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ORIGINAL ARTICLE

Endoscopic Vs. Microscopic Discectomy for Single Level Lumber Prolaps Disc Patients

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ABSTRACT

Objective: An endoscopic discectomy and a microdiscectomy for lumbar spine disc disease were compared in a randomized controlled trial.

Material and Methods: This randomized controlled experiment study conducted at the tertiary care hospital of KPK from Jan 2021 to Jan 2022. The study comprised 40 patients suffering from low back discomfort that travels down their legs and who have prolapsed intervertebral discs at the L5-S1 and L4-L5 levels, as shown on magnetic resonance imaging (MRI). They varied in age from 12 to 64. Endoscopic/microscopic discectomy with fluoroscopic guidance was conducted while the patient was laying on his or her back under a general anesthetic. All patients were monitored who spending two hours in the recovery room after surgery before being transferred to the ward. All patients were clinically followed up for a year using the Oswestry disability index (ODI).

Results: There were 22(55%) male patients and 18(45%) female patients, ranging in age from 12 to 64. On average, the patients were 52.5 years old. Thirteen (32.5%) and 27(67.5%) patients had prolapsed discs at the L4-L5 and L5-S1 levels. Patients in the endoscopic and microscopic discectomy groups both improved significantly in their analog visual ratings after surgery. Despite this, A less amount of postoperative pain medication was needed, a shorter length of stay in the hospital, and quicker mobility for the endoscopic discectomy group compared to the microscopic group.

Conclusion: Both endoscopic and microdiscectomy are safe and equally effective procedures. Each of them is capable of relieving. Nonetheless, early mobility and decreased postoperative discomfort were advantages of the endoscopic discectomy.

Keywords: Endoscopic Discectomy, Microscopic Discectomy, Lumbar Prolapse Disc, spinal surgery, Minimally invasive surgery

INTRODUCTION

One of the most common signs of a prolapsed intervertebral disc is discomfort that travels down one or both legs. If the pain is severe enough and does not improve with medication, surgical intervention may be required. The nucleus pulpous and annulus fibrosis make up the intervertebral disc. The nucleus pulposus herniates first, followed by wear and tear in the annulus fibrosus, which causes the disc to prolapse. Sciatica is the name for the back pain that radiates down the legs and affects millions of Patients worldwide.[1] Because of the disc protrusion's pressure on the nerve roots, the roots become inflamed and release inflammatory mediators, which are responsible for the pain.[2] Compression of the spinal cord causes symptoms such as cauda equina syndrome and multiple nerve palsies in patients.[3] The morphological changes within the disc material that cause the discogenic low back pain are the cause of the discomfort.[4] A discectomy may be necessary if this discomfort is correlated with internal morphological abnormalities in the disc. For this, there are several surgical alternatives, including open, microscopic, and endoscopic methods. Due to muscle injury and soft tissue trauma, open surgery has a higher morbidity rate. These muscles are crucial for maintaining segmental stability.[5] Many spine and neurosurgeons think less invasive surgery produces superior outcomes. The lumbar disc may be safely operated on in the "Kambin triangle." according to more excellent knowledge of the architecture of the spinal column.[6] With improved knowledge, this triangular method is currently used to do transforaminal discectomy. Conservative therapy fails to relieve sciatica symptoms in 10–20% of people, who then need surgery.[7]

Open laminectomy is preferred by certain neurosurgeons because they believe it provides superior exposure and anatomical alignment, is the most often done and approved procedure, and has the slightest danger of causing instability or harming facet joints or nerve roots.[8] Endoscopic discectomy has recently been more often used due to its minimally invasive nature, less muscle stress, and quick recovery.[9] The indications are growing presently because of improvements in endoscopic instruments and a more excellent grasp of the procedure. [10]

METHOD AND MATERIALS

This randomized controlled experiment study conducted at the tertiary care hospital of KPK from Jan 2021 to Jan 2022. The tertiary care hospital served as the site of this investigation. The whole outpatient department of 40 patients resulted in ward admissions. and had randomized microscopical and endoscopic procedures while under GA (general anesthesia). Both the endoscopic and microscopic groups used postoperative C arm assistance. All of the Study participants provided their informed consent. The hospital's ethics committee provided the clearance.

Inclusion Requirements: The Study covered both sexes and all Patients with sciatic symptoms between the ages of 12 and 64.

Conditions for Exclusion: Those above the age of 64 were barred from participating in the study. People were ruled medically unfit owing to upper lumbar disc concerns, multilevel disc degeneration, or central disc illness.

Data Collection: Everyone who suffers from low back discomfort that travels down their legs who had positive results on the SLR (straight leg raising test) and either had or did not have any clinical symptoms were extensively examined. The pre-designed performance was filled up with data.

Clinical Management: If the patient was older than 40, all routine blood tests, an X-ray of the chest, and an ECG were performed. A proper evaluation of the lumbosacral spine MRI was conducted. Moreover, a lumbosacral spine X-ray was taken. The Study eliminated Patients over 64 years old, medically unfit, had upper-level disc or multilayer disc degeneration on MRI, or had lumbar discs linked to spinal stenosis. All patients were sent to the neuro ICU for two hours after surgery, and they were then moved to the neuro ward for adequate postoperative treatment. All patients received standard nursing and rehabilitative treatment. The first postoperative day saw the release of every patient. To compare pre- and postoperative discectomies, VAS scales (visual analogue score) and ODI scales (Oswestry Disability Index) were also used (microscopic and endoscopic).

Follow-up: At the OPD, all patients received clinical and radiological monitoring. All patients were monitored during the tenth postoperative day, one month, three months, and six months.

Data Analysis: SPSS version 23.0 was used to input and analyze all of the data. The SPSS version 23.0 program was used to input and analyze the descriptive and numerical data. Using a Chi-square test, we found out whether or not the two groups really were that different. In this study, significance was defined as a p-value of 0.05 or less.

RESULTS

Gender Distributions: We looked at the 40 patients treated in our department between March 2018 and March 2021; of them, 18 (45%) were female, and 22 (55%) were male.

Age Range: Patients' ages vary from 12 to 64 years old. Our patients came to us with sciatic discomfort and low back pain. The patients were 52.5 years old on average.

Clinical Presentation: Thirteen patients (32.5%) had disc prolapse at L4-5 levels, whereas 27 patients (67.5%) had prolapsed discs at L5 S1 levels. We performed a randomized endoscopic/microscopic discectomy. In this Study, we compared the results of microscopic and endoscopic discectomies on patients. We checked up on the patients in three weeks, three months, and six months (Table 4).

Comparison: After surgery, both endoscopic and microscopic discectomies significantly improved VAS and ODI ratings. Less time was spent in the hospital, there was earlier mobility, and fewer analgesics were used in the endoscopic discectomy group (Tables 1, 2). The outcomes of the two groups are compared in Table 3, which demonstrates that both strategies provide exceptional and fruitful outcomes.

Table-1: Symptom Assessment Scale (Visual Analog Score).

Technique	Mean Preoperative VAS	Mean Postoperative VAS
Endoscopic	6.9	3.1
Discectomy		
Microscopic	7.1	4.45
Discectomy		

Table-2: Average Oswestry Disability Index, as shown in Table 2, (ODI).

Technique	Mean ODI Preoperative	Mean ODI Postoperative
Endoscopic	65.1	22.50
Discectomy		
Microscopic	66.3	24.30
Discectomy		

Table 3: Below is the endoscopic and microscopic ODI score tables.

ODI Score	Microscopic	Endoscopic	Chi-Square ($\square^2$) and p-value
Excellent(0-20)	37.5% (15)	32.5% (13)	0.445; p-value: 0.499
Good (21 – 40)	62.5% (25)	67.5% (27)	
Fair (41 – 60)	0	0	
Poor (> 60)	0	0	

Table 4: Compare Endoscopic vs Microscopic groups

Total No of Patients=40		Endoscopic discectomy group	Microscopic discectomy group	Total
Gender	Male Female	16 (40%) 11 (27.5%)	6 (15%) 7 (17.5)	22 (55%) 18 (45%)
Age group	12-29 30-45 46-64	6 (15%) 8 (20%) 13 (32.5%)	3 (7.5%) 4 (10%) 6 (15%)	9 (22.5%) 12 (30%) 19 (47.5%)
Duration	3week's 3month's 6month's	13(32.5%) 8 (20%) 5 (12.5%)	7 (17.5%) 3 (7.5%) 4 (10%)	20 (50%) 11 (27.5%) 9 (22.5%)
Prolapsed discs	L4-L5 L5-S1	9(22.5%) 17 (42.5%)	4 (10%) 10 (25%)	13 (32.5%) 27 (67.5%)

DISCUSSION

As a minimally invasive procedure with a good prognosis, endoscopic discectomies are performed at our clinic for lumbar disc disease. The Study concludes to the fact that endoscopic spine operations are safer, need less recovery time, and require less intrusive surgery, and have positive results.[11] We also observed that, compared to microscopic discectomy, Since less muscle, soft tissue, and bone was cut during endoscopic surgery, our patients recovered more quickly and with less pain, and nerve roots. In our Study, endoscopic discectomy had a smaller incision than microscopic discectomy, which also required more significant retraction of muscles and bone work. In a different trial, they performed a microdiscectomy with a large incision, a retractor, further bone work, and partial ligamentum flavum removal.[12] Our study found that Patients who had either endoscopic or microscopic discectomy reported significant postoperative improvement in radicular pain and no recurrence of symptoms. Nonetheless, other studies have shown a return of postoperative discomfort after endoscopic discectomies, which contradicts our findings. They assert that severe epidural fibrosis creating compression over the nerve roots may be to blame for the pain returning.[13] Several reported endoscopic discectomies have complications cases when the first durotomy failed and open surgery was required, such as those with pseudo meningocele, meningitis, or discitis.[14, 15] In our Study, there were no such problems, and no endoscopic discectomy cases required conversion to open surgery. According to a culture report, three patients had wound infections Dressing changes were used to treat and intravenous antibiotics. We monitored our patients for up to a year to look for any return of symptoms, but none were found. In their investigation, Xu, et al. also reported that there were no such problems or recurrences. Nevertheless, they reported the nerve root damage Hsu, et al. in further Study. We did not record any cases of durotomy in our patients, despite Sencer et al.[16] noting 5.8% odds of iatrogenic durotomy in their Study. Many studies have noted a 3–4% recurrence incidence.[17]

Table 5: safety after surgery

Variables		Yes	NO	Total
Surgical site infection	Male Female	3(7.5%) 2(5%)	19(47.5%) 16(40%)	22(55%) 18(45%)
Nerve Complication	Male Female	2(5%) 1(2.5%)	20(50%) 17(42.5%)	22(55%) 18(45%)
Early Mobilization	Endoscopic Microscopic	24(60%) 4(10%)	3(7.5%) 8(20%)	27(67.5%) 13(32.5%)

Limitations: My study's main drawbacks include its single-center design, limited sample size, and short follow-up period. A more significant multicentric investigation with a sizable patient population is necessary to develop the viewpoint and suggestions fully.

CONCLUSION

Both endoscopic and microscopic lumbar discectomies are safe and effective over the long term after surgery. It was shown that endoscopic discectomy had better short-term results than microscopic discectomy because of quicker mobilization and less postoperative pain. In the hands of several people with a thorough understanding of spinal anatomy, the endoscopic procedure is secure.

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