An Outcome Comparison of Posterolateral Fusion Using Either Iliac Crest Autograft or Local Bone Graft: a Minimum 2-year Follow-up

+*Roper JG; *Zimmerman A; *Dawson EG; *Wang JC
+*University of California Los Angeles, Los Angeles, CA

Introduction

Autogenous iliac crest bone graft has been the gold standard for use in posterolateral spinal fusions despite a high incidence of morbidity associated with the harvesting process. Minor complications including increased blood loss, increased hospital stay, and superficial infections have been reported to occur in 9.4% to 25% of cases. Major complications such as deep infection, fracture of the ileum, chronic pain, abdominal herniation, and unsightly scarring have occurred in 0.7% to 25% of cases (1,2,3,5). The current study investigates the efficacy of using local bone graft in posterolateral spinal fusion. It is a less invasive technique comprised of harvesting spinous processes, lamina, and decorticated transverse processes of exposed vertebral segments during surgery. The purpose of this study is to determine if the fusion rates for lumbar surgery are different with the use of autogenous local bone graft as compared to lumbar fusions with autogenous iliac crest bone grafting, and to determine if iliac crest bone grafting is necessary for all lumbar fusions.

Methods

A retrospective review was conducted of all patients who underwent posterolateral lumbar fusion with local bone graft by a single surgeon from 1992 to 1998. A similar group of patients that underwent posterolateral fusion with ICBG were also studied as a control. Of the patients who received local bone graft (30), 24 were instrumented with pedicle screw fixation, and 6 had a non-instrumented fusion. A demineralized bone matrix (DBM) was used in 67% (20/30) of the patients in the local bone graft group. Of the patients who received iliac crest bone graft (34), 26 had pedicle screw fixation, 2 had Luque wire fixation, and 7 were non-instrumented fusions. Successful spinal fusion was determined radiographically by continuous bone bridging the transverse processes of at least one side of the fusion mass. Successful fusion was also dependent upon a clinical exam. All patients had a minimum of two years follow-up.

A review of the literature revealed several variables that may play a role in the success of a spinal fusion: age, sex, smoking history, diagnosis, number of levels fused, prior pseudarthrosis, and number of prior spinal surgeries. These variables were statistically evaluated to determine whether significant inherent differences existed between the two groups.

Essential Results

The fusion rate for the patients that received local bone graft was 96.7% (29/30). The fusion rate for the patients that received ICBG was 91.18% (31/34). The 95% confidence interval for the difference was -6.0 to 16.9, meaning that patients treated with ICBG may have a higher fusion rate by no more than 6%, while patients treated with local bone graft may have a higher fusion rate up to 16.9%.

There was one failed fusion in the local bone graft group. The patient had pedicle screw fixation with addition of DBM. The ICBG group had 3 failed fusions. One of the fusions was instrumented with pedicle screws, one with Luque wire fixation, and one was non-instrumented.

The average age of the patients in the local bone graft group was slightly higher, 62.9 years compared to 58.5 years. The presence of tobacco use was similar within the two groups. There were two current smokers in the local bone graft group and none in the ICBG group. The pre-operative diagnosis of the patients was also similar. The majority of the patients had spondylolisthesis, 70% (21/30) compared to 47% (16/34) in the ICBG group. The ICBG group had a higher percentage of multi-level fusions, 35% (12/34) verses 17% (5/30) in the local bone graft group. In both groups the majority had pedicle screw fixation, 80% (24/30) in the local bone graft group, verses 76% (26/34). Two patients in the ICBG group had Luque wire fixation, one resulted in a pseudarthrosis. There were no cases of wire fixation in the local bone graft group. The use of DBM was slightly higher in the local bone graft group, 67% (20/30) versus 59% (20/34). Two patients in each group underwent revision surgery for a prior pseudarthrosis. The percentage of patients who had undergone prior spinal surgery was significantly higher in the local bone graft group at 47% (14/30) verses 18% (6/34).

Conclusion

The results of this study show that local bone graft resulted in similar fusion rates when compared to the current gold standard of autogenous ICBG in posterolateral fusion. The only other study in the literature comparing local grafting techniques with ICBG had significantly low fusion rates in both patient groups, 60% and 56% respectively. Radiographic follow-up was limited in the study with only 58/108 having radiographs at 24 months. In addition, the study included patients who underwent posterolateral interbody fusion in 83.9% (47/56) in the local bone graft group, and 17.3% (9/52) in the ICBG group (4).

The results of this study demonstrate that for short, instrumented fusions in the lumbar spine without significant risk factors, the use of autogenous local bone graft has fusion rates comparable to the use of autogenous iliac crest bone grafting.

References