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Comparative Study between Posterior Lumbar Interbody Fusion (FLIF) and Transforaminal Interbody Fusion (TLIF) in the Treatment of Spondylolisthesis

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Abstract **Original Research Article**

Objective: In this study our main goal is to compare the efficiency of posterior lumbar interbody fusion (FLIF) and transforaminal lumbar interbody fusion (TLIF) in the treatment of spondylolisthesis. ***Method:*** This experimental observational type study was carried out at Bangabandhu Sheikh Mujib Medical University and different private hospital in Dhaka from July, 2006 to December 2019. A total number of 340(PLIF=150, TLIF=190) patients underwent lumbar interbody fusion with pedicle screw fixation for the treatment of adult lumbar spondylolisthesis were taken as a study sample. ***Results:*** During the study, surgical outcomes between PLIF and TLIF where there were significant differences between the groups in relation to VAS for back pain. These variables were significantly higher in the TLIF group compared to the PLIF group. There was no significant difference between the two groups with respect to VAS for leg pain at final follow-up. However prevalence of Nerve Root injury,Dural tearand blood loss is higher in FLIF groupe than TLIF group. Also, at the time of the last follow-up, both groups had similar slip reduction, and spinal fusion rates (P > .05). ***Conclusion:*** From our study we can say that, TLIF is superior to PLIF with respect to functional outcome and complication rate in grade I/II single-level lumbar spondylolisthesis.

Keywords: Posterior lumbar interbody fusion (FLIF), transforaminal lumbar interbody fusion (TLIF), spondylolisthesis.

INTRODUCTION

Spondylolisthesis is defined as the forward slippage of one vertebra on another [1]. Of its 5 subtypes, degenerative and isthmic spondylolisthesis are the most common in adults [2]. Both can lead to compression and instability, which result in radicular and low back pain [3].

Surgical fusion is a crucial method for stabilizing the spine in cases of lumbar spondylolisthesis; it is used to reduce the pain in patients with chronic low back pain [4]. Different surgical fusion techniques are currently available including anterior interbody fusion, posterior interbody fusion, posterolateral fusion, and repair of the pars interarticularis [5-7].

PLIF or TLIF can achieve a circumferential spinal stabilization by the placement of pedicle screws and an interbody spacer through a single posterior approach [8-10]. There is no definitive evidence for one approach being superior to the other in terms of fusion or clinical outcomes [11].

In this study our main goal is to compare the efficiency of posterior lumbar interbody fusion (FLIF) and transforaminal interbody fusion (TLIF) in the treatment of spondylolisthesis.

OBJECTIVE

- To compare the efficiency of posterior lumbar interbody fusion (FLIF) and transforaminal lumbar interbody fusion (TLIF) in the treatment of spondylolisthesis.

METHODOLOGY

Type of study	Experimental Observational study
Place of study	Bangabandhu Sheikh Mujib Medical University and different private hospital in Dhaka
Study period	July, 2006 to December 2019
Study population	A total number of 340(PLIF=150, TLIF=190) patients underwent lumbar interbody fusion with pedicle screw fixation for the treatment of adult lumbar spondylolisthesis grade I and II were taken as a study sample.
Sampling technique	Purposive

METHOD

- During the study, informed verbal consent was taken. Socio-demographic and clinical data were collected from the patients using standard questionnaires and kept confidential during the research.

DATA ANALYSIS

- Statistical analysis was performed using the Statistical package for social science SPSS version 15.0. A descriptive analysis was performed for clinical features and results were presented as mean ± standard deviation for quantitative variables and numbers (percentages) for qualitative variables

RESULTS

In table-1 shows age distribution of the patients. The mean age of the patients was 38.7 ± 11.8 years and the youngest and oldest patients were 20 and 65 years old respectively. The following table is given below in detail:

Table-I: Age distribution of the participants

Age (yrs)	Percentage
<30	40.0
31-40	26.6
41-50	20.0
51-60	6.7
>60	6.7

Mean age = (38.7 ±11.8) years; **range** – (20 – 65) years.

In figure-1 shows gender distribution of the patients where most of the patients were male. The following figure is given below in detail: Male 33%and Female 67%, should change the chart.

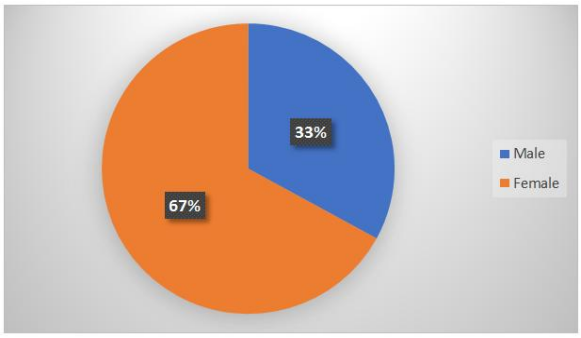

Fig-1: Gender distribution of the patients

In table-2 shows comparison of surgical outcomes between PLIF and TLIF where there were significant differences between the groups in relation to VAS for back pain and ODI. These variables were significantly higher in the TLIF group compared to the PLIF group. There was no significant difference between the two groups with respect to VAS for leg pain at final follow-up. The following table is given below in detail:

Table-2: Comparison of surgical outcomes between PLIF and TLIF

Variable	PLIF,n=150	TLIF, n=190	P value
Operation time (minutes)	127.39 ± 21.62	114.48 ± 13.26	0.0004
Blood loss (cm^3)	456.96 ± 120.74	366.15 ± 78.49	0.0001
VAS back pre	7.00 ± 1.26	7.25 ± 1.28	0.1717
VAS back post	2.26 ± 1.00	1.77 ± 0.75	0.0044
VAS back change	4.74 ± 1.14	5.40 ± 1.18	0.0037
VAS leg pre	7.39 ± 1.24	7.17 ± 1.36	0.1752
VAS leg post	3.24 ± 1.18	2.98 ± 0.91	0.0824
Postoperative complications	8%	3.8%	
Dural tear	4.5%	1.9%	
Nerve root injury (neurologic deficit)	1.5%	0%	
Wound infection	2%	1.9%	

In table-3 shows slip reduction and fusion rate of spondylolisthesis where at the time of the last follow-up, both groups had similar slip reduction, and spinal fusion rates (P > .05). The following table is given below in details:

Table-3: Slip reduction and fusion rate of spondylolisthesis

Variable	PLIF,n=150	TLIF, n=190	P value
Slip reduction	64.68 ± 10.87	51.79 ± 13.59	0.1717
Preoperative	22.37 ± 10.20	18.08 ± 6.42	0.0004
Postoperative	8.24 ± 5.32	8.71 ± 3.98	0.0001
Fusion rate			
Grade I, rate	70%	62%	
Grade II, rate	30%	38%	

DISCUSSION

In the study, the improvement of the VAS for back pain was significantly higher in the TLIF group compared to the PLIF group (p = 0.0037). This came in agreement with the study who reported that the postoperative VAS for back pain was significantly improved in the TLIF group compared to the PLIF group [11]. Nevertheless, another study reported that the improvement in VAS was related to the pre-operative pathology, where the isthmic spondylolisthesis showed more improvement in VAS compared to the degenerative type [12]. This might explain the significant VAS for back pain improvement in the current study, as isthmic spondylolisthesis represented 50% of the TLIF group cases compared to only 41.3% of the PLIF group.

In the current study, we could report a complication rate of 8% occurring in the PLIF group including a dural tear in 4.5% of cases, nerve root injury in another 1.5% of cases, and a deep wound infection in only 2% of them, but in TLIF group, there was a complication rate of only 3.8% including 1.9% of cases with a superficial wound infection and 1.9% of them with a dural injury. One study evaluated the results of PLIF versus TLIF in their studies and reported that the complication rate in PLIF was higher than in TLIF [13].

In our study, by the time of the last follow-up, both groups showed no significant difference in slip reduction and spinal fusion rate. Solid fusion was achieved in all cases including grade I fusion in 62% of cases in the TLIF group and 70% of cases in the PLIF group. Similarly, another comparative study between PLIF and TLIF, found that there was no significant difference between both groups in slip reduction rate and that all patients have achieved spinal fusion with no case of cage extrusion.

CONCLUSION

From our study we can say that, TLIF is superior to PLIF with respect to functional outcome and complication rate in grade I/II single-level lumbar spondylolisthesis.

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