Outcomes of Anatomic and Reverse Total Shoulder Arthroplasty in Patients 80 Years and Older

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INTRODUCTION:

Both primary anatomic (TSA) and reverse total shoulder arthroplasty (RSA) have shown a consistent rise in incidence over the last decade, with rates peaking for patients aged 75 years and older. Despite TSA being the mainstay of treatment for patients with glenohumeral arthritis in the absence of rotator cuff pathology, there has been an upward trend of RSA utilization for this indication based upon the concerns of rotator cuff health. It is imperative that age-specific outcomes are evaluated in order to guide treatment decisions between anatomical and reverse shoulder arthroplasty, especially in patients 80 years of age and older. The purpose of this study is to evaluate outcomes including pain, function, range of motion, satisfaction, and complications in patients 80 years or older following either anatomic or reverse total shoulder arthroplasty for the specific indication of osteoarthritis without rotator cuff tear.

METHODS:

A retrospective query of our institution's shoulder and elbow surgery repository identified patients treated with TSA or RSA by a single fellowship trained shoulder and elbow surgeon between 11/2006 and 2/2022. Patients were included if they were $\geq$ 80 years old at time of surgery, had minimum 2-year follow-up, and underwent surgery for a primary indication of osteoarthritis without rotator cuff tear. Patient-reported outcome measures (PROMs), range of motion, and strength were evaluated at the visit immediately before surgery and at most recent follow-up. Patient satisfaction was also evaluated at most recent follow-up. Complications and revisions were recorded and reported.

RESULTS:

A total of 130 patients (77 TSA and 53 RSA) met inclusion criteria. There were no significant differences in demographics, BMI, surgery on dominant arm or length of follow-up between TSA and RSA patients. At most recent follow-up, there was no significant differences in PROM between TSA and RSA patients including American Shoulder and Elbow Surgeon (ASES), Simple Shoulder Test (SST), Single Assessment Numeric Evaluation (SANE), VAS (Visual Analog Score) Function, and VAS Pain scores (Table 1). There were 6 complications amongst TSA patients (7.8%, 6/77) – four subscapularis insufficiency, one humeral shaft periprosthetic fracture treated with ORIF, and one with prosthetic joint infection revised to a functional composite spacer. There were 3 RSA patients (5.6%, 3/53) who sustained complications – all three with acromial spine fractures, treated non-operatively. There were no revisions in the RSA cohort. There was no significant difference in the rate of complications or revisions. Both TSA and RSA patients reported high satisfaction ("excellent" in 82% of TSA and 74% of RSA) and high rates of being willing to have the same surgery again (88% of TSA and 91% of RSA).

DISCUSSION AND CONCLUSION:

The results of this study demonstrate both anatomic and reverse shoulder arthroplasty yield high patient satisfaction, good functional outcomes and low complication rates in patients over the age of 80 years.

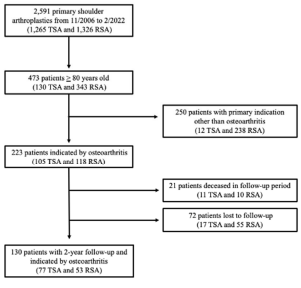

Figure 1. A Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) flow diagram displaying number of and reason why patients were excluded. TSA, Total Shoulder Arthroplasty; RSA, Reverse Shoulder Arthroplasty

Table I. Comparison of Outcomes between TSA and RSA at Most Recent Follow-Up

	TSA (n=77)		RSA (n=53)		
	n	Median (IQR) or N (%)	n	Median (IQR) or N (%)	P
SANE	75	90 (80-99)	52	86 (51-99)	.108
ASES	77	90 (77-97)	53	88 (74-93)	.438
SST	77	9 (7-11)	53	8 (7-10)	.198
VAS Function	76	9 (8-10)	53	9 (7-10)	.396
VAS Pain	77	0 (0-1)	53	0 (0-1)	.772
Range of Motion	74				
Elevation		135 (120-146)	52	130 (120-140)	.278
Abduction		90 (90-100)	52	90 (90-100)	.430
External Rotation		50 (35-60)	51	40 (30-50)	**.003**
Internal Rotation*		8 (6-8)	48	5 (2-8)	**.001**
Strength					
Deltoid	77	5 (5-5)	52	5 (5-5)	.243
Supraspinatus	76	5 (5-5)	52	5 (5-5)	.553
External Rotation	77	5 (5-5)	53	5 (5-5)	.107
Internal Rotation	77	5 (5-5)	53	5 (5-5)	.093
Satisfaction	77		53		.459
Excellent		63 (82)		39 (73.6)	
Good		8 (10)		10 (18.9)	
Satisfactory		3 (4.0)		3 (5.6)	
Unsatisfactory		3 (4.0)		1 (1.9)	
Same surgery again? (yes)	76	67 (88.2)	53	48 (90.6)	.684
Complications	77	6 (7.8)	53	3 (5.7)	.737
Revisions	77	1 (1.3)	53	0 (0)	1.00

*Internal rotation was scored on a 10-point scale using the following conversions: buttock/greater trochanter=2, sacrum-L4=4, L1–L3=6, T8–T12=8, T1–T7=10. TSA, Total Shoulder Arthroplasty; RSA, Reverse Shoulder Arthroplasty; SANE, Single Assessment Numeric Evaluation; IQR, Interquartile Range; ASES, American Shoulder and Elbow Surgeons; SST, Simple Shoulder Test; VAS, Visual Analog Scale

Table II. Summary of Patient Complications

Patient	Sex	Age at Surgery (yrs)	Follow-up (yrs)	Complication	Osteoporosis? (Y/N)	Revision? (Y/N)
TSA (n=6)						
1	F	82	2.1	Subscapularis Failure	N	N
2	F	87	2.9	Subscapularis Failure	N	N
3	M	83	5.4	Subscapularis Failure	N	N
4				Subscapularis Failure	Y	N
5	F	85	7.3	Periprosthetic Humeral Shaft Fracture	Y	N
6	M	80	5.4	Presumed osteomyelitis	N	Y*
RSA (n=3)						
1	F	80	2.1	Type 3 ASF†	Y	N
2	F	83	2.1	Type 2C ASF†	N	N
3	F	86	2.9	Type 2 ASF†	Y	N

TSA, Total Shoulder Arthroplasty; RSA, Reverse Shoulder Arthroplasty; ASF, acromial spine fracture.
*Revision to functional hemiarthroplasty spacer
†All RSA ASFs were managed non-operatively.