Chronic Postsurgical Pain following reverse shoulder arthroplasty (RSA): When does a painful RSA become permanently painful?

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INTRODUCTION:

Chronic postsurgical pain (CPSP) is a known complication following total hip arthroplasty (THA) (7.5%) and total knee arthroplasty (TKA) (20.9%), however it is not yet well-defined following reverse shoulder arthroplasty (RSA). Furthermore, it is not known at what point in time this diagnosis can be made following RSA, and whether patients with higher-than-normal pain scores at 6 months post-operative can still improve or are already established as CPSP.

METHODS:

All primary RSAs enrolled in multi-center research database of a single, platform shoulder prosthesis were included if they had complete post-operative visual analog pain (VAS) pain scores at 6 months, 1 year and 2 years. Revision surgeries or surgery performed for fracture or tumors were excluded as were patients with any known complication or those that underwent revision surgery prior to 2 years. Patients were stratified into three groups based on their self-reported VAS pain score at 6-months: minimal: 0-1; mild: 2-4; and moderate-severe (M-S): 5+. Demographics, comorbidities, and pre-operative pain management were compared using Welch's ANOVA for continuous variables, or Fisher-Freeman-Halton tests for count variables. Patients in the mild group were then classified as either improved or unimproved by 2 years based on whether they transitioned to the minimal group or remained in the mild group. Improved and unimproved groups were then compared using Welch's t-tests or Fisher's exact tests.

RESULTS:

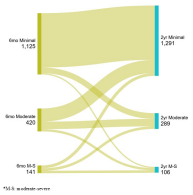
A total of 1,686 patients were included for analysis. The average age was 72 ± 7 years, and the average BMI was 29 ± 6. 61% of the cohort were female, 30% had undergone previous surgery, 47% had undergone previous injections, and 70% were taking analgesics preoperatively. Preoperative diagnoses were as follows: 55% with osteoarthritis (OA), 33% with rotator cuff tear (RCT), and 38% with cuff tear arthropathy (CTA) (Table 1). Some patients had more than one diagnosis. At 6 months post-operatively, 67% had minimal pain (n = 1125), 25% had mild pain (n = 420), and 8.4% had M-S pain (n = 141). These groups demonstrated significant differences in age and previous surgery, with the M-S group having a lower age and more previous surgery, respectively. Diagnosis demonstrated differences in OA and CTA, with the M-S group having a lower diagnosis frequency of OA and higher diagnosis frequency of CTA. The M-S group had a higher rate of patients with heart disease and diabetes. By the 2-year post-operative mark, the relative percentage of patients in the minimal pain group increased (n = 1,291, 77%), while proportions in the mild (n = 289, 17%) and M-S (n=106, 6.3%) groups decreased.

The mild pain (VAS 2-4) group was evaluated at 6 months and patients were separated based on whether they improved from 6 months to 2 years or did not improve (Figure 1). The group of patients that improved from 6 months to 2 years demonstrated less prior surgery, were more frequently diagnosed with OA and less frequently diagnosed with RCT (Table 2). No differences were demonstrated between surgical or implant parameters. The improved group demonstrated significantly improved post-operative patient-reported outcome measures (PROMs), but not with range of motion (ROM), aside from abduction.

DISCUSSION AND CONCLUSION:

At 2 years post-operatively, 6.3% of primary RSA patients demonstrated CPSP in this study, which is a lower rate than reported after TKA or THA. This was an improvement from the 6-month mark (8.4%). The group of patients that improved from the mild pain group to the minimal pain group underwent less prior surgery, were more frequently diagnosed with OA, and were less frequently diagnosed with RCT. No surgical or implant parameters were associated with any difference, and PROMs improved even though the only ROM improvement was found specifically in abduction.

Figure 1: Results of groups by pain level at 6 months and 2 years.



*M-S: moderate-severe

Table 1: Demographics information of the included 1,686 patients.

Diagnosis	
Osteoarthritis	55%
Anterior Cuff Tear	33%
Cuff Tear Arthropathy	38%
Rheumatoid Arthritis	3%
Comorbidities	
None	29%
Hypertension	57%
Heart Disease	15%
Diabetes	15%
Tobacco Use	7%
Preoperative Pain Management	
Injections	47%
Analgesic Use	70%

Table 2: Improved vs unimproved groups from 6 months to 2 years.

Demographics	Improved	Unimproved	p-value
Age	71.8 ± 7.3	70.7 ± 8.2	0.157
Gender (% Female)	58.5%	67.8%	0.078
BMI	28.7 ± 6.4	28.4 ± 5.3	0.543
Previous Surgery	30.3%	42.3%	**0.024**
Diagnosis			
Osteoarthritis	52.7%	41.8%	**0.042**
Anterior Cuff Tear	30.3%	43.8%	**0.010**
Cuff Tear Arthropathy	41.2%	30.4%	0.028
Rheumatoid Arthritis	2.5%	2.9%	0.753
Comorbidities			
None	27.2%	33.3%	0.201
Hypertension	56.6%	57.9%	0.827
Heart Disease	16.7%	17.3%	0.760
Diabetes	16.3%	16.8%	1.000
Tobacco Use	6.3%	9.0%	0.071
Pre-op Pain Management			
Injections	45.4%	44.9%	0.918
Analgesic Use	69.5%	71.8%	0.719

*Welch statistically significant