Anatomic versus Reverse Total Shoulder Arthroplasty for Patients with Glenoid Dysplasia and an Intact Rotator Cuff

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INTRODUCTION: Glenoid dysplasia is a common developmental variant of the posteroinferior portion of the glenoid and adjacent scapular neck. This unique glenoid deformity was classified by Walch et al. as a Type C glenoid with retroversion exceeding 25 degrees, not caused by erosion. When presenting with concurrent osteoarthritis, surgeons must consider options to manage glenoid retroversion including: high-side reaming, augmented glenoid components, bone grafting, and stilting. In some practices, a Type C glenoid is considered an indication for reverse total shoulder arthroplasty (rTSA). However, correcting version from its native state may over tension the posterior rotator cuff leading to more significant restrictions in internal rotation. In addition, if one considers the high retroversion to be native and not due to a pathological process, it maybe irrational to attempt to modify it. The purpose of this study is to compare the outcomes of aTSA and rTSA in patients with glenoid dysplasia presenting with primary osteoarthritis compared to patients without glenoid deformity. We hypothesized that aTSA patients would have similar outcomes to controls; however, rTSA patients would have poorer rotational motion and PROMs compared to controls.

METHODS:

A retrospective review of a multicenter shoulder arthroplasty database was performed between 2004 and 2022. All shoulders undergoing primary aTSA or rTSA for RCI-GHOA with a Walch C glenoid were identified. Matched cohorts were conceived based on age, sex, follow-up, and Walch classification (to A1 or B1). Clinical outcomes including range of motion, outcome scores, and rates of complications and reoperations were compared at a minimum 2-year follow-up.

RESULTS:

64 TSA (21aTSA, 43rTSA) were performed in patients with type C glenoids (mean age 67±7.2 years). Shoulders were evaluated at a mean follow-up of 4.2 years (range, 2-11). When compared to patients without glenoid deformity, dysplastic glenoids treated with aTSA demonstrated similar post-operative ROM and PROMs. Dysplastic patients treated with rTSA demonstrated significantly greater improvements in post-operative abduction and forward elevation compared to controls ($p<0.008$). Additionally, they also achieved significantly greater improvements in the ASES and SAS scores (55 vs 43, $p=0.008$, 33 vs 24, $p=0.014$. When comparing Type C glenoids treated with aTSA to those undergoing rTSA, patients treated with aTSA demonstrated better post-operative internal rotation (L2-3 vs L4-5, $p=0.041$). However, no differences were observed in post-operative PROMs and other ROM measures.

DISCUSSION AND CONCLUSION:

Both aTSA and rTSA provide similar, substantial clinical improvements for patients with primary glenohumeral osteoarthritis and a dysplastic glenoid. Similar function can be expected when compared to patients without glenoid deformity. aTSA does not appear to offer clinically significant functional benefit over rTSA in regards to internal and external rotation despite reorientation of the rotator cuff muscular insertion compared to its native state.