

THE EFFICIENCY OF LUMBAR DECOMPRESSION, INTERBODY FUSION AND POSTERIOR INSTRUMENTATION METHOD IN THE TREATMENT OF SPONDYLOLISTHESIS

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ABSTRACT

Objective: In this study our main goal is to evaluate efficiency of lumbar decompression, Interbody Fusion and Posterior instrumentation method in the treatment of Spondylolisthesis. **Method:** This prospective Interventional study was carried out at from July 2017 to June 2019 (24 months) at Department of Orthopedics Surgery, DMCH, Dhaka. All patients with clinical and radiological evidence of Spondylolisthesis. Total 18 patients were selected, among them 11 female and 7 males. **Results:** During the study, in this study fusion occurred in 16(88.9%) and probably not fusion occurred 2(11.1%) radiological after 6 months. Mean preoperative VAS 6.83 ± 0.49 and postoperative VAS 2.27 ± 0.57 . Mean difference preoperative to postoperative VAS score were statistically significant. According to preoperative and postoperative VAS score for leg pain, mean preoperative VAS 6.75 ± 0.60 and postoperative VAS 1.28 ± 0.46 . Mean difference preoperative to postoperative VAS score were statistically significant. Regarding the modified Macnab criteria of the study patients, 14(78.0%) was found excellent in final follow up and only 4(22.0%) found good. **Conclusion:** To conclude, Posterior Lumbosacral Interbody fusion method is effective in relieving symptoms, achieving stability and fusion and lesser complication rates in surgical management of Spondylolisthesis.

KEYWORDS: lumbar decompression, Interbody Fusion, Posterior instrumentation, Spondylolisthesis.

INTRODUCTION

The incidence of Spondylolisthesis is contributing more and more to the health burden of our country. The surgical treatment of Spondylolisthesis is indicated for failure of conservative management, progressive worsening of spondylolisthesis, and presence of neurological deficits.

There are several procedures that have been described for interbody fusion with or without instrumentation such as posterior lumbar interbody fusion (PLIF), anterior lumbar interbody fusion (ALIF), circumferential 360o fusion (front and back) and more recently, the transforaminal lumbar interbody fusion (TLIF).^[1]

A posterior lumbar interbody fusion (PLIF) has the advantages of spinal canal decompression, anterior column reconstruction, decompression of foraminal stenosis, and reduction of the sagittal slips from a single posterior approach. The PLIF using double cage has been a standard practice till recently. However, there are many studies now with PLIF using single cages with comparable results and lesser Complications.^[2]

During the last decade, posterior lumbar interbody fusion (PLIF) has been widely used in arthrodesis for segmental instability of the lumbar spine. With additional instrumentation and posterolateral fusion, the overall fusion rate has been high, ranging from 96% to 100%, and the clinical success has been satisfactory as reported in the literature (Yu, et al., 2008).

In this study our main goal is to evaluate efficiency of lumbar decompression, Interbody Fusion and Posterior instrumentation method in the treatment of Spondylolisthesis.

METHODOLOGY

Types of study: this was a prospective Interventional study.

Place and period of the study: This study was carried out from July 2017 to June 2019 (24 months) at Department of Orthopedics Surgery, DMCH, Dhaka.

Study population: All patients with clinical and radiological evidence of Spondylolisthesis. Total 18 patients were selected, among them 11 female and 7 males.

Sampling technique: Purposive sampling technique was used.

Inclusion criteria

- Symptomatic Spondylolisthesis after adequate conservative treatment.
- All adult symptomatic patient.
- Both male and female.
- Progressive neurological deficit.

Exclusion criteria

- Previous spinal surgery in lumbosacral region.
- Severe radiological osteoporosis.
- Associated with other spinal pathology i.e., spinal tumour, active infection, auto-immune affection.

Method: during the study, the data were collected in a prescribed data collection sheet with a pre-tested

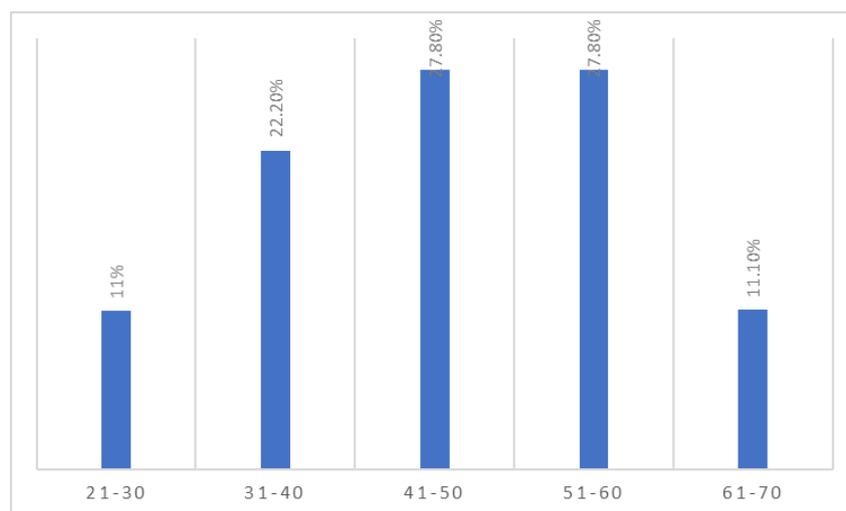
structured questionnaire containing history, clinical examination, laboratory investigations, pre-operative and perioperative assessment, perioperative findings and postoperative outcome. Cases were selected for study from emergency or OPD after x-ray examination, then admitted to hospital. After counseling for surgical technique then taking consent for thesis enrollment, preoperative data were collected.

After discussing the technique with the surgical team, operation done methodically, preoperative and postoperative data was recorded. Each patient was followed up for at least 12 weeks, clinical, radiological and functional scoring done and recorded for final outcome evaluation.

Data analysis: Analysis done by SPSS 22 for windows software. The data tabulated and quantitative parameters such as age of patients summarized in terms of mean with standard deviation, to understand the variation present in the data. Percentage expression for positivity of scoring estimated along with 95% confidence interval. The significance of the results as determined in 95.0% confidence interval and a value of $p < 0.05$ considered to be statistically significant.

RESULTS

In figure-1 shows age distribution of the patients where among 18 patients mean age was 46.90 ± 13.7 years, maximum patients (27.8%) age 51-60 and 41-50 years followed by 22.2% age range 31-40 years. The following figure is given below in detail:



Figur-1: Age distribution of the patients.

In figure-2 shows gender distribution of the patients where most of the patients were female. The following figure is given below in detail:

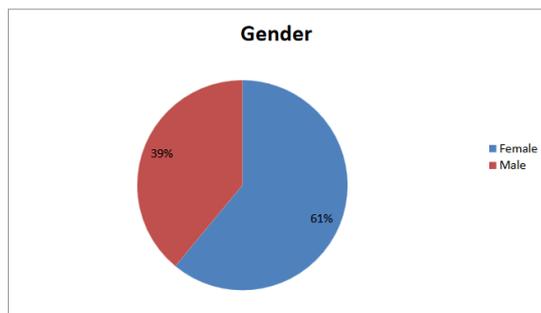


Figure-2: Gender distribution of the patients.

In table-1 shows fusion status (n=18) where in this study fusion occurred in 16(88.9%) and probably not fusion

occurred 2(11.1%) radiological after 6 months. The following table is given below in detail:

Table-1: Fusion status.

Fusion status	%
Probably fused	0
Probably not fused	11
Pseudarthrosis	0

In table-2 shows comparison of ODI preoperative and postoperative (n=18) where mean preoperative ODI 57.78 ± 2.25 and postoperative ODI 16.56 ± 3.53 . Mean difference preoperative to postoperative ODI were statistically significant. The following table is given below in detail:

Table-2: Comparison of ODI preoperative and postoperative (n=18).

ODI	Preoperative, Mean \pm SD	Per operative, Mean \pm SD	P value
	57.78 ± 2.25	16.56 ± 3.53	<0.001*

Table-3 shows the comparison of preoperative and postoperative VAS score for back pain. Mean preoperative VAS 6.83 ± 0.49 and postoperative VAS

2.27 ± 0.57 . Mean difference preoperative to postoperative VAS score were statistically significant. The following table is given below in detail:

Table-3: Comparison of preoperative and postoperative VAS score (n=18).

VAS	Preoperative, Mean \pm SD	Per operative, Mean \pm SD	P value
	6.83 ± 0.49	2.27 ± 0.57	<0.001*

In table-4 shows the comparison of preoperative and postoperative VAS score for leg pain. Mean preoperative VAS 6.75 ± 0.60 and postoperative VAS 1.28 ± 0.46 . Mean

difference preoperative to postoperative VAS score were statistically significant. The following table is given below in detail:

Table-4: Comparison of preoperative and postoperative VAS score for leg pain (n=18).

VAS	Preoperative, Mean \pm SD	Per operative, Mean \pm SD	P value
	6.83 ± 0.49	1.28 ± 0.46	<0.001*

In table-5 shows Comparison on motor function assessment pre-operative and postoperative. Pre-operatively, 8(44.44%) patient had motor deficit (assessed clinically according to MRC grading). After six months of operation, it reduced to 2 (11.11%). The following table is given below in detail:

Table-5: Comparison on motor function assessment pre-operative and postoperative.

Motor deficit	%
Preoperative:	
Present	44.44
Absent	55.56
Postoperative:	
Present	11.11
Absent	88.89

In table-6 shows functional outcome of the study where regarding the modified Macnab criteria of the study patients, 14(78.0%) was found excellent in final follow up and only 4(22.0%) found good. The following table is given below in detail:

Table-6: Functional outcome of the study.

Functional outcome	%
Excellent	78
Good	22
Fair	0
Poor	0

DISCUSSION

In this series improvement of pain status measured by Visual Analogue Score (VAS) is, back pain improvement from (6.83 ± 0.49 to 2.27 ± 0.57) and leg pain improvement from (6.75 ± 0.60 to 1.28 ± 0.46), p value of both of which are 0.0001 which is statistically significant. In initial series of one study reported that, the improvement of VAS score of back pain was (07.18 ± 01.09 to 01.84 ± 0.91) and leg pain improvement was (06.88 ± 01.21 to 01.34 ± 0.97) both of which is comparable to this study.^[5]

In this series improvement of disability measured by Oswestry Disability Index (ODI) is (57.78 ± 02.25 to 16.56 ± 3.53) after 6 months of follow-up, here also p value is 0.0001 which is statistically significant. In the

one study showed that, in 54 patient series Oswestry Disability Index (ODI %) was 60.00 ± 01.21 pre-operatively and 17.09 ± 0.97 after 6 months of follow-up, which is comparable to this study.^[6]

According to one report, excellent outcome had been observed around 92.86% cases in posterior lumbar interbody fusion by using Macnab criteria, which was also comparable to this study where 14(78%) was found excellent in final follow up and only 4(22%) found good.^[7]

The criteria used to analyze the overall outcome was proposed by Modified Macnab criteria which is based on relief of back and leg pain, return of employment, restriction of physical activities and use of analgesics for lumbar spine fusion. In this series 14 patients (78%) got excellent results, 4(22%) belonged to the good results. Another study got 85.3% excellent and good results with satisfactory clinical outcome which is comparable with our results.^[8]

LIMITATIONS

There are some limitations in this study.

- The sample size was small.
- Long term follows up was not done due to shortage of time.
- It was conducted in a single center.

CONCLUSION

To conclude, Posterior Lumbosacral Interbody fusion method is effective in relieving symptoms, achieving stability and fusion and lesser complication rates in surgical management of Spondylolisthesis.

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