

Ketamine for Intraoperative Analgesia in Laparoscopic Cholecystectomies

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Introduction

In anesthesia practice, opioids are routinely administered during the perioperative phase for pain relief and sedation. While historically a conventional approach, opioid use is associated with well-documented side effects, including respiratory depression, nausea, vomiting, addiction, and delirium, which can complicate postoperative recovery (Bohringer et al., 2020; Ferry et al., 2023). In 2021, 75.4% of all drug overdose deaths were opioid-related, highlighting the need for opioid-sparing alternatives in medical settings (CDC, 2023). This doctoral quality improvement project aimed to promote ketamine utilization as an adjunct analgesic in laparoscopic cholecystectomies to reduce postoperative opioid requirements at a medical facility on the Florida Gulf Coast. While opioid-sparing strategies are already in use, nurse anesthetists often have differing views on ketamine. As an N-methyl-D-aspartate (NMDA) receptor antagonist, **ketamine has demonstrated efficacy in reducing postoperative pain and opioid consumption, particularly in high-pain surgeries like laparoscopic cholecystectomies** (Le Cornec et al., 2024; Morgan & Kittner, 2023).

To support this initiative, a literature review was conducted to evaluate ketamine's efficacy. Findings were of high quality evidence. Nurse anesthetists' baseline ketamine administration was assessed via a preliminary survey, followed by targeted education on ketamine's analgesic benefits. A post-implementation survey then measured CRNAs' likelihood of incorporating ketamine into practice.

This project was guided by the PICO question: **In adult patients undergoing laparoscopic cholecystectomy (P), does intraoperative ketamine (I) versus no ketamine (C) reduce postoperative opioid consumption (O)?** The findings aim to provide evidence-based insights to improve anesthesia practice.

Methods

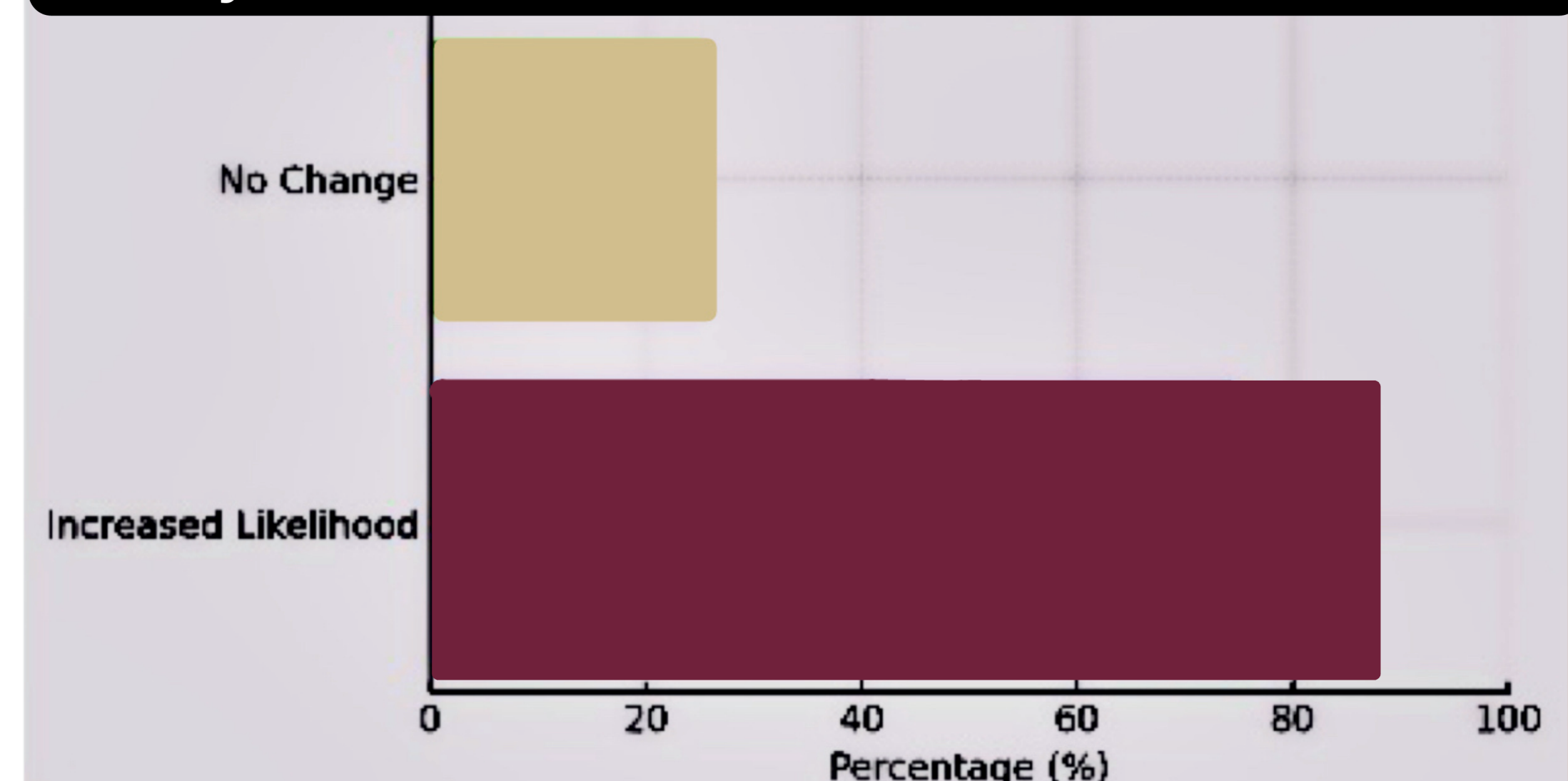
A **survey** was administered to Certified Registered Nurse Anesthetists (CRNAs) at a designated hospital to assess baseline ketamine usage. Following the survey, **an educational intervention was conducted, presenting a synthesis of high-level evidence on ketamine's benefits.** A post-intervention survey was then distributed to evaluate changes in CRNAs' likelihood of incorporating ketamine into their practice.

Educational Intervention

“Several studies support the use of intravenous ketamine for perioperative and postoperative pain management during laparoscopic cholecystectomies. A meta-analysis by Brinck et al. (2018) demonstrated that perioperative ketamine significantly reduced opioid consumption and pain over a 48-hour period. Singh et al. (2013) found that preemptive ketamine resulted in lower pain scores and delayed the need for postoperative analgesics without significant side effects at lower doses. Similarly, Toleska et al. (2022) and Zhu et al. (2018) concluded that ketamine reduces opioid consumption and improves pain control. While concerns like postoperative nausea, vomiting, and emergence delirium exist, studies show these risks can be mitigated with appropriate dosing (1 mg/kg) and the use of antiemetics. These findings support ketamine as a safe and effective adjunct in multimodal analgesia, promoting better outcomes and reduced opioid use.”

Results

Surveyed CRNA's Likelihood to Administer Ketamine



87.5% of respondents indicated an increased likelihood of incorporating ketamine as an analgesic adjunct in laparoscopic cholecystectomies after reviewing the synthesis of evidence.

The survey revealed that primary concerns with Ketamine noted by CRNAs was the risk of postoperative delirium or confusion. Interestingly... The receptor that Ketamine blocks is **NMDA receptors!** Postoperative delirium occurs when NMDA receptors are disrupted and become overactive by stress and inflammation induced by surgery. NMDA receptors normally regulate memory and awareness. Contrary to the nurse anesthetists' concerns of causing postoperative delirium, **Ketamine helps prevent postoperative delirium** by slowing the overactivity of those receptors and reduces neuro-inflammation (Abola et al., 2017).

Discussion

This project's goal was to explore and promote ketamine utilization as an adjunct analgesic in laparoscopic cholecystectomies while reducing postoperative opioid requirements. The results of this project were overwhelmingly positive and clinically significant. Ketamine effectively reduces postoperative opioid consumption and improves analgesia in a multimodal approach. Previous barriers to its use included concerns about delirium, PONV, and limited accessibility due to hospital dispensing policies. These concerns were met with evidence-based education that significantly increased CRNAs' willingness to incorporate ketamine into practice. Standardized dosing guidelines and streamlined medication access could further facilitate ketamine's integration into clinical practice. Increasing ketamine use as a multimodal analgesic for laparoscopic cholecystectomies benefits both patients and providers by:

Reducing hospital length of stay
Decreasing opioid use during recovery
Enhancing patient satisfaction
Addressing the opioid crisis
Promoting evidence-based practice
Removing barriers to implementation

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