30-Day Readmission in Morbidly Obese Patients Following Total Shoulder Arthroplasty

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INTRODUCTION: Morbid obesity, a condition projected to affect a quarter of adults by 2030 [1], is a known risk factor for adverse postoperative outcomes following arthroplasty surgery. Prior literature has demonstrated that morbid obesity increases risk of readmission following total hip and knee arthroplasty [2,3], but the comorbidities leading to readmission following total shoulder arthroplasty (TSA) remains underreported. Therefore, the purpose of this study is to further investigate what risk factors among morbidly obese patients increase the likelihood of readmission following TSA.

METHODS: The American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database was queried for all patients who underwent TSA between 2015 and 2020. After exclusion criteria, patients were divided into two cohorts, those who are and those who are not morbidly obese. Bivariate logistic regression was used to compare patient demographics and comorbidities between the cohorts, and multivariate logistic regression, adjusted for all significant patient demographics and comorbidities, was used to identify the complications independently associated with 30-day readmission in the morbidly obese cohort.

RESULTS: A total of 26,640 patients remained after exclusion criteria, with 23,809 (89.4%) patients in the cohort without morbid obesity and 2,831 (10.6%) in the cohort with morbid obesity. Within the morbidly obese cohort, 109 (3.9%) patients experienced 30-day readmission. On multivariate analysis, independent predictors of readmission following TSA in the morbidly obese cohort were found to be dependent functional status (OR 3.11, 95% CI 1.54-6.28; p = 0.002), COPD (OR 1.81, 95% CI 1.06-3.09; p = 0.029), and preoperative transfusion (OR 8.75, 95% CI 1.64-46.69; p = 0.011).

DISCUSSION: As the prevalence of obesity continues to increase across the United States, investigation into postoperative complications is increasingly relevant. Morbidly obese patients are up to 14 times more likely to have major surgical complications compared to all other BMI groups due to their greater comorbidity profiles [4]. Prior literature has found that every 5 kg/m^2 increase in BMI is associated with a 16% increase in likelihood of readmission following anatomic TSA [5]. Furthermore, both readmission and BMI status have been shown to contribute to increased hospital costs, independent of physician charges, and because of stipulations within the Affordable Care Act [6,7]. Our study identified dependent functional status, COPD, and preoperative transfusion to be independent risk factors for readmission among morbidly obese patients.

SIGNIFICANCE/CLICINAL RELEVANCE: Patients with morbid obesity carry a high comorbidity profile and are potentially at increased postoperative risk. These findings can help guide physicians in preoperative optimization of morbidly obese individuals to limit adverse outcomes.

REFERENCES: [1] Ward, et al., N Engl J Med. 2019; [2] George, et al., J Arthroplasty. 2018; [3] Hanly, et al., J Arthroplasty. 2016; [4] Giori, et al., J Bone Joint Surg Am. 2018; [5] Anakwenze, et al., J Shoulder Elbow Surg. 2017; [6] Beauvais, et al., J Multidiscip Healthc. 2022; [7] Griffin, et al., J Shoulder Elbow Surg. 2014.

IMAGES AND TABLES:

Characteristic	No Readmission Number	No Readmission Percent	Readmission Number	Readmission Percent	p-value
Total	2,722	100.0%	109	100.0%	
Age					
18-39	18	0.7%	1	0.9%	0.765
40-64	1,012	37.2%	38	34.9%	0.707
65-74	1,276	46.9%	52	47.7%	--
≥75	416	15.3%	18	16.5%	0.830
Gender					0.113
Female	1,940	71.3%	70	64.2%	
Male	782	28.7%	39	35.8%	
ASA Classification					0.099
1-2	407	15.0%	10	9.2%	
≥3	2,315	85.0%	99	90.8%	
Functional status					**<0.001**
Independent	2,647	97.2%	99	90.8%	
Dependent	75	2.8%	10	9.2%	
Smoking					0.133
No	2,507	92.1%	96	88.1%	
Yes	215	7.9%	13	11.9%	
Diabetes					
No	1,862	68.4%	67	61.5%	--
Non-Insulin	567	20.8%	23	21.1%	0.627
Insulin	293	10.8%	19	17.4%	**0.028**
COPD					**0.008**
No	2,481	91.1%	91	83.5%	
Yes	241	8.9%	18	16.5%	
CHF					0.483
No	2,692	98.9%	107	98.2%	
Yes	30	1.1%	2	1.8%	
Hypertension					0.273
No	568	20.9%	18	16.5%	
Yes	2,154	79.1%	91	83.5%	
Bleeding disorders					0.065
No	2,653	97.5%	103	94.5%	
Yes	69	2.5%	6	5.5%	
Preoperative transfusion					**<0.001**
No	2,717	99.8%	107	98.2%	
Yes	5	0.2%	2	1.8%	
Total operative time					
0-79	640	23.5%	24	22.0%	0.832
80-128	1,379	50.7%	49	45.0%	--
≥129	703	25.8%	36	33.0%	0.247

ASA, American society of anesthesiologists; COPD, chronic obstructive pulmonary disease; CHF, congestive heart failure

Figure 1. Patient Demographics and comorbidities for patients with and without 30-day readmission following TSA. Bold values indicate statistical significance with p < 0.05.

Characteristic	Odds Ratio	95% CI	p-value
Dependent functional status	3.11	1.54-6.28	**0.002**
Insulin dependent diabetes	1.57	0.92-2.68	0.100
COPD	1.81	1.06-3.09	**0.029**
Preoperative transfusion	8.75	1.64-46.69	**0.011**

CI, confidence interval; COPD, chronic obstructive pulmonary disease

Figure 2. Multivariate analysis of patient demographics and comorbidities associated with 30-day readmission following TSA.. Bold values indicate statistical significance with p < 0.05.