Radial Nerve Injury and Recovery After Humeral Nonunion Surgery

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Purpose: Radial nerve palsy (RNP) after humeral shaft fractures is well characterized. Data regarding RNP after humeral nonunion repair is more limited and rates range from 0% to 18.5%, typically from small sample sizes. This study uses multi-center data to determine the rate of RNP after humeral nonunion repair and predictive factors for palsy.

Methods: We retrospectively reviewed 393 adult patients who underwent humeral shaft nonunion repair at 18 centers. Exclusion criteria were pathologic fracture and initial complete RNP. Data included demographics, fracture/nonunion characteristics, and post-op course. RNP deficits either partial or complete. We used multivariate logistic regression to characterize patients with RNP. Additionally, demographics and surgical factors were evaluated with univariate logistic regression and chi-squared contingency testing.

Results: 393 patients (159 M, 234 F, ages 18-93). 25(6.3%) had worse RNP after nonunion repair. 68% were approached anteriorly with a 6% palsy rate, 8% posteriorly with 5% and 7% laterally with 8%. Midshaft nonunions were associated with RNP (P = 0.02) and bone grafting trended towards association (P = 0.07). Logistic multivariate regression showed good model performance for fracture location, nonunion type, and nonunion repair approach (P = 0.036). Middle third fractures correlated with RNP (P = 0.02). Of 25 patients with postop RNP, 8(32%) had persistent RNP at final follow-up (273 days; range 40-539). For those who recovered, resolution averaged 23 weeks. On average, partial/complete palsies resolved at 11/42 weeks.

Conclusion: In a large series of patients treated operatively for humeral shaft nonunion, the rate of RNP was 6.3% and the rate of persistent RNP at union was 2.0%. This finding is more generalizable than prior reports. Midshaft fractures were associated with palsy although surgical approach was not.

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.