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Assessment of Prolapse Lumber Intervertebral Disc Surgery: An Observational Study

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Abstract

Background: *The prolapsed lumbar intervertebral disc (PLID) commonly causes low back pain and radiculopathy, often necessitating surgery when conservative treatments are ineffective. Surgery aims to relieve nerve compression, alleviate pain, and restore function, with outcomes influenced by factors like patient age, disc herniation severity, and surgical Methods. This study aimed to evaluate the surgical procedures of prolapsed lumbar intervertebral disc.*

Methods: *This prospective observational study was conducted in the Department of Department of Orthopaedic Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from 26 March 2021 to 21 July 2022. A total of 87 patients with low back pain who underwent surgical treatment for prolapsed lumbar intervertebral disc (PLID) were purposively selected for this study. The data were processed, analyzed, and disseminated using MS Office tools.*

Results: *The L4-L5 level was affected in nearly two-thirds of patients (63.2%) in most of the cases (63.2), left-side involvement was observed. Fenestration discectomy was performed in the majority of cases (72%) and combined surgical procedures were utilized in 14.9% of cases. In evaluating radicular pain, we observed a statistically significant reduction ($p< 0.001$) in VAS scores from the preoperative period to the 6-month follow-up. As per the Modified Macnab outcome criteria assessment, excellent and good outcomes were found in 71% and 17% of the participants. Additionally, fair and poor outcomes were in 8% and 4% of the cases respectively.*

Conclusion: *The left side and the L4-L5 level are the most susceptible to the occurrence of prolapsed lumbar intervertebral disc (PLID). Fenestration discectomy is a commonly used surgical method for managing PLID. Surgical procedures have shown significant improvement in recent times.*

Keywords: *Low back pain, Lumbar vertebrae, PLID, Prolapse lumber intervertebral disc, Spine, Surgery.*

1. Introduction

Lumbar disc herniation is the primary cause of most back pain cases, with an increasing number of individuals from various age groups being diagnosed with prolapsed lumbar intervertebral disc (PLID) [1]. Low back pain resulting from a prolapsed lumbar intervertebral disc (PLID) is a leading cause of disability and poses a significant health concern [2]. A thorough evaluation of PLID is essential for effective treatment, as improper medical or surgical interventions can worsen the patient's condition and increase their suffering [3]. A comprehensive medical evaluation is necessary

before initiating any treatment in these patients; an insufficient medical or surgical intervention may worsen symptoms, heightening the risk of complications [4]. Emerging focus areas include surgical approaches for degenerative scoliosis and the rising number of anterior lumbar spine procedures. Spinal anesthesia for prolapsed lumbar intervertebral disc (PLID) surgery is gaining popularity due to its benefits, such as allowing patients to comfortably self-position and reducing the risk of neurological injury associated with prone positioning under general anesthesia. Additionally, PLID surgery is considered a relatively cost-effective surgical option [5]. Lumbar discectomy is typically performed under general anesthesia, which can lead to various perioperative complications such as nausea, vomiting, atelectasis, pulmonary aspiration, and extended recovery time post-anesthesia; performing the procedure under spinal anesthesia may potentially reduce the incidence of these complications [6]. Discectomy via fenestration remains the most common approach for managing PLID when conservative treatment fails [3]. Primary discectomy generally provides good outcomes, but revision surgery tends to have less reliable results and higher risks [7,8]. Recurrence rates reported in various studies range from 3% to 19% [9,10]. The major objective of this current study was to evaluate the surgical procedures of prolapsed lumbar intervertebral disc.

2. METHODOLOGY

This was a prospective observational study that was conducted in the *Department of Orthopaedic Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh* from *26 March 2021 to 21 July 2022*. A total of 87 patients with low back pain who underwent surgical treatment for prolapsed lumbar intervertebral disc (PLID) were purposively selected for this study. The entire intervention was carried out following the principles of human research outlined in the Helsinki Declaration [11] and adhered to all relevant regulations, including the General Data Protection Regulation (GDPR) [12]. Proper written consent was obtained from all participants before data collection. All patients were classified under ASA grades I-III. A thorough perioperative assessment was conducted, documenting anesthetic complications, intraoperative events, the pace of physiological and functional recovery, and patient satisfaction. Variables recorded included pain levels using a visual analog scale (VAS) at pre-operative and 6-month follow-up stages; patient satisfaction levels during the hospital stay; duration of surgery; and intraoperative blood loss. The functional outcomes were assessed by Modified Macnab outcome criteria (Macnab, 1971). Data were analyzed using SPSS version 23.0.

3. RESULT

In this study, most participants (55.2%) were in the 41-60 years' age group, followed by 33.3% from the 18-40 years' age group, and the remaining 11.5% were over 60 years old. Among the total of our participants nearly two-thirds (68%) were male and the rest 32% were female. In analyzing the levels of disc prolapse, we found that the L4-L5 level was affected in nearly two-thirds of patients (63.2%), while the L5-S1 level was involved in approximately one-third of cases (32.2%).

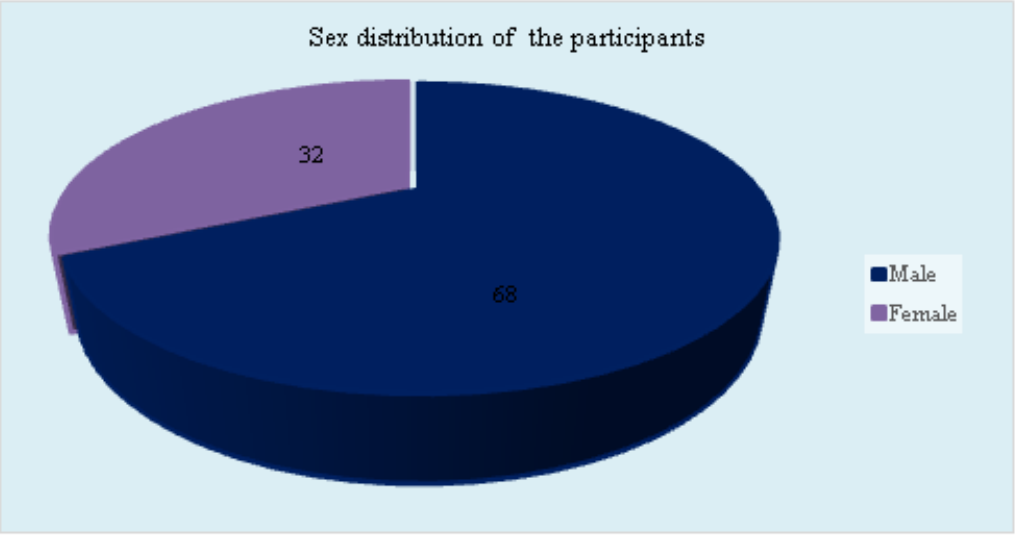

Figure 1. *Pie chart showed gender wise participant'sdistribution(N=87)*

In this study, in most of the cases (63.2%), left-side involvement was observed; in nearly one-third of cases (31%) right side was involved. In this study, fenestration discectomy was performed in the majority of cases (72%). Meanwhile, laminectomy was applied in 12.6% of patients, and combined surgical procedures were utilized in 14.9% of cases. In evaluating radicular pain, we found that the preoperative mean ± SD VAS (Visual Analog Scale) score was 5.7 ± 0.9, and at the 6-month follow-up, it had decreased to 1.6 ± 0.6, a statistically significant improvement ($p<0.001$).As per the Modified Macnab outcome criteria assessment, in this study, excellent and good outcomes were found in 71% and 17% of the participants. Additionally, fair and poor outcomes were in 8% and 4% of the cases respectively.

Table 1. *Age distribution of participants (N=87)*

Age (Year)	n	%
18-40	29	33.3%
41-60	48	55.2%
>60	10	11.5%

Table 2. *Levels of disc prolapse (N=87)*

Level	n	%
L3-l4	4	4.6%
L4-l5	55	63.2%
L5-s1	28	32.2%

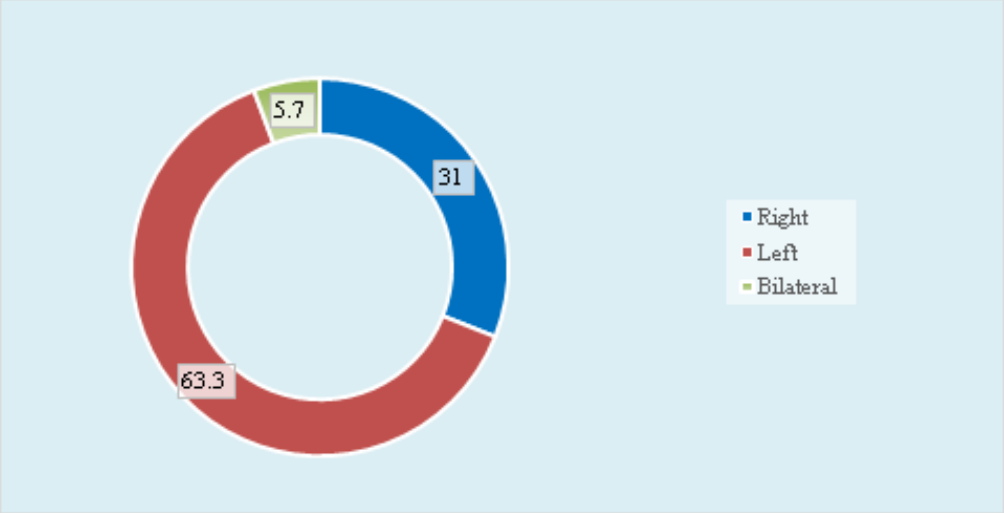

Figure 2. *Ring chart showed side involvement wise participant's (N=87)*

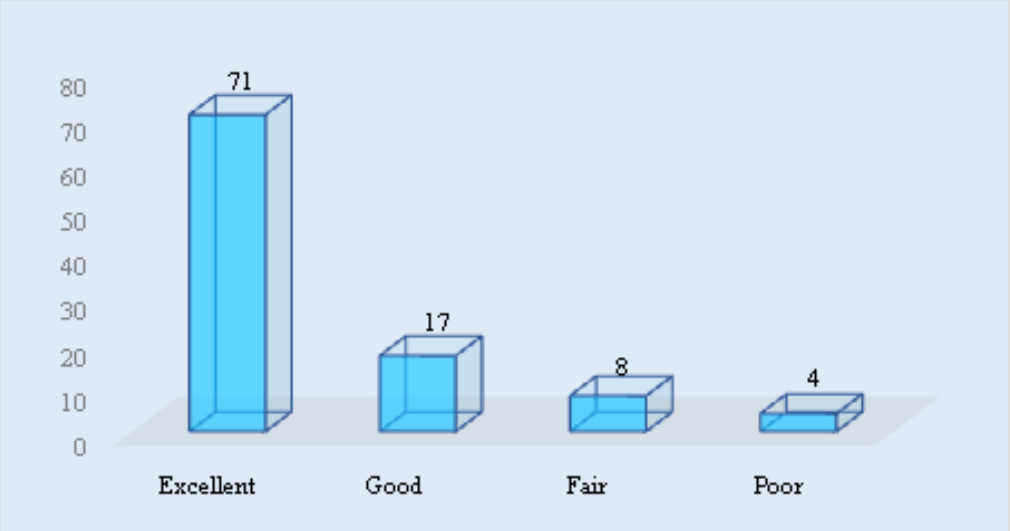

Figure 3. *Column chart showed outcomes of theparticipant's(N=87)*

Table 3. *Types of surgery (N=87)*

Surgery	n	%
Laminectomy	11	12.6%
Fenestration discectomy	63	72.4%
Combined	13	14.9%

Table 4. *Radicular pain assessment (N=87)*

Stage	VAS Score	p-value
	Mean ±SD	
Pre-operative	5.7±0.9	<0.001
6-month follow-up	1.6±0.6	

4. Discussion

In this study, most participants were in the 41-60 age group which was also supported by the findings of another recent study [13]. Among the total of our participants, nearly two-thirds were male. Such male predominance was also observed in the studies conducted by Rajesh et al. [13] and Khan et al. [5]. While analyzing the levels of disc prolapse, we found that nearly two-thirds of our patients had involvement at the L4-L5 level. In contrast, the L5-S1 level was affected in approximately one-third of cases. A nearly similar incidence rate was observed in another recent study [14]. In most of our participants, left-sided involvement was observed, while the right side was affected in nearly one-third of cases. Nearly similar side involvement was observed in another study [2] which was also conducted in Bangladesh. In our study, fenestration discectomy was performed in the majority of cases, accounting for nearly three-fourths of the total.

Additionally, laminectomy or combined surgical procedures were applied in some instances. In the study conducted by Khan et al. [5], a similar trend in surgical procedures was observed; however, they applied combined surgical methods in fewer cases compared to our study. In evaluating radicular pain, we observed a statistically significant reduction ($p < 0.001$) in VAS scores from the preoperative period to the 6-month follow-up. Nearly similar findings were observed in another previous study [2] although they had taken their follow-up report after one year.

According to the Modified Macnab outcome criteria, the majority of participants in this study had excellent and good outcomes: a total of 88%, while fair and poor outcomes were observed in a few cases. Comparable findings were found in many studies [13-15]

5. Limitation of the Study

This study was single-centered with a small sample size and conducted over a brief period. Therefore, the findings may not accurately represent the broader national situation

6. Conclusion and Recommendation

The left side and the L4-L5 level are the most susceptible areas for the occurrence of prolapsed lumbar intervertebral disc (PLID). Fenestration discectomy is a commonly employed surgical method for managing PLID, effectively alleviating symptoms and improving patient outcomes. Recent advancements in surgical techniques and procedures have led to significant improvements in the success rates of these interventions. As a result, patients undergoing fenestration discectomy often experience reduced pain, enhanced mobility, and a better quality of life, highlighting the importance of timely surgical intervention in managing PLID cases.

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