

Minimally Invasive Versus Open Transforaminal Lumbar Interbody Fusion: A Prospective Randomized Study

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Introduction

Symptomatic spondylolisthesis patients may benefit from surgical decompression and stabilization. The standard (S) technique is a transforaminal lumbar interbody fusion (TLIF). Newer, minimally invasive (MI) techniques seem to provide similar results with less morbidity. However, prospective studies comparing S versus MI TLIF are rare.

Methods

Patients with at least 6 months of symptoms and image-confirmed low-grade spondylolisthesis were enrolled, at a single academic institution, between 2011 and 2015. The patients were randomized to either S or MI TLIF. The primary outcome measure was the Oswestry Disability Index (ODI) improvement at 1 year. Secondary outcome measures included length of operation, estimated blood loss, length of hospitalization, and fusion rates at 1 year. Complications were also recorded.

	S TLIF (SD; range)	MI TLIF (SD; range)
Age	50.12 (11.09; 17-67)	51.3(9.36; 34-69)
Sex	23F / 17M	24F / 16M
BMI	29.92(5.7; 19-44)	28.97(5.18; 21-40)

Comparative demographics

Table 2

	S TLIF (SD; range)	MI TLIF (SD; range)	P value
ODI preop	38.35(7.58; 26-57)	37.75(6.59; 29-60)	0.707
ODI postop 1Y	11.67(6.09; 2-24)	11.52(6.56; 2-23)	0.995
ODI difference	26.62(7.75; 12-45)	26.47(8.17; 11-45)	0.962
Operative time	296.22(101.01; 116-493)	321.92(85.57; 212-473)	0.219
EBL	417.5(211.69; 150-1100)	351.25(198.87; 100-1000)	0.153
POD discharge	4.12(0.88; 2-6)	1.92(0.52; 1-3)	<0.0001
Fusion at 1y	90%	90%	1

Comparative results

Results

Forty patients were enrolled in each group. There was no crossover between groups. The age was 50.12 +/-11.09 years in the S TLIF group and 51.3 +/-9.36 years in the MI TLIF group. The mean operative time and estimated blood loss in the S versus MI TLIF group were 297 +/-101 versus 323 +/-85 minutes and 417 +/-211 versus 351 +/-198 ml, respectively. There were 4 transfusions in the S TLIF and 3 transfusions in the MI TLIF group. The patients were discharged after surgery at 4.12 +/-0.88 days for the S TLIF group and 1.92 +/-0.52 days for the MI TLIF group. The ODI improved from 37 +/-6 to 11 +/-6 in the S TLIF group (ODI difference: 26 +/-7) and from 38 +/-7 to 11 +/-6 in the MI TLIF group (ODI difference: 26 +/-8). In both groups, the fusion was considered solid (Grade I) in 36 (90%) and partial (Grade II) in 4 (10%) patients at 1 year. There were no reoperations for pseudarthrosis or any other postoperative complication. There were 2 superficial wound infections in the standard TLIF group, which resolved with oral antibiotic treatment alone.

Conclusions

The standard and minimally invasive TLIF in patients with symptomatic spondylolisthesis provided similar clinical and radiological outcomes at 1 year. The patients undergoing MI TLIF had a shorter hospital stay. Both surgical techniques yielded good results at 1 year.

Learning Objectives

1. Understand the local anatomy for open and MI TLIF
2. Understand the MI TLIF surgical technique
3. Understand the benefits of MI TLIF technique

References

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