Outcomes of reverse total shoulder arthroplasty in patients aged 50 and younger

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INTRODUCTION:

Reverse total shoulder arthroplasty was initially recommended by previous studies for patients 65 years and older. Since then, RTSA usage has expanded to a wider age range and spectrum of indications. However, suitability for younger patients remains uncertain because of the concern for long term survival of the RTSA implants. Also, patients younger than 65 other factors may impact upon the survival of the implants, such as type of work and workload, activity level, longer lifespan, high functionality, and long-term wear. The goal of this study was to report the clinical and radiological results of RTSA in patients aged ≤50 years. These patients were matched to a cohort of patients aged ≥65 at the time of RTSA. We hypothesized that the results in patients aged ≤50 would be comparable to the outcomes among an older, matched comparison group.

METHODS:

Between 2004 and 2021, 1,239 primary RTSA procedures were performed by a single experienced surgeon at one institution. A cohort of 38 patients was identified using inclusion criteria consisting of having undergone a primary RTSA, age at surgery ≤50 years old, and minimum 2-year follow-up. Patients were matched to a cohort of patients who underwent RTSA at an age of ≥65 years for procedure indication, sex, and glenoid morphology.

RESULTS:

In the ≤50 cohort, there was one revision, and overall survival of this group was 97% at 61 months (range 51–69 months); the ≥65 cohort had one revision and survival of 99% (range 46–58 months). In the under <50 cohort osteoarthritis was the primary diagnosis which was 53% compared to the ≥65 group where it was 69%. However, in the ≤50 cohort the osteoarthritis was secondary to underlying diseases such as Kniest syndrome, Ehlers Danlos, cerebral palsy, and an unknown immunologic disorder. Three (8%) patients in the ≤50 cohort and two (3%) in the ≥65 cohort experienced complications. One of the complications in the ≤50 group was a neuropraxia that resolved 4 months after the operation. All other complications in both groups were due to infection. Additionally, among the patients with postoperative imaging, 16% (5 of 31) of the ≤50 cohort demonstrated postoperative notching of Grade I 11%, Grade 2 3%, Grade 3 0% and Grade 4 0%. In the ≥65 cohort 11 of 74 had notching with Grade I 9%, Grade 2 5%, Grade 3 0% and Grade 4 0%. In both cohorts, postoperative ROM improved significantly from preoperative ROM for all metrics studied (Table I). The magnitude of improvement did not differ significantly between the ≤50 group and the ≥65 group. Both groups demonstrated significant improvements between all preoperative PROMs and postoperative PROMs, while demonstrating no significant difference between the two cohorts' magnitude of improvement (Table II). Additionally, postoperative satisfaction was reported to be an average of 83/100 in the ≤50 group versus 92/100 in the ≥65 group (p = 0.11).

DISCUSSION AND CONCLUSION:

The clinical outcomes of patients aged ≤50 years who underwent RTSA were comparable to those aged ≥65. RTSA RTSA in this group proved to be a safe and effective procedure for those ≤50 and resulted in high satisfaction and functional results. Longer-term studies are needed to evaluate determine the long-term survival and function of patients younger than 50.

Table I Range of motion outcomes.

Range of Motion Metric	Age ≤ 50 (n = 38)			Age ≥ 65 (n = 77)			P value	MCID
	Preop	Postop	Difference	Preop	Postop	Difference		
Abduction Active (degrees)	94	135	+42*†	91	126	+35*†	0.35	+6
Abduction Passive (degrees)	101	135	+34*†	99	127	+28*†	0.41	+13
Flexion Active (degrees)	93	137	+44*†	91	126	+35*†	0.1	+4
Flexion Passive (degrees)	101	138	+36*†	99	127	+28*†	0.28	+12
External Rotation at 90 Degrees (degrees)	46	79	+33*†	44	71	+27*†	0.36	+7
External Rotation with Arm at Side (degrees)	13	36	+23*†	18	33	+15*†	0.18	+10
Internal Rotation at 90 Degrees (degrees)	15	37	+22*†	20	41	+22*†	0.94	+7
Internal Rotation behind Back (Constant Score) (/10)	4	5	+2*†	3	5	+2*†	0.97	0

All values are represented as a mean. Median change in Constant Score was compared between groups using Mann-Whitney U test. Mean changes in all other range of motion measurements were compared between 50 and Under and Over 65 using unpaired t-test. Note that measurements were not recorded for every patient. Thus, the displayed data is for a subset of all patients. MCID = minimal-clinically important difference.
*p < 0.05 between preoperative and postoperative measures by paired t-test.
†Indicates values that meet or exceed calculated MCID.

Table II Patient reported outcome measures.

Patient Reported Outcome Measure	Age ≤ 50 (n = 38)			Age ≥ 65 (n = 77)			P value	MCID
	Preop	Postop	Difference	Preop	Postop	Difference		
Simple Shoulder Test (/12)	3.2	8.0	+4.7*†	3.5	8.9	+5.4*†	0.48	+3.6
Single Assessment Numeric Evaluation (SANE) (/100)	3.5	71.2	+67.6*†	16.7	74.4	+57.7*†	0.16	+45.8
American Shoulder and Elbow Surgeons Score (/100)	29.1	69.9	+40.8*†	34.1	78.4	+44.2*†	0.49	+25.7
Visual Analog Scale Pain (/10)	7.9	3.0	-4.9*†	7.2	1.6	-5.6*†	0.38	-3.0
L'Insalata (/100)	41.9	85.3	+43.4*†	46.0	83.5	+37.5*†	0.91	+30.2
Postoperative Satisfaction (/100)	—	83	—	—	92	—	0.11	—

All values are represented as a mean. Changes in outcomes were compared between Osteoarthritis and Dislocation Arthropathy using Mann-Whitney U test. Note that measurements were not recorded for every patient. Thus, the displayed data is for a subset of all patients. MCID = minimal-clinically important difference.
*p < 0.05 between preoperative and postoperative measures by paired t-test.
†Indicates values that meet or exceed calculated MCID.