

Regional Anesthesia Has Lower Risk of Readmission After Total Knee Arthroplasty

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INTRODUCTION:

Total knee arthroplasty is among the most common surgical procedures performed in the United States. Readmission can become a burden to the patient and healthcare system. Moreover, it is associated with higher healthcare costs. This study sought to assess the relationship between regional anesthesia (RA) on 30-day readmission among patients who underwent primary total knee arthroplasty (TKA).

METHODS:

A retrospective cohort study was performed using the National Surgical Quality Improvement Program (NSQIP) database of primary TKA occurring between 2012 and 2020. The primary exposure was anesthesia modality (RA versus general anesthesia [GA]). The primary outcome was readmission within 30 days of total knee arthroplasty. Potential confounders included basic demographics (age, sex, race, ethnicity), baseline health status (preoperative functional status, ASA classification, BMI, smoking, diabetes, chronic immunosuppression), and procedure characteristics (admission source, procedural setting, operative time, and wound classification). Univariate analyses were performed to assess for differences between cohorts. Multivariable regression analysis that adjusted for confounding was performed to identify risk of anesthesia modality on 30-day readmission.

RESULTS:

Over the study period, there were 200,500 cases of TKA, of which 8,523 (4.25%) received RA. Many patients in both cohorts had age 65-74 years, female sex, White race, non-Hispanic ethnicity, independent functional status, obesity, no smoking, no diabetes, no chronic immunosuppression, admission from home, and inpatient setting. In contrast, a higher proportion of patients who received RA versus GA had ASA class 2 versus 3, respectively. On multivariable regression analysis, patients who received RA versus GA had 0.84 times lower (95% CI 0.73 to 0.97; $p=0.016$) odds of readmission following TKA.

DISCUSSION AND CONCLUSION:

Compared to patients who received GA, those who received RA for TKA had a lower risk of 30-day readmission following TKA. Further research involving risk stratification and identification of ideal candidates for RA may help to expand use of

RA and optimize patient outcomes.

Table 1: Univariate Analysis of Patients Undergoing Total Knee Arthroplasty with Regional or General Anesthesia

	Regional N = 8523 (4.25%)	General N = 191977 (95.75%)	p-value *
Age Group			<0.001
18-54	747 (8.8%)	21,218 (11.1%)	
55-64	2,675 (31%)	58,764 (30%)	
65-74	3,220 (38%)	72,980 (38%)	
75-84	1,651 (19%)	34,655 (18%)	
85	250 (3%)	4,320 (2.3%)	
Sex			0.004
Female	5,124 (60%)	118,422 (62%)	
Male	3,399 (40%)	73,555 (38%)	
Race			<0.001
Asian	140 (1.6%)	3,891 (2.0%)	
Black or African American	512 (6.0%)	18,241 (9.5%)	
Other	71 (0.8%)	1,894 (1.0%)	
White	6,871 (80%)	152,568 (80%)	
Ethnicity			<0.001
Non-Hispanic	7,269 (85%)	163,144 (85%)	
Hispanic	329 (3.9%)	13,587 (7.1%)	
Unknown	92 (1.1%)	15,259 (8.0%)	
Functional Status Prior to Surgery			<0.001
Dependent	182 (2.1%)	2,586 (1.4%)	
Independent	8,315 (98%)	188,365 (99%)	
ASA Classification			<0.001
1-No Disturb	166 (1.9%)	2,691 (1.4%)	
2-Mild Disturb	4,428 (52%)	85,874 (45%)	
3-Severe Disturb	3,779 (44%)	89,707 (47%)	
4-5-Life Threat/Neurologic	144 (1.7%)	3,567 (1.9%)	
BMI Category			<0.001
Normal	791 (9.3%)	16,777 (8.8%)	
Obese	5,395 (63%)	126,830 (66%)	
Overweight	2,257 (26%)	48,044 (25%)	
Underweight	80 (0.9%)	920 (0.5%)	
Smoking Status			<0.001
No	873 (10%)	17,448 (9.1%)	
Diabetes			<0.001
No	7,117 (84%)	154,669 (81%)	
Insulin	350 (4.1%)	8,271 (4.3%)	
Non-Insulin	1,056 (12%)	28,017 (15%)	
Immunosuppressive Therapy			0.767
No	119 (1.4%)	7,396 (3.9%)	
Admission Origin			0.345
Home	8,495 (100%)	191,220 (100%)	
Institution	24 (0.3%)	657 (0.3%)	
Missing	4	200	
Setting			<0.001
Inpatient	7,497 (88%)	172,980 (90%)	
Outpatient	1,026 (12%)	18,997 (10%)	
Operation Time in Minutes Mean (SD)	98 (35)	96 (40)	<0.001
Wound Classification			0.875
1-Clean	8,481 (100%)	190,919 (99%)	
2-Clean/Contaminated	10 (0.1%)	761 (0.4%)	
3-Contaminated	7 (<0.1%)	158 (<0.1%)	
4-Dirty/Infected	5 (<0.1%)	141 (<0.1%)	
Readmission	214 (2.5%)	6,807 (3.6%)	<0.001

*Pearson's Chi-Squared Test; Fisher's Exact Test; Wilcoxon Rank Sum Test

Table 2: Adjusted Multivariable Regression of Regional Anesthesia and Readmission

	Readmission		
	OR ^a	95% CI ^b	p-value
General	---	---	---
Regional	0.84	0.73-0.97	0.016

^aOdds Ratio ^bConfidence Interval