

Preoperative Marijuana and Total Knee Arthroplasty: Outcomes at 90 Days and 1 Year

Nequesha Mohamed¹, Chukwuweike Uchenna Gwam, Sahir Pervaiz, Scott Douglas, Tianyi David Luo, Johannes F Plate, Ronald Emilio Delanois²

¹Wake Forest Baptist Medical Center, ²Rubin Institute for Advanced Orthopedics

INTRODUCTION:

Marijuana consumption has risen among the older and elderly population with estimated increases of 48% and 455% in adults 45 to 54 years old and adults 55 to 64, respectively. Consequently, there has been an increase in the proportion of patients undergoing total knee arthroplasty (TKA) who preoperatively consume marijuana. However, the effects of preoperative marijuana use on postoperative TKA outcomes have not been well described. The following study employed a large all-payer database to assess 90-day and 1-year outcomes in TKA recipients who consumed preoperative marijuana to those who did not. Specifically, we compared opioid consumption, readmissions, revisions, and complications after TKA in a matched cohort of marijuana users and nonusers.

METHODS:

A large insurance database was retrospectively reviewed for all primary TKA patients between 2010 and 2018. Patients were excluded if they had a history of opioid abuse, had continuous opioid use 12 months prior to surgery, or consumed more than 240 morphine milliequivalents worth of opioids within 12 months of the index TKA procedure. International Classification of Diseases (ICD) 9 and 10 codes were employed to identify marijuana users, matching them 1:1 with nonusers on age, sex, Charlson Comorbidity Index (CCI), obesity, alcohol, tobacco, and comorbidities. This yielded 2,421 patients per cohort. Outcomes assessed at 90 days and 1 year were opioid consumption, episode of care costs, readmissions, revisions, and complications. Categorical and continuous variables were assessed with chi-square analyses and t-tests, respectively.

RESULTS:

Marijuana users were evenly matched to nonusers on age, sex, CCI, obesity, alcohol and tobacco abuse, and comorbidities (all $p > 0.05$) (**Table 1**). Compared to marijuana nonusers, opioid consumption at 90-days was nonsignificant ($p = 0.489$), while readmissions were significantly higher among marijuana users ($p = 0.005$) (**Table 2**). In addition, revision rates were similar between the groups ($p = 0.999$), but cerebrovascular accidents, deep vein thromboses, hematomas, myocardial infarctions, and urinary tract infections were all higher in marijuana patients at 90-days (all $p > 0.05$). In contrast, opioid consumption ($p = 0.703$) and costs ($p = 0.299$) at one year were both nonsignificant, but marijuana users had a significantly higher readmissions rate than nonusers ($p < 0.001$) (**Table 3**). Furthermore, revisions and all complications were similar in occurrence between the two groups at one year (all $p > 0.05$).

DISCUSSION AND CONCLUSION:

The utilization of marijuana has increased among older adults over recent years, particularly in the age group that frequently undergoes TKA. This study reports increased readmissions at 90-days and 1-year in marijuana users, but no increase in opioid consumption at either timepoint. Additionally, several complications such as deep vein thromboses, myocardial infarctions, and urinary tract infections were elevated among marijuana users at 90-days, but not at 1-year post-TKA. Preoperative counsel of marijuana users by arthroplasty surgeons may help reduce the risk of these postoperative complications, and guide expectations on post-procedure outcomes. Further evidence stratifying the levels of consumption correlated with negative outcomes are needed to elucidate the risks of preoperative marijuana consumption among this population.

Table 1. Patient Demographics of Patients Undergoing Total Knee Arthroplasty

N (%)	Patients with Marijuana Use (n=2,421)	Patients Without Marijuana Use (n=2,421)	P-value
Age [†] (SD)	55.3 (7.6)	55.4 (7.7)	0.541
Sex			0.999
Male	1,061 (43.8)	1,061 (43.8)	
Female	1,360 (56.2)	1,360 (56.2)	
Charlson Comorbidity Index [†] (SD)	1.49 (1.82)	1.49 (1.82)	0.999
Obesity Status			0.999
Non-Obese	1,069 (44.2)	1,069 (44.2)	
Obese	685 (28.3)	685 (28.3)	
Morbidly Obese	667 (27.6)	667 (27.6)	
Alcohol Abuse			0.999
No	1,707 (10.5)	1,707 (10.5)	
Yes	714 (29.5)	714 (29.5)	
Tobacco Abuse			0.999
No	787 (32.5)	787 (32.5)	
Yes	1,634 (67.5)	1,634 (67.5)	
Diabetes			0.999
No	1,191 (49.2)	1,191 (49.2)	
Yes	1,230 (50.8)	1,230 (50.8)	
Hypertension			0.999
No	295 (12.2)	295 (12.2)	
Yes	2,126 (87.8)	2,126 (87.8)	
Congestive Heart Failure			0.999
No	2,097 (86.6)	2,097 (86.6)	
Yes	324 (13.4)	324 (13.4)	
Chronic Obstructive Pulmonary Disease			0.999
No	1,025 (42.3)	1,025 (42.3)	
Yes	1,396 (57.7)	1,396 (57.7)	

SD: Standard Deviation; MME: Morphine Milliequivalents
[†]Number provided is the mean figure with standard deviation in parentheses

Table 2. 90-Day Opioid Consumption, Readmissions, Revisions, and Complication Rates in Patients Undergoing Total Knee Arthroplasty

N (%)	Patients with Marijuana Use (n=2,421)	Patients Without Marijuana Use (n=2,421)	P-value
Opioid Consumption [†] (MME) (SD)	791.7 (867.9)	773.2 (856.5)	0.489
Readmissions	372 (15.4)	303 (12.5)	0.005
Revision Surgeries	238 (9.8)	238 (9.8)	0.999
Complications			
Blood Transfusions	118 (4.9)	92 (3.8)	0.078
Cardiac Arrest	33 (1.4)	43 (1.8)	0.298
Cerebrovascular Accidents	145 (6.0)	93 (3.8)	0.001
Deep Vein Thromboses	304 (12.6)	253 (10.4)	0.024
Hematoma/Seratoma	96 (4.0)	65 (2.7)	0.016
Mechanical Complications	246 (10.2)	246 (10.2)	0.999
Myocardial Infarctions	171 (7.1)	129 (5.3)	0.015
Pneumoniae	652 (26.9)	592 (24.5)	0.052
Prosthetic Joint Infections	224 (9.3)	198 (8.2)	0.203
Pulmonary Emboli	145 (6.0)	128 (5.3)	0.319
Respiratory Failures	352 (14.5)	317 (13.1)	0.157
Urinary Tract Infections	961 (39.7)	812 (33.5)	<0.001

SD: Standard Deviation; MME: Morphine Milliequivalents
[†]Number provided is the mean figure with standard deviation in parentheses