Preoperative Pelvic Incidence-Lumbar Lordosis Mismatch Predicts Extent of Lordosis Correction After 1 Level TLIF

Alexander B. Dru MD University of Florida, Department of Neurosurgery Gainesville, FL, USA

Ken Porche MD University of Florida, Department of Neurosurgery Gainesville, FL, USA

Paul S. Kubilis MS University of Florida, Department of Neurosurgery Gainesville, FL, USA

Daniel J. Hoh MD University of Florida, Department of Neurosurgery, Gainesville, FL, USA

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Introduction

There is increased awareness of the importance of optimizing lordosis after lumbar fusion. Transforaminal lumbar interbody fusion (TLIF) is a common approach, and results in varying degrees of lordosis correction.

Pelvic Incidence represents an individualized ‘ideal’ lumbar lordosis for each patient. Patients with a Pelvic Incidence-Lumbar Lordosis mismatch of less than 10 degrees may achieve less lordotic correction at both the segmental and global level during lower TLIF operations.

The purpose of this study is to determine preoperative pelvic parameters that predict change in postoperative segmental and lumbar lordosis after TLIF.
Methods

A single center, retrospective review was performed on 67 patients undergoing single level TLIF between L3-S1.

All patients underwent bilateral facetectomy, 10 mm TLIF cage (non-lordotic), and bilateral pedicle screw-rod constructs.

Pre and post-operative x-rays were assessed for preop pelvic incidence (PI), lumbar lordosis (LL), and segmental lordosis (SL). Patients were separated into two groups, one with a mismatch of preop PI to preop LL less than 10° and greater than 10°.

Changes in segmental and lumbar lordosis were calculated by the difference in postop and preop cobb angles at the TLIF level and lumbar spine, respectively.

Multivariate regression analysis was performed to determine the relationship between preoperative and change in segmental and lumbar lordosis while adjusting for age, sex, BMI, or TLIF level.
Results

Mean age was 60.6 vs 61.7, 54% vs. 62% were female, and BMI 29.9 vs 31.8 for preop PI-LL<10° vs. >10°, respectively.

46 patients presenting with preop PI-LL<10° and 21 with preop PI-LL>10°.

The mean change in SL and LL after TLIF was 6.9°/2.7° for preop PI-LL<10° (P=0.05) and 10.3°/10.3° for preop PI-LL>10° (P=0.0001).

The two groups did not differ significantly in age, sex, BMI, or TLIF level.
Discussion

Results suggest that patients with a global lumbar lordosis within 10 degrees of their pelvic incidence experience less lordotic correction during TLIF surgery.

The study was not performed on a deformity population, therefore changes in lumbar lordosis were from disk level and global lumbar mobility (not due to the use of lordotic cages or maximal posterior persuasion of instrumentation).

It appears patients with minimal mismatch between their PI and LL (i.e. relatively preserved LL) have an intrinsic ‘ceiling’ for lordotic disk level correction.

Limitations of the study include its retrospective nature, single institution/surgeon, and non blinded calculation of pelvic parameters.
Conclusion

TLIF is effective at enhancing correction of segmental and lumbar lordosis.

Patients presenting with a PI-LL mismatch of greater than 10° gained a significant, larger lordotic correction undergoing TLIF at the surgical level and lumbar spine.