

ORIF versus Radial Head Arthroplasty for the Treatment of Radial Head Fractures in a Young Active Population

Nicholas Kusnezov, MD¹; Emmanuel Eisenstein, MD¹; Justin Mitchell, DO²;

Kelly Kilcoyne, MD²; Brian Waterman, MD²;

¹William Beaumont Army Medical Center/Texas Tech University Health Sciences Center, El Paso, Texas, USA;

²William Beaumont Army Medical Center, El Paso, Texas, USA

Purpose: Radial head arthroplasty (RHA) compares favorably to open reduction and internal fixation (ORIF) for the treatment of radial head fractures in a young active military population.

Methods: A retrospective electronic medical record review was performed of the Military Health System (M2) database for CPT codes 24665 (ORIF) and 24666 (RHA), between 2010 and 2015. Procedure miscoding or patients with insufficient follow-up (ie, <2 years) were excluded. Multiple variables including demographics, ipsilateral versus contralateral injury with respect to dominant handedness, junior or senior rank, age, gender, fracture classification based on Mason classification scheme (OTA 21-B2), associated dislocation (OTA 20-A, OTA 20-B), concomitant coronoid fracture (OTA 21-C1.2), coronoid fixation, associated ulna fracture (Monteggia variant, 21-B3), lateral ulnar collateral ligament (LUCL) reconstruction, other concomitant injury, and heterotopic ossification (HO) prophylaxis were studied with regard to range of motion (ROM), ability to return to military duty and deployment, complications and revisions, as well as final DASH (Disabilities of the Arm, Shoulder and Hand) scores. Multivariable analysis was performed to assess for the influence of specific risk factors on stated end points.

Results: There were 67 patients who underwent 69 ORIFs and 10 patients who underwent RHA available for review. Average patient age was 31 years (SD 8.1) with a mean follow-up time of 3.4 years (range, 2-5.8). 22 patients had an associated dislocation and 14 had an associated coronoid fracture with 6 undergoing coronoid fixation. Average extension was 8.7° (SD 9.9), flexion 132° (SD 12), pronation 80° (SD 16), and supination 73° (SD 23). 90% of patients in both groups were able to return to active duty. Deployment data were available for 24 patients with 75% being able to deploy postoperatively. Functional end points did not significantly differ between ORIF and RHA. Coronoid fracture was significantly associated with decreased supination ($P < 0.05$), while secondary coronoid fixation predicted improved pronation and supination ($P < 0.05$). Dislocation, coronoid fracture, and LUCL reconstruction were associated with a significantly increased rate of sustaining one or more complications ($P < 0.05$), while dislocation and need for LUCL reconstruction independently predicted revision surgery ($P < 0.05$). DASH scores were available for 14 ORIF patients with an average of 18, and for 5 RHA patients with an average of 13.

Conclusion: Arthroplasty and ORIF are viable options for treating radial head fractures in a young active population. With 90% of service members able to return to full duty after radial head fracture, increased complexity of the fracture or requirement for arthroplasty due to nonreconstructable fracture pattern does not affect the ability to have a functional upper

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extremity. Increased fracture complexity as measured by coronoid fracture has a negative effect on ROM, with fixation of the fracture associated with improved ROM. However, dislocation, coronoid fracture, and LUCL reconstruction (as markers of increased fracture severity and complexity) are associated with increased complications. Dislocation and LUCL reconstruction are associated with increased need for revision surgery, again as surrogates for injury severity. While the optimal treatment of radial head fractures, especially more complex injury patterns, is still debatable, it is reassuring to know that in a young active population with high upper extremity demands both treatment options provide good results, and thus one should not be overly concerned with providing arthroplasty as an option in young patients due to nonreconstructable radial head fractures.