

## Out Come of Endoscopic Discectomy

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### ABSTRACT

**Objectives:** To evaluate the outcome of endoscopic discectomy, in terms of symptomatic recovery in patients with unilateral and monosegmental nerve root compression due to prolapsed, sequestered or migrated disc in lumbar spine.

**Study Design:** This was a descriptive case series.

**Setting:** Department of Neurosurgery, Lahore General Hospital, Lahore.

**Materials and Methods:** This study included 35 patients with symptomatic lumbar disc herniation. All the patients were treated with endoscopic discectomy. The outcome was determined at 6 months follow up based on McNab's classification system. Duration of study was 1 year from June 2014 to June 2015.

**Results:** According to McNab's classification system, 31(88.57%) patients had successful outcome including excellent and good results. Discitis was seen among 3 (8.57%) patients, dural tear in 3(8.57%) patients and recurrence in 1(2.86%) patient.

**Conclusion:** Endoscopic Discectomy is a safe and effective treatment modality for patients with unilateral and monosegmental lumbar disc herniation.

**Key words:** Lumbar disc herniation, endoscopic discectomy.

### INTRODUCTION

Disc herniation was described for the first time by Mixter and Barr in 1934. They defined it as a posterior rupture of the intervertebral disc allowing the nuclear material to leak in the spinal canal and cause compression of the adjacent spinal root (Mixter et al., 1934).<sup>1</sup>

Approximately, 10% of the patients who have backache suffer from lumbar disc herniation (Battie et al., 2006).<sup>2</sup> In about 90 – 96% of all patients with herniation of the lumbar disc, the herniation occurs at the level of L<sub>4-5</sub> and L<sub>5</sub> – S<sub>1</sub> (Battie et al., 2006;<sup>2</sup> Rehman et al., 2007). To confirm the diagnosis of disc herniation for a patient experiencing sciatic pain the patient's history, including description of symptoms, the physical examination and the results of imaging investigations (CT or MRI) are evaluated. Diagnostic tools for lumbar disc herniation includes Magnetic Resonance Image (MRI), Computed Tomographic Scan (CT scan), and Myelography, either a lone or in

different combinations, as the occasion demands (Haughton V, 2006; Lurie JD et al., 2008). Among these, MRI is considered as investigation of choice because it exquisitely delineates herniated discs and their relationship with adjacent soft tissues. The accuracy of MRI for predicting the presence of disc herniation at surgery is relatively high (varying from 76% to 96%) (Lurie JD et al., 2008; Van Rijn CJ et al., 2005).

All the patients suffering from sciatic pain due to herniation of the lumbar disc should be given a trial of conservative therapy except for those with cauda equina syndrome or severe and progressive limb weakness. The results of conservative therapy usually depend on the type of herniation. Surgical treatment is offered to the patients who do not recover from the symptoms with medical therapy. Various surgical treatment modalities have been devised to deal with prolapsed intervertebral disc. Laminectomy and hemi laminectomy

for open discectomy had been the standard approaches for decades. Although, good outcomes have been reported by many authors in the past with open discectomies, this procedure is not out of risk of complications such as intra-operative complications (like nerve root injury, postoperative perineural scarring and fibrosis) and postoperatively prolonged hospital stay and pain (Awad JN et al., 2006).<sup>1</sup> The advancement in the instrument design and optical principles led to the successful use of an endoscope for the removal of disc material through the interlaminar approach. Available evidences with this technique showed encouraging results (Jhala et al., 2010). With endoscopic discectomy the extruded or sequestered disc material can be removed with minimal manipulation of the nerve root. The advantage of endoscopic discectomy over open techniques is that it involves a posterior approach without muscle cutting, thus minimizing injury to the ligaments and muscles of the spine which facilitates early rehabilitation, reduction in duration of hospital stay and early return to work (Tzaan WC, 2007; Lee SH et al., 2006; Peng CWD et al., 2009). The small surgical scar, less intra operative blood loss, early ambulation and less average duration of hospital stay are quoted benefits of microendoscopic discectomy (Sharma P et al., 2011).

The trend of treating lumbar disc herniation with endoscopic discectomy is becoming popular throughout the world. Studies have shown that this is a safe procedure and it has shown successful outcome. The endoscopic discectomy has gained widespread acceptance as minimal invasive surgery for lumbar disc herniation but some authors have reported the incidence of complications like dural tear, nerve root injury and recurrence which is attributed to the initial difficulty in judging the depth of surgical field (Takahashi H et al., 2014). However, still many neurosurgeons rely on conventional open surgery. These highlight the need for clinical trials in this context to present the outcome of endoscopic discectomy in our setup.

**MATERIALS AND METHODS**

This study was conducted at the Department of Neurosurgery Lahore General Hospital Lahore from June 2014 to June 2015.

**RESULTS**

There were total thirty five patients included in this study.

**Distribution of Patients by Age**

In this study, the mean age of the patients was 42.71 years with standard deviation of  $\pm 11.38$  years (range: 20 to 65 years). There were 6 (17.14%) patients of age range of 20 – 30 years, 9 (25.71%) patients of age range of 31 – 40 years, 10 (28.57%) patients of age range of 41 – 50 years, 8 (22.85%) patients of age range of 51 – 60 years and 2 (5.71%) patients of age range of 61 – 65 years (Table 1).

**Distribution of Patients by Gender**

There were 23 (65.71%) male patients and 12 (34.29%) female patients in the study. The female to male ratio was 1: 1.92.

**Table 1:** *Distribution of patients by age (n = 35).*

Age in Years	No. of Patients	Percentage
20 – 30	06	17.14%
31 – 40	09	25.71%
41 – 50	10	28.57%
51 – 60	08	22.85%
61 – 65	02	5.71%
Mean	42.71 years	
Standard Deviation	$\pm 11.38$ years	
Range of age	20 – 65 years	

**Distribution of Patients by Results of Surgery on McNab’s Classification**

The results of surgery were excellent among 13 (37.14%) patients, good among 18 (51.43%) patients, fair among 3 (8.57%) patients, and poor among 1 (2.86%) patients (Table 2).

**Table 2:** *Distribution of patients by Results based on McNab’s Classification (n = 35).*

Results	No. of patients	Percentage
Excellent	13	37.14%
Good	18	51.43%
Fair	3	8.57%
Poor	1	2.86%

**Distribution of Patients by Duration of Hospital Stay:**

In this study, the mean duration of hospital stay after the procedure was 4 days with standard deviation of  $\pm 2.54$  days. There were 31 (88.57%) patients with duration of 1 – 7 days and 4 (11.43%) patients with duration of 8 – 28 days (Table 3).

**Table 3:** *Distribution of patients by duration of hospital stay (n = 35).*

Stay in Days	No. of Patients	Percentage
1 – 7	31	88.57%
8 – 28	4	11.43%
Mean	4	
Standard Deviation	$\pm 2.54$	
Range of days	1 – 28	

**Distribution of Patients by Post Operative Day of Mobilization**

The mean post operative day for the mobilization of patients after the procedure was 2<sup>nd</sup> post operative day with standard deviation of  $\pm 1.48$  days. There were 28 (80%) patients who were mobilized on 1<sup>st</sup> – 2<sup>nd</sup> post operative day, 3 (8.57%) patients mobilized on 3<sup>rd</sup> – 7<sup>th</sup> post operative day and 4 (11.43%) patients mobilized on 8<sup>th</sup> – 28<sup>th</sup> post operative day (Table 4).

**Table 4:** *Distribution of patients by post operative day of mobilization (n = 35).*

Post Operative Day	No. of Patients	Percentage
1 – 2	28	80%
3 – 7	3	8.57%
8 – 28	4	11.43%
Mean	2	
Standard Deviation	$\pm 1.48$	
Range of days	1 – 28	

**Distribution of Patients by Successful Outcome**

Based on the results of McNab’s classification, the outcome was successful among 31 (88.57%) patients and was unsuccessful among 4 (11.43%) patients.

**Distribution of Patients by Complications**

Wound infection was seen in 1 (2.86%) patient, discitis among 4 (11.43%) patients, dural tear among 3 (8.57%) patients and no complications were seen among 27 (77.14%) patients (Table 5).

**Table 5:** *Distribution of patients by Complications (n = 35).*

Complications	No. of patients	Percentage
Wound Infection	1	2.86%
Discitis	3	8.57%
Dural Tear	3	8.57%
Recurrence	1	2.86%
None	27	77.14%
Total	35	100%

**DISCUSSION**

This study was conducted among 35 patients with lumbar disc herniation who received treatment with endoscopic discectomy and the results of the study were in favor of the technique with a high frequency of successful outcome i.e. 88.57%. The incidence of lumbar disc herniation is very high but the current study was performed on patients with disc herniation at the lower lumbar spine i.e. L<sub>4</sub> – L<sub>5</sub> and L<sub>5</sub> – S<sub>1</sub> levels. Moreover, the endoscopic procedure performed in this study is applicable only for the unilateral and mono-segmental lumbar disc herniation.

A study was conducted by Ju C and his colleagues (Ju C et al., 2009)<sup>6</sup> in which the outcome of lumbar discectomy was studied among 26 patients with lumbar disc herniation. This study dominated the female population, while our study dominated the male population. The male to female ratio was 1:1.28. The age range of this study was from 20 to 70 years. Like our study, they adopted the McNab’s criteria as the outcome parameter. Mean follow-up was 6.37 month. In their study, 23.1% patients showed excellent outcome, 65.4% patients showed good outcome, 5.5 patients showed fair outcome and 3.8% patients showed poor outcome. Thus the successful outcome in their study was seen in 88.5% cases (23 patients). The results of this study are comparable to the results of our study as the successful outcome in our study was seen in 88.57% cases with maximum cases having good outcome i.e. in 51.43% followed by excellent outcome in

37.14%. They also showed improvement in pain.

Lee DY and coworkers (Lee DY et al., 2006)<sup>10</sup> conducted a study to analyze the surgical outcomes in 46 consecutive adolescent patients between 13 and 18 years of age (mean age, 16.5 years) with single level lumbar disc herniation. The mean follow-up duration was 37.2 months. They analyzed the outcome of patients in VAS and McNab's criteria. In terms of the McNab criteria, 91.3% of the cases showed excellent and good outcome. The results of this study were also comparable with our study i.e. 88.57%.

Amith Jhala and Mistry (Jhala A et al., 2010)<sup>4</sup> conducted a study of endoscopic discectomy on 100 consecutive patients of age range of 19 – 65 years with herniation of the lower lumbar discs. Patients were evaluated by using McNab's classification. The follow up duration was 2, 6, and 12 weeks. 91% of cases showed successful outcome. 4 patients had recurrence; 3 of them were re-operated.<sup>4</sup> The results of this study were also encouraging and validated the results of our study.

In our study, McNab's score was used to measure the outcome parameter. McNab's criteria was also used by Ju C (Ju C et al., 2009),<sup>6</sup> Lee DY (Lee DY et al., 2006)<sup>9</sup> and Amith Jhala (Jhala A et al., 2010) and Pain Visual Analogue Scale (VAS). VAS was also used by Ju C.<sup>6</sup> Amith Jhala have also used MRI to see complete decompression. All of these outcome parameters are reliable. We preferred McNab's criteria as it is simple to apply and can be completed on follow up of the patient in outpatient department without need of any investigations. So, it may be cost effective in our developing country with limited resources, where majority of patients belong to poor socioeconomic status.

Post operative MRI was done in all the patients enrolled in the study on two weeks follow up to check the adequacy of decompression. In 34 (97.14%) patients, we found that there was no residual disc material or thecal compression. In 1(2.86%) patient, however, the residual disc material was found on post operative MRI compressing the thecal sac at L<sub>4</sub> – L<sub>5</sub> level, That patient was later on operated through open laminectomy.

The overall failure rate was seen among 4 (11.43%) patients. Of these 4 patients with failure, discitis was seen among 3 (8.57%) patients and recurrence in 1 (2.86%) patient. Study by Amith Jhala<sup>4</sup> has reported a much less rate of discitis i.e. 4% and even was less in study by Peng CWB i.e. 1.8%.<sup>12</sup>

We managed all the cases of discitis conserva-

tively. Amith Jhala<sup>4</sup> also managed most of the cases of discitis conservatively; however, in their study one patient had second procedure i.e. fusion for relief of pain.<sup>4</sup>

Dural tear was observed among 3 (8.57%) patients in our study. When compared to the rate of the complications in the study by Perez – Cruet (Perez – Cruet MJ et al., 2002)<sup>13</sup> it was 5%. All the patients with dural tear in our study healed spontaneously after water tight closure of the wound. These 3 patients fell in the category of good outcome according to McNab's classification.

Wound infection was seen in 1 (2.86%) patient who was treated with antibiotics. So, that patient also fell in the category of good outcome according to McNab's classification. No nerve root injury was noticed in our study, while study by Amith Jhala (Jhala A et al., 2010)<sup>4</sup> showed that in 1 (1%) patient the L<sub>5</sub> Root was damaged who developed paresthesia in L<sub>5</sub> distribution.

The complications we faced were because of the initial learning curve. The spinal endoscopic technique has a long learning curve due to orientation with scope, two dimensional vision, depth of the operative field and less space available for dissection.<sup>15</sup>

One of the patients in our study had sciatica with severe intermittent claudication. The claudication subsided after successful L<sub>4,5</sub> discectomy. Another patient in the study had left sided foot drop which showed improvement at one month and successive follow ups. It was also observed that sacral sensations were to restore immediately after the successful discectomy.

## CONCLUSION

The successful outcome with endoscopic lumbar discectomy is promising. It is a safe and effective technique to relieve symptoms of herniated lumbar disc. It is recommended that this technique should be attempted among all suitable patients with lumbar disc herniation in our setup.

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