

Optimizing Ketorolac Utilization in Anesthesia Practice: Implementing the Analgesic Ceiling Dose

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Abstract

Effective pain management is crucial in healthcare, and intravenous ketorolac is commonly used to achieve analgesia. Though multiple studies have shown the analgesic ceiling dose of ketorolac to be 10 mg IV, greater doses are often administered in clinical practice. This quality improvement project aimed to educate Certified Registered Nurse Anesthetists on the analgesic ceiling effect of ketorolac IV. Pre-intervention and post-intervention data (ketorolac administration) were collected over 30-day period. A one-week educational intervention was implemented between these two periods. There was a significant increase in the use of the 10 mg post-intervention and a corresponding decrease in the use of the 30 mg post-intervention. The most significant change was the increase in 10 mg doses, suggesting that the educational intervention effectively influenced ketorolac administration practices. The educational intervention effectively influenced nurse anesthetists' dosing practices.

Introduction

Effective pain management remains a continuous challenge in healthcare. Ketorolac, a nonsteroidal anti-inflammatory drug (NSAID), exhibits potential as an analgesic adjunct for mild to moderate pain.

Traditionally valued for its anti-inflammatory properties, ketorolac inhibits prostaglandin synthesis and directly targets pain pathways. One study showed that ketorolac has an analgesic ceiling dose of 10 mg intravenously (IV) and that increasing the dose fails to provide an added analgesic response (Motov et al., 2017). Despite this evidence, clinical practice often sees administration exceeding this analgesic ceiling dose.

This clinical practice improvement project aims to educate Certified Registered Nurse Anesthesiologists (CRNAs) on the analgesic ceiling effect of ketorolac, with the goal of reducing administered doses to 10 mg IV. The initial impetus for this project emerged from discussions with an upperclassman who recognized its potential impact at a Florida Panhandle Hospital. Subsequent clinical rotations revealed routine administration of ketorolac 30-mg IV, exceeding the analgesic ceiling threefold.

Clinical Practice Question

This project is guided by the following PICO question: Do CRNAs (P) who receive educational material on the analgesic ceiling effect of ketorolac (I) that use more than 10 mg of Ketorolac intravenously (C) reduce their dose to 10 mg (O)?

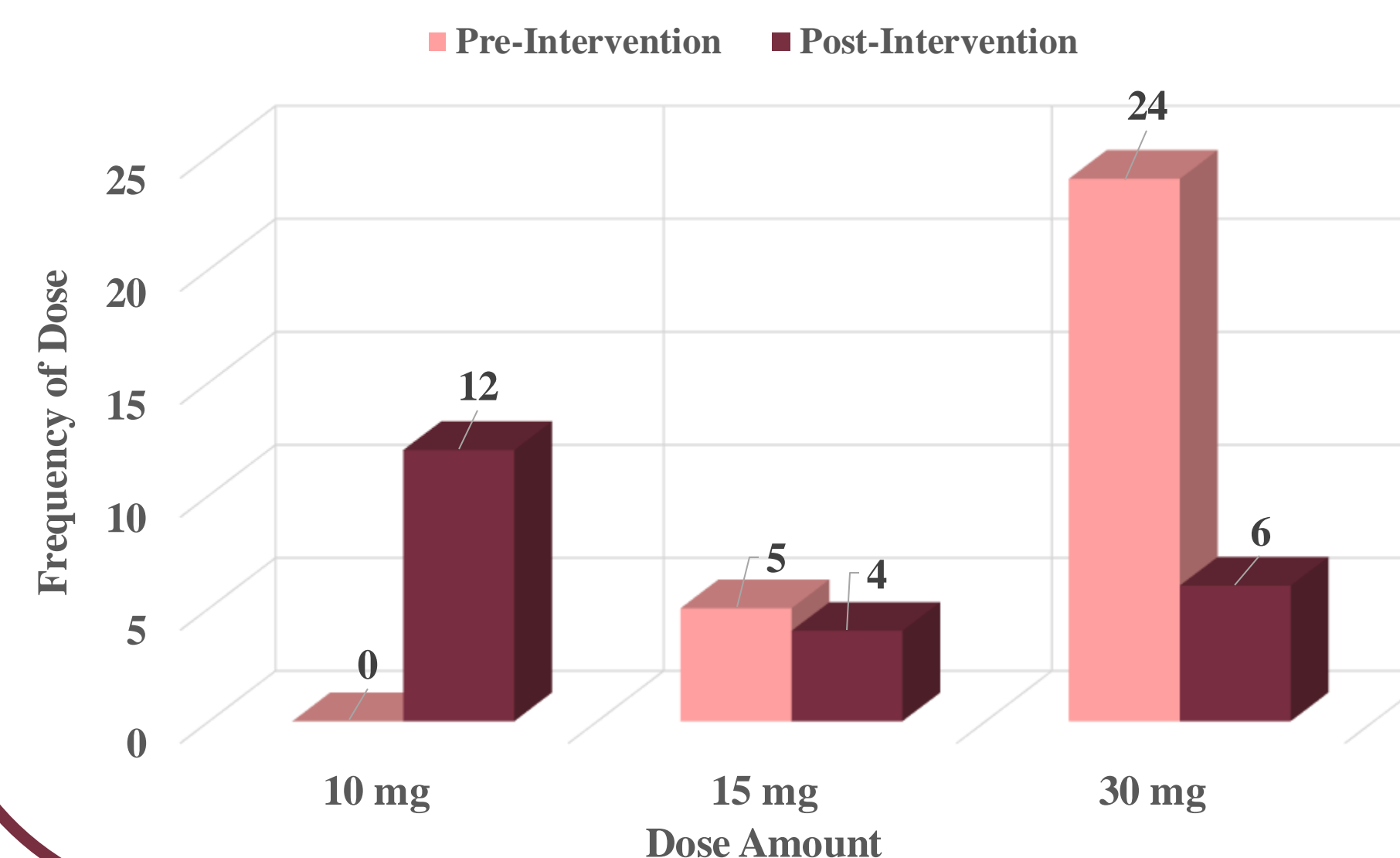
Methods

- The CRNAs at the facility were provided with an educational flyer offering a comprehensive exploration of the analgesic ceiling effect of ketorolac.
- To ensure the intervention reached all staffed CRNAs, copies of the educational flyer were affixed to each operating room medication cart.
- The facility pharmacists assisted in collecting data by accessing the EMRs of OR patients that received ketorolac.
- Initial and post-intervention data were collected over 30-day periods, spanning August 9, 2024, to September 9, 2024, and September 16, 2024, to October 14, 2024, respectively. A one-week educational intervention was implemented between these two periods.

Results

- Pre-intervention, a total of twenty-nine ketorolac doses were administered, with a distribution of five doses at 15 mg, twenty-four doses at 30 mg, and no doses at 10 mg .
- Post-intervention, a total of twenty-two doses were administered, demonstrating a shift in dosing practices: Twelve doses at 10 mg, four doses at 15 mg, and six doses at 30 mg.
- There was a significant increase in the use of the 10 mg post-intervention (from 0.00% to 54.55%), and a corresponding decrease in the use of the 30 mg post-intervention (from 82.76% to 27.27%). The use of the 15 mg dose remained relatively stable.

Ketorolac Dosing



Discussion

Implementing an educational flyer highlighting ketorolac 10 mg IV ceiling dose as an analgesic regimen within our clinical practice demonstrated a significant change in dosing practices post-intervention. The pre-intervention mean was ketorolac 27.4 mg IV administration while the post-intervention mean was 16.4 mg IV administration. That represents a 40% reduction in dosage among CRNA providers following the intervention. The educational intervention, centered on the pharmacological principles, and evidence-based guidelines supporting the analgesic ceiling dose, successfully influenced CRNAs to adopt the new, reduced-dosing strategy. The observed increase in the utilization of the 10 mg dose and the corresponding decrease in the 30 mg dose highlight the effectiveness of the educational approach. By emphasizing the analgesic ceiling effect, CRNAs made evidence-based decisions regarding ketorolac dosing, prioritizing patient safety, and optimizing analgesic efficacy. The educational strategy employed in this study, utilizing the distribution of educational flyers, proved to be a practical and effective method for disseminating information to a diverse group of healthcare providers. The use of flyers as the primary educational tool was particularly beneficial for part-time and as-needed CRNAs, ensuring consistent access to the information.

Conclusion

- Implementation of ketorolac 10 mg IV ceiling dose, coupled with targeted education, represents a significant step towards optimizing analgesic care and enhancing patient safety.
- 40% dosage reduction among anesthesia providers proves a successful intervention.

References

