Δ Factors Associated with Ulnar Neuropathy After Bicolumnar Plate Fixation of Distal Humerus Fractures

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Purpose: Ulnar nerve symptoms after surgical fixation of distal humerus fractures are common. The purpose of this study was to assess the risk factors associated with postoperative ulnar nerve symptoms in patients undergoing surgical fixation of distal humerus fractures.

Methods: The results of a previously presented randomized controlled trial were utilized. Patients were followed for 1 year, and comprehensive neurological, functional, and electrophysiological assessments were conducted. Multiple factors were examined in an "a priori" manner to assess the risk of ulnar neuropathy. The purpose was to identify risk factors associated with ulnar neuropathy, and risk factors associated with abnormal electromyographic (EMG) results.

Results: 58 patients were examined (mean age 52 years, 60% female). The rate of ulnar neuropathy was high at all times points: 95% preoperatively, 98% at 6 weeks, 86% at 3 months, and 75% at 1 year postoperatively. At 6 weeks the prevalence of ulnar neuropathy was highest in patients treated with a triceps sparing approach (89%), compared to triceps split (35%, P = 0.003) or olecranon osteotomy (25%, P = 0.003), as well as patients treated with 90-90 plating (76%) compared to 180° plating (35%, P = 0.008). Multivariable analysis demonstrated that a triceps-sparing approach increased the risk of ulnar neuropathy compared to triceps split (odds ratio [OR] 7.8, P = 0.03) and olecranon osteotomy (OR 28.6, P = 0.016), while plate position did not show an effect. At 6 weeks, 60% of patients had EMG abnormalities (44% severe, 56% minor). The presence of EMG abnormality had no effect on patients' functional outcome (Disabilities of the Arm, Shoulder and Hand [DASH] or Mayo Elbow Performance Score [MEPS]) at any time point; however, it was associated with higher rates of ulnar neuropathy at nearly all time points postoperatively. Controlling for other factors in a multivariable analysis, the only factor increasing the risk of EMG abnormality was a triceps-sparing approach compared to triceps split (OR = 8.3, P = 0.03) or olecranon osteotomy (OR = 13.9, P = 0.04).

Conclusion: The incidence of ulnar neuropathy after bicolumnar plate fixation of distal humerus fractures is high. EMG abnormalities are highly correlated with ulnar neuropathy symptoms in the short and long term; however, outcome scores (DASH and MEPS) are not sensitive enough to capture such dysfunction. The use of triceps-sparing approach, which may cause further ulnar nerve manipulation, may lead to increase in neuropathy symptoms. Patient education regarding the high prevalence of postoperative neuropathy, along with careful handling of the nerve intraoperatively, are of importance.

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