

Correlations of Opioid Intake During Different Predischarge Time Frames with Postdischarge Opioid Use Following Inpatient Surgery



Benjamin D Schenkel, B.A., Megan L Rolfzen, MD, Dustin C Krutsinger, MD,
Ana Fernandez-Bustamante, M.D., Ph.D., Karsten Bartels, M.D., Ph.D., M.B.A.



Background

- Opioids possess side-effect profiles that necessitate careful medical management of their use.
- Following inpatient surgery, opioids are often prescribed using a one-size-fits all regimen rather than a patient-centered approach.
- Overprescription of opioids following surgery contributes to patterns of opioid misuse and abuse.
- Pre-discharge opioid use following surgery has been previously shown to be the most reliable predictor of ongoing analgesic requirements and post-discharge opioid use.
- Different time frames preceding discharge could yield different information regarding analgesic requirements.
- While longer time frames before discharge could yield more comprehensive information, they are more likely to include the immediate post-operative period during which analgesic requirements could be lower (e.g., from residual local anesthetic effect) or higher (e.g., from the more recent response to tissue damage). Conversely, shorter (<24h) time frames closer to discharge may be unevenly impacted by diurnal/nocturnal variations in activity.
- We attempted to elucidate the best pre-discharge time frame for predicting opioid use following surgery by assessing the correlations of five pre-discharge time frames to post-discharge opioid use.
- We hypothesized that the 24h time frame would yield the best correlation.

Methods

- We conducted a secondary analysis of outcomes reported in three prospective cohort studies in 604 adult patients undergoing surgery (Abrams et al., Carrico et al., Bartels et al.).
- These patients were followed with four weekly surveys that yielded >80% response rates.
- Pre-discharge opioid use during five pre-discharge time frames was assessed by individual chart review of the electronic medication administration records, and these quantities were converted to oral milligram morphine equivalents.
- Data for patients with hospital stays less than 48 hours and for those who failed to respond to at least one survey were excluded.
- Spearman rank coefficients were calculated to assess correlations between the pre-discharge time frames and post-discharge opioid use.
- We assessed normalcy by visual assessment of the data and by Kolmogorov-Smirnov statistical testing.

Results

Table 1. Patient Characteristics n = 604

Characteristic	Median (IQR)
Age, years	43.0 (32.0-62.75)
BMI	28.4 (23.7-33.6)
	No. (%)
Surgery Type	
GI	201 (33.3)
C-Section	203 (33.6)
Thoracic	200 (33.1)
Sex	
Male	157 (26)
Female	447 (74)
Insurance Status	
Medicare	115 (19.0)
Medicaid	111 (18.0)
Commercial	347 (57.5)
Tricare or Other	31 (5.1)
ASA Status	
1	7 (1.2)
2	312 (51.7)
3	270 (44.7)
4	15 (2.5)
Ethnicity	
Hispanic or Latino(a)	74 (12.3)
Not Hispanic or Latino(a)	529 (87.6)
Prefer not to answer	1 (0.2)
Race	
American Indian or Alaska Native	3 (0.5)
Asian	17 (2.8)
Black or African American	25 (4.1)
Native Hawaiian or Other Pacific Islander	3 (0.5)
White	494 (81.8)
More than one race	26 (4.3)
Other	30 (5.0)
Unknown	5 (0.8)
Prefer not to answer	1 (0.2)

Table 2. Outcomes Reported in Oral Milligram Morphine Equivalents (MME)

Outcomes	Median (IQR)
Opioids prescribed at discharge	225 (210-450)
Total opioids taken	
48h pre-discharge	92.0 (39.3-158.8)
24h pre-discharge	37.5 (7.5-75.0)
18h pre-discharge	29.0 (4.0-47.1)
12h pre-discharge	15.0 (0.0-30.0)
6h pre-discharge	7.5 (0.0-15.0)
4 weeks post-discharge	90 (7.5-217.5)

Table 3. Correlations of opioid intake during different pre-discharge time frames with 4-week post-discharge opioid use in surgical patients

Pre-discharge time frame	Spearman's rho	P-value
48h	0.56	< 0.001
24h	0.60	< 0.001
18h	0.58	< 0.001
12h	0.56	< 0.001
6h	0.50	< 0.001

Conclusions

- We found that the 24h pre-discharge time frame showed the strongest correlation ($\rho=0.60$) to post-discharge opioid use.
- We assume that the relative strength of this correlation could be due to the 24h time frame's unique combination of sufficient temporal distance from the time of surgery together with its immunity to diurnal/nocturnal variations in activity.
- While this confirms our hypothesis, uncertainty remains about the interpretation of this Spearman correlation.
- Most sources interpret a Spearman coefficient of 0.6 to be "moderate," although this interpretation may be considered arbitrary since the context of the correlation within the range of other assessed correlations may be more relevant to interpreting its individual strength.
- Since the range of Spearman coefficients resulting from this investigation is small (0.10), we hesitate to place much significance on the absolute strength of any of them using this analysis alone.
- However, consistent with our findings, guidelines for post-discharge opioid prescriptions following inpatient surgery recommend a tiered approach toward determining the total quantity of opioids to be prescribed.
- The feasibility and effectiveness of using 24h pre-discharge opioid intake to appropriately inform post-discharge analgesic prescriptions deserves further study.

Disclosures

This work was supported by the National Institutes of Health (NIH), Award Number K23DA040923, to Karsten Bartels. The content of this report is solely the responsibility of the authors and does not necessarily represent the official views of the NIH. The NIH had no involvement in study design, collection, analysis, interpretation of data, writing of the report, or the decision to submit the article for publication.