Anatomic Shoulder Arthroplasty with High Side Reaming versus Reverse Shoulder Arthroplasty for Eccentric Glenoid Wear Patterns with an Intact Rotator Cuff: Comparing Early versus Mid-Term Outcomes with Minimum 7 Years of Follow Up

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INTRODUCTION: Eccentric glenoid bone loss patterns (B and C type glenoid) pose a difficult challenge when performing shoulder arthroplasty. Anatomic total shoulder arthroplasty (ATSA) with preferential high side reaming in an effort to place a glenoid component with adequate bony support has been an accepted method to treat this problem. Reverse shoulder arthroplasty (RSA) with its enhanced glenoid fixation has become an alternative method to manage these cases with eccentric glenoid wear. The purpose of this study was to compare and contrast the early two-year outcomes with the mid-term outcomes for patients undergoing ATSA versus RSA with eccentric glenoid wear patterns and an intact rotator cuff.

METHODS: From 2008-2014 there were 242 shoulder arthroplasties performed in the setting of eccentric glenoid wear patterns (128 ATSA, 114 RTSA). ATSA was performed if at the time of surgery, with high side reaming, an estimated backside bony support of 90% or greater could be achieved for the glenoid component. If this could not be achieved then RSA was performed. Of that initial cohort 101 ATSA and 92 RSA had both two year and final follow up with a minimum of 7 years from surgery. In the ATSA cohort there was 96 B2 glenoids and 5 B3 glenoids. In the RSA cohort there were 68 B2, 20 B3, and 4 C glenoids. American shoulder and elbow scores (ASES), Simple Shoulder Test (SST), range of motion, and patient satisfaction were calculated for each cohort and contrasted at the two-year follow-up point, and last follow-up timepoint. Radiographs in the ATSA cohort were evaluated for glenoid loosening and proximal migration of the humeral component over time. In the RTSA cohort radiographs were evaluated for progressive loosening and notching.

RESULTS:

Average follow up in the ATSA cohort was 100 months (8.3 years) compared to 94 months (7.8 years) in the RSA cohort. At the two-year follow-up point, in contrasting the two cohorts, the ATSA group had statistically significant better average ASES scores (85 vs. 80 [p<.001]), SST scores (10 vs. 9.6 [p<.001]), forward elevation (162^0 vs. 151^0 [p<.001]), external rotation (47^0 vs. 42^0 [p<.001]), and internal rotation (80% full IR vs. 55% full IR [p<.001]). At two-year follow up 95% of the ATSA cohort were satisfied compared to 93% in the RSA cohort. Over time, the results changed, and at final follow up the RSA group had better average ASES scores (80 vs. 77 [p<.001]) and SST scores (9.4 vs. 8 [p<.001]). There was no longer a difference in forward elevation between the ATSA and RSA group (152^0 vs. 149^0 [p=.025]), however the ATSA group continued to have better external rotation (45^0 vs. 41^0 [p<.001], and internal rotation (74% full IR vs. 54% full IR [p=.005]). The patient satisfaction at final follow up had decreased in the ATSA group to 82% of patients, but was maintained in the RSA group with 95% satisfied. The mean radiolucency score for the ATSA glenoids was 1.8 at the two-year follow up, and increased to 3.5 at final follow up. Proximal migration of the ATSA humeral component was 2.4% of patients at two-year follow up and increased to 14% of patients at final follow up. The RSA group had no notching or component loosening at the two-year follow up, and 7% of patients with notching and no loosening of the humeral or glenoid components at final follow up. Of the initial ATSA cohort 7% of patients had undergone revision prior to final follow up (4 patients glenoid loosening, 4 for cuff tear, 1 for posterior instability, 1 for infection). In the RSA cohort 2% of patients underwent revision prior to final follow up (1 dislocation, 1 infection), and 2 patients had acromial stress fractures and 1 axillary nerve palsy that was transient.

DISCUSSION AND CONCLUSION:

When comparing ATSA with high side reaming versus RSA for eccentric glenoid wear patterns and an intact cuff there were significant differences between the two-year results and the final follow-up results at a minimum of 7 years. The ATSA group had better outcomes scores and range of motion with a similar patient satisfaction rating to RSA at the two-year point. Over time, the ATSA results deteriorated and at final mid-term follow up the RSA group had better outcome scores and a higher patient satisfaction rating than the ATSA group (95% vs. 82%). In conjunction with a higher revision rate over time in the ATSA group versus the RSA group (7% vs. 2% of patients), in this series RSA demonstrated more durable results for patients with eccentric glenoid wear patterns and an intact rotator cuff.