

Correlation Between Intraoperative Endplate Violation and Subsidence of Polyetheretherketone Intervertebral Cages in Extreme Lateral Interbody Fusion

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Introduction

Extreme lateral interbody fusion (XLIF) has become a well accepted alternative to anterior/posterior approaches to the lumbar spine. While subsidence remains a major concern, it has not been well characterized. The purpose of this study is to investigate the incidence of subsidence with XLIF procedures, and to present any correlation with intraoperative endplate breach.

Methods

IRB approved retrospective review of 164 thoracolumbar levels in 45 patients with an XLIF procedure done between 2008 and 2012. Intraoperative images were reviewed for clear endplate damage. At follow-up appointments, radiographs were reviewed for subsidence. The role of demographic and operative data was analyzed.

Results

Subsidence occurred in 69% of patients at any level, and 38% of total levels. 23% of levels had radiographic evidence of intraoperative endplate violation. When subsidence occurred, the cage migrated into the inferior body 50% of the time, superior body 26% of the time, and both 24% of the time. Levels found to have intraoperative endplate violation tended to have later subsidence. 46.4% of levels with endplate violation developed severe subsidence, versus 13.2% of levels without endplate violation that eventually developed severe subsidence. 71.8% of levels with endplate violation developed subsidence of any severity, while 27.3% of levels without endplate violation developed any radiographic evidence of subsidence ($p < 0.0001$ for all comparisons). Direction of endplate violation was associated with a correlated direction of subsidence ($p < 0.0001$). The presence of an intraoperative endplate violation increased the risk of subsidence by more than 770% (OR: 7.77, $p < 0.0001$). Intraoperative endplate violation increased the risk of severe subsidence by more than 660% (OR: 6.62, $p < 0.0001$).

Conclusions

Intraoperative endplate violation during extreme lateral interbody fusion is a major risk factor for the development of subsidence, as it predicts both subsidence direction and severity.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of intraoperative parameters on the incidence of subsidence with XLIF procedures, 2) Discuss, in small groups, what increases the risk for the eventual subsidence postoperatively, 3) Identify an effective treatment to minimize the risks of the development of subsidence after an XLIF procedure.

References

Eck JC, Hodges S, Humphreys SC. Minimally invasive lumbar spinal fusion. The Journal of the American Academy of Orthopaedic Surgeons. 2007;15(6):321-9. Epub 2007/06/06. PubMed PMID: 17548881

Karikari IO, Nimjee SM, Hardin CA, Hughes BD, Hodges TR, Mehta AI, et al. Extreme lateral interbody fusion approach for isolated thoracic and thoracolumbar spine diseases: initial clinical experience and early outcomes. Journal of spinal disorders & techniques. 2011;24(6):368-75. Epub 2010/12/15. PubMed PMID: 21150667