

# Smoking is an Independent Risk Factor for Complications in Outpatient Total Shoulder Arthroplasty

Kenny Ling<sup>1</sup>, Emma Smolev<sup>1</sup>, Ryan Tantone<sup>1</sup>, David E. Komatsu<sup>1</sup>, Edward D. Wang<sup>1</sup>  
<sup>1</sup>Department of Orthopaedics and Rehabilitation, Stony Brook University, Stony Brook, NY, USA  
Kenny.Ling@stonybrookmedicine.edu

**Disclosures:** None

**INTRODUCTION:** Smoking is a major public health concern and an important risk factor to consider during preoperative planning. Smoking has previously been reported as the single most important risk factor for developing postoperative complications after elective orthopedic surgery. However, there is limited literature regarding the postoperative complications associated with smoking following outpatient total shoulder arthroplasty (TSA). The purpose of this study was to investigate the association between smoking status and early postoperative complications following outpatient TSA using a large national database.

**METHODS:** We queried the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database for all patients who underwent TSA between 2015 and 2020. Smoking status in NSQIP is defined as any episode of smoking with 12 months prior to surgery. Bivariate logistic regression was used to identify patient demographics, comorbidities, and complications significantly associated with current or recent smoking status in patients who underwent TSA with a length of stay (LOS) of 0. Multivariate logistic regression, adjusted for all significantly associated patient demographics and comorbidities, was used to identify associations between current or recent smokers and 30-day postoperative complications.

**RESULTS SECTION:** 22,817 patients were included in the analysis, 2,367 (10.4%) were current or recent smokers and 20,450 (89.6%) were non-smokers. These patients were further stratified based on LOS: 2,428 (10.6%) patients had a LOS of 0 days, 15,267 (66.9%) patients had a LOS of 1 day, and 5,122 (22.4%) patients had a LOS of 2 days. Within the outpatient cohort (LOS = 0), 202 (8.3%) patients were current or recent smokers and 2,226 (91.7%) were non-smokers. Multivariate logistic regression identified current or recent smoking status to be independently associated with higher rates of myocardial infarction (MI) (odds ratio [OR] 9.80, 95% confidence interval [CI] 1.48-64.96; p = 0.018), deep vein thrombosis (DVT) (OR 20.05, 95% CI 1.63-247.38; p = 0.019), and readmission (OR 2.82, 95% CI 1.19-6.67; p = 0.018) following outpatient TSA. Readmission was most often due to pulmonary complication (n=10, 22.7%).

**DISCUSSION:** Current or recent smoking status is independently associated with higher rates of myocardial infarction, deep vein thrombosis, and readmission following TSA performed in the outpatient setting. Current or recent smokers may benefit from an inpatient setting of minimum 2 nights. As outpatient TSA becomes increasingly popular, refining proper patient selection criteria is imperative to optimizing postoperative outcomes.

**SIGNIFICANCE/CLINICAL RELEVANCE:** As outpatient TSA becomes increasingly popular, refining proper patient selection criteria is imperative to optimizing postoperative outcomes.

**IMAGES AND TABLES:**

Table 1. Bivariate analysis of 30-day complications between non-smokers and smokers.

Postoperative Complication	Non-smoker (n=2,226)		Smoker (n=202)		p-value
	Number	Percent	Number	Percent	
Myocardial infarction	3	0.13%	2	0.99%	<b>0.029</b>
Bleeding transfusions	3	0.13%	1	0.50%	0.259
Deep vein thrombosis	1	0.04%	2	0.99%	<b>0.011</b>
Pulmonary embolism	3	0.13%	1	0.50%	0.259
Superficial incisional SSI	4	0.18%	2	0.99%	<b>0.049</b>
Organ/space SSI	6	0.27%	0	0.00%	0.999
Wound dehiscence	1	0.04%	0	0.00%	1.000
Readmission	36	1.62%	8	3.96%	<b>0.021</b>
Reoperation	22	0.99%	1	0.50%	0.497
Non-home discharge	11	0.49%	2	0.99%	0.351
Mortality	1	0.04%	0	0.00%	1.000

SSI, surgical site infection

Table 2. Multivariate analysis of 30-day complications between non-smokers and smokers.

Postoperative Complication	OR	95% CI	p-value
Myocardial infarction	9.80	1.48-64.96	<b>0.018</b>
Deep vein thrombosis	20.05	1.63-247.38	<b>0.019</b>
Superficial incisional SSI	5.38	0.93-31.22	0.061
Readmission	2.82	1.19-6.67	<b>0.018</b>

OR, odds ratio; CI, confidence interval