

Decreased Preoperative External Rotation is a Predictor of Need for Intraoperative Conversion from Anatomic TSA to RSA in the Setting of Primary Glenohumeral Osteoarthritis

Garrett Christensen¹, Maria Fernanda Bozoglian², Joseph Rund, Joseph W Galvin, James V Nepola³, Brendan Patterson²

¹University of Iowa Hospitals and Clinics, ²University of Iowa, ³UHIC

INTRODUCTION:

Surgical treatment options for advanced primary glenohumeral osteoarthritis (GHOA) include anatomic total shoulder arthroplasty (TSA), hemiarthroplasty, and reverse shoulder arthroplasty (RSA). Patient age, glenoid deformity, rotator cuff integrity, range of motion, and activity level are factors that influence decision-making for TSA versus RSA. The purpose of this study was to evaluate the preoperative patient characteristics and intraoperative variables that predict the intraoperative decision for TSA versus RSA in patients with primary GHOA. Secondly, patient-reported outcomes (PROs) and revision rate at 2 years postoperatively were evaluated among patients undergoing TSA and RSA for primary GHOA.

METHODS:

Patients with primary GHOA indicated for TSA versus RSA were identified. Patients were indicated preoperatively for 'TSA versus RSA' and were informed that when possible TSA would be performed. Patients with primary GHOA who were indicated and consented for RSA alone were excluded. Patients with preoperative MRI scans were excluded from this cohort. Preoperative records were reviewed for patient demographics, preoperative range of motion, and rotator cuff strength based on clinical assessment. Preoperative computed tomography (CT) scans were reviewed for Walch classification and glenoid version. Patient records were reviewed for complications and need for revision surgery. ASES scores at minimum 2-year follow-up were compared for patients undergoing TSA versus RSA for primary GHOA.

RESULTS: 111 patients met inclusion criteria from 2018-2021. 94 patients (85% of total cohort) underwent TSA, while 17 patients had an intraoperative conversion from TSA to RSA. When comparing patients undergoing TSA versus RSA, there were no significant differences in age, BMI or preoperative Walch classification for glenoid types A2, B2 or B3 ($p=0.1722$, $p=0.3143$, $p=0.1153$ respectively). Patients who received RSA had significantly decreased preoperative external rotation ($p=0.0058$). External rotation ≤ 30 degrees was found to be the only preoperative predictive factor for performing RSA instead of TSA ($p=0.0004$). The most common reason for intraoperative transition from TSA to RSA was rotator cuff deficiency. Full-thickness rotator cuff tears were identified in 7 patients (6.3% of total cohort). Intraoperative glenoid bone defects which would preclude adequate TSA polyethylene seating and implantation were encountered in 4 patients. For these patients, RSA was performed despite an intact rotator cuff. At 2-year follow-up, median ASES scores were 94.2 (IQR 85-96.7) and 88.3 (IQR 73.3-94.5) for TSA and RSA, respectively ($p=0.096$). At minimum 2-year follow-up, there was one revision in each cohort.

DISCUSSION AND CONCLUSION: This study identified decreased preoperative external rotation range of motion as a significant preoperative predictor of intraoperative conversion from TSA to RSA. Intraoperative variables which dictated conversion to RSA were identification of intraoperative rotator cuff tears and glenoid bone defects not appreciated on preoperative CT scans. This study highlights that the vast majority of patients with rotator cuff intact primary GHOA are still well served with anatomic total shoulder arthroplasty. This study also demonstrates that patients with primary GHOA who receive RSA given inadequate glenoid bone stock or rotator cuff pathology can still achieve excellent 2-year postoperative PROs, with a low rate of revision surgery. This study supports the use of preoperative CT scan, consideration of preoperative external rotation, and careful intraoperative evaluation of rotator cuff integrity when making the decision between TSA and RSA in the setting of primary GHOA.