

Evaluating Progression of Bony Fusion in Multilevel Lumbar Fusion with BMP Abhishiek Sharma MD; Christopher E. Wolfla MD, FAANS Medical College of Wisconsin



Introduction

Lumbar spine fusion is a commonly performed procedure in the United States. The lack of standardized noninvasive imaging modalities, varied operative techniques, utilization of different autograft and biological augmentation limits clinical studies in evaluation of maturing bony fusion. We sought to evaluate the radiographic progression of bony maturation in intertransverse lumbar fusion with iliac crest autograft and BMP augmentation by examining anteroposterior and lateral radiographs.

Methods

We performed a primary analysis of retrospectively collected data on patients undergoing multilevel, intertransverse lumbar fusion utilizing iliac crest bone graft supplemented with BMP. All patients underwent elective posterior lumbar fusion surgery for degenerative indications at a single academic institution by single board-certified Neurosurgeon. Patients with trauma, oncologic, neuromuscular or nondegenerative diagnoses were excluded. We graded post-operative radiographs at 1, 3, 6, 12 and 24 months utilizing the Molinari grading scale.

Results

59 patients met inclusion criteria. Patient demographics, comorbidities, diagnosis, segments fixed and interbody fusions performed were studied. The initial post-operative radiographs were assigned a grade of 5. We found the mean Molinari grade to be 3.85 at 1 month period with some resorption of bone graft; 2.7 at 3 months, and 1.7 at 6 months. We found mature bony unions at 12 months with average Molinari grades of 1.1. The average time-to-fusion was 10.7 months. Fifty eight patients achieved complete, mature fusion scores of 1 but one patient who had solid, unilateral fusion. had a Molinari grade of 2. Of note, there was less graft resorption noted at interbody fusion segments.

Plot showing progression of bony fusion over 24 months of follow-up



Conclusions

We found that radiographic progression of bone graft maturation appears similar with BMP augmentation. We also found that the mean time to fusion in our study was 10.7 months. Therefore, it appears BMP is a viable adjunct for augmentation of bony fusion in multilevel intertransverse lumbar surgery.

Anteroposterior radiographs demonstrating the Molinari grading system in a patient with L4-S1 fusion.



Learning Objectives

1. Bony maturation appears similar during the fusion process with BMP augmentation.

2. Molinari grading scale can be used to adequately study bony fusion with plain radiographs.

References Available upon request