THE UNIVERSITY OF ARIZONA College of Nursing

Optimizing Analgesia: Opioid-Sparing Alternatives for Obstructive Sleep Apnea

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Abstract

- This quality improvement project assessed the impact of an educational intervention on anesthesia providers' perceptions, confidence, and intent to use four non-opioid intravenous analgesic agents — dexmedetomidine, ketamine, lidocaine, and magnesium—for opioid-sparing analgesia in OSA patients.

Purpose

- The purpose of this project was to enhance anesthesia providers' understanding of opioid-sparing intravenous analgesic agents and their role in improving perioperative outcomes in patients with obstructive sleep apnea (OSA). ,

Background/Significance

- **OSA is a growing concern in surgical patients**, with **over 1 billion people affected worldwide**, increasing perioperative risks (Cozowicz & Memtsoudis, 2021).
- **Opioids exacerbate OSA-related respiratory risks**, contributing to upper airway obstruction, ventilatory instability, and postoperative complications, and respiratory complications account for **92,000 additional ICU admissions** and **$3.42 billion** annually in healthcare costs.(Freire et al., 2022).
- **OSA patients face higher perioperative risks,** including respiratory depression, hypoxia, and increased ICU admissions, especially with opioid use (Gupta et al., 2018).
- **ASA guidelines recommend minimizing opioid use in OSA** patients due to increased rates of respiratory depression and critical adverse events (ASA, 2014).
- Despite the emphasis on opioid-reduction in OSA patients, **there is a gap in recommendations for specific agents** to utilize.
- **Dexmedetomidine, ketamine, lidocaine, and magnesium** have well-documented opioid-sparing effects, demonstrating reduced opioid consumption across various surgical populations (Wang et al., 2018).

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References

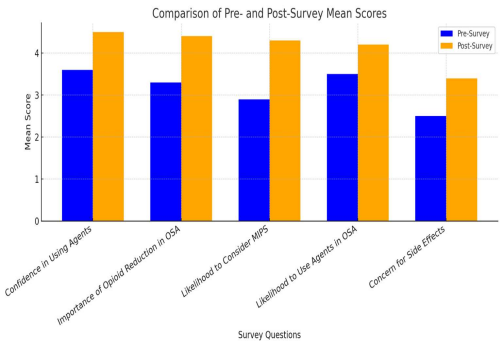
Methods

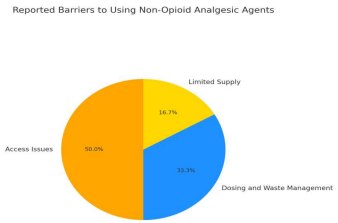
- ***QI Project Design & Intervention:*** The QI project employed a pre-test and post-test methodology to evaluate the impact of a virtual educational session.
- ***Presentation:*** A 20 minute pre-recorded video was distributed to the participants via email.
- ***Participant Involvement:*** 10 anesthesia providers participated in the project: CRNAs and 3 Anesthesiologists.

Agent	Dosage	Action	Administered	Side Effects
Dexmedetomidine	Bolus: Up to 0.5 mcg/kg Infusion: 0.3-0.8 mcg/kg/hr	α_2-adrenergic receptor agonist. Reduces norepinephrine release.	Administered intraoperatively as a bolus or infusion.	Hypotension, bradycardia, dry mouth, sedation, nausea.
Ketamine	Bolus: 0.5 mg/kg Infusion: 0.1-0.5 mg/kg/hr	NMDA receptor antagonist. Prevents central sensitization, reducing pain transmission.	Administered intraoperatively as a bolus followed by continuous infusion.	Hallucinations, increased intracranial pressure, hypertension, dysphoria.
Magnesium	Bolus: 30-50 mg/kg Infusion: 10-15 mg/kg/hr	NMDA receptor antagonist. Prevents central sensitization in the spinal cord.	Administered intraoperatively as a bolus followed by continuous infusion.	Hypotension, flushing, nausea, vomiting, respiratory depression.
Lidocaine	Bolus: 1-1.5 mg/kg Infusion: 1-2 mg/kg/hr	Sodium channel blocker. Inhibits neuronal signal conduction.	Administered intraoperatively as a bolus followed by continuous infusion.	Hypotension, bradycardia, dizziness, seizures (at toxic doses).

- Opioid-Sparing Intravenous Agents

Results





Discussion

- **Wilcoxon Signed-Rank Tests:** showed statistically significant improvements ($p < 0.05$) in 6 out of 7 survey items, including confidence in using opioid-sparing agents and the perceived importance of minimizing opioid use in OSA patients.
- The analysis identified logistical barriers, such as limited access to agents in the operating room and impractical dosages.

Conclusion

- **Increased Confidence and Perceived Importance:** The educational intervention improved anesthesia providers' confidence in using opioid-sparing agents, as well as increased the perceived importance of minimizing opioid use in OSA.
- **Intent to Modify Practice**: Participants demonstrated a greater intent to incorporate non-opioid intravenous agents into their anesthesia plans for OSA.
- **Study Limitations**: Lower-than-expected participation limited the sample size, which may affect the generalizability of findings. Additionally, logistical barriers, such as agent availability and dosing concerns, remained a consideration for implementation.

Table 1: Wilcoxon Signed-Rank Test Results

Question	Test Statistic (W)	Standardized Test Statistic (Z)	Effect Size (R)	P-value
Q1: Confidence in opioid-sparing agents	28	2.46	0.78	0.014
Q2: Importance of opioid reduction in OSA	36	2.60	0.82	0.009
Q3: Likelihood to consider MIPS metrics	36	2.56	0.81	0.011
Q4: Understanding benefits of non-opioid agents	32	2.11	0.67	0.035
Q5: Likelihood to use agents in OSA	21	2.33	0.74	0.02
Q6: Concern for side effects with agents	7	1.93	0.61	0.54
Q7: Barriers to using agents	36	2.54	0.81	0.011