



Cannabis Use In Patients Undergoing Knee Arthroscopy Is Associated With Less Postoperative Opioid Use And Fewer Postoperative Complications

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Project funded by and performed at UT Southwestern Medical Center, Department of Orthopaedic Surgery, Dallas, TX, USA

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Disclosures

Christopher McCrum, MD

- Committee member AOSSM
- Editorial Board *Arthroscopy Journal*

Jacob Wood

- None

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- None

Introduction

- Medical and recreational cannabis use is increasing
 - Medical cannabis now legal in 36 states, recreational cannabis legal in 15 states¹
 - Cannabis use within past month increased from 6.2% in 2003 to 8.9% in 2016²
- 16% Americans over 12 used cannabis within last month³
 - Reported cannabinoid use increased from 9% to 15% of orthopedic surgical patients between 2012 and 2017⁴
- Paucity of data on the influence of cannabis use on postoperative outcomes
 - Particularly following arthroscopic procedures



Purpose and Hypothesis

- Purpose
 - To determine the difference in complication rates, cost, and opioid use following knee arthroscopy with or without perioperative cannabis use
- Hypothesis
 - Perioperative cannabis use would not result in different postoperative complication rates, opioid use, or cost following hip arthroscopy

Methods

- Retrospective database review
- PearlDiver
 - Commercially available database with medical and prescription records
 - Includes >137 million patients
 - US commercial insurance, Medicare, Medicaid, and self-pay

Methods

Queried 2.8 million patients undergoing arthroscopic procedures (2010-2019)



Identified knee arthroscopy by CPT code



Defined cannabis use by diagnosis code (ICD-10)



Excluded patients with less than one year follow up



Created two groups of 9668 patients matched by Charlson Comorbidity Index (CCI), Elixhauser Comorbidity Score (ECI), age, gender, obesity, tobacco use, and diabetes

Methods

- Two groups of 9,668 patients
 - Compared:
 - 30 day costs of hip arthroscopy
 - Opioid use (by Morphine milligram equivalents (MME))
 - Complication rates
 - 30/90 days
- Statistics
 - Descriptive
 - Unequal variance t-test for continuous variables
 - $p \leq .05$

Results: Demographics

1,631,154 patients underwent knee arthroscopy 2010-2019



9,929 (0.61%) reported cannabis use or abuse



9,668 patients matched to non-cannabis using patients by demographics and comorbidities

		Matched cohort with cannabis use	Matched cohort without cannabis use
Total Patients		9668	9668
Male		5398 (55.8%)	5398 (55.8%)
Female		4270 (44.2%)	4270 (44.2%)
Average Age		39.91 (\pm 13.59)	39.99 (\pm 13.69)
Average CCI score		0.81 (\pm 1.47)	0.83 (\pm 1.48)
Average ECI score		7.08 (\pm 3.78)	7.08 (\pm 3.78)
Obese	Yes	4057 (42.0%)	4057 (42.0%)
	No	5611 (58.0%)	5611 (58.0%)
Diabetes	Yes	2994 (31.0%)	2994 (31.0%)
	No	6674 (69.0%)	6674 (69.0%)
Smoking	Yes	6942 (71.8%)	6942 (71.8%)
	No	2726 (28.2%)	2726 (28.2%)

Table 1: Summary of demographic data of the total and sample patient populations of the study. No significant differences between groups by any co-morbidity.

Results: Opioid Use and Cost

	Cannabis Use	No Cannabis Use	P-Value (95% CI)
Opioid Use (MME)	1711 (± 3292)	2253 (± 5010)	P < 0.001 (376, 709)
Average Reimbursement	\$1637 (± \$2177)	\$1517 (± \$1805)	P < 0.001 (-156, -84)

Table 2: Opioid use by Milligram Morphine Equivalents (MME) and 30-day episode of care reimbursement.

- The mean amount of MME prescribed was significantly less in the cohort of patients with cannabis use than the non-cannabis use cohort
- Small, but significantly increased cost of procedure with perioperative cannabis use vs those with no reported cannabis use

Results: Complications

- Cannabis use associated with significantly increased risk of 10 day mortality (though rare)
- Otherwise, cannabis was not a risk for increased 30- and 90-day complications
- Cannabis use associated with lower rates of DVT and PE at 30- and 90-days after knee arthroscopy

Complication		No Cannabis Use	Cannabis Use	Odds Ratio	Lower 95% CI	Upper 95% CI	P-value
10-day Mortality		10**	32	3.207	1.576	6.528	0.001*
Deep Vein Thrombosis	30 day	150	96	0.636	0.492	0.823	0.001*
	90 day	200	144	0.716	0.577	0.888	0.002*
Pulmonary Embolism	30 day	55	20	0.362	0.217	0.605	<0.001*
	90 day	72	30	0.415	0.271	0.636	<0.001*

Table 3: 30- and 90-day complication rate after knee arthroscopy stratified by cannabis use. Odds ratio, 95% confidence interval, and p-values presented. *statistically significant at p<0.05 level. **Incidence ≤10, but set at 10 to allow for statistical analysis.

Limitations

- Limited by coded procedures/diagnosis
 - May underestimate cannabis use^{5,6}
 - Cannot distinguish medicinal vs recreational cannabis use, or methods of consumption
 - Need for prospective analysis, well designed studies
- Not matched by procedure type
- Opioid prescribing may be subject to bias
 - Prescribing physicians may be biased by known presence/absence of cannabis use/disorder

Conclusions

Following knee arthroscopy, patients with perioperative cannabis use:

- Receive less prescription opioid medication
- Have a small, but significantly increased 30-day episode of care cost
- Have increased risk for 10-day mortality
- Have lower 30-day and 90-day risk for DVT and PE

References

1. Otanez M, Grewal J. Health and Safety in the Legal Cannabis Industry Before and During COVID-19. *New Solut.* 2021;30(4):311-323.
2. Center for Behavioral Health Statistics and Quality. 2016 National Survey on Drug Use and Health: Detailed Tables. 2017
3. 2018 National Survey on Drug Use and Health: Detailed Tables. 2018.. Accessed February 20, 2021. <https://www.samhsa.gov/data/sites/default/files/cbhsq-reports/NSDUHDetailedTabs2018R2/NSDUHDetTabsSect1pe2018.htm>
4. Denduluri Sahitya K., Woolson Steven T., Indelli Pier F., Mariano Edward R., Harris Alex H. S., Giori Nicholas J. Cannabinoid and Opioid Use Among Total Joint Arthroplasty Patients: A 6-Year, Single-Institution Study. *Orthopedics.* 2021;44(1):e101-e106. doi:10.3928/01477447-20200928-02
5. Quan H, Li B, Saunders L, et al. Assessing validity of ICD-9-CM and ICD-10 administrative data in recording clinical conditions in a unique dually coded database. *Health Serv Res.* August 2008. doi:10.1111/j.1475-6773.2007.00822.x
6. Kim H, Smith E, Stano C, et al. Validation of key behaviourally based mental health diagnoses in administrative data: suicide attempt, alcohol abuse, illicit drug abuse and tobacco use. *BMC Health Serv Res.* January 2012. doi:10.1186/1472-6963-12-18