Results Following Surgical Intervention for Fracture Nonunions: Does Diabetes Predict Poor Outcomes?

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Purpose: Diabetes mellitus has become an increasingly prevalent in our healthcare system, and will affect approximately 439 million adults worldwide by 2030. Diabetes mellitus has been known to affect bone quality, leading to increased fracture risk and, is associated with increased risk of nonunion following a fracture. However, there is little evidence which gives insight as to the long-term outcomes of diabetic patients who are treated surgically for fracture nonunion. The purpose of this study was to examine the functional outcomes of diabetic patients who were treated for a nonunion, and compare their functional outcomes against matched controls.

Methods: Three hundred and thirty-three patients who were surgically treated for a fracture nonunion were followed prospectively. Sixty-one (18.3%) patients carried a diagnosis of diabetes mellitus (either type 1 or type 2). This cohort was paired with 61 matched controls based on age, gender, and location of fracture nonunion. All fracture nonunions were treated surgically in a similar manner. Patients were evaluated for union with radiographs and function using the Short Musculoskeletal Functional Assessment (SMFA) at baseline (pre-operatively) and at 3 months, 6 months, 12 months, and greater than 2 years post-operatively. Patients were also assessed at these time points for healing and any complications. Univariate analysis was performed using independent t-tests for normally distributed continuous variables and the Mann Whitney U test for non-normally distributed continuous variables, with significance set at $p < .05$. Pearson's chi-squared analysis was used for categorical variables.

Results: The diabetic group was composed of 29 females and 32 males, with an average age of 58.2. In each group, there were 17 upper extremity nonunions and 43 lower extremity nonunions. The average length of time of long-term follow-up was 37.7 months for the diabetic group and 41.7 months for the non-diabetic group. The average time to heal for the diabetic group was by 6.7 months and by 6.5 months for the non-diabetic group ($p = 0.764$). Additionally, there was no difference in the complication rate between the groups. Distributions of SMFA scores for diabetic and non-diabetic patients were similar at baseline, 3 months and 6 months post-operatively, as assessed by visual inspection. SMFA scores at 12 months and long-term were normally distributed, and there was no significant difference in SMFA scores between the groups at either time point. Diabetic patients saw a 13.2 reduction in mean SMFA score from baseline to long-term follow-up while non-diabetics had a reduction of 18.5.

Conclusions: The comorbidity of diabetes mellitus does not lead to significantly worse functional outcomes following surgical treatment for a fracture nonunion. Although patients with diabetes mellitus are at a higher risk for developing a nonunion following an acute fracture, comparison with matched controls demonstrates that diabetes mellitus has little impact on the healing that occurs after surgical revision for fracture nonunions. Orthopaedic surgeons should counsel diabetic patients that they can expect a similar return to function and time to healing as non-diabetic patients if undergoing this treatment.