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## Clinical outcomes in patients undergoing microlumbar discectomy for lumbar disc herniation

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#### Abstract

**Introduction:** Lumbar microdiscectomy has been associated with high rates of success and low postoperative morbidity. We aimed to evaluate the clinical outcome of patients undergoing lumbar microdiscectomy for disc herniations.

**Methodology:** The study was performed in the Department of Orthopedics, Lokmanya Hospital Chinchwad and Lokmanya Hospital Nigdi, Pune from August 2002 till May 2004 on all patients scheduled for microlumbar discectomy for lumbar disc herniation. Intra-operatively, type and level of prolapse and operative time was noted. We also noted the length of hospital stay and any complications experienced by the patient. For assessing the patients, instruments like Visual Analog Scale (VAS) for pain at the end of first week and return to normal activity of daily living (ADL) and satisfaction with the result of surgery at the end of six months were used.

**Results:** All surgeries were single level microdiscectomy. Operative time on the average was 85 minutes and 83% of the patients had a stay of less than 5 days in the hospital. Disc sequestration and disc exclusion were the most commonly seen types of prolapse. Pre-operatively five patients had a back pain VAS of more than 4 and four patients had a leg pain VAS of more than 4. On assessing the outcome in terms of returning to activities of daily living and satisfaction with surgery only four and five patients had a score more than two respectively.

**Conclusions:** Proper preoperative planning and correct surgical technique can prevent complications in these cases. Future multicentric studies with larger sample size and longer follow up periods are needed to support our findings.

**Keywords:** Complications, disc prolapse, outcome, pain

#### Introduction

Lumbar microdiscectomy has been associated with high rates of success and low postoperative morbidity. The procedure is generally effective for lumbar radicular pain and the success rates in the treatment of sciatic pain has been reported to range from 50–98% [1]. Originally the surgery was described in 1934 by Mixter and Barr, which involved a lengthy midline incision and extensive muscle retraction with full laminectomy [2]. In the 1960's chymopapain injection was used as an alternative to lumbar discectomy which would result in satisfactory outcomes in approximately 75% of treated patients. However, evidence from randomized trials suggested chemonucleolysis was less effective than discectomy. Moreover, there were concerns regarding allergic response to chymopapain. Over the past few years, minimally invasive techniques for posterior spinal surgery have evolved. Newer surgical techniques like digital fluoroscopy, image guidance and high resolution endoscopy have helped with the advancement [3].

In this study, we aimed at describing our experience of operating on patients of lumbar disc herniation with microdiscectomy in terms of operative details, clinical findings and patient centred outcomes. Parameters like postoperative pain, return to activities of daily living and satisfaction with surgery were used to evaluate patient outcomes.

#### Methodology

##### Study Design and setting

The study was performed in the Department of Orthopedics, Lokmanya Hospital Chinchwad and Lokmanya Hospital Nigdi, Pune from August 2002 till May 2004.

During the study period, all patients who were scheduled for microlumbar discectomy for lumbar disc herniation were approached for inclusion in the study. In the abovementioned period, 24 cases were operated in our department and were thus included in the study. Institutional ethics committee approval was sought before enrolling the patients.

All patients first underwent conservative for the minimum period of three weeks, after which they were counselled for operative option. We included patients who had an unremitting sciatica, with or without back pain, and/or a neurological deficit that correlated with appropriate level and side of neural compression revealed on CT or MR imaging. We did not exclude patients who presented with other spinal degenerative conditions such as stenosis or arthritis with herniated disc because their symptoms were suggestive of the herniated disc. Patients with associated bony canal stenosis and spondylolisthesis were excluded. All patients underwent routine investigations for fitness and marker X-ray of the lumbo-sacral spine was taken. As with all surgical procedures, informed consent was obtained and an explanation of risks, alternatives, and benefits was given.

### Data Collection and Data Analysis

We collected personal, demographical and clinical history of the patients. All patients underwent X-ray lumbo-sacral spine anterior-posterior and lateral view on their first visit to the hospital. When improvement in signs and symptoms were not satisfactory with conservative method in three weeks of time the Computed Tomography (CT)-myelography or Magnetic Resonance Imaging (MRI) of lumbo-sacral spine was done. MRI was preferred investigation of choice. The disc prolapse was classified according to the herniation of nucleus pulposus and its anatomic zone. Intra-operatively, level of prolapse and operative time was noted. We also noted the length of hospital stay and any complications experienced by the patient.

For assessing the patients, instruments like Visual Analog Scale (VAS) for pain at the end of first week and return to normal activity of daily living (ADL) and satisfaction with the result of surgery at the end of six months were used. The ability to perform normal activities and work were rated according to a four-part scale in which a grade of 1 was considered excellent (no limitations); 2, good (one or more limitations but most work can be accomplished); 3, fair (one or more limitations that interfere seriously with ADL or work); 4, incapacitated (unable to perform ADL or to work at all). Furthermore, a four-point scale was administered to ascertain a patients satisfaction with the results of surgery and were ranked as very satisfied; satisfied but with minor reservations; partly satisfied but with major reservations; and not satisfied at all. VAS scores were grouped according to successes (scores 0-4) or failures (scores 5-10). For other two four-part scales, scores were counted as successes (1 or 2) or failures (3 or 4). The data was compiled and analysed descriptively using Epi Info software. The frequency tables were prepared and percentages were calculated.

### Results

From August 2002 to May 2004, a prospective study was carried out of 24 consecutive patients with lumbar disc herniation in whom microlumbar discectomy was performed. Majority of the patients were males and average age of the patients was 45.85 years (Table 1). All surgeries were single level microdiscectomy including L5-S1 (33.33%), L4-L5 (62.5%), and L3-L4 1(4.1%). In 3 cases preoperative CT/MR finding did not matched with the intraoperative findings.

Initial first seven microdiscectomy were done without any magnification (naked eye) with additional light source for better illumination, later all cases were done under microscope. All the cases of L4-L5 and L3-L4 discectomy required fenestration of L4 and L3 lamina respectively while only 3 cases of L5-S1 required fenestration of the L5 lamina for the proper exposure of the disc space. Only in 2 cases with central disc herniation interspinous ligaments were excised and lateral part of ligamentum flavum was excised completely in all the cases. Three patients had excessive intraoperative bleeding due to hypertension and improper positioning, but none of them requires postoperative blood transfusion. Operative time on the average was 85 minutes (range 45 to 135 minutes). 83% of the patients had a stay of less than 5 days in the hospital. Disc sequestration and disc exclusion were the most commonly seen types of prolapse. Pre-operatively five patients had a back pain VAS of more than 4 and four patients had a leg pain VAS of more than 4 (Table 2). On assessing the outcome in patients in terms of returning to activities of daily living and satisfaction with surgery only four and five patients had a score more than two respectively (Table 3).

### Discussion

Due to escalating healthcare costs and other costs associated with hospitalization, in most of the spine care center around the world, lumbar microdiscectomy is done as a day care surgery. With the availability of the operating microscope, lumbar microdiscectomy has become less invasive. In our study, however, median hospital stay was 4 days with range 3 to 10 days. Objective assessments in terms of VAS, return to ADL and satisfaction with surgery have been described by various authors in the past. The most important cause of variability in discectomy-related outcomes are differences in patients selection, follow-up time, and the instruments used to measure outcome and their interpretation. The highest discectomy-related rates ranged from 96 to 98% [4], and these successes were reported in a retrospective, report biased publication. In contrast, in most of the literature on this subject, the average or typical success rates were found to be moderate; for example, 73 to 77%, and 70 to 90% [5]. We believe that outcome success rate of 75 to 80% are more realistic than those of 90% or more found in some reports.

In our study, we included patients irrespective of their socio-economic status. Previous studies have suggested that patient age at the time of surgery is not predictive of functional outcomes [6]. However, female gender and increased duration of preoperative symptoms have been independently associated with poor outcomes. Additionally, lower socioeconomic status and education have poorer surgical outcomes when compared with patients with higher status and education. Type of disc herniation also has a significant influence on the functional outcomes of the patients [7]. Small annular tears with large disc fragments have been associated with the best surgical outcomes and lowest reherniation rates.

When performing a single-level lumbar decompressive procedure, avoiding operating at the wrong level is very important [8]. The surgical level cannot be identified accurately by the marker X-ray taken preoperatively as X-ray is taken in supine position with lumbar lordosis while operation is done in prone position with spine flexed. We confirmed the level of surgery after patient is positioned in the Wilson frame via image intensifier, and also counted the level from the below. In our experience computed tomography scan is more helpful in identifying the correct level and for the

proper surgical exposure as it shows bone anatomy more clearly. In our study, one out of 24 patients, we entered in to the wrong level but recognized this at the time of surgery and corrected it. Additionally, there was a case of minor dural tear for which flowing was done except that patient was kept lying down for 5 days. Such tears should be promptly recognized and immediately repaired. Once repair is completed, the integrity of the repair should be tested with Valsalva maneuver. Other complications mentioned in the literature are haemorrhage requiring perfusion, thrombophlebitis, cauda equine syndrome, superficial wound infection, nerve root injury, disc space infection and pulmonary infection [9].

### Conclusion

Lumbar microdiscectomy is very safe and effective means of treating disc herniation related sciatic pain. Proper selection of patients is very important for better surgical outcome as all patients should be counselled for conservative management first. Proper preoperative planning and correct surgical technique can prevent complications in these cases. Future multicentric studies with larger sample size and longer follow up periods are needed to support our findings.

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

Total number of patients	24
Average age (range)	45.85 years (24 to 64 years)
Males	15 (63%)
<b>Level of prolapse</b>	
L3-L4	1 (4%)
L4-L5	15 (63%)
L5-S1	8 (33%)
<b>Operative time</b>	
Less than 60 mins	3 (13%)
60 to 90 mins	13 (54%)
More than 90 mins	8 (33%)
<b>Length of hospital stay</b>	
Less than 5 days	20 (83%)
More than 5 days	4 (17%)
<b>Classification of prolapse</b>	
Central disc bulge	5 (21%)
Lateral disc bulge	3 (13%)
Disc protrusion	3 (13%)
Disc extrusion	6 (25%)
Disc sequestration	7 (28%)
<b>Complications</b>	
Dural tear	1 (4%)
Wrong level of exposure	1 (4%)
Superficial wound infection	1 (4%)

**Table 2:** Pain assessment of patients preoperatively based in Visual Analogue Scale (VAS)

Scale	Back pain	Leg pain
0-2	0	0
3-4	5	0
5-6	10	0
7-8	9	14
9-10	0	1
Preoperative scores		
Less than equal to 4	19	20
More than 4	5	4

**Table 3:** Outcome assessment of the patients

	Less than equal to 2	More than 2
Return to Activities of Daily Living	20	4
Satisfaction with surgery	19	5

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