Traumatic Rotator Cuff Tears following Shoulder Dislocation Demonstrate Increased Tear Complexity but Similar Postoperative Outcomes: A Matched Cohort Analysis of Elderly Patients

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INTRODUCTION:

Approximately twenty percent of shoulder dislocations occur in patients 60 years of age or older.[1] In this population, the posterior constraints to the shoulder are more susceptible to injury, likely due to the degenerative aging process weakening the rotator cuff tendons. As a dynamic stabilizer to the glenohumeral joint, a rotator cuff tear may result in persistent dysfunction and recurrent instability if not promptly stabilized. [2-7] Rotator cuff repair in this unique setting has demonstrated improved patient outcomes and reduced incidence of instability compared to non-operative treatment.[8,9] However, much of the clinical data has focused on ages greater than 40 years old and limited by small sample sizes.[10-15]

Thus, the purpose of this study was to compare functional and patient-reported outcomes following rotator cuff repair in elderly patients, aged 55 years or older, with and without a history of shoulder dislocation. Using a matched cohort design, we aimed to evaluate whether the presence of a preceding dislocation influenced surgical outcomes, tendon integrity, and failure rates. We hypothesized that elderly patients with a history of shoulder dislocation will present with more complex rotator cuff tears but will demonstrate similar postoperative outcomes and patient-reported measures when compared to matched controls without prior dislocation.

METHODS:

A retrospective cohort study was performed, with electronic medical records queried to identify all patients 55 years of age or older who underwent a primary arthroscopic rotator cuff repair from 2014-2019 at a single institution. All included patients were cross-referenced with ICD-10 codes relevant to shoulder instability, were confirmed to have a history of dislocation, and had minimum 2 year follow up. These patients were then matched based on age, sex, and BMI to a similar cohort who underwent a rotator cuff repair without a history of shoulder instability. Exclusion criteria included those who underwent a tuberoplasty, patch augmentation, rotator cuff repair after prior total shoulder arthroplasty, less than 55 years old, or lacked follow up or documentation. Chart review was conducted to determine demographic information, range of motion, strength testing, instances of recurrent instability, concomitant/secondary injuries, concomitant procedures, need for revision surgery, and patient reported outcome measures (PROMs) such as American Shoulder and Elbow Surgeons (ASES), Visual Analogue Scale (VAS), Single Assessment Numeric Evaluation (SANE), and QuickDash scores. Statistical analysis was performed by student t-test or Mann-Whitney U tests to compare groups of 2 and ANOVA or Kruskal-Wallis tests to compare groups of 3 or more. Fisher's Exact test were used to compare categorical data. A p-value of <0.05 was considered to be significant for the purpose of this study.

RESULTS: Overall, 293 patients (73 dislocated, 220 nondislocated) were included in this study. There were no significant difference in age, sex, BMI, comorbidities, or follow up between groups. The dislocation cohort demonstrated a higher incidence of concomitant fractures (8.2% vs 0.9%, p=0.004), Capsule tears (6.8% vs 0.5%, p=0.004), Bankart lesions (32.9% vs 0.5%, p<0.001), Labral tears (61.6% vs 47.3%, p=0.023), Glenoid Bone injury (20.5% vs 0%, p = <0.001), Hill-Sach Lesions (21.9% vs 0%, p = <0.001), recurrent instability (4.1% vs 0%, p=0.003), and axillary nerve injury (4.1% vs 0%, p=0.015). The dislocation cohort had greater rates of full thickness tears of the supraspinatus (SS) (93.2% vs 79.5%, p=0.007), infraspinatus (IS) (43.8% vs 25.5%, p=0.003), and subscapularis (Sub) (27.4% vs 14.5%, p=0.012). The dislocation cohort demonstrated greater tear complexity, with a higher incidence of combined SS/IS and SS/IS/Sub tears (37% vs 24.5% and 24.7% vs 13.2%, respectively overall p=0.003) and worse pre-operative range of motion (ROM) in forward flexion (FF) (136 vs 93.2, p=<0.001) and external rotation (ER) (44.14 vs 36.1, p=0.002). There was no difference in postoperative ROM in FF or Internal Rotation (IR), with significant improvement in ER (55.4 vs 47.9, p=0.018) in the dislocation group. While a worse postoperative VAS score in the dislocation group was reported (17.2 vs 4.8, p = <0.001), there was no other differences found in postoperative patient reported outcomes or failure rates.

DISCUSSION AND CONCLUSION:

Our findings suggest that patients with rotator cuff tears in the setting of a dislocation demonstrate significantly higher rates of full thickness cuff tears and multiple tendon involvement compared to those without instability. Similarly, these patients are more likely to sustain concomitant pathology including labral tears, greater tuberosity fractures, humeral and glenoid bone loss, capsular tears, and bankart lesions. Despite the increased complexity, our matched analysis revealed little difference in postoperative functional measures, PROMs or failure rates. The statistically significant difference in postoperative VAS between groups in this study is small and likely clinically insignificant. In conclusion, despite the increased injury severity, patients with rotator cuff tears following an instability event can achieve comparable clinical outcomes to those without instability.

Table 1. Demographics

	[ALL] (N=293)	Without Dislocation (N=220)	With Dislocation (N=73)	Overall P Value
Sex				0.602
Female – n (%)	173 (59.0%)	128 (58.2%)	45 (61.6%)	
Male– n (%)	120 (41.0%)	92 (41.8%)	28 (38.4%)	
BMI – mean (SD)	29.9 (6.38)	30.0 (6.41)	29.5 (6.34)	0.575
Race				1.000
Black– n (%)	27 (9.2%)	20 (9.1%)	7 (9.6%)	
White– n (%)	241 (82.3%)	176 (80.0%)	65 (89.0%)	
Unreported/Other – n (%)	25 (8.5%)	24 (10.9%)	1 (1.4%)	
Age at Procedure (Years)	65.3 (6.09)	65.2 (5.96)	65.7 (6.52)	0.542
Laterality				0.749
LT– n (%)	113 (38.6%)	86 (39.1%)	27 (37.0%)	
RT– n (%)	187 (61.4%)	134 (60.9%)	46 (63.0%)	
Hand Dominance				0.296
Left– n (%)	31 (11.8%)	25 (12.2%)	6 (9.37%)	
Right– n (%)	238 (88.2%)	180 (87.8%)	58 (90.6%)	
Smoker				0.108
No– n (%)	282 (96.2%)	214 (97.3%)	68 (93.2%)	
Yes– n (%)	11 (3.8%)	6 (2.7%)	5 (6.8%)	
Diabetes				0.172
No– n (%)	265 (90.4%)	196 (89.1%)	69 (94.5%)	
Yes– n (%)	28 (9.6%)	24 (10.9%)	4 (5.5%)	
Charlson Comorbidity Index (CCI) - mean (SD)	2.51 (1.08)	2.52 (1.10)	2.48 (0.97)	0.931
Time between Injury and Procedure Date (Days) - mean (SD)	60.0 (70.1)	86.0 (.)	59.0 (70.5)	0.228
Follow-Up (Years) – mean (SD)	6.9 (1.8)	7.3 (2.0)	5.8 (1.89)	

Table 2. Functional Outcomes

	[ALL] (N=293)	Without Dislocation (N=220)	With Dislocation (N=73)	Overall P Value
PREOP PROMs	-			-
ASES - mean (SD)	42.7 (20.2)	42.3 (20.5)	44.9 (18.7)	0.584
VAS- mean (SD)	5.55 (2.92)	5.55 (2.92)	(.)	-
SANE- mean (SD)	33.5 (22.6)	35.1 (23.3)	23.5 (15.2)	0.223
Quickdash- mean (SD)	49.8 (20.6)	44.7 (13.3)	53.1 (24.1)	0.276
POSTOP PROMs				
ASES 1- mean (SD)	83.7 (19.3)	82.3 (19.2)	85.7 (19.5)	0.219
SANE- mean (SD)	79.4 (22.4)	80.1 (20.7)	78.6 (24.3)	0.681
VAS- mean (SD)	9.09 (18.4)	4.8 (12.8)	17.2 (24.2)	<0.001
QuickDASH- mean (SD)	17.8 (18.1)	20.1 (19.4)	15.6 (17.1)	0.224
Revision Rotator Cuff Repair				0.093
No– n (%)	278 (94.9%)	206 (93.6%)	72 (98.6%)	
Yes– n (%)	15 (5.1%)	14 (6.4%)	1 (1.4%)	
Recurrent Instability				0.003
No– n (%)	290 (99.0%)	220 (100%)	70 (95.9%)	
Yes– n (%)	3 (1.0%)	0 (0.00%)	3 (4.1%)	
Recurrent Rotator Cuff Tear on MRI				0.511
No– n (%)	263 (89.8%)	196 (87.7%)	67 (91.8%)	
Yes– n (%)	30 (10.2%)	24 (12.3%)	6 (8.2%)	
Reverse TSA				0.875
No– n (%)	280 (95.6%)	210 (95.5%)	70 (95.9%)	
Yes– n (%)	13 (4.4%)	10 (4.5%)	3 (4.1%)	
Failure				0.734
No– n (%)	266 (90.8%)	199 (90.5%)	67 (91.8%)	
Yes– n (%)	27 (9.2%)	21 (9.5%)	6 (8.2%)	