Patterns of Opioid Use Following Operative Treatment of Distal Radius Fractures

Nayun Lee, BS, Elliot L.H. Le, MD, MBA, Matthew L. Iorio, MD
Division of Plastic and Reconstructive Surgery, University of Colorado School of Medicine

INTRODUCTION

- Distal radius fractures (DRF) are prevalent in all age groups, and its treatment places a multifaceted burden on individuals and society.[1-4]
- The treatment of distal radius fractures poses not only a high financial burden, but also an increased narcotic burden in terms of patient exposure or risks of dependence.
- A recent study found that the average opioid consumption following distal radius fracture in an adult population was 58.5 morphine milligram equivalents (MME) per day.[7]
- With the growing U.S. opioid epidemic, hand surgeons are recommended to screen patients for risk factors that may contribute to morbidity or mortality related to opioid consumption.[9]
- Currently, there is no mention of cannabis use and its effects on post-operative opioid consumption despite the growing reported usage of cannabis.
- Investigation on the role of cannabis in acute surgical pain management is warranted as physicians encounter more patients with a history of cannabis use.
- The purpose of this study was to evaluate the effects of cannabis use on immediate post-operative pain management, specifically in regard to opioid consumption following operative repair of DRF.

METHODS

- PearlDiver (PearlDiver Technologies, Colorado Springs, CO, USA) is a claims database that represents 122 million patients nationwide across all payer types.
- PearlDiver was queried for all patients who underwent open reduction and internal fixation (ORIF) of distal radius fractures (DRF) between 2010 and 2020.
- Patients with a history of cannabis use were then propensity matched 1:1 with patients in the control group.
- The primary outcome measure was morphine milligram equivalents (MME) per day within 30 days after ORIF of DRF.
- Welch two-sample T-test was performed to determine a significant difference in opioid consumption daily and in 10-day intervals between patients with a history of cannabis use and those without.

RESULTS

- A total of 2,137 patients with a history of cannabis use underwent ORIF of DRF.
- Patients *with* a history of cannabis use consumed an average 47.04 MME/day (SD = 26.10) compared to 56.02 MME/day (SD = 33.12) in patients *without* a history of cannabis use.
- Significantly less opioids were consumed post-operatively when looking at ten-day intervals: 1-10 day, 11-20 day, and 21-30 day intervals in the cannabis use group.

Patient Population	Cannabis Use	Matched Control
Patients Included	2137	2137
Female (n)	1129	1129
Average age (years)	43.05	43.2

Table 1. Patient Demographics

Interval	Cannabis Use (MME/day)	Matched Control (MME/day)	P-value
1-30 days	47.04	56.02	<0.00001
1-10 days	50.38	57.77	<0.00001
11-20 days	42.84	53.69	<0.00001
21-30 days	43.91	51.20	0.003

Table 2. Table 2. DVT Prophylaxis and VTE Events

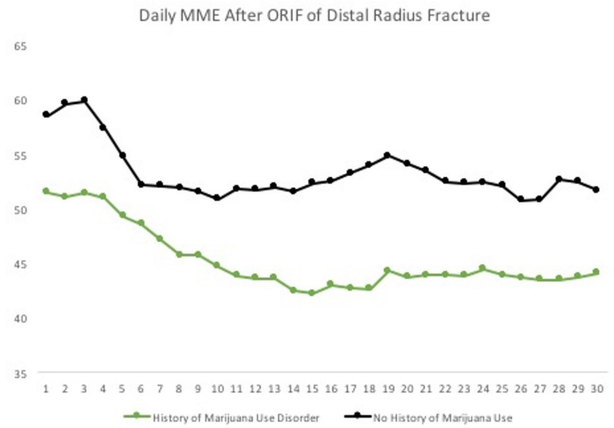

Figure 1. MME per day for non-cannabis users and cannabis users

CONCLUSION

- Prior history of cannabis use is associated with a significant reduction in opioid consumption for pain management following distal radius fracture repairs.
- In comparison to non-cannabis users, significant opioid consumption differences were maintained through the postoperative recovery and prescribing period.
- Due to the risks of opioids, it is important to take a patient's social history with cannabis use into consideration prior to prescribing opioids, as well as a continued effort at opioid exposure and use reduction strategies.

REFERENCES

1. Karl JW, Olson PR, Rosenwasser MP. The Epidemiology of Upper Extremity Fractures in the United States, 2009. J Orthop Trauma. 2015;29(8):e242-244.
2. Bonafede M, Espindle D, Bower AG. The direct and indirect costs of long bone fractures in a working age US population. J Med Econ. 2013;16(1):169-178.
3. MacIntyre NJ, Dewan N. Epidemiology of distal radius fractures and factors predicting risk and prognosis. J Hand Ther. 2016;29(2):136-145.
4. Nellans KW, Kowalski E, Chung KC. The epidemiology of distal radius fractures. Hand Clin. 2012;28(2):113-125.
5. Ryan LM, Teach SJ, Searcy K, et al. Epidemiology of pediatric forearm fractures in Washington, DC. J Trauma. 2010;69(4 Suppl):S200-205.
6. Shauver MJ, Yin H, Banerjee M, Chung KC. Current and future national costs to medicare for the treatment of distal radius fracture in the elderly. J Hand Surg Am. 2011;36(8):1282-1287.
7. O'Neil JT, Wang ML, Kim N, Maltenfort M, Ilyas AM. Prospective Evaluation of Opioid Consumption After Distal Radius Fracture Repair Surgery. Am J Orthop. (Belle Mead NJ) 2017;46(1):E35-E40.
8. Dowell D, Haegerich TM, Chou R. CDC Guideline for Prescribing Opioids for Chronic Pain - United States, 2016. MMWR Recomm Rep. 2016;65(1):1-49.
9. Labrum JT, Ilyas AM. Perioperative Pain Control in Upper Extremity Surgery: Prescribing Patterns, Recent Developments, and Opioid-Sparing Treatment Strategies. Hand. (NY) 2019;14(4):439-444.
10. Helmerhorst GT, Vranceanu AM, Vrahas M, Smith M, Ring D. Risk factors for continued opioid use one to two months after surgery for musculoskeletal trauma. J Bone Joint Surg Am. 2014;96(6):495-499.
11. Kim N, Matzon JL, Abboudi J, et al. A Prospective Evaluation of Opioid Utilization After Upper-Extremity Surgical Procedures: Identifying Consumption Patterns and Determining Prescribing Guidelines. J Bone Joint Surg Am. 2016;98(20):e89.
12. Morris BJ, Mir HR. The opioid epidemic: impact on orthopaedic surgery. J Am Acad Orthop Surg. 2015;23(5):267-271.
13. Substance Abuse and Mental Health Services Administration. 2020 National Survey on Drug Use and Health Detailed Tables, 1.28A. Available at: https://www.samhsa.gov/data/report/2020-nsduh-detailed-tables. Accessed October 25, 2021.
14. Salottolo K, Peck L, Tanner Ii A, et al. The grass is not always greener: a multi-institutional pilot study of marijuana use and acute pain management following traumatic injury. Patient Saf Surg. 2018;12:16.
15. Hickernell TR, Lakra A, Berg A, Cooper HJ, Geller JA, Shah RP. Should Cannabinoids Be Added to Multimodal Pain Regimens After Total Hip and Knee Arthroplasty? J Arthroplasty. 2018;33(12):3637-3641.
16. Noyes R, Jr., Brunk SF, Baram DA, Canter A. Analgesic effect of delta-9-tetrahydrocannabinol. J Clin Pharmacol. 1975;15(2-3):139-143.
17. Johnson JR, Burnell-Nugent M, Lossignol D, Ganae-Motan ED, Potts R, Fallon MT. Multicenter, double-blind, randomized, placebo-controlled, parallel-group study of the efficacy, safety, and tolerability of THC:CBD extract and THC extract in patients with intractable cancer-related pain. J Pain Symptom Manage. 2010;39(2):167-179.
18. Medina SH, Nadarajah V, Jauregui JJ, et al. Orthopaedic surgery patients who use recreational marijuana have less pre-operative pain. Int Orthop. 2019;43(2):283-292.

University of Colorado
Anschutz Medical Campus