Oral Versus Intravenous Opioid Administration for Pain: Effect on Clinical Outcomes Following an Intravenous National Shortage

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Abstract

INTRODUCTION: This is a retrospective analysis comparing administration methods of hydromorphone and morphine before and after a national intravenous (IV) opioid shortage. A protocol was implemented at our institution to allow pharmacists to automatically convert IV morphine and hydromorphone to an equianalgesic oral dose.

METHODS: The primary endpoints assessed were median IV and oral opioids administered (as expressed in morphine milligram equivalents) and median pain scores. Secondary endpoints assessed were use of adjunct analgesic medications for pain, adverse effects, use of naloxone, and cost-savings.

RESULTS: Two hundred eight patients were considered in the analysis of clinical outcomes (105 in the pre-protocol group and 103 in the post-protocol group). There was a statistically significant difference between the median IV morphine milligram equivalent [0 (IQR 0-4) vs. 0 (IQR 0-0); p = 0.03] and oral morphine milligram equivalent [97.5 (IQR 40-167.5) vs. 142.5 (IQR 61.5-217.5); p = 0.01] opioids administered between the pre-protocol and post-protocol groups, respectively. There was no statistically significant difference between the pre-protocol and post-protocol groups in regards to median pain scores (median score 3 vs. 3, p = 0.77). Of note, while there were no differences in adverse effects or the use of naloxone among each group, there was a statistically significant difference in the percentage of adjunct NSAID therapy (75.2% vs. 56.3%, p = 0.005) in the pre-protocol and post-protocol groups, respectively.

CONCLUSION: Based on this retrospective analysis, transitioning from intravenous administration of hydromorphone and morphine to oral administration had no deleterious effects on clinical outcomes.

Objective

To evaluate the efficacy and safety of a pharmacist-driven protocol aimed at reducing intravenous administration of hydromorphone and morphine

Methods

- Retrospective chart review
- Pre-protocol group:
  - October 1 – December 31, 2017
- Post-protocol group:
  - March 1 – May 31, 2018

Inclusion Criteria

- ≥ 18 years of age
- Elective orthopedic surgery
- IV hydromorphone or morphine ordered for post-operative pain

Exclusion Criteria

- Nothing by mouth (NPO) orders
- Inability to receive enteral narcotics
- Patient-controlled analgesia (PCA) orders

Outcomes

- Primary:
  - Median IV and oral opioids administered (expressed in morphine milligram equivalents or MME)
  - Median pain scores
- Secondary:
  - Use of adjunct analgesic agents
  - Adverse effects
  - Use of naloxone
  - Cost-savings

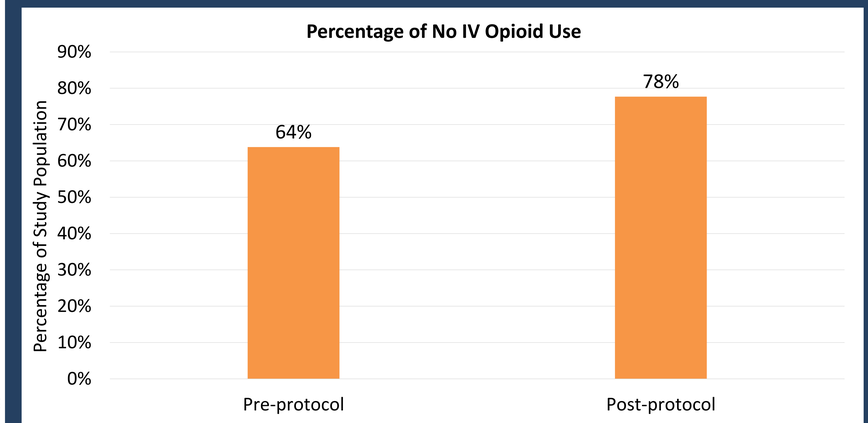
Statistical analyses

- Categorical data: χ^2 or Fisher's exact test
- Continuous data: Mann-Whitney U test
- GraphPad QuickCalcs (GraphPad Software, Inc. La Jolla, CA)

Results

Primary Outcomes

	Pre-protocol (n=105)	Post-protocol (n=103)	P-value
IV Opioid MME, (Mdn, IQR)	0 (0, 4)	0 (0, 0)	0.03
PO Opioid MME, (Mdn, IQR)	97.5 (40, 167.5)	142.5 (61.5, 217.5)	0.01
Median pain score, (Mdn, IQR)	3 (2, 5)	3 (2, 5)	0.77



Secondary Outcomes

Adjunct Analgesic Utilization	Pre-protocol (n=105)	Post-protocol (n=103)	P-value
Acetaminophen, n (%)	51 (48.6)	56 (54.3)	0.41
NSAID, n (%)	79 (75.2)	58 (56.3)	0.005
Gabapentinoid, n (%)	77 (73.3)	64 (62.1)	0.10
Muscle Relaxer, n (%)	24 (22.9)	25 (24.3)	0.87

Adverse Effects	Pre-protocol (n=105)	Post-protocol (n=103)	P-value
Laxative/Stool Softener Use, n (%)	96 (91.4)	90 (87.3)	0.38
Antiemetic Use, n (%)	40 (38.1)	50 (48.5)	0.16
Antihistamine Use, n (%)	7 (6.6)	10 (9.7)	0.46
Naloxone Use, n (%)	0 (0)	1 (0.97)	0.50

Study Limitations

- Retrospective chart review
- Single-center study
- Small sample size
- Limited to orthopedic population
- Inconsistency of pain score documentation by nursing

Conclusions

- Implementation of this pharmacist-driven protocol had no detrimental effect on pain management for post-operative orthopedic patients
- Substituting equianalgesic oral opioid therapy appears to be a viable alternative in the presence of an IV opioid shortage
- There was a modest cost reduction of 14.5% in the post-protocol group compared to the pre-protocol group

References

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