



Isthmic Spondylolisthesis: Analysis of Quality of Life Outcomes and Cost-Effectiveness Following Surgical Treatment

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Introduction

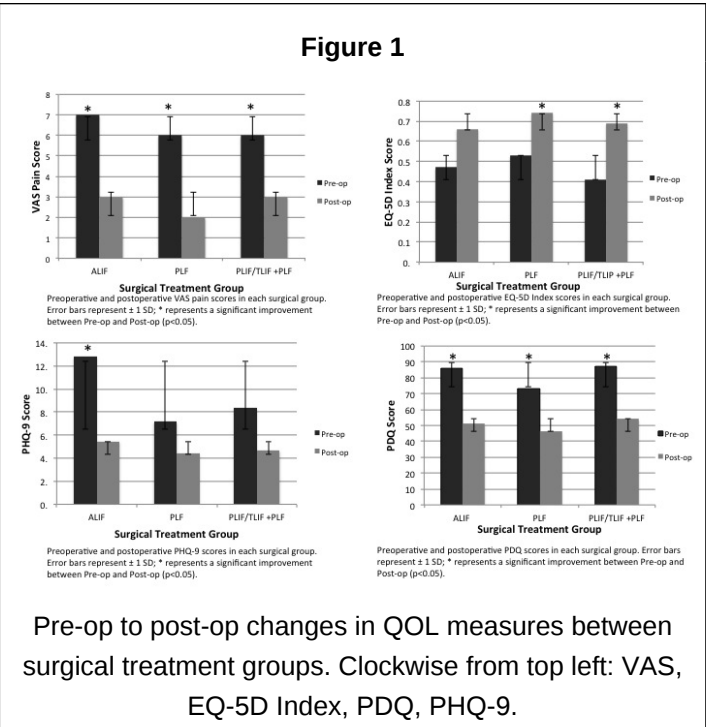
For patients with lumbar isthmic spondylolisthesis (IS) whose symptoms do not resolve with conservative treatments, fusion is recommended, and they may undergo posterolateral fusion (PLF), interbody fusion (PLIF or TLIF), or circumferential fusion (ALIF). While previous studies have analyzed the surgical outcomes associated with various techniques, there are no studies that have focused on multiple quality of life (QOL) outcome measures or correlated these results with the cost-effectiveness of each surgical technique.

Methods

A single-institution retrospective analysis of all patients diagnosed with lumbar IS and who underwent surgical treatment between 2004-2014 was conducted. Fourty six patients who had at least 1 year of follow-up data were identified. Patients received 1 of 3 treatments: ALIF, PLF, or PLIF/TLIF+PLF. Four quality of life outcome measures were analyzed: the Visual Analog Scale for pain, EuroQoL 5 Dimensions (EQ-5D), Pain Disability Questionnaire (PDQ), and Patient Health Questionnaire 9 (PHQ-9). Direct costs were estimated using Medicare national payment amounts, and indirect costs were estimated based on patients’ missed workdays. Postoperative 1-year cost-utility ratios and incremental cost-effectiveness ratios (ICERs) were calculated using a cost-effectiveness threshold of \$100,000/Quality Adjusted Life Year (QALY) gained.

Results

- At 1-year follow up, each surgical technique provided significant improvement (p<0.05) in at least 3 of 4 QOL measures.
- There were no significant differences (p>0.05) between surgical groups in any QOL measure or overall costs.
- The 1-year cost-utility ratio was lowest for those who underwent PLIF/TLIF+PLF (\$57,665/QALY) compared to PLF (\$70,256/QALY) or ALIF (\$80,424/QALY).
- The 1-year ICERs compared to PLIF/TLIF+PLF were: PLF (\$15,671) and ALIF (\$5,498).



Results, Continued:

Table 1								
Treatment Group	Mean Δ VAS score	ANOVA between groups P	Mean ΔEQ-5D Index score	ANOVA between groups P	Mean ΔPHQ-9 score	ANOVA between groups P	Mean ΔPDQ score	ANOVA between groups P
ALIF	-3.89*	0.49	0.19*	0.71	-7.36*	0.23	-35.5*	0.81
PLF	-4.27*		0.21*		-2.61		-27.18*	
PLIF/TLIF +PLF	-2.55*		0.28*		-2.92		-33.23*	

Comparisons of the mean improvements in each quality of life outcome measure between surgical treatment groups. * represents improvement which exceeded the minimum clinically important difference (MCID).

Conclusions

ALIF, PLF, and PLIF/TLIF+PLF each provide significant improvement in 1-year postoperative quality of life outcomes for patients with isthmic spondylolisthesis. While each surgical technique is cost-effective based on the threshold, PLIF/TLIF+PLF provided the best cost-utility ratio. These results support the need for further studies using longer-term follow-up periods.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) discuss the improvements in quality of life outcomes provided by three different surgical approaches for treating lumbar isthmic spondylolisthesis, and 2) Have an understanding of the relative costs and cost-utility ratios of each surgical technique.