COMPARATIVE STUDY BETWEEN ANTERIOR LUMBAR INTERBODY FUSION (ALIF) AND TRANSFORMINAL LUMBAR INTERBODY FUSION (TLIF) IN CASES OF LUMBAR DEGENERATIVE SPONDYLOLISTHESIS

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Introduction

The most frequent cause of low back pain is lumbar disc degeneration, which requires both surgical and diagnostic intervention. There is no mechanism to distinguish intervertebral disc degeneration from the physiological processes of growth, ageing, healing, and adaptive remodeling, despite the fact that the etiology of intervertebral disc degeneration can be attributed to numerous factors. Degenerative disc disease (DDD) describes loss of function of an intervertebral disc of the spine. Disc degeneration is often the effect of natural daily stresses, abnormal postures and minor injuries that cause intervertebral discs to gradually lose water as the annulus fibrosus weakens. Then, they begin to collapse. This can result in foraminal stenosis and roots compression

Aim of the work

In this study, there is a comparison between the anterior lumbar interbody fusion (ALIF) and posterior transforaminal lumbar interbody fusion (TLIF) techniques in a group of patients affected by degenerative spondylolisthesis. The purpose of the study was to analyze intraoperative, functional, and radiological data between the two techniques.

METHODS

Patients were clustered into two homogeneous groups (group 1 = ALIF, group 2 = TLIF) according to surgical procedure. A statistical analysis of intraoperative and radiological findings was performed to compare the two groups

Results

forty patients were comparable in terms of clinical and surgical data and included in the study, involving 19 male and 21 female patients with an average age of 42 years. The mean follow-up duration was 12 months. Twenty patients (50%) were clustered in group 1 (ALIF). Twenty patients (50%) were clustered in group 2 (TLIF). A significant reduction in surgical time (80 vs 120 minutes) and blood loss (150 vs 700 ml) in group 1 ($p < 0.0001$) was observed. No significant differences in complications and reoperation rates between the two groups ($p = 0.561$) was observed. A significant improvement in functional outcome was observed in both groups ($p < 0.001$), but no significant difference between the two groups was found at the last follow-up as fusion. In group 1, a faster median time of return to work (1 vs 3 months) was recorded. A significant improvement in L5–S1 postoperative lordosis restoration was registered in the ALIF group (9.0 vs 4.0, $p = 0.023$).

Table (1):Intra- and perioperative data

Variable	ALIF (n = 20)	TLIF (n = 20)	p Value
Males/females	8/12	11/9	
Mean age (SD), yrs	42.09 (9.15)	45.55 (13.41)	
Mean surgical time (SD), mins	60 (15)	100 (20)	<0.0001
Intraop blood loss, ml			<0.0001
Median	140 (120–160)	450 (300–600)	
Mean	150 (20)	400 (100)	
Intraop complications	n = 1, 5%	n = 1, 5%	0.561
Hospitalization length of stay, days			0.1303
Median	1 (1–2)	1.5 (1–3)	
Mean	1 (1)	2 (1)	
Patients needed blood transfusion	n = 1, 5%	n = 3, 15%	0.4095
Early postop complications	n = 1, 5%	n = 1, 5%	0.561

Table (2): Radiological data

Radiological Outcome	Group 1 Mean (SD)		Group 2 Mean (SD)		P value
	Preop	Postop	Preop	Postop	
PI (°)	47 (10)	52 (9)	49 (9.5)	51 (7.5)	
PT (°)	16.5 (7)	18 (15.5)	16 (10)	17 (6.5)	
SS (°)	32 (8)	35 (7.5)	33.5 (6)	31.5 (5.5)	
L1–S1 LL (°)	48.7 (7)	46.5 (11)	47.9 (12)	47.5 (9.5)	
L4–S1 LL (°)	31.5 (7.5)	35.2 (6)	32.8 (7.5)	34 (17)	
L5–S1 LL (°)	17 (6)	26.5 (5.5)	19.5 (12)	22.5 (5.5)	<0.001

Conclusion

According to these results, interbody fusion is effective in the surgical management of degenerative spondylolisthesis to manage low back pain.
Even if clinical benefits were achieved in the ALIF group (better scores and faster return to work), both procedures improved functional outcomes at last follow-up.
The ALIF group showed significant reduction of blood loss, shorter surgical time, and better segmental lordosis restoration when compared to the TLIF group. No significant differences in postoperative complications were observed between the groups. Based on these results, the ALIF technique enhances radiological outcome improvement in spinopelvic parameters when compared to TLIF in the management of adult patients with L5–S1 degenerative spondylolisthesis.