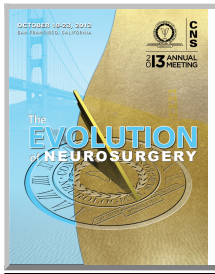

Fusion Rates and Cost Analysis of Anterior Lumbar Interbody Fusion With or Without Additional Anterior or Posterior Instrumentation

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Learning Objectives

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

1) Appreciate and better understand the challenges facing the development of fusion criteria for patients treated with ALIF.

2) Identify the cost ramifications of utilizing additional instrumentation versus a stand-alone ALIF.

3) Apply information regarding the timing of post-operative CT imaging to future patient management.

Introduction

Radiographic fusion guidelines and cost analyses are currently lacking for anterior lumbar interbody fusion (ALIF) procedures. This study was designed to assess fusion rates and costs in patients receiving ALIF procedures with 3 different configurations.

Methods

A retrospective review of 62 patients was conducted, including collection of demographic information, treatment information, and follow-up CT images. Patients either received a stand-alone ALIF (n=37), an ALIF with anterior plating (n=12), or an ALIF with posterior pedicle screw instrumentation (n=13). Seventy-seven levels were treated: L4-L5 (n=25) and L5-S1 (n=52). Assessment of the CT images (N=118) for fusion status was conducted by three independent readers using previously agreed-upon grading criteria. Cost data (n=59) included total cost, time-related (surgery, anesthesia and recovery room), supply (implants and surgical supply) and all other costs. Statistical comparisons were made using non-parametric tests and logistic regression. Inter-rater reliability was judged using Fleiss' kappa.

Results

There was no significant difference between groups with respect to age or gender. Fusion rates after six months were not significantly different between stand-alone (93.8%), added anterior (100%) and posterior (87.0%) instrumentation groups. Logistic regression showed increase in fusion status with postoperative time ($p=0.001$), while level fused and treatment type had no significant effect. Inter-rater reliability was low with a kappa of 0.2631. Cost data on single-level fusions revealed significant differences in total, supply, and operation cost between treatment groups ($p<0.001$). Median supply costs increased for anterior and posterior fixation when compared to stand-alone ALIF (+29% and 62%, respectively), as did operation costs (10% and 88%), resulting in total cost increases (+19% and 56%).

Conclusions

Fusion status was not significantly different between treatment options, while cost increased substantially with supplemental anterior or posterior instrumentation. When clinically indicated, stand-alone ALIFs may be preferable to additional anterior or posterior instrumentation.

Key Points

•Supplemental instrumentation shows increased costs without significant differences in radiographic fusion.

•Computed tomography imaging performed before six-months post-operative shows significant differences in fusion status when compared with images taken after six months. Regular CT imaging follow-up before six months is not recommended.

•Increases in costs with supplemental fixation were largely tied to increases in time-related costs and supply costs.

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