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Discectomy Surgery on Prolapsed Lumbar Intervertebral Disc: Study in Prime Medical College Hospital, Rangpur, Bangladesh

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Abstract **Original Research Article**

Background: Basically, human backbone or spinal column is of a chain of bones also known as vertebrae. Spinal cord runs through the spinal column. Lumbar discectomy is a type of surgery to fix a disc in the lower back portion of human body. This surgery uses smaller cuts (incisions) than an open lumbar discectomy. We have very few proved data regarding the effectiveness of discectomy surgery on prolapsed lumbar intervertebral disc. The aim of this study was to assess the role of discectomy surgery on prolapsed lumbar intervertebral disc. ***Methods:*** This was a prospective observational study which was conducted at the Department of Orthopedics Surgery in Prime Medical College Hospital, Rangpur, Bangladesh during the period from January 2019 to December 2020. In total 38 patients with low back pain selected for discectomy surgery on prolapsed lumbar intervertebral disc were enrolled as the study population. This study was approved by the ethical committee of the mentioned hospital. Proper written consents were taken from all the participants before starting data collection. A pre-designed questionnaire was used in patent data collection. Radicular pain was observed by visual analogue score and disability status was done by using Oswestry disability index. By using modified Macnab criteria, outcome of the surgery was determined. All data were processed, analyzed and disseminated by MS Office and SPSS version as per need. ***Result:*** In our study as postoperative complication dural tear, superficial wound infection and foot drop were observed in 57.14% (Highest), 28.57% and 14.29% (Lowest) participants respectively. In analyzing radicular pain among the participants, we observed that VAS score had been reduced to 1.6±1.2 from 7.2±5.4 within one year of surgery which was 2.7±1.3 at immediate postoperative period. On the other hand, in analyzing Disability status among the participants we observed that, ODI index had been reduced to 10±1 from 64±8 within one year of surgery which was 17±6 at immediate postoperative period. According to the Modified Macnab Criteria in analyzing the final outcome among the participants we observed 52.63%, 39.47%, 5.26% and 2.63% participants got 'Excellent' (Highest), 'Good', 'Fair' and 'Poor' (Lowest) results respectively. ***Conclusion:*** In terms of reduction of pain, complication and disability scores it was noted that, in the surgery of prolapsed lumbar intervertebral disc the surgical outcome after one year period of discectomy is quite satisfactory. Considering the cost effectiveness and short treatment duration this surgical method may consider as the choice of method for treating patients with prolapsed lumbar intervertebral disc.

Keywords: Discectomy surgery, Prolapsed, Lumbar, Intervertebral disc, Pain, Orthopedics.

I. INTRODUCTION

Basically, human backbone or spinal column is of a chain of bones also known as vertebrae. Spinal cord runs through the spinal column. Lumbar discectomy is a type of surgery to fix a disc in the lower back portion of human body. This surgery uses smaller cuts (incisions) than an open lumbar discectomy. We have very few proved data regarding the effectiveness of discectomy surgery on prolapsed lumbar intervertebral disc. Oppenheins and Krause accomplished the first fruitful surgical excision of a herniated intervertebral disc in 1909. Unfortunately they could not recognize the excised tissue as disc material and interpreted it as an enchondroma [1]. Dandy reported removal of disc tumour or chordoma from patients with sciatica in 1929 [2]. In 1932 Barr

attributed the source of sciatica to the herniated lumbar disc [3]. In 1939 Seemes presented a new procedure to remove the ruptured interverterbral disc that included subtotal laminectomy and retraction of the dural sac to expose and remove the ruptured disc with the patient under local anaesthesia [4]. Love in the same technic has done successful removal of disc independently [5]. Standard procedure for disc removal was total laminectomy followed by transdural approach of the disc [1]. Mixter and Barr [6] proposed lumbar fusion after excision of the disc to prevent instability. But Frymoyer *et al*. [7] and others indicate that there is little if any advantage to the addition of spinal fusion. Discectomy through fenestration remains the most common method for this condition in which conservative management has failed. Primary discectomy gives good results, but for revision surgery these results are less certain and the risks greater [8]. Many studies have looked at rates of recurrence which are reported to vary from 3% to 19% [9]. In this study we have examined the rate of recurrence, and identified the risk factors which would indicate the likelihood of a revision operation being required [10]. The objective of this study was to explore the outcome of primary discectomy operation in prolapsed lumbar intervertebral disc (PLID).

II. OBJECTIVES

General Objective

- To assess the role of discectomy surgery on prolapsed lumbar intervertebral disc.

Specific Objective

- To collect data regarding demographic status of patients with prolapsed lumbar intervertebral disc.
- To collect data regarding disc level involvement of patients with prolapsed lumbar intervertebral disc.
- To collect data regarding side involvement of patients with prolapsed lumbar intervertebral disc.
- To collect data regarding outcomes among patients with prolapsed lumbar intervertebral disc.

III. METHODOLOGY & MATERIALS

This was a prospective observational study which was conducted at the Department of Orthopedics Surgery in Prime Medical College Hospital, Rangpur, Bangladesh during the period from January 2019 to December 2020. In total 38 patients with low back pain selected for discectomy surgery on prolapsed lumbar intervertebral disc were enrolled as the study population. This study was approved by the ethical committee of the mentioned hospital. Proper written consents were taken from all the participants before starting data collection. A pre-designed questionnaire was used in patent data collection. Radicular pain was observed by visual analogue score and disability status was done by using Oswestry disability index. By using modified Macnab criteria, outcome of the surgery was determined. After operation follow up were done on 6 weeks, 12 weeks, 6 months and 1 year. According to the inclusion criteria of this study patients with dominant leg pain rather than back pain, severe motor and sensory deficits, progressive neurological deficits with sciatica, persistent pain hampering daily activities, and restricted straight leg raising test and positive radiographic or magnetic resonance imaging (MRI) findings were included as study people. On the other hand, patients of PLID who had spinal instability, other spinal pathology, congenital anomaly, cauda equina syndrome were excluded. Only primary cases were included and recurrent cases were not enrolled in this current study. After selection as a study people, patients were made ready for primary discectomy operation. All the pre-requisites for operative procedures and anaesthesia were followed for every patient. At the initiation of operation, a 3.5 cm midline incision was completed at the affected level and to approach the inter- laminar space the para spinal muscles were elevated and the space was exposed with a Micro lumbar retractor. The nerve root was exposed using unilateral flavectomy and retracted medially or laterally according to the disc position. All the loose materials were removed through transverse annulotomy. The midline structures were not handled. Post operatively, all the patients could mobilize within 24 hours and discharged on about day 7 (5-8 days) and suture were removed on day 14. All patients underwent 4 follow up sessions on 6 weeks, 12 weeks, 6 months and on 1 year. The variables which were recorded in the present study were pain free interval, side and extent of herniation, operating time, length of hospital stay and pre- and post-operative visual analogue score (VAS) for pain. The clinical outcome was evaluated using the modified Macnab Criteria [11]. All data were processed, analyzed and disseminated by MS Office and SPSS version as per need.

IV. RESULT

In this study the mean (±SD) age of the participants was 35±7.25 years. Among them the highest number of participants was from 21-40 years' age group which was 50%. Besides this 15.79%, 23.68% and10.53% participants were from >20, 41-60 and >60 years' age groups respectively. In this study 61% participants were male whereas 39% were female. So, male was dominating in number and the male-female ratio was 1.53:1. In this study, among all the participants as disc level L2-3, L3-4, L4-5 and L5-S1 were involved in 5.26% (Lowest), 10.53%, 31.58% and 52.63% (Highest) participants respectively. On the other hand- right, left and bilateral side involvement were found in 39.47%, 47.37% (Highest) and 13.16% (Lowest) participants respectively. In our study as postoperative complication dural tear, superficial wound infection and foot drop was observed in 57.14% (Highest), 28.57% and 14.29% (Lowest) participants respectively. In analyzing radicular pain among the participants, we observed that VAS score had been reduced to 1.6±1.2 from 7.2±5.4 within one year of

surgery which was 2.7±1.3 at immediate postoperative period. On the other hand, in analyzing Disability status among the participants, we observed that ODI index had been reduced to 10±1 from 64±8 within one year of surgery which was 17±6 at immediate postoperative period. According to the Modified Macnab Criteria in analyzing the final outcome among the participants we observed 52.63%, 39.47%, 5.26% and 2.63% participants got 'Excellent' (Highest), 'Good', 'Fair' and 'Poor' (Lowest) results respectively.

Table-I: Demographic status distribution of participants (n=38)

Characteristics	n	%
Age (Years)		
Mean ± SD	35±7.25	
Age group (Year)		
>20	6	15.79
21-40	19	50.00
41-60	9	23.68
>60	4	10.53
Gender		
Male	23	60.53
Female	15	39.47

Table-II: Involved disc level among participants (n=38)

Involved disc level	n	%
L2-3	2	5.26
L3-4	4	10.53
L4-5	12	31.58
L5-S1	20	52.63
Total	38	100

Table-III: Involved side among participants (n=38)

Involved side	n	%
Right	15	39.47
Left	18	47.37
Bilateral	5	13.16
Total	38	100

Table-IV: Postoperative complication among participants (n=38)

Postoperative complication	n	%
Dural tear	4	57.14
Superficial wound infection	2	28.57
Foot drop	1	14.29
Total	7	100

Table-V: Radicular pain and disability status among participants (n=38)

Stage	Radicular Pain	Disability status
	VAS score	ODI index
Preoperative	7.2±5.4	64±8
Postoperative	2.7±1.3	17±6
After one year	1.6±1.2	10±1

ODI: Oswestry Disability Index

Table-VI: Final outcome as per Modified Macnab Criteria among participants (n=38)

Outcome	n	%
Excellent	20	52.63
Good	15	39.47
Fair	2	5.26
Poor	1	2.63
Total	**38**	**100**

V. DISCUSSION

The aim of this study was to assess the role of discectomy surgery on prolapsed lumbar intervertebral disc. In this study the mean (±SD) age of the participants was 35±7.25 years. Among them the highest number of participants was from 21-40 years' age group which was 50%. Besides this 15.79%, 23.68% and10.53% participants were from >20, 41-60 and >60 years' age groups respectively. In this study 61% participants were male whereas 39% were female. So, male was dominating in number and the male-female ratio was 1.53:1. Morgan Hough *et al*.[12] also found near about the similar findings in their study. They reported mean age 39 years with 56.7% male patients. They also noted 58.2% cases had L5-S1 and 41.2% had L4-L5 disc involvement. We have found also most of the cases had L5-S1 involvement. In a study in Bangladesh, Kamrul *et al*. also found more male patients (73%) [13]. Kyeng Soo Suk *et al*. stated in their study that, during the primary discectomy procedure, the authors performed partial discectomy of degenerated and fragmented discs, which meant that, a relatively smaller quantity of disc material was removed from a contained disc than from a no contained disc. Therefore, most recurrent disc herniation occurred after primary discectomy of a contained disc (27/28, 96.4%) [14]. In our study as postoperative complication dural tear, superficial wound infection and foot drop was observed in 57.14% (Highest), 28.57% and 14.29% (Lowest) participants respectively. In this study according to the Modified Macnab Criteria in analyzing the final outcome among the participants we observed 52.63%, 39.47%, 5.26% and 2.63% participants got 'Excellent' (Highest), 'Good', 'Fair' and 'Poor' (Lowest) results respectively. Morgan Hough *et al*. reported 8.7% cases required further surgery. Here only 5.33% cases developed postoperative complications like Dural tear, foot drop and superficial wound infection. Kamrul *et al*. also reported the similar complications and findings were similar [13]. In our study, in analyzing radicular pain among the participants, we observed that VAS score had been reduced to 1.6±1.2 from 7.2±5.4 within one year of surgery which was 2.7±1.3 at immediate postoperative period. On the other hand, in analyzing Disability status among the participants, we observed that ODI index had been reduced to 10±1 from 64±8 within one year of surgery which was 17±6 at immediate postoperative period. In the present study it was noted that pain status was significantly reduced from pre-operative status to one year after surgery status. Kamrul *et al*. also reported that in their study pain reduced (VAS) from 7.7 to 1.3 after primary discectomy operation [13]. Disability rate was reduced significantly from pre-operative 65 to post-operative 9 (p=0.001), the results correspondence with Kamrul *et al*. report [13].

LIMITATIONS OF THE STUDY

This was a single centered study with a small sized sample. So, the findings of this study may not reflect the exact scenario of the whole country.

VI. CONCLUSION AND RECOMMENDATIONS

In terms of reduction of pain, complication and disability scores it was noted that, in the surgery of prolapsed lumbar intervertebral disc the surgical outcome after one year period of discectomy is quite satisfactory. Considering the cost effectiveness and short treatment duration this surgical method may consider as the choice of method for treating patients with prolapsed lumbar intervertebral disc. For getting more reliable information we would like to recommend for conducting more studies in several places with larger sized samples.

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