Comparison of Dexmedetomidine and Midazolam for Sedation in Pediatric Patients

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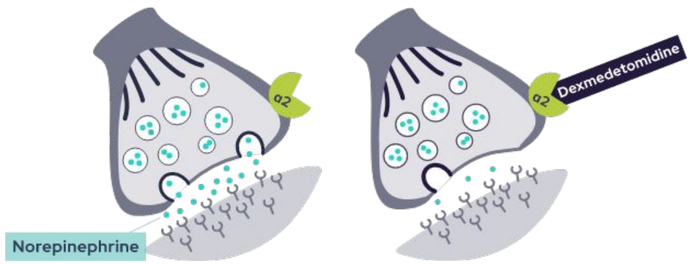
Intro and Background

- Dexmedetomidine, a powerful alpha-2 agonist, is utilized for sedation in pediatric patients undergoing diverse surgical procedures. It has the potential to mitigate delirium and facilitate the transition between states of sedation and wakefulness.
- Midazolam is a benzodiazepine also indicated for sedation in pediatric patients undergoing surgical procedures, mainly due to its safety profile.
- The purpose of this review is to compare the use of dexmedetomidine and midazolam for sedation in pediatric patients.



Mechanism of action of dexmedetomidine

Key Findings

Dexmedetomidine has potential advantages over midazolam in tonsillectomy and dentistry procedures, hernia repair surgery, laceration repair, strabismus surgery, and reconstructive surgery. This includes the reduced risk of perioperative respiratory adverse events (PRAEs) and lower postoperative delirium.

Both agents have similar effects on parental separation anxiety and mask acceptance.

Methods

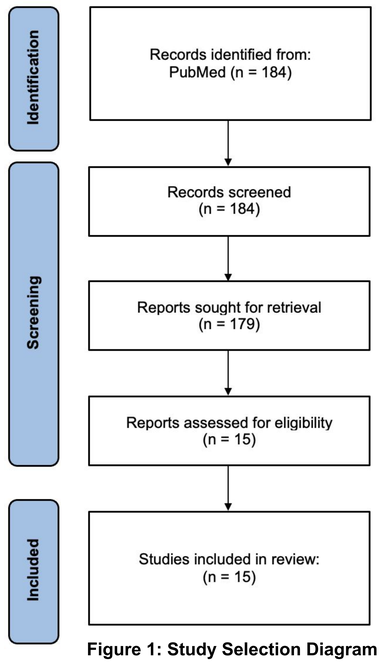


Figure 1: Study Selection Diagram

PubMed Search Parameters

- "Midazolam use for sedation"
- "Dexmedetomidine and midazolam"
- "Dexmedetomidine use for sedation"

Inclusion criteria

- Pediatric populations
- Randomized control trials
- Articles published between 2004 and 2024

15 articles met inclusion criteria and were utilized for interpretation.

Synthesis

Dexmedetomidine		Midazolam	
Pros	**Cons**	**Pros**	**Cons**
• Premedication with dexmedetomidine is correlated with a decreased occurrence of perioperative respiratory adverse events (PRAEs) • Post-operatively, demonstrates statistically significant superior analgesic efficacy • Children given preoperative dexmedetomidine have significantly lower anxiety in the postoperative period	• May cause bradycardia or hypotension in some patients, especially if administered rapidly by the intravenous route • Relatively prolonged onset of action, especially when administered intranasally	• Intranasal midazolam demonstrates superior effectiveness in terms of onset of action, sonographer ratings, and parental satisfaction scores during pediatric transthoracic echocardiography • More effective than parental presence or a placebo in alleviating anxiety and enhancing compliance during anesthesia induction	• Administration of intranasal midazolam for premedication is linked to a higher occurrence of PRAEs • Ineffective in preventing emergence delirium (ED) after sevoflurane anaesthesia for strabismus correction • Sensation of burning and nasal irritation with intranasal administration

Figure 2: Risk of Bias Summary

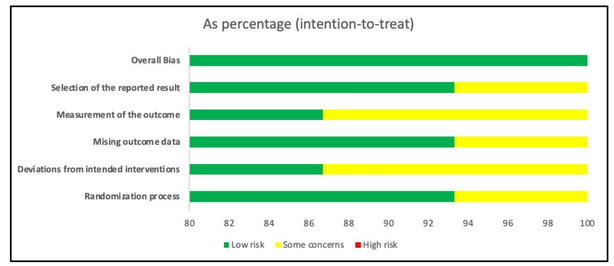


Figure 3: Risk of Bias Graph

Conclusions

- Despite the significant amount of research that has been conducted on the efficacy and safety of dexmedetomidine and midazolam sedatives for pediatric patients, only a limited number of studies have investigated their long-term impact on the cognitive functions of this patient population.
- The long-term impact of dexmedetomidine and midalozam on pediatric patients' cognitive functions is a critical area of research, as it has the potential to impact overall quality of life. Therefore, it is essential to conduct further studies to determine the long-term effects of these sedatives on pediatric patients' cognitive functions.

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