Monitored Anesthesia Care 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. Readmissions are a burden to the patient and healthcare system. This study sought to assess the relationship between monitored anesthesia care (MAC) 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 (MAC versus general anesthesia [GA]). The primary outcome was readmission within 30 days of surgery. 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 259,278 cases of TKA, of which 67,301 (25.96%) received MAC. 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 MAC versus GA had ASA class 2 versus 3, respectively. On multivariable regression analysis, patients who received MAC versus GA had 0.84 times lower odds (95% CI 0.80 to 0.90; p<0.001) of 30-day readmission.

DISCUSSION AND CONCLUSION: Compared to patients who received GA, those who received MAC for TKA had a lower risk of readmission following surgery. Further studies involving amenable patient characteristics may help to expand the use of MAC and optimize patient outcomes.

Table 1: Univariate Analysis of Patients Undergoing Total Knee Arthroplasty with MAC/IV Sedation or General Anesthesia

	MAC/IV Sedation N = 67301 (25.957%)	General N = 191977 (74.043%)	p-value [a]
Age Group			<0.001
18-54	5,925 (8.8%)	21,218 (11%)	
55-64	19,791 (29%)	58,764 (31%)	
65-74	26,761 (40%)	72,980 (38%)	
75-84	13,095 (19%)	34,695 (18%)	
85	1,729 (2.6%)	4,320 (2.3%)	
Sex			0.002
Female	41,056 (61%)	118,422 (62%)	
Male	26,245 (39%)	73,555 (38%)	
Race			<0.001
White	44,232 (86%)	152,568 (86%)	
American Indian or Alaska Native	632 (1.2%)	1,137 (0.6%)	
Asian	956 (1.9%)	3,891 (2.2%)	
Black or African American	5,436 (11%)	18,541 (10%)	
Native Hawaiian or Pacific Islander	98 (0.2%)	657 (0.4%)	
Other	27 (<0.1%)	10 (<0.1%)	
Ethnicity			<0.001
Non-Hispanic	48,966 (73%)	163,144 (86%)	
Hispanic	3,586 (5.3%)	11,987 (6.3%)	
Unknown	14,639 (22%)	15,559 (8.2%)	
Functional Status Prior to Surgery			<0.001
Dependent	515 (0.8%)	2,586 (1.4%)	
Independent	66,314 (99%)	188,365 (99%)	
ASA Classification			<0.001
1-No Disturb	1,229 (1.8%)	2,691 (1.4%)	
2-Mild Disturb	32,750 (49%)	85,874 (45%)	
3-Severe Disturb	31,940 (47%)	99,707 (52%)	
4/5-Life Threat/Moribund	1,340 (2.0%)	3,567 (1.9%)	
BMI Category			<0.001
Normal	6,393 (9.5%)	16,177 (8.4%)	
Obese	42,216 (63%)	126,836 (66%)	
Overweight	18,452 (27%)	48,044 (25%)	
Underweight	240 (0.4%)	920 (0.5%)	
Smoking Status	4,926 (7.3%)	17,648 (9.2%)	<0.001
Diabetes			<0.001
No	55,646 (83%)	154,669 (81%)	
Insulin	2,619 (3.9%)	9,271 (4.8%)	
Non-Insulin	9,036 (13%)	28,037 (15%)	
Immunosuppressive Therapy	2,387 (3.5%)	7,306 (3.8%)	0.002
Admission Origin			<0.001
Home	67,098 (100%)	191,120 (100%)	
Institution	154 (0.2%)	657 (0.3%)	
Setting			<0.001
Inpatient	58,323 (87%)	172,980 (90%)	
Outpatient	8,978 (13%)	18,997 (9.9%)	
Operation Time in Minutes *Mean (SD)*	86 (32)	96 (40)	<0.001
Wound Classification			<0.001
1-Clean	67,107 (100%)	190,919 (99%)	
2-Clean/Contaminated	143 (0.2%)	761 (0.4%)	
3-Contaminated	34 (<0.1%)	154 (<0.1%)	
4-Dirty/Infected	17 (<0.1%)	143 (<0.1%)	
Readmission	1,781 (2.6%)	6,605 (3.4%)	<0.001

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

Table 2: Adjusted Multivariable Regression of Mac/IV Sedation Anesthesia and Readmission

	Readmission		
	OR [a]	95% CI [b]	p-value
General	---	---	
Mac/IV Sedation	0.84	0.80-0.90	<0.001

a Odds Ratio   b Confidence Interval