

Comparison of Early and Delayed Aseptic Baseplate Failure in Primary Reverse Shoulder Arthroplasty With and Without Structural Glenoid Autograft

Eddie Y Lo¹, Jeffrey F Sodi, Alvin Ouseph, Austin Witt, Raffaele Garofalo, Alexander Thomas Sanders, Temilola Olutola Majekodunmi, Sumant G Krishnan²

¹Baylor University Medical Center, ²The Shoulder Center

INTRODUCTION:

Glenoid erosions (retroversion, inclination, and/or medialization) are common in arthritic patients managed with reverse total shoulder arthroplasty (RSA). Contemporary RSA designs have reduced the incidence of glenoid baseplate complications and failures compared with older generation implants. However, there exists minimal literature assessing larger cohorts beyond two years. To this end, we compare the incidence and etiology of patients with acute aseptic glenoid baseplate failure (<2 years postoperative) vs. patients with delayed failure (>2 years postoperative) in all patients who received a contemporary-design RSA with and without structural glenoid bone grafting at one institution.

METHODS:

Between 2014 and 2019, 753 consecutive patients who underwent primary RSA using the same monoblock 9.5 millimeter central screw baseplate were retrospectively reviewed. Exclusion criteria included any case of fracture or septic arthropathy. Mean age was 69.5 years (Range 39 - 96). A total of 414 implants (55%) were performed without glenoid bone grafting. Some 339 cases (45%) were managed with structural patient-specific corticocancellous autograft under the baseplate to correct preoperative glenoid erosion (modified Walch A2, B2, B3, C1, C2, E2, E3, and/or E4 variants).

All patients underwent standardized clinical and radiographic follow up at defined timepoints postoperatively. When compared with initial postoperative radiographs, failure was strictly identified as any shift in glenoid baseplate component position, any radiographic lucency surrounding the glenoid component, any mechanical glenoid implant failure, and/or any patient requiring glenoid component revision for indications other than infection.

All patients with failures were divided into two cohorts based on when the failure was first identified. "Acute" failure was arbitrarily defined as occurring at or prior to 2 years postoperative. "Delayed" failure was arbitrarily defined as greater than 2 years. Comparative analysis was performed to identify any differences between the cohorts.

RESULTS:

Overall, there were 23 patients with baseplate failures (23/753, 3.0%). Twenty-two of 23 failures (95.7%) occurred in patients who received structural glenoid bone grafting. There were 5 patients (21.7%) who failed acutely versus 18 (78.3%) who had delayed failure. There were no differences in any patient characteristics between the 2 cohorts (age, gender, and/or BMI). All 5 patients (100%) who suffered acute failure were augmented with structural glenoid autograft, with 4/5 occurring without trauma. Bone graft union was not observed in any of these 5 acute failures with mean time to failure of 12 months (Range: 5-21 months).

In the 18 patients with delayed failure, 17 of 18 (94.4%) were augmented with structural glenoid autograft. Nine of these 18 patients (50%) occurred without trauma. Bone graft nonunion was observed in 9 of these 17 patients (53%) with mean time to failure of 48 months (Range: 25-91 months).

DISCUSSION AND CONCLUSION:

Contemporary RSA glenoid baseplate design with a monoblock central screw appears to have an acceptably low incidence of failure. However, the addition of a structural bone graft to correct glenoid erosive pathology confers a higher incidence of failure. Furthermore, more of these patients suffer failure after the 2 year postoperative mark, with the majority having radiographic evidence of graft nonunion. This highlights the necessity of longer clinical and radiographic follow up, and also the importance of patient education on the possible risk of failure with use of glenoid bone grafting. Further analysis is necessary to determine etiology of failures in the bone graft population (type and severity of glenoid erosion, size of glenoid graft, etc.) to provide recommendations regarding the appropriate use of this technique.

Table 1-Characteristics of Failures and Autograft Union

	Failures (n = 23)		Glenoid Autograft (n=17)	
	Atraumatic	Traumatic	Non Union	Union
Acute	4	1	5	0
Delayed	9	9	9	7
Total	13	10	14	7