



The effects of surgical level on clinical outcomes following minimally invasive transforaminal lumbar interbody fusion: L4-L5 vs. L5-S1

Zachary Adam Smith MD; Cort D. Lawton B.A; Richard G. Fessler MD
Department of Neurological Surgery, Northwestern University



Introduction

TLIF was developed to achieve circumferential fusion of the lumbar spine, similar to the anterior lumbar interbody fusion and posterior lumbar interbody fusion techniques, with the advantage of a reduced risk of complication. Recent advancements in minimally invasive surgery led to the development of MI-TLIF, which has been reported to reduce intra-operative blood loss, post-operative pain, and hospitalization.

Mean age, operating room (OR) time, estimated blood loss, and hospital stay			
	L4-L5	L5-S1	P-Value
Age (years)	63.63 ±10.75	53.24 ±13.31	0.014
OR Time (min)	181.84 ±37.07	185.76 ±58.65	0.937
EBL (mL)	101.32 ±72.87	102.94 ±90.52	0.627
Hospital stay (days)	2.74 ±1.28	2.47 ±1.125	0.587

Methods

Thirty-six patients with grade 1 or grade 2 spondylolisthesis, degenerative disc disease, and/or lumbar stenosis underwent MI-TLIF. Before surgery and at follow-up, patients completed the Oswestry Disability Index and Visual Analogue Scale for their back and leg, with outcomes compared between patients with L4- L5 involvement to those with L5-S1 involvement.

Surgical Indications

Surgical Indications	L4-L5 Patients	L5-S1 Patients
Spondylolisthesis Grade 1	10	6
Spondylolisthesis Grade 2	2	2
Degenerative Disk Disease	6	6
Stenosis	1	3

(χ^2 =1.89, df=3, p=0.596)

Results

The L4-L5 pathology affected an older age group with a mean age of 63.63 ±10.75 compared to 53.23 ±13.31 for the L5-S1 pathology (p-value = 0.014). The mean hospital stay, operating time, intra-operative blood loss, and hospitalization were not significantly different between the two groups (p-values = 0.587, 0.937, 0.627, 0.587). The post-operative questionnaire results show no significant difference between the two groups (p-value = 0.819 for VAS [back], p-value = 0.626 for VAS [leg], and p-value = 0.962 for ODI). Two complications included the development of a rash from an antibiotic and a case of post-operative nausea which resolved with discontinuation of narcotic analgesia.

		Pre-operative	1 Year	P-Value
L4-5	VAS(B)	5.16±2.41	1.68±1.827	<0.001
	VAS(L)	4.74±3.03	1.68±2.18	0.001
	ODI	33.05±11.02	15.58±13.26	<0.001
L5-S1	VAS(B)	6.12±2.02	2.11±2.69	<0.001
	VAS(L)	5.76±3.09	2.00±2.71	0.002
	ODI	38.29±13.19	16.00±16.598	0.001

Pre and 1 year post-operative results for visual analog scores for back and leg pain (VASB and VASL) and Oswestry Disability Index (ODI). P-values were statistically significantly different comparing pre-operative to post-operative values for all parameters tested.

	L4-L5	L5-S1	P-Value
Pre VAS (B)	5.16 ±2.41	6.12 ±2.02	0.235
Pre VAS (L)	4.74 ±3.03	5.76 ±3.09	0.299
Pre ODI	33.05 ±11.02	38.29 ±13.19	0.210
Post VAS(B)	1.68 ±1.827	2.11 ±2.69	0.819
Post VAS (L)	1.68 ±2.18	2.00 ±2.71	0.626
Post ODI	15.58 ±13.26	16.00 ±16.598	0.962

Conclusions

There is no difference between the outcomes for patients undertaking MI-TLIF at the L4-L5 level compared to the L5-S1 level.

Learning Objectives

1. To determine if the level of operation, a common consideration for open approaches, is important for minimally invasive approaches to the lumbar spine.

References

- 1.Enker P, Steffee AD: Inte rbody fusion and instrumentation. C linical orthopaedics and related research 1994 :90-101.
- 2.Mummaneni PV, Rodts GE, Jr.: The mini-open transforaminal lumbar interbody fusion. Neurosurgery 2005, 57:256-261; discussion 256 -261.
- 3.Rosenberg WS, Mummaneni P V: Transforaminal lumbar interbody fusion: technique, complications, and early results. Neurosurgery 2001, 48:569-574; discussion 574 -565.
- 4.Dhall SS, Wang MY, Mummaneni P V: Clinical and radiographic comparison of mini- open transforaminal lumbar inte rbody fusion with open transforaminal lumbar interbody fusion in 42 patients with long-te rm follow-up. Journal of neurosurgery Spine 2008, 9:560-565.
- 5.Schwender JD, Holly LT, Rouben DP, Foley KT: Minimally invasive transforaminal lumbar inte rbody fusion (TLIF): technical feasibility and initial results. Journal of spinal disorders & techniques 2005, 18 Suppl:S1-6.
- 6.Holly LT, Schwender JD, Rouben DP, Foley KT: Minimally invasive transforaminal lumbar inte rbody fusion: indications, technique, and complications. Neurosurgical focus 2006, 20:E6.