Elderly Patients with Primary Glenohumeral Arthritis and an Intact Rotator Cuff Show Similar Clinical Improvement at a Minimum 2-Year Follow Up after Reverse or Anatomic Total Shoulder Arthroplasty

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INTRODUCTION: The optimal management of primary glenohumeral arthritis (GHOA) in the elderly is an ongoing topic of debate. The purpose of this study was to compare functional outcomes and complications in patients aged 75 years or older treated with anatomic total shoulder arthroplasty (TSA) or reverse shoulder arthroplasty (RSA) for primary GHOA with an intact rotator cuff.

METHODS: A retrospective study was performed on a prospectively maintained database which was queried for all patients at least 75 years of age who underwent RSA or TSA for primary GHOA at a single institution between 2012 and 2021 with minimum 2-year follow up. Rotator cuff integrity was confirmed intraoperatively. Patient-reported outcomes (PROs), i.e., Visual Analog Scale for pain (VAS), American Shoulder and Elbow Surgeons (ASES), and Subjective Shoulder Value (SSV), and active range of motion (ROM), i.e., forward flexion (FF), external rotation (ER), internal rotation (IR), were collected pre- and postoperatively. Complications, reoperations, and satisfaction were also recorded. The percentage of patients achieving clinically significant improvement (i.e., minimally clinical important difference [MCID], substantial clinical benefit [SCB], patient acceptable symptomatic state [PASS]) with VAS, ASES, and SSV were reported for both cohorts.

RESULTS: One-hundred-four patients were eligible for study analysis, of which 37 were RSA patients and 67 TSA patients. Mean follow up was 39.4 months. Preoperative baseline characteristics, PROs, and ROM were similar between groups. While clinical outcomes improved comparably in both groups, the TSA cohort showed significantly greater improvement in ER (36° vs. 26°; p=0.01). Both cohorts had low revision (0% for RSA vs. 3% for TSA) and complication (5% for RSA vs. 7% for TSA; p=0.7) rates. Satisfaction was similar in both groups (92% for RSA vs. 93% for TSA; p=0.9). Clinically significant improvement was achieved comparably in both groups with ASES (MCID, 100% for RSA vs. 93% for TSA; SCB, 95% vs. 82%; PASS, 78% vs. 67%; p > 0.05).

DISCUSSION AND CONCLUSION: Both RSA and TSA seem to provide similar short-term clinical benefits for elderly patients with primary GHOA. Complication and revision rates are comparably low at short-term follow up. Advanced age alone should not be used as a decision-making tool for TSA versus RSA in the setting of primary GHOA with an intact rotator cuff.

Table 2. Surgical Factors

	RSA (n=37)		TSA (n=67)		
	n	%	n	%	p
Stem Length					
Stemless	0	0%	7	10%	NA
Short	29	78%	54	81%	0.8
Standard	8	22%	6	9%	0.07
Glenoid Morphology[a]					
A1	8	22%	28	42%	0.04
A2	4	11%	3	4%	0.2
B1	2	5%	21	31%	<0.01
B2/B3	23	62%	15	22%	<0.01
C	0	0%	0	0%	NA
Bone Graft	3	8%	0	0%	NA

[a]Walch classification
RSA, reverse shoulder arthroplasty; TSA, total shoulder arthroplasty.

Table 3. Prospective Status

	RSA (n=37)		TSA (n=67)		
Patient Reported Outcomes	mean	SD	mean	SD	p
VAS	6.1	1.9793	5.8	2.1	0.6
ASES	42.4	14.5	40.1	17.6	0.4
SSV	37.1	20.7	29.7	17.9	0.06
Range of motion					
FF	100	31	97	28	0.6
ER	19	20	17	14	0.5
IR	18	2	18	2	0.6

RSA, reverse shoulder arthroplasty; TSA, total shoulder arthroplasty; FF, forward flexion; ER, external rotation; IR, internal rotation; ASES, American Shoulder and Elbow Surgeons; SSV, Subjective Shoulder Value; VAS, Visual Analog Scale

Table 4. Postoperative Outcomes

	RSA (n=37)		TSA (n=67)		
Patient Reported Outcomes	mean	SD	mean	SD	p
VAS	0.8	1.2	1.2	1.8	0.2
ASES	89.6	11.3	83.7	18.1	0.08
SSV	69.7	12.3	84.6	20.5	0.2
Range of motion					
FF	124	18	125	26	0.8
ER	44	19	55	17	0.02
IR	16	2	16	2	0.3
Satisfaction					
(yes, %)	34	92%	62	93%	0.9
Complications					
(yes, %)	2	5%	5	7%	0.7
Reoperation					
(yes, %)	0	0%	2	3%	NA

RSA, reverse shoulder arthroplasty; TSA, total shoulder arthroplasty; FF, forward flexion; ER, external rotation; IR, internal rotation; ASES, American Shoulder and Elbow Surgeons; SSV, Subjective Shoulder Value; VAS, Visual Analog Scale

Table 5. Pre- to Postoperative Change

	RSA (n=37)		TSA (n=67)		RSA vs TSA
Patient Reported Outcomes	mean	CI (95%)	mean	CI (95%)	p
VAS	-5.1	(-5.9,-4.41)	<0.01	-4.6	(-5.1,-3.92)	<0.01	0.2
ASES	47.1	(42.1,52.)	<0.01	44.5	(38.1,48.01)	<0.01	0.4
SSV	32.4	(43.4,40.2)	<0.01	54.6	(38.6,69.8)	<0.01	0.4
Range of motion					
FF	34	(24.1-33.1)	<0.01	30	(20.7-35.2)	<0.01	0.5
ER	26	(18.5-32.8)	<0.01	36	(31.52-41.22)	<0.01	0.01
IR	-2.4	(-2.4,-2.38)	<0.01	-2.7	(-4.17,-2.195)	<0.01	0.7

RSA, reverse shoulder arthroplasty; TSA, total shoulder arthroplasty; FF, forward flexion; ER, external rotation; IR, internal rotation; ASES, American Shoulder and Elbow Surgeons; SSV, Subjective Shoulder Value; VAS, Visual Analog Scale

Table 1. Baseline Demographics

	RSA (n=37)		TSA (n=67)		
					p
Age (years)					
(mean, sd)	79.5	3.9	79.0	3.5	0.6
Follow-up (months)					
(mean, sd)	32.5	13.8	43.2	19.6	<0.01
Males					
(yes, %)	17	46%	28	42%	0.7
CCI					
(mean, sd)	2.6	2.4	2.4	1.9	0.7
Osteoporosis					
(yes, %)	17	46%	27	40%	0.6
DM type 2					
(yes, %)	9	24%	20	30%	0.5
BMI					
(mean, sd)	29.3	5.7	28.4	6.8	0.5
Tobacco Use					
Non-smokers					
(yes, %)	24	65%	31	46%	0.07
Current					
(yes, %)	1	3%	6	9%	0.2
Former					
(yes, %)	12	32%	30	45%	0.2

RSA, reverse shoulder arthroplasty; TSA, total shoulder arthroplasty; CCI, Charlson Comorbidity Index; DM, diabetes mellitus; BMI, Body mass index

Table 6. Clinically Significant Improvement: RSA vs TSA

	RSA (n=37)		TSA (n=67)		
	n	%	n	%	p
VAS					
MCID	36	97%	59	88%	0.1
SCB	31	84%	50	75%	0.3
PASS	29	78%	45	67%	0.2
ASES					
MCID	37	100%	62	93%	NA
SCB	35	95%	55	82%	0.07
PASS	29	78%	45	67%	0.2
SSV					
MCID	32	86%	55	82%	0.6
SCB	20	54%	44	34%	0.2
PASS	32	86%	55	82%	0.6

RSA, reverse shoulder arthroplasty; TSA, total shoulder arthroplasty; ASES, American Shoulder and Elbow Surgeons; SSV, Subjective Shoulder Value; VAS, Visual Analog Scale