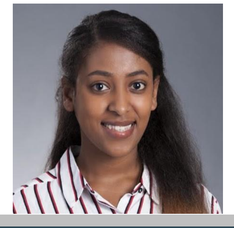
PONV: An update on the management of postoperative nausea and vomiting

Milka Woldu, DDS; Nina Ray, DDS; Marvellous Akinlotan, PhD; Dan Burch, DDS

Texas A&M University School of Dentistry, Dallas, TX; Children's Medical Center- Dallas, TX



AIM

The authors aimed to examine which drugs demonstrate the highest efficacy in treating postoperative nausea and vomiting (PONV) across various all surgical procedures to provide better armamentarium to clinicians across the nation working with children and teenagers under surgical conditions. .

INTRODUCTION

Postoperative nausea and vomiting (PONV) is a common and distressing complication of surgery, affecting up to 80% of patients. It poses significant clinical concerns due to its association with patient discomfort, prolonged hospitalization, increased healthcare costs, and heightened risk of postoperative complications. PONV is particularly problematic for certain groups, including females, those with a history of PONV or motion sickness, non-smokers, and those receiving postoperative opioids[1]. Effective prevention and treatment of PONV are crucial to improve patient outcomes and reduce complications. Various antiemetic medications are used for prophylaxis, but determining the most effective ones with minimal side effects remains a challenge[2]. Efforts to address PONV risk include the Apfel risk scoring system, which identifies key risk factors. This review aims to evaluate the efficacy and safety of antiemetics in preventing PONV to inform clinical decision-making and enhance perioperative care.

METHODS AND MATERIALS

This paper reviewed current PONV literature from 2012 to 2024.

An electronic clinical trial literature search was conducted on MEDLINE/PubMed database. MeSH terms searched: "PONV", "Palonosetron", and "Dexamethasone."

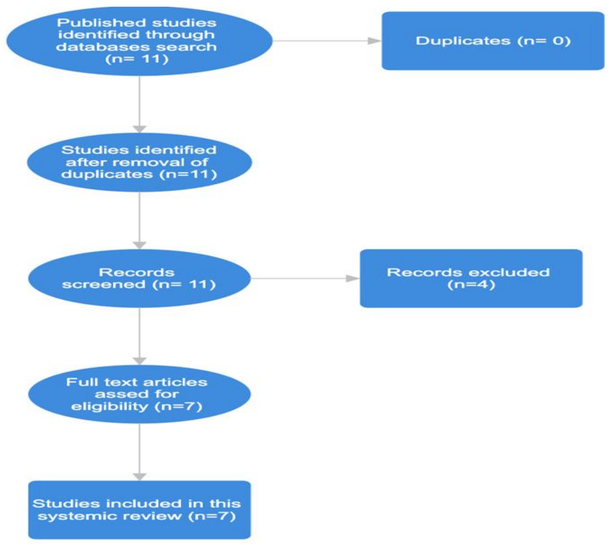
Inclusion criteria: Human subjects, clinical trial, articles written in english, PONV

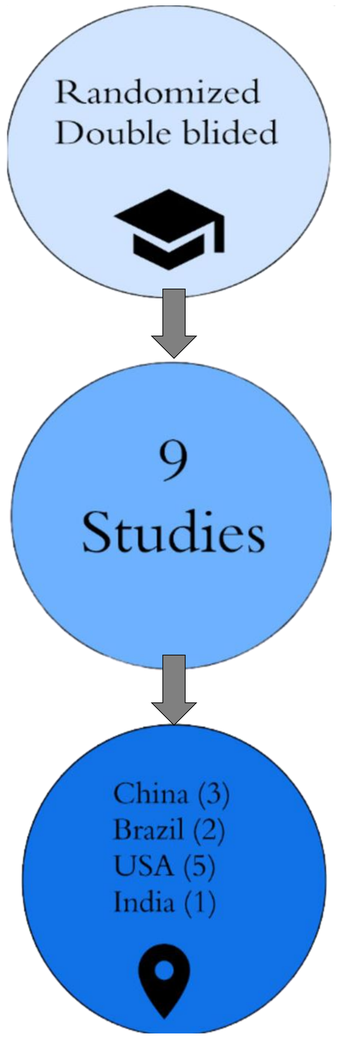
Exclusion criteria: non-human subjects, oral sedation, ASA V and above.

REFERENCES

RESULTS

- 8 studies used dexamethasone, either in combo with another drug or alone
- 8 studies used palonosetron, either in combo with another drug or alone
- 1 study used fosaprepitant in combination with palonosetron
- 2 studies used ondansetron in combination with dexamethasone or palonosetron
- 1 study used a combination of three drugs (aprepitant, dexamethasone and palonosetron)
- In all the studies, patients showed equal reduction in nausea and vomiting for up to 24 hours after surgery for both dexamethasone and 5-HT receptor antagonist.





DISCUSSION

9 articles and 1,154 met inclusion criteria. Patients showed equal reduction in nausea and vomiting for up to 24 hours after surgery for both dexamethasone and 5-HT receptors. Palonosetron, utilized in 9 of the studies either in combination or alone, distinguishes itself as a second-generation serotonergic 5HT3 receptor antagonist. Unlike its counterparts, palonosetron boasts a unique molecular structure and demonstrates distinct clinical and pharmacological characteristics. While serotonin (5HT3) plays a pivotal role as a central and peripheral neurotransmitter in the perception of nausea and vomiting, palonosetron mechanism of action differs. Rather than directly competing with serotonin, palonosetron exerts an indirect effect through allosteric inhibition of the 5HT3 receptor. This action leads to the inhibition of substance P release from specific sensory nerves and inflammatory cells, thereby blocking the activation of Neurokinin-1 (NK-1R) receptors and ultimately fostering an antiemetic effect. This unique mode of action accounts for palonosetron's heightened affinity for the receptor and its prolonged half-life compared to other drugs in its class.

Significant gaps persist in the research concerning effective medications for preventing or reducing postoperative nausea and vomiting (PONV) in pediatric patients undergoing dental rehabilitation following general anesthesia. Despite the recognized importance of managing PONV in this population, limited attention has been given to exploring pharmaceutical interventions tailored specifically to children. Moreover, existing studies predominantly focus on adult populations, overlooking the unique considerations and responses to treatment that children may exhibit.

CONCLUSIONS

More evidence is needed on effective medications that reduce PONV among children who undergo dental rehabilitation, and dental surgeries in general. In all the studies, patients showed equal reduction in nausea and vomiting for up to 24 hours after surgery for both dexamethasone and 5-HT receptors. Palonosetron had a longer duration of action and its effects lasted >24.

ACKNOWLEDGEMENTS

This program is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) as part of an award totaling $3,350,000 (D88HP28504-06-00). The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by HRSA, HHS, or the U.S. Government. For more information, please visit HRSA.gov