Primary Acute Total Elbow Arthroplasty for Treatment of Distal Humerus Fractures Results in Fewer Reoperations Compared to Salvage TEA After Failed Fracture Fixation

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Introduction: Distal humerus fractures in elderly can be treated with open reduction internal fixation (ORIF) or total elbow arthroplasty (TEA). TEA is a viable option for elderly patients with comminuted intra articular distal humerus fractures, however, identifying optimal candidates remains a subject of ongoing debate. Concerns about implant longevity, complications, lifetime weight-bearing restrictions and lifestyle limitations after TEA are major concerns. Thus, it brings up the question of whether there is any benefit or harm in attempting ORIF first and perform a salvage TEA later in case of ORIF failure. Previous studies have shown variable results in small cohorts. This study aims to investigate differences in reoperation rate between primary TEA for treatment of acute distal humerus fracture, compared to salvage TEA following failed ORIF.

Materials & Methods: This is a retrospective study conducted at two large health system. Current Procedural Terminology (CPT) code 24363 was used to identify patients who had undergone TEA procedures between 1994 and 2023. Patients were included if they underwent TEA for treatment of an acute distal humerus fracture (<40 days from time of injury), or TEA for treatment of failed ORIF. Data was retrospectively collected and analyzed, including patient demographics, complications, and reoperations. We hypothesized that salvage TEA would be associated with higher rate of revision surgery.

Results: 138 patients were identified: 88 underwent primary acute TEA for treatment of their distal humerus fracture, while 50 had salvage TEA after a failed ORIF**.** Overall, mean age was 73 years, and 83% were female. The mean age in the primary TEA group was 77, which was significantly higher than the mean age of 66 in the salvage group (p=0.001). The majority of injuries were a result of a ground level fall. Open fractures were 8/88 (10%) in the primary TEA group, and 10/50 (20%) in the salvage TEA group (p=0.11). Mean time from injury to TEA surgery was 13 days in the primary TEA group, and 463 days in the salvage TEA group.

Regarding outcomes, there were significant differences in reoperation rates. Rate of revision surgery for any reason was 13/50 (26%) in the salvage TEA group, compared to 9/88 (10%) in the primary TEA group (p=0.028). Revision total elbow arthroplasty was also significantly higher in the salvage TEA group, 9/50 (18%) compared to 1/88 (1%) in the primary TEA group (p=0<0.001). Rate of deep infection requiring surgical treatment trended towards significance in the salvage group (10% vs. 3%, p=0.22).

Discussion: To our knowledge, this is the largest study comparing primary acute TEA to salvage TEA for treatment of distal humerus fractures. Patients undergoing salvage TEA due to failed ORIF had significantly higher rate of reoperation for any reason, as well as significantly higher rate of revision arthroplasty. This highlights the potential risks of revision surgery in this elderly population, that may be inherent with conversion arthroplasty after failed ORIF. In these elderly patients, a primary TEA may be a better approach than attempt at ORIF and later conversion to TEA.