Increasing Dexmedetomidine Usage For Adequate Pain Control in Laparoscopic Surgeries

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Abstract

Dexmedetomidine has emerged as a valuable adjunct in anesthetic management for laparoscopic abdominal surgery. Research was conducted and published in the early 2000s, with a subsequent increase in clinical application in 2010. The goal of this project was to educate Certified Registered Nurse Anesthesiologists (CRNAs) on the drug's advantageous pharmacologic profile, appropriate dosing regimen, and the clinical situations in which dexmedetomidine should be used, thereby leading to its utilization in subsequent cases.

Pre- and post-intervention data were collected over 2 weeks each. Between data collection weeks, an educational intervention was completed. Most significantly, our survey showed a 31% increase in providers reporting no concerns about using dexmedetomidine in future laparoscopic cases. However, our research also revealed a barrier that hindered the medication's use in the operating room.

Introduction

For this doctoral project, the group aims to evaluate the impact of educating anesthesia providers on the optimal use of dexmedetomidine—specifically, how to achieve adequate analgesia and smooth emergence from anesthesia without causing excessive hypotension or prolonged sedation. The focus is on laparoscopic abdominal surgery for two main reasons. First, insufflation of the abdomen with carbon dioxide (CO_2) increases intra-abdominal pressure and often triggers hypertension and tachycardia due to sympathetic stimulation. As a sympatholytic, dexmedetomidine can help mitigate this response, stabilizing the patient's hemodynamic status (Janardhana & Thimmaiah, 2019). Second, postoperative pain is expected with any surgery, and opioids remain the most common treatment. However, opioids have significant side effects, including nausea, vomiting, constipation, respiratory depression, dizziness, and prolonged drowsiness. These side effects can be worsened by general anesthesia and laparoscopic surgery, further increasing patient discomfort.

The project will take place at a community hospital in the Florida Panhandle, where many anesthesia providers currently manage sympathetic stimulation and pain with opioids or beta blockers. Through discussions with these providers, we found that concerns about dexmedetomidine-induced hypotension were the main reason for its underuse. Recognizing this gap, we designed our project to educate providers on proper dexmedetomidine dosing—specifically, how to titrate the drug effectively to achieve adequate sedation and analgesia while minimizing the risk of sudden hypotension and extended emergence..

Clinical Practice Question

The following PICO question guided this project:
Do patients undergoing laparoscopic abdominal surgery (P) who receive dexmedetomidine perioperatively (I), compared to those who do not (C), report lower pain scores postoperatively(O)?

Methods

- A pre-education survey was distributed in each operating room and the CRNA break room, available for two weeks.
- After providing ample opportunities for community involvement in the survey, an educational pamphlet was distributed in the same areas. This pamphlet provided information on the recommended mechanism of action, dosing, and benefits of dexmedetomidine, including reduced postoperative nausea and vomiting, decreased use of volatile anesthetics, and shortened recovery time in the Post-Anesthesia Care Unit (PACU).
- A post-education survey was distributed in the same common areas for two weeks to assess our progress.
- The survey also included participants' ages and lengths of practice.

Results

- 13 of 20 CRNAs participated in our survey.
- In the pre-education survey, 54% chose that they rarely used dexmedetomidine. In contrast, 46% of participants reported no concerns about using the medication.
- In the post-education survey, no participants chose that they would rarely use dexmedetomidine, showing a significant improvement in medication utilization.

Discussion

The survey results demonstrate a clear and favorable shift in anesthesia providers' views toward the use of dexmedetomidine following the educational intervention. Before the study, dexmedetomidine was notably underutilized in laparoscopic cases, with more than half of participants (54%) reporting that they rarely used the drug and only 15% stating that they usually incorporated it into their anesthetic plan. Although most respondents expressed minimal concern about the drug initially, uncertainty surrounding hemodynamic effects, sedation, and inconsistent medication availability still contributed to low usage.

After the educational flyers highlighting the drug's benefits were introduced, providers reported a substantial change in their willingness to use dexmedetomidine. Post-education, 15% of participants stated they would "always" use it, and 30% indicated they would "usually" use it, reflecting a meaningful increase in acceptance and planned clinical use compared with pre-intervention patterns. Additionally, the percentage of CRNAs reporting plans to use dexmedetomidine in the future suggests that the educational materials effectively addressed misconceptions and knowledge gaps. Although some providers have concerns about drug availability, sedation, and cardiovascular effects, the overall findings show a strong trend toward greater comfort, confidence, and likelihood of dexmedetomidine use after the study, indicating that targeted education can significantly influence provider practice patterns in favor of this beneficial adjunct.

Conclusions

- Results showed an increase in the use of dexmedetomidine post-intervention.
- Barriers were still shown to exist, inhibiting dexmedetomidine use.

References