

Predictive Factors in Achieving Indirect Decompression in Minimally-Invasive Lateral Lumbar Interbody Fusion

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Introduction

It is unknown whether the degree of indirect decompression achieved is affected by lumbar level and/or location of the cage in the disc space in lateral lumbar interbody fusion (LLIF). The purpose of this study is to identify any association between interbody cage location in the disc space or lumbar level and the degree of indirect decompression achieved.

Methods

A review of 54 disc levels in consecutive patients who underwent LLIF with pre and immediate post-op MRI was performed. Primary outcome variables included:

- 1) Change in intervertebral disc height at the level of the posterior longitudinal ligament (PLL)
- 2) Change in mid-sagittal antero-posterior (AP) canal diameter and axial thecal sac area
- 3) the ratio of mean change in canal diameter relative to increase in intervertebral disc height, termed the indirect decompression ratio; and
- 4) the location of cage placement as a ratio of the posterior aspect of the cage relative to the total AP length of the disc space

Results

54 disc levels (L1/2 -2; L2/3 - 11; L3/4 - 19; L4/5 - 22) were assessed from consecutive patients from October 2015 to October 2017. Cage location varied from 0.09 to 0.49 along the width of the disc space as a ratio. There was a statistically significant relationship between the cage location and the indirect decompression ratio ($p < 0.001$; ci 0.58-1.27). The indirect decompression ratio (range 0.04-3.4) was calculated for each level (L1/2-1.29; L2/3 – 1.14; L3/4 – 1.10; L4/5 – 1.01).

Conclusions

There appears to be a significant relationship between the location of the interbody cage and the degree of indirect decompression achieved. For each descending level both the indirect decompression ratio as well as the relative improvement of thecal sac area decreased – implying greater disc height change needed to achieve the same improvement in indirect decompression. The indirect decompression ratio is proposed to quantify the improvement in canal diameter adjusted for the change in disc height achieved during LLIF.

Learning Objectives

By the conclusion of this session, participants should be able to:

- 1) Describe the definition of the indirect decompression ratio
- 2) Understand the relationship of lumbar level and cage location in influencing the degree of indirect decompression achieved in lateral lumbar interbody fusion

References