Dipak Chaulagain,  
Volodymyr Smolanka,  
Andriy Smolanka,  
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Alexandr Shecko



# Clinical outcomes and satisfaction in patients after lumbar microdiscectomy. A single centre study

Dipak Chaulagain, Volodymyr Smolanka, Andriy Smolanka, Taras Havryliv, Alexandr Shecko

Regional Clinical Centre of Neurosurgery and Neurology, Uzhhorod National University, Uzhhorod, UKRAINE

## ABSTRACT

**Introduction:** Lumbar disc herniation is a common cause of low back and radicular pain. Microdiscectomy is the recommended surgical technique for herniated lumbar discs at the moment. It has great success rates and little postoperative morbidity. We aimed to assess the clinical result and patient satisfaction of micro-discectomy in lumbar disc herniation patients.

**Methodology:** This is prospective observational hospital-based research of 26 patients who had micro-discectomy at the Regional Clinical Center of Neurosurgery and Neurology in Uzhhorod, Ukraine, during August and September 2021. The research excluded patients with recurrent prolapsed intervertebral discs, multiple level herniated discs, and disc surgery requiring stability. During surgery, the kind of prolapsed intervertebral disc, its level, and the duration of the procedure were recorded. Additionally, we recorded the duration of the patient's hospital stay and any complications. The visual analogue scale (VAS), the Oswestry Disability Index (ODI), and the MacNab score questionnaires were used to measure pain, disability, and patient satisfaction, respectively.

**Result:** All procedures were performed on a single level using micro-discectomy. The mean age of the study population was 45.69 years. Micro-discectomy surgeries were performed in less than an hour in 69.2% of cases. The most often seen lumbar prolapsed intervertebral disc occurred at the L4-L5 level (57.7%). The most often seen kinds of prolapse were disc extrusion (30.8%) and disc sequestration (26.9%). The mean length of stay in the hospital was 3.96 days. After surgery, 57.7% of patients received an excellent rating on the Macnab's scale. There was a statistically significant difference between pre- and postoperative VAS and ODI scores ( $p < 0.05$ ).

**Conclusion:** Overall 65.4% of patients had no postoperative complications. In these instances, a proper surgical technique might help avoid problems. Our findings demand additional investigation with bigger sample sizes and longer follow-up periods.

## INTRODUCTION

Low Back pain is a prevalent complaint among patients seeking basic care. Lumbar disc herniation (LDH) causes low back pain and leg pain [23]. Nucleus pulposus or annulus fibrosis displacement beyond

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Corresponding author:  
**Dipak Chaulagain**

Regional Clinical Centre of  
Neurosurgery and Neurology,  
Uzhhorod National University,  
Uzhhorod, Ukraine

neurodipak@gmail.com

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normal intervertebral disc space is a typical cause for radiculopathy. 95 percent of lower lumbar disc herniation occur at L4-5 and L5-S1 [12, 17]. A lumbar disc herniation may be treated in many ways, but the diagnosis is made based on the patient's history, physical exam, and radiograph. Patients with persistent lower back pain, with or without leg radiating pain, difficult to manage pain, or acute paresis, including cauda equine syndrome, are frequently given surgery [28]. Radiculopathy caused by LDH usually heals without surgery. If nonsurgical treatment fails, micro-discectomy may be explored. Lumbar micro-discectomy has good success rates and little postoperative morbidity. The operation has been shown to be successful in treating lumbar radicular pain and sciatica with success rates ranging from 50% to 98% [26]. Elective lumbar discectomy is one of the most popular neurosurgical treatments for lumbar disc herniation. If sciatica or neurological impairments remain following a period of conservative therapy, a discectomy is regarded the gold standard [4, 13]. More than 70 years, fenestrated discectomy has been the primary treatment for lumbar disc herniation worldwide [15]. A long midline incision and significant muscle retraction with complete laminectomy were first documented in 1934 by Mixter and Barr [3]. LDH surgery entered a new era in 1977 when surgeons started using operating microscopes to remove herniated disc material [6]. As early findings showed, micro-discectomy was equally as effective as regular discectomy and had certain benefits over the latter. This was soon after the launch of the aforementioned invention. An advantage of micro-discectomy over traditional open discectomy is the ability to do surgery with fewer incisions and less harm to the skin and fascia [18]. Oswestry Impairment Index (ODI) measures the degree of disability caused by low back pain and is based on the Oswestry Low Back Pain Questionnaire. VAS was the last scale to be implemented [5, 8]. Following micro-discectomy surgery, we documented the surgical procedures, clinical results, postoperative patient satisfaction (VAS and ODI), length of stay in the hospital and early problems (Macnab score) that we encountered. The study's goal was to evaluate the short-term clinical outcomes after a single-level lumbar micro-discectomy operation.

#### MATERIAL AND METHODS

From August to September 2021 at a Regional

Clinical Center of Neurosurgery and Neurology in Uzhhorod, Ukraine, we conducted a cross-sectional observational research to evaluate our patients who had had a microlumbar discectomy. Patients with a single level lumbar disc herniation were eligible to participate in the trial. Cases with repeated disc herniations, several levels of lumbar disc herniation and disc surgery with instrumentation were ruled out.

Types and levels of LDH, and surgical time were all reported during surgery for LDH (central, lateral extrusion, protrusion, lateral disc bulge, and sequestration). Complications that occurred during treatment were also reported. Patient's pain was assessed using VAS and ODI before and after surgery. This was the main outcome. Two questionnaires, the Visual Analogue Scale (VAS, 0-10) and the Oswestry Impairment Index (ODI, 0-100% disability), were used to evaluate patient's levels of pain and disability before and after surgery. When it comes to assessing low back function, the ODI is the gold standard [19, 25]. The Macnab questionnaire was used to measure patient satisfaction and it was rated excellent, good, fair, or bad [16].

Early complications like nausea and vomiting, post-operative cerebrospinal fluid leak, wound infection and discitis were recorded. SPSS version 25 was used for data collection, and the data were then analyzed using the statistical software for social sciences (SPSS). For example, age and gender, type of LDH and complication. ODI and VAS were evaluated by the paired samples t-test method.  $P < 0.05$  was assessed as significant.

#### RESULTS

From August to September 2021, lumbar disc herniation patients who had micro-lumbar discectomy were studied prospectively. The patients were mostly male and average age was 45.69 [Table 4]. All surgeries were single level micro-discectomy including L3-L4 (3.8%), L4-L5 (57.7%), and L5-S1 (38.5%) [Table 1]. 69.2% cases were performed surgically by less than one hour whereas 30.8% cases took more than one hour for micro-discectomy [Table 1]. Average day of staying in hospital of patients post-operatively was 3.96 days [Table 4]. Disc extrusion (30.8%) and disc sequestration (26.9%) were the most commonly seen types of prolapse [Table 1]. There was statistically significant difference ( $p < 0.05$ ) in pre-operative and post-

operative VAS scores and ODI [Table 5]. After surgery, 57.7% of patients received an excellent rating on the macnab's scale [Table 2] and Overall 65.4% of patients had no postoperative complications [Table 3].

**Table 1.** Description of patients involved in the study

Total number of patients	26
Average age (range)	30-58
Males	16 (61.5%)
Females	10 (38.5%)
Side of PIVD	
Right side	15 (57.7%)
Left side	11 (42.3%)
Level of prolapse	
L3-L4	1 (3.8%)
L4-L5	15 (57.7%)
L5-S1	10 (38.5%)
Types of PIVD	
Central disc bulge	6 (23.1%)
Lateral disc bulge	8 (30.8%)
Disc protrusion	3 (11.5%)
Disc extrusion	7 (26.9%)
Disc sequestration	2 (7.7%)
Operation duration	
Less than hour	18 (69.2%)
More than hour	8 (30.8%)

**Table 2.** Description of Macnab's score (post-op) in the study

	Frequency	Percent	Valid Percent	Cumulative Percent
EXCELLENT	15	57.7	57.7	57.7
FAIR	3	11.5	11.5	69.2
GOOD	7	26.9	26.9	96.2
POOR	1	3.8	3.8	100.0
Total	26	100.0	100.0	

**Table 3.** Description of early post-op complication in the study

	Freq.	%	Valid Percent	Cumulative Percent
CSF LEAK	1	3.8	3.8	3.8
DISCITIS	1	3.8	3.8	7.7
NAUSEA,VOMITING	5	19.2	19.2	26.9
NO COMPLICATION	17	65.4	65.4	92.3
WOUND INFECTION	2	7.7	7.7	100.0
Total	26	100.0	100.0	

**Table 4.** Descriptive mean statistics of Age and Duration of hospital stay (post-op) in the study

	N	Min.	Max.	Mean	Std. Deviation
AGE	26	30	58	45.69	8.966
POST-OP DURATION OF HOSPITAL STAY(DAY)	26	2	6	3.96	1.311

**Table 5.** Paired-samples T-test of VAS score and ODI (pre-op and post-op) in the study

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	VAS SCORE (PRE-OP) - VAS SCORE (POST-OP)	6.500	1.105	.217	6.054	6.946	30.007	25	.000
Pair 2	ODI % (PRE-OP) - ODI % (POST-OP)	30.000	14.213	2.787	24.259	35.741	10.763	25	.000

**DISCUSSION**

If the nucleus pulposus and the annulus fibrosus degenerate, LDH is almost always caused by this. Lifting accidents or other trauma may also be to blame. People who have lower back pain almost always have their intervertebral discs bulging, especially if they push on a nerve root. Numbness and tingling are very common in the lower legs because of the pain caused by this. The L4-L5 and L5-S1 segments of the spinal column are the most often affected by disc disease. There are a variety of therapy options available for lumbar discopathy. 90% of individuals will have a conservative improvement in their pain levels [22].

Patients with lumbar disc herniation had satisfactory long-term treatment outcomes for their sciatica symptoms, regardless of whether they underwent surgery or received conservative therapy. When compared to conservative therapy, surgical surgery alleviated back pain more quickly; nevertheless, after three months, no difference was seen between any of the treatments [21]. Discectomy of the lumbar spine is one of the most frequent surgical procedures performed today. Open surgery and endoscopic surgery are both

acceptable methods of doing the procedure. The discectomy process has gone a long way since Yasargil conducted the first microscopic surgery in 1968 and Schreiber and Suezawa conducted the first endoscopic discectomy in 1986, then Mayer, Brock, and Mathews refined the technique in the 1990s [7, 9,14,24].

In this cross-sectional research, we looked at the surgical result and patient satisfaction rate of micro-lumbar discectomy, which is the most common kind of spine surgery. Discectomy of the lumbar spine is one of the most frequent surgical procedures performed today. Open surgery and endoscopic surgery are both acceptable methods of doing the procedure. The outcomes of this research corroborate the long-held notion that discectomy is a safe and effective therapeutic option for lumbar discopathy associated with sciatic pain in the lower back. Patients have claimed success rates ranging from 88–97% for this treatment; however, more realistic results, as determined by patient-reporting measures, range from 75–80% [1].

Because of rising healthcare expenditures and other costs connected with hospitalization, most neurosurgical centers across the globe perform lumbar microdiscectomy as a day care procedure to save costs. One of the most important considerations during a surgery is the duration of the procedure, especially in light of the probability of blood loss and the existence of intraoperative risk factors for surgical site infections. Micro-discectomy has a number of advantages, one of which is that the quantity of blood lost during the treatment is significantly decreased, according to the findings of various studies [20, 29, 30]. In our study, 69.2% of cases were completed surgically in less than one hour, while 30.8% of patients required more than one hour for micro-discectomy surgery.

According to our study, the median length of hospitalization was 3.96 days, with a range of 2 to 6 days being recorded. Differential results in discectomy-related outcomes are primarily influenced by changes in patient selection, follow-up period, and the tools employed to quantify outcome and their interpretation. Patients who have had lumbar disc herniation surgery are able to return to work in 76% of cases after one year [2].

The kind of disc herniation has also been shown to have a substantial impact on the functional results of patients [27]. Following surgery, 4% of patients

report a decrease in their functional condition. Prior to surgery, the following factors are associated with deterioration: lengthy duration of pain and low ODI (greater function) [11].

According to Shriver, Michael F et al., the overall complication rate of micro-lumbar discectomy was 12.5%, with 1.3% reporting new or worsening neurological deficit, 2.6% reporting direct nerve root injury, 0.5% hematoma, 2.1% wound complications (infection, dehiscence, seroma), and 4.1% recurrent disc complications [10]. While in our study, 65.4% of patients had no postoperative issues, we discovered that 3.8%, 3.8%, 19.2%, and 7.7% of cases experienced difficulties such as Cerebrospinal fluid leak, discitis, nausea and vomiting, and wound infection, respectively [Table 3].

While our research had a small number of participants, it was not without its faults. Proposed multi-center study on lumbar micro-discectomy with long-term follow-up should be conducted in order to get more universal and reasonable findings.

#### LIMITATIONS

A single-center research has a smaller sample size. Prospective research with large sample sizes and long follow-up times are also necessary to correctly extrapolate results to the general population.

#### CONCLUSIONS

A lumbar micro-discectomy is a safe and efficient treatment for disc herniation-related sciatic lumbar pain. It will be necessary to conduct additional multi-centric studies with a larger sample size and a longer follow-up period in order to verify our findings.

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