

ORIGINAL RESEARCH

Effectiveness of percutaneous endoscopic lumbar discectomy in managing of lumbar disc herniation cases

¹Dr. Sumit Mehra, ²Dr. Praveen

¹Assistant Professor, Department of Orthopedics, Rajshree Medical Research Institute, Bareilly, Uttar Pradesh, India

²Associate Professor, Department of Orthopedics, Rohilkhand Medical College & Hospital, Bareilly, Uttar Pradesh, India

Corresponding Author

Dr. Praveen

Associate Professor, Department of Orthopedics, Rohilkhand Medical College & Hospital, Bareilly, Uttar Pradesh, India

Email: drpraveen2@gmail.com

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ABSTRACT

Introduction: We reviewed data and methodically compared the effectiveness and safety of UBE discectomy and traditional endoscopic discectomy in the treatment of LDH. **Material and Methods:** In the current study, there were 25 females and 33 males. After getting written agreement, everyone was enrolled in the investigation. Age, gender, name, and other information were all recorded. Preoperative magnetic resonance imaging (MRI) and X-rays of the lumbosacral spine were performed on all patients. **Results:** Approach was trans foraminal in 34, inter laminar in 16 and combined in 8. Outcome was excellent in 25, good in 18, fair in 10 and poor in 5. The difference was significant ($P < 0.05$). age group 30-40 years had 8, 40-50 years had 13, 50-60 years had 14 and >60 years had 23 patients. The difference was significant ($P < 0.05$). **Conclusion:** Patients in the UBE group were discharged from the hospital quicker than those in the control group and spent less time there overall. The management of cases with lumbar disc herniation using percutaneous endoscopic lumbar discectomy has been found to be safe.

Keywords: lumbar disc herniation, lumbar discectomy Back pain, sciatica

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INTRODUCTION

Back pain and sciatica are frequently brought on by lumbar disc herniation. Around 80% of people experience low back pain (LBP) at least once in their lifetime.¹ The most frequent cause of LBP, which has a wide range of potential causes, is intervertebral degeneration, which results in degenerative disc disease and lumbar disc herniation (LDH). Therefore, it is crucial to have a thorough grasp of LDH, its causes, and how to treat it effectively.²

Minimally invasive surgery is frequently used to treat patients with free LDH, however because the herniated nucleus pulposus tissue is free in the spinal canal, a precise and readily observable method is required.³ Percutaneous endoscopic lumbar discectomy is the minimally invasive surgery most frequently utilized to treat free LDH, however due to the procedure's relatively restricted field of view and

limited tool mobility in the working channel, significant spinal canal exploration is not possible.^{4,5}

The effectiveness of unilateral double-port endoscopic (UBE) and traditional endoscopic discectomy in the management of free LDH has been demonstrated.⁶ According to some research, UBE features a sizable, adaptable operating area that is simple to use, with a wide range of visualization that enables exploration of all spinal canal directions and portions. This makes the entire spinal canal easier to explore and decompress.^{6,7}

Only single-segment lumbar disc herniations were first treated with traditional endoscopic discectomy. As a result of the advancement of this technology, some patients with double- or multi-segment lumbar disc herniations have been treated with standard endoscopic discectomy. With two-level or multi-level lumbar disc herniations, the least invasive benefits of

classic endoscopic discectomy may be more apparent due to the extent of the surgical trauma. In order to provide a reference for clinical application, we reviewed data and methodically compared the effectiveness and safety of UBE discectomy and traditional endoscopic discectomy in the treatment of LDH.

MATERIALS & METHODS

The study included patients with disc prolapse with neurologic deficit, disc prolapse with failed conservative treatment lasting six weeks, and patients with Cauda equina syndrome. In the current study, there were 25 females and 33 males. After getting written agreement, everyone was enrolled in the investigation. Age, gender, name, and other information were all recorded. Preoperative magnetic resonance imaging (MRI) and X-rays of the lumbosacral spine were performed on all patients. Clinical follow-up was conducted at intervals of one month, three months, six months, one year, and then annually after that.

INCLUSION CRITERIA

The following standards must be met for articles to be included in this meta-analysis in accordance with the PICOS principle:

1. **P (participants):** LDH sufferers.
2. **I (interventions):** Lumbar spine surgery with minimally invasive techniques.
3. **C (comparisons):** UBE discectomy was used for the UBE group's comparisons, whereas conventional UBE discectomy was used for the control group.
4. Pain, intraoperative hemorrhage, the Oswestry Dysfunction Index (ODI), and the visual analogue scale (VAS) of complications are all examples of 4. O (outcomes).
5. **S (study design):** RCT research with thorough available data and at least three assessment indicators chosen for this analysis.

Table 1: Age wise distribution

Age group(Years)	Number	Pvalue
30-40	8	0.023
40-50	13	
50-60	14	
>60	23	

Table2 shows that approach was trans for aminor in 34, inter laminar in 16 and combined in 8. Outcome was excellent in 25, good in 18, fair in 10 and poor in 5. The difference was significant (P<0.05).

Table 2: Patient parameters

Variables	Parameters	Number	Pvalue
Approach	Transfor aminor	34	0.01
	Inter laminar	16	
	Combined	8	
Outcome	Excellent	25	0.02
	Good	18	
	Fair	10	
	Poor	5	

EXCLUSION CRITERIA

Articles were excluded from the meta-analysis if they met any of the following exclusion criteria:

1. had a follow-up time <6 months, concerned a similar study published within the same period at the same institution, concerned a single-arm study without a control group, concerned a case report or a review, was a duplicate publication, the full text was unavailable, or serious complications were observed in the study subjects before or during the study;
2. included patients with a history of tuberculosis, inflammation, tumor, etc.
3. included patients who showed degenerative changes, such as calcification, severe adhesions, lumbar instability, or hypertrophy of the ligamentum flavum, or patients who had cauda equina syndrome, or patients who had a combination of serious medical diseases in the lesioned segment.

STATISTICAL ANALYSIS

The Oswestry Disability Index, visual analog scale, and modified Macnab's criteria were used to evaluate the outcome. The student's t test was used to analyze the results, and the level of significance was set at 0.05. The t-test of two independent samples is used to assess the variation between the random effects model and the fixed effects model in the point estimate and interval estimation of the combination values, and to analyze the sensitivity, if it is caused by clinical factors or research methodologies. Race, test technique, population, and other factors can all contribute to heterogeneity.

RESULTS

Table 1 shows that age group 30-40 years had 8, 40-50 years had 13, 50-60 years had 14 and >60 years had 23 patients. The difference was significant (P< 0.05).

DISCUSSION

Patients with LDH that develops into free LDH should be treated with surgery as early as possible, as untimely treatment is likely to place pressure on patients' nerves and may even lead to the development of cauda equina syndrome, which is more difficult to treat.⁸ Common procedures, such as percutaneous single-channel laminectomy and percutaneous endoscopic lumbar discectomy, are minimally invasive and have low complications, and have been shown to have certain efficacy in clinical practice.⁹ However, they also have problems, such as a small operative field and a limited decompression range.¹⁰ The results of our study showed that the UBE technique can safely and effectively treat patients with free LDH. Although many studies have shown the efficacy of PELD with good clinical outcome, the percutaneous approach poses challenges to surgeons and the PELD, the learning curve is usually perceived to be steep.¹¹ Major complications such as nerve root injury, dural tear, haematoma, visceral injury, vascular injury, and infection may occur, possibly resulting from lack of skilled surgical techniques during the learning period. The NP is primarily composed of type II collagen, which accounts for 20% of its overall dry weight.¹² In contrast, the AF functions to maintain the NP within the center of the disc with low amount of PG; 70% of its dry weight is comprised of primarily concentric type I collagen fibers. In LDH, narrowing of the space available for the thecal sac can be due to protrusion of disc through an intact AF, extrusion of the NP through the AF though still maintaining continuity with the discs space, or complete loss of continuity with the disc space and sequestration of a free fragment.¹³ Since we started using this technique at the end of 2020, we found that there are still many intraoperative difficulties and shortcomings that require attention and improvement. For example, to avoid positioning errors when establishing the working channel. Fluoroscopy should be confirmed at the inferior edge of the vertebral plate using a positioner, and a C-arm should also be used for preoperative positioning.¹⁴ Since the small arterial plexus near the small articular processes of the vertebral body is more abundant, it is easy to cause bleeding during blunt separation, resulting in a blurred visual field.¹⁵ To ensure a clearer visual field during the procedure and the safety of the subsequent surgery. The use of plasma RF tip and hemostatic material filling is an effective method of controlling intraoperative bleeding.¹⁵ As the UBE technique requires continuous flushing to guarantee a clear visual field, the pressure of the salt solution used must be controlled at 25–30 mmHg; if the pressure is too low, the visual field will become blurry, and if the pressure is too high, the internal pressure will increase, causing irritation, which may cause the patient to suffer from headache and other symptoms after awakening from the anesthesia.¹⁶ In addition, gravity-guided salt solution flushing should

be chosen over an infusion pump where possible, as the continuous infusion of a salt solution will elevate the pressure if the solution outflow is obstructed when an infusion pump is used.¹⁷ Intervertebral discs can be treated with the UBE technique by removing parts of the upper and lower vertebral bodies. Nonetheless, removing too much of the plate may cause lumbar instability and recurrent low back pain.¹⁸

Surgically, we tend to treat the articular eminence joint in a minimal manner, treating only a part of the superior lamina. It is also important to preserve the inferior lamina as much as possible, so the yellow way can be broken into the dural surface, which is less harmful.¹⁹ Dural tears are the most likely complication of this approach. This was primarily due to the operator's discomfort with the endoscope's two-dimensional plane during the early stages of the study, because it is easy to injure during the breaking of the yellow and the removal of the ligamentum flavum, this procedure requires careful manipulation in order to avoid injury. In order to remove as much ligamentum flavum as possible along the nerve root's path, the dura must be carefully separated from the ligamentum flavum.²⁰ In addition, grinding drills should be used with caution to prevent tears in the peridural fibrous bands and vascular bundles from becoming entangled in the necks of the grinding drill.²¹

The outcome of day surgery is identical to that of traditional surgery. As a result, there was no connection between hospital stay and surgical results. The operator's operation may be one of the primary elements impacting the result of surgery.

CONCLUSION

LDH was treated with UBE discectomy, and positive clinical outcomes were attained. Particularly, patients in the UBE group were discharged from the hospital quicker than those in the control group and spent less time there overall. UBE discectomy can therefore be marketed in clinics and has a specific standard of reference. The management of cases with lumbar disc herniation using percutaneous endoscopic lumbar discectomy has been found to be safe.

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