

Outcomes of Reverse Total Shoulder Arthroplasty for Proximal Humerus Fracture versus Rotator Cuff Arthropathy

Stephen Maier, Anjali M Prabhat, Jamie Elizabeth Collins¹, Arvind Gabriel Von Keudell, Brandon Elizabeth Earp¹, Dafang Zhang

¹Brigham and Women's Hospital

INTRODUCTION: Reverse total shoulder arthroplasty (RSA) is an effective surgical treatment for rotator cuff arthropathy (RCA) and proximal humerus fracture (PHF) of higher complexity in the appropriate patients. There has been limited literature on the differences in patient-reported outcome measures (PROMs) of RSA for traumatic versus elective indications, and the available evidence is limited by short-term follow up. The primary aim of this study was to compare PROMs between those treated with RSA for RCA versus those treated for PHF. We hypothesized that patients with RCA would have better validated outcomes following RSA compared to those treated for PHF at minimum 2-year follow up.

METHODS: A retrospective review was conducted of 189 shoulders in 189 patients treated at two tertiary care centers with RSA for PHF or RCA. Inclusion criteria were all adult patients with a minimum of 2 years of postoperative follow up after RSA. Patients were excluded if RSA was performed for an indication other than PHF or RCA and if the RSA was a revision arthroplasty. Self-reported clinical outcomes were assessed using the American Shoulder and Elbow Surgeons score (ASES), Shoulder Pain and Disability Index (SPADI), Visual Analog Scale (VAS), and Subjective Shoulder Value (SSV). Statistical analyses were performed using linear or logistic regression with generalized estimating equations. Models were adjusted for demographic data including age, sex, and comorbidities.

RESULTS: Of the 189 patients in this study, 70 underwent RSA for fracture and 119 underwent RSA for RCA. Demographic data was similar for the two groups with respect to age, comorbidities, and diabetes status; however, there were differences in smoking status and average follow-up time. Overall, at a mean of 6.4 years of postoperative follow up, the mean ASES was 79.7, the mean SPADI-Total was 20.8, the mean VAS was 0.8, and mean SSV was 77.1. After adjusting for covariates using multivariable regression, there was no significant difference in average SSV ($p=0.7$), VAS ($p=0.7$), or SPADI-Pain ($p=0.2$) between PHF and RCA groups. However, the RCA group reported significantly better outcomes in ASES ($p=0.002$), SPADI-Disability ($p<0.0001$), and SPADI-Total ($p=0.0001$).

DISCUSSION AND CONCLUSION: Patients with RCA and PHF treated with RSA achieved similar medium-term outcomes in several domains, particularly postoperative pain levels; however, PHF patients reported greater perceived disability at minimum 2-year follow up. While RSA is an effective procedure, patients may have variable functional outcomes based on the indication for surgery.

Table 1. Descriptive statistics of patient reported outcomes. Displayed in cells: n (%) for categorical variables. Mean (SD); median for continuous variables.

Instrument	Overall	Arthropathy	Fracture
SPADI-Disability	27.3 (23.0) 21.3	23.6 (23.2) 15.0	33.5 (21.3) 33.1
SPADI- Pain	18.6 (19.5) 12.0	17.2 (17.3) 12.0	20.9 (22.7) 12.0
SPADI Total	23.8 (19.4) 20.8	21.1 (19.0) 13.8	28.5 (19.3) 25.8
ASES	79.7 (17.1) 83.3	82.4 (15.8) 86.7	75.0 (18.5) 78.3
SSV	77.1 (19.5) 80.0	76.5 (19.3) 80.0	78.1 (19.9) 80.0
VAS	0.8 (1.7) 0.0	0.6 (1.5) 0.0	1.1 (2.1) 0.0
VAS: 0 vs. 1+			
0	139 (74%)	90 (76%)	49 (70%)
1+	50 (26%)	29 (24%)	21 (30%)

Table 2. Results of multivariable regression, adjusted for age, sex, diabetes, smoking status,

CCI, and time since surgery, exhibiting association between indication for RSA and patient reported outcomes. Displayed in cells is adjusted mean (95% confidence interval), and adjusted mean difference (95% confidence interval).

Instrument	Arthropathy	Fracture	Difference	p-value*
ASES	82.6 (76.6, 88.5)	73.3 (66.6, 80.0)	9.3 (3.5, 15.0)	0.0022
SPADI_D	19.5 (12.2, 26.7)	34.4 (27.5, 41.3)	-14.9 (-22.1, -7.8)	<.0001
SPADI_P	19.8 (12.8, 26.8)	26.1 (18.5, 33.6)	-6.3 (-13.5, 1.0)	0.2258
SPADI_T	19.5 (13.1, 25.9)	31.0 (24.9, 37.2)	-11.5 (-18.0, -5.1)	0.0001
SSV	74.5 (66.6, 82.4)	73.6 (65.0, 82.2)	0.9 (-5.4, 7.2)	0.6685