A Comparison of Primary Total Elbow Arthroplasty Versus Secondary Total Elbow Arthroplasty (Following Failed Internal Fixation) for Distal Humeral Fractures of the Elderly

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Purpose: The purpose of our study was to compare the outcome of distal humeral fractures treated with acute (primary) total elbow arthroplasty (TEA) to those treated with late (secondary) arthroplasty following failure of initial fracture fixation.

Methods: This was a single-center, retrospective, longitudinal cohort study of patients undergoing primary TEA or secondary TEA for distal humerus fracture at a single university-affiliated hospital from 1994 to 2011. Patients were initially identified through a prospectively gathered clinical database. Data captured included demographics, fracture classification, type of arthroplasty (primary or secondary), presence of complications, revision surgery, and signs of radiographic loosening. Charts were reviewed and patients were asked to return to clinic for a follow-up visit in order to capture functional outcomes. The primary outcome measure was the Disabilities of the Arm, Shoulder and Hand (DASH) score. Other outcome measures included operative parameters, Mayo Elbow Performance Score (MEPS), range of motion, ulnar nerve function, and grip strength.

Results: We identified 91 eligible patients who were treated with either primary or secondary TEA for a distal humerus fracture between 1994 and 2011. Nine patients declined participation, and 31 had died. A comprehensive chart review was performed on 82 patients with a mean follow-up of 6 years (the latest available chart data were included for patients who had died). 36 patients had a primary TEA, and 46 had a secondary TEA. In the primary group there were 7 male and 29 female patients with an average age of 77 years. In the secondary group there were 11 male and 35 female patients with an average age of 68 years. The difference in age was statistically significant (P < 0.001). The rate of revision was 8% (3/36) in the primary group and 20% (9/46) in the secondary group (P = 0.12). Two patients (6%) with a primary arthroplasty had a deep infection requiring irrigation and debridement compared to four patients (9%) in the secondary group (P = 0.34). 25% of patients in the primary group had postoperative neurologic symptoms in the limb compared to 22% in the secondary group (P = 0.78). The mean operative time was 101 minutes in the primary group and 103 minutes in the secondary group (P = 0.89). The mean DASH score at final follow-up was 33 in the primary group and 42 in the secondary group (P = 0.46). The mean MEPS at final follow-up was 85 in the primary group and 80 in the secondary group (P = 0.45).

Conclusion: To our knowledge, this is the largest reported comparison of primary versus secondary TEA for distal humeral fracture. There was no significant difference in functional outcome between the two groups. Our study suggests a trend that secondary TEA was associated with a higher incidence of revision compared to primary TEA, but this was

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not statistically significant (possibly due to a small sample size or beta error). Our results support TEA for either primary fracture care or secondary reconstruction of distal humeral fractures in the elderly. Additionally, these data are useful in surgical decision-making regarding these difficult injuries.