Similar rates of adverse events following primary anatomic compared to reverse shoulder arthroplasty in patients ≥70 years old with glenohumeral osteoarthritis: a cohort study of 3,398 patients

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INTRODUCTION:

Reverse total shoulder arthroplasty (RTSA), initially indicated for cuff tear arthropathy, is increasingly used for elderly patients with primary glenohumeral osteoarthritis (GHOA) and an intact rotator cuff. This is often done to avoid revision surgery in elderly patients for rotator cuff failure with anatomic total shoulder arthroplasty (ATSA) despite traditionally good outcomes of ATSA. We sought to determine whether there was a difference in outcomes for patients ≥70 years who receive RTSA compared to ATSA for GHOA.

METHODS: A retrospective cohort study was conducted using data from a United States integrated health care system's shoulder arthroplasty registry (a surveillance tool with 100% capture rate that records a predefined set of patient-, procedure-, implant-, surgeon- and hospital-related variables). Patients who were ≥70 years who underwent primary shoulder arthroplasty for GHOA with an intact rotator cuff between 2012-2020 were included. Patients who received RTSA were compared to those who received ATSA. Multivariable Cox proportional hazard regression was used to evaluate all-cause revision risk during follow-up, while logistic regression was used to evaluate 90-day emergency department (ED) visit, 90-day readmission, and scapula stress fractures. Regression models included age, gender, race/ethnicity, any non-OA diagnosis, operative year, Walch's glenoid morphology, and patient comorbidities as covariates, as well as a cluster term to account for correlation of procedures performed by the same surgeon.

RESULTS: Then final study sample comprised 535 RTSA and 2863 ATSA for primary GHOA. The mean age was 75.9 years and 43.8% were male. The cumulative all-cause revision probability at 5-years follow-up was 2.17% and 2.89% for RTSA and ATSA, respectively. After accounting for confounders, no significant difference in revision risk (hazard ratio=0.99, 95% confidence interval [CI]=0.51-1.91) was observed between procedure groups. The most common reason for revision following RTSA was glenoid component failure (33.3%) followed by dislocation and periprosthetic fracture (22.2% for each). Half of revisions following ATSA were for rotator cuff tear, with dislocation (26.4%) and glenoid component loosening (16.7%) the second and third most common reasons, respectively (**Table**). There was no significant difference between RTSA versus ATSA in likelihood for 90-day ED visits (odds ratio [OR]=0.94, 95% CI=0.69-1.29) and 90-day readmission (OR=1.21, 95% CI=0.73-1.99) with overall rates of 12.4% and 4.4%, respectively. No scapular stress fractures were identified following RTSA and only one was observed for ATSA. No association with glenoid morphology was identified.

DISCUSSION AND CONCLUSION: ATSA and RTSA for GHOA with an intact rotator cuff in patients ≥70 years had a similar revision risk, as well as likelihood for 90-day ED visits and readmissions. While revision risk was similar, the most common causes for revision were different with rotator cuff tears for ATSA and glenoid component loosening for RTSA.

Table. Reasons for revision following primary shoulder arthroplasty for glenohumeral osteoarthritis by procedure type (patients could have more than one reason for revision reported).

Reason, n (%)	RTSA	TSA
Total N	9	72
Arthrofibrosis	1 (11.1)	1 (1.4)
Dislocation	2 (22.2)	19 (26.4)
Glenoid fracture	0 (0.0)	1 (1.4)
Glenoid component loosening	3 (33.3)	12 (16.7)
Liner wear	0 (0.0)	2 (2.8)
Humeral component loosening	1 (11.1)	1 (1.4)
Infection	1 (11.1)	9 (12.5)
Malpositioning	0 (0.0)	1 (1.4)
Malunion	1 (11.1)	0 (0.0)
Non-union	0 (0.0)	1 (1.4)
Periprosthetic fracture	2 (22.2)	3 (4.2)
Rotator cuff tear	0 (0.0)	36 (50.0)
Other	1 (11.1)	3 (4.2)