Introduction

When conservative treatments fail to eliminate abnormal motion, spinal fusion has been shown to provide symptomatic treatment for spinal instability, stenosis, spondylolisthesis, and symptomatic degenerative disc disease. The trend and rates of fusion over the past few has been dramatic in the United States. Accompanying that higher incidence has been the shifting from traditional open surgery to minimally invasive techniques to reduce scar tissue formation, significance of muscle stripping, and muscle retraction which all have been shown to adversely affect outcomes. Other reasons supporting the widespread transition to minimally invasive spine (MIS) techniques include decreased postoperative pain, decreased intra-operative blood loss, shorter postoperative hospital stay, faster return to normal activity, and reduced reoperation rates.

Spinal fusion procedures rely on a bony fusion substrate in addition to fixation hardware. While available grafting options include autogenous, allogeneic and synthetic materials, recent interest in viable allograft material with living cells has drawn attention and attraction for incorporating a biologic basis for regenerative consideration. A recent viable allograft, complete with cellular and designated bone carrier (ViaGraft, Vivex Biomedical, Marietta, GA) has been developed. This study represents a retrospective review of a single practice, single surgeon evaluation of the product in 50 consecutive patients for fusion by CT and radiographic evaluation at 12 months in conjunction with a minimally invasive surgical approach.

Methods

A retrospective review identified patients treated for revision surgery who received ViaGraft cellular bone matrix material in minimally invasive transforaminal lumbar interbody fusion (MITLIF) with a minimum of 12-month follow-up.

Patient diagnoses included radiculopathy in all instances, and varied collateral indications to which pain and morbidity had been unresolved by conservative treatment.

Adverse events including infection, revisions and evidence of immune response were evaluated, and patient co-morbidities defined for the entire population of patients. Patient fusion status was assessed using CT. Patients were deemed fused if CT scans demonstrated evidence of bridging bone at the fusion site without evidence of motion on flexion-extension radiographs.

Results

As a retrospective evaluation, all patient outcomes were assessed at the 12-month clinical visit. In total, 75 levels in 50 patients were evaluated (Table 1). Of the 50 patients, 47 were fused at the 12-month follow-up. The 3 patients who had not fused were all single level procedures, and all failure occurred at L5-S1. None of the patients who did not fuse were assigned to comorbidities of smoking or diabetic complications. ANOVA demonstrated no correlation in the success of the spinal fusion between age, BMI, or number of levels treated (Table 2).

Discussion

In this population, 94% of the patients treated achieved the surgical objective in 96% of the levels treated were fused. The high rate of fusion, the lack of secondary morbidity with autologous bone harvest, and the clinical success account the benefits of viable allograft matrix for MITLIF use. Limitations to the findings in this study exist because of single surgeon, a single site, and although all patients were treated by MITLIF, the study was not randomized or compared with patients undergoing open TLIF. Clinical data will be added to the radiographic assessment to attend the considerations of early relief, more efficient gains in quality of life, and in cost analysis regarding patient morbidity, return to work, facility cost, and the overall economics of advanced biologics in patient care.