Does Butterfly Fragment Management Affect Healing Following Fixation of Comminuted Clavicle Fractures?

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Purpose: We sought to assess the healing outcomes of patients who sustained a comminuted clavicle fracture and underwent operative fixation with either a bridge plate technique or interfragmentary screw and neutralization plate.

Methods: 271 patients with 271 comminuted clavicle fractures who presented to our hospital system with a displaced clavicle fracture and underwent operative fixation were retrospectively reviewed. Data collected include patient demographics, initial injury information, and fixation technique. Furthermore, outcome information such as total complications, fracture-related infection (FRI, based on consensus criteria), need for removal of hardware, nonunion (defined as failure to achieve 3/4 cortex bridging after 3 radiographic follow-up visits), and the need for revision fracture surgery prior to healing were reviewed. Complications such as loss of chest wall sensation, venous thrombosis, adhesive capsulitis of the shoulder, and screw backout were categorized as “other.” Patients were seen for clinical and radiographic follow-up at 2 weeks, 6 weeks, 3 months, 6 months, and 12 months postoperatively. Clinical healing was defined as non-tenderness about the fracture site with painless range of shoulder motion, and radiographic healing was defined as presence of bridging callus and lack of fracture line on radiograph. $\chi 2$ analysis, analysis of variance, and binomial regression analysis were used to determine any significant differences between the 2 different fixation method cohorts.

Results: There were 126 comminuted fractures fixed with a bridge plate technique and 145 comminuted fractures fixed with a plate and at least 1 interfragmentary screw both with a mean follow-up of 6 months. The plate group was more female, the result of high-energy mechanisms, and had more anteroinferior plates ($P<0.05$ for all). Although patients fixed with the bridge plate technique underwent a higher incidence of revision surgery, underwent a higher incidence of hardware removal, and had on average a longer time until they were clinically healed, on multivariate regression analysis bridge plate fixation was not independently associated with any of these outcomes ($P>0.05$ for all).

Conclusion: Fixation method is not independently associated with any outcome following displaced, comminuted clavicle fractures.