Functional and Radiographic Outcomes of Anatomic Total Shoulder Arthroplasty in B3 Glenoids

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INTRODUCTION:
Anatomic total shoulder arthroplasty (aTSA) is the gold-standard treatment of glenohumeral osteoarthritis (GHOA) with an intact rotator cuff, resulting in consistent improvements in pain and range of motion. However, achieving a durable result with aTSA in shoulders with glenoid retroversion deformities, specifically Walch B3 glenoid deformities, can be a challenge. In this retrospective series, we report the mid-term follow-up of aTSA in patients with B3 glenoids with nonaugmented polyethylene implants.
METHODS:
Following local institutional review board approval, patients that had undergone aTSA at this institution by a fellowship-trained surgeon between January, 2013 and August, 2017 with a pre-operative CT scan demonstrating a B3 glenoid were identified. All patients underwent aTSA with a lesser tuberosity osteotomy, stemmed humeral component, and a non-augmented all-polyethylene glenoid. Eccentric reaming was performed to achieve complete seating of the glenoid component, regardless of retroversion. Patients were contacted to complete patient-reported outcome scores (ASES, WOOS, SST), and radiographic review. Radiographs were reviewed by two independent reviewers who graded for glenoid loosening using Lazarus rating. Posterior humeral subluxation was measured relative to the axis of the glenoid component on immediate post-operative and final follow-up axillary x-rays.
RESULTS:
Forty total subjects met inclusion criteria during the study period, of which 7 could not be contacted and 8 declined to participate. Therefore, 25 subjects were included and consisted of 6 females (24%; 6/25) with a mean age of 65.1 (range: 55-81) years. These patients had a mean follow-up of 6.2 years (range: 3.9-8.4). VAS pain scores decreased significantly from 6.3 ± 2.2 pre-operatively to 0.8 ± 2.0 post-operatively ($p < 0.001$) while overall ASES improved from 38.2 ± 13.2 to 90.0 ± 16.9 ($p<0.001$). All patients with pre-operative ASES scores surpassed minimally clinically important difference for ASES. Three-quarters (19/25) of these patients were available for radiographic review and had an average Lazarus grade of 1.7 (range: 0-5). There was no change in average posterior glenohumeral subluxation (54.6% vs. 52.3%; $p=0.15$) relative to their immediate post-operative films. The 12 patients with a Lazarus grade less than two had a final ASES score of 93.6 ± 2.5 compared to 73.7 ± 9.8 for the 7 patients with a Lazarus grade greater than or equal to two ($p=0.03$). One patient (2.5%; 1/40) underwent revision surgery for humeral loosening.
DISCUSSION AND CONCLUSION:
At mid-term follow-up, aTSA without augmented implants for B3 glenoid deformity provides a reliable treatment option for restoration of function and improvement in pain. Mid-term radiographic review demonstrated evidence of early glenoid component loosening in some patients with associated deterioration in their clinical function. Long-term follow-up is needed to understand how aTSA without augmented implants compares long-term to aTSA with augmented glenoids or reverse total shoulder arthroplasty.