Outcomes in Reverse Total Shoulder Arthroplasty in Patients 55 and 50 Years Old or Younger

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INTRODUCTION: Reverse total shoulder arthroplasty (rTSA) utilization in the United States continues to grow, particularly among younger patients. Despite this trend, limited data exist regarding functional outcomes and complication rates in patients aged 55 and younger. This study aimed to evaluate patient-reported outcome measures (PROMs), complication rate, and implant survivorship in patients aged ≤ 55 who underwent RTSA, with sub-analyses in those aged ≤ 50.

METHODS: We conducted a case series of consecutive patients aged ≤ 55 who underwent primary RTSA at a single institution between February 2016 and July 2022, with a minimum 2-year follow-up. Demographics, surgical indications, American Shoulder and Elbow Surgeon (ASES) and Single Assessment Numeric Evaluation (SANE) scores, satisfaction, complications, and revisions were recorded. Satisfaction was assessed using a 5-point Likert scale, with 1 representing 'most satisfied.' Sub-analyses were conducted for patients aged ≤ 50 with minimum 2-year follow-up. Paired t-tests and Fisher's exact tests were used to assess changes in PROMs and complication rates.

RESULTS: Among 46 patients aged ≤ 55 years, the mean age at surgery was 50.9 ± 5.1 years and the mean time from surgery to final follow-up was 56.14 ± 25.62 months. The most common diagnoses were osteoarthritis (OA) (43.5%) and cuff tear arthropathy (CTA) (41.3%) (Table 1). ASES scores improved from 29.9 ± 16.0 to 69.8 ± 26.0 ($p < 0.001$), SANE scores improved from 18.3 ± 20.3 to 75.1 ± 21.2 ($p < 0.001$), and patient satisfaction was high (mean 1.66 ± 1.13) (Table 2). Complication and revision rates were 19.6% and 13.0%, respectively, with 87.0% implant survival. Complications included instability (n = 3), persistent pain requiring additional imaging (n = 5), infection (n = 2), and acromial fracture (n = 2), with a mean time to complication of 20.4 months ± 16.5 months and a mean time to revision of 49.6 months ± 24.2 months. Among 15 patients aged ≤ 50, the mean age was 45.8 ± 6.1 years and the mean time to final follow-up was 44.4 ± 21.7 months. The most common diagnoses were primary OA (46.7%), CTA (20.0%), and post-traumatic OA (20.0%) (Table 1). ASES scores improved from a preoperative mean of 31.7 ± 16.1 to 68.3 ± 28.9 ($p < 0.001$), SANE scores improved from 34.2 ± 18.9 to 76.3 ± 29.0, and satisfaction was high (mean 2.0 ± 1.0). (Table 2). The complication rate was 20.0% (3/15), all of whom required revision surgery, yielding a revision rate of 20.0% and an implant survival rate of 80.0%. Complications included instability (n = 2) and acromial fracture (n = 1), with a mean time to complication of 39.8 ± 11.6 months and time to revision of 54.2 ± 33.5 months.

DISCUSSION: The principal finding of this study is that rTSA patients aged ≤ 55 have high rates of implant retention and experience significant functional improvement as measured by ASES, SANE, and satisfaction scores at minimum 2-year follow up. Sub-analyses isolating patients aged ≤ 50 provided similar results. To our knowledge, this is the first study to explicitly report outcomes in patients ≤ 50 years of age treated with primary rTSA and the largest series of primary rTSA patients aged ≤ 55 years with a minimum 2-year follow-up in the United States. Currently, only one study has assessed functional rTSA outcomes in patients ≤55 years old.[1] Notably, most patients in the Otto et al.[1] study were indicated for rTSA due to failed rotator cuff surgery (11/32) or CTA (10/32), while only 5 were diagnosed with OA. Differences in indications may explain some of the variation between our findings. Our results suggest that rTSA is a viable option for treating OA and CTA in patients ≤ 55 years of age. Otto et al. findings are consistent with our study which found overall complication, revision, and survival rates to be 19.6%, 13%, and 87%, respectively at an average follow up time of 4.7 years. Our findings and the current literature suggest that primary rTSA is an effective and durable treatment modality for younger patients, though these patients might be at an increased risk of complications and revision relative to older patient populations more commonly treated with rTSA.[2] Longer term studies with larger sample sizes are needed to refine the long-term clinical outcomes and complication profile of rTSA within younger patients.

SIGNIFICANCE/CLINICAL RELEVANCE: Primary rTSA in patients ≤55 including those ≤50 produced large, clinically meaningful improvements in ASES and SANE with high satisfaction at ≥2 years, supporting its use for osteoarthritis and cuff tear arthropathy in carefully selected younger patients. However, the observed complication (~20%) and revision rates (13% overall; 20% in ≤50) and implant survivorship (87% overall; 80% in ≤50) warrant thorough preoperative counseling and long-term follow-up to set expectations and guide shared decision-making.

Indication	<55 2-Yr PROMs (N=46)	<50 2-Yr PROMs (N=15)
Osteoarthritis	20 (43.5%)	7 (46.7%)
Cuff Tear Arthropathy	19 (41.3%)	3 (20.0%)
Congenital Deformity	0 (0.0%)	0 (0.0%)
Post-traumatic Osteoarthritis	4 (8.7%)	3 (20.0%)
Failed Open Reduction Internal Rotation	1 (2.2%)	0 (0.0%)
Rheumatoid Arthritis	2 (4.3%)	2 (13.3%)
Total	46 (100%)	15 (100%)

Age	ASES Pre (mean ± SD)	ASES Post (mean ± SD)	ASES (mean ± SD)	SANE Pre (mean ± SD)	SANE Post (mean ± SD)	SANE (mean ± SD)	Satisfaction (mean ± SD)
≤ 55 years (n = 46)	29.9 ± 16.0	69.8 ± 26.0	40.0 ± 28.7	18.3 ± 20.3 (n=17)	75.1 ± 21.2 (n=17)	56.8 ± 29.4	1.66 ± 1.13 (n=41)
≤ 50 years (n = 15)	31.7 ± 16.1	68.3 ± 28.9	36.6 ± 25.6	34.2 ± 18.9 (n=6)	87.5 ± 6.9 (n=6)	53.3 ± 16.4	2.0 ± 1.0 (n=12)