The Association of Preoperative Opioid Tapering with Postoperative Opioid Use and Medical Spending

Christopher L. Muller, PhD[1], Amber R. Watson, PharmD[1], Meridith Blevins Peratikos, MS[1,2], Lindsey C. Morris, PhD[1], Elizabeth Ann Stringer, PhD[1]
[1]axialHealthcare, Nashville, Tennessee; [2]Vanderbilt University Medical Center, Department of Biostatistics, Nashville, Tennessee

BACKGROUND

Preoperative opioid use has been widely reported as a significant risk factor for a variety of poor surgical outcomes.[1,2] While eliminating or reducing opioid use prior to surgery may mitigate risks of poor outcomes, the long-term postoperative outcomes associated with preoperative opioid tapering remain poorly described.

OBJECTIVE

In the current study, we identified individuals with high dose chronic opioid use who met CDC guidelines[3] for opioid tapering prior to musculoskeletal surgery. We then assessed time to opioid cessation and medical spending during a 180-day window after surgery.

DATA

We conducted a retrospective analysis of U.S commercial administrative medical and pharmacy claims provided by Blue Health Intelligence™. Analyses focused on members who underwent one of four common musculoskeletal procedures:
knee arthroplasty (27447), knee arthroscopy (29881), shoulder arthroscopy (29826), anterior spinal fusion (22551).

Members were included in subsequent analyses if they met all the following inclusion criteria:

1. At least 18 years old at time of surgery
2. Surgery performed between June 1, 2016 and January 1, 2018
3. Only one surgery of interest performed during study timeline
4. Had continuous healthcare coverage during study timeline

METHODS

High Dose Chronic Opioid Use

Member opioid use was first evaluated during a 120-day window between preoperative day 210 and 91. Members met high dose chronic opioid use definition, if:

- > 0 Morphine Equivalent Daily Dose (MEDD) for 90 or more days
- > 50 MEDD for at least one day

Opioid Tapering

For members with high dose chronic opioid use, we evaluated whether they met CDC opioid tapering recommendations of a **monthly 10% dose reduction** over a 90-day timeline prior to surgery, ending at preoperative day 10.

Opioid Cessation

Opioid cessation was defined as at least 45 days with a MEDD = 0. The cessation date was defined as the last day of an opioid episode, which is defined by consecutive days with a MEDD > 0. Opioid episodes that are less than 45 days apart are considered part of the same episode.

Medical Spend

Medical Spend was defined as the overall medical calim spend that occured between postoperative day 1 and 180.

Figure 1. Flow diagram of study sample.

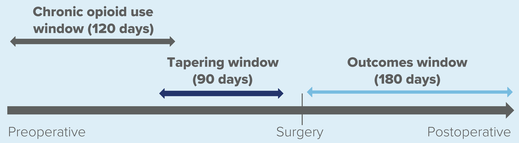

Figure 2. Overview of study timeline.

RESULTS

	HR (95% CI)	*P-value*
Met taper guidelines	2.85 (2.31, 3.53)	< 0.0001
Gender (Male vs. Female)	1.35 (1.09, 1.66)	0.0055
Surgery type		0.0438
Knee arthroplasty (reference)	1	
Shoulder arthroscopy	0.72 (0.53, 0.96)	
Knee arthroscopy	0.72 (0.53, 0.98)	
Anterior spinal fusion	0.96 (0.73, 1.26)	
Age (60 vs. 49 years)	0.86 (0.72, 1.02)	0.0996
Insurance plan type		0.0975
PPO (reference)	1	
EPO	3.00 (1.23, 7.28)	
HMO	0.84 (0.53, 1.32)	
POS	1.17 (0.74, 1.83)	
TRD	1.40 (0.72, 2.72)	

Table 1. Predictors significantly associated with likelihood of postoperative opioid cessation. Cox regression was used to estimate the association between preoperative tapering and opioid cessation within 180 days after surgery, adjusting for member age, gender, insurance plan type, and surgery type.

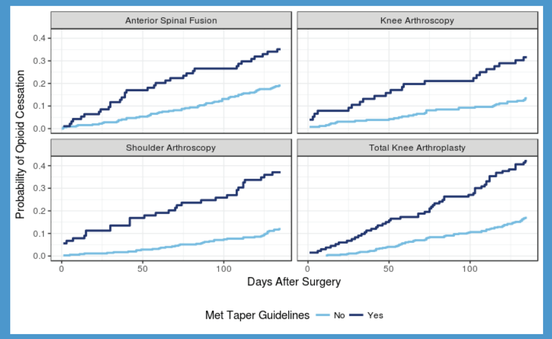

Figure 3. Probability of postoperative opioid cessation by tapering group and surgery type. Crude time to event curves illustrate members who met opioid tapering guidelines prior to surgery have increased likelihood of opioid cessation within 180 days after surgery.

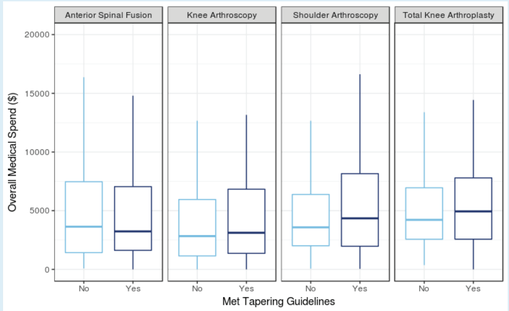

Figure 4. Postoperative medical spending by tapering group and surgery type. Pooling data across procedures, Wilcoxon rank-sum test did not indicate significant association (p = 0.073) between postoperative medical spend and preoperative opioid tapering.

CONCLUSIONS

- Chronic opioid use members who met tapering guidelines before surgery are approximately **3X more likely to stop using opioids after surgery.**
- Postoperative opioid cessation **ranged from 12% to 42%** depending on procedure and preoperative tapering.
- There was **little difference in medical spending** after surgery for members who met opioid tapering guidelines before surgery versus those who did not.

FUTURE DIRECTIONS

- Sensitivity analysis around measuring opioid tapering in the administrative claims
- Examine tapering association with relevant surgical outcomes
- Evaluate tapering along a moving preoperative window
- Causal inference methods (e.g. inverse probability weighting)

REFERENCES

1. Goesling, Jenna, et al. "Trends and predictors of opioid use following total knee and total hip arthroplasty." Pain 157.6 (2016): 1259.
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3. Dowell, Deborah, Tamara M. Haegerich, and Roger Chou. "CDC guideline for prescribing opioids for chronic pain—United States, 2016." JAMA 315.15 (2016): 1624-1645.