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A Comparison of Intranasal Dexmedetomidine and Oral Midazolam as Premedicants in the Pediatric Population

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Purpose: An estimated 50-75% of pediatric patients undergoing surgery experience anxiety. Anxiety is associated with distress upon emergence and postoperative behavioral problems. Premedication within this population serves many purposes including a reduction of anxiety, the facilitation of separation from parents, and promotes the acceptance of the anesthesia mask upon induction. Unfortunately, the ideal drug for premedication and the best route of administration have yet to be determined. Oral midazolam, a benzodiazepine has been the premedication of choice for healthy pediatric patients undergoing elective surgical procedures. Although oral midazolam has a rapid onset, its bitter taste results in only a 70% acceptability by children. Intranasal midazolam is also effective but has been known to produce nasal irritation. Although oral midazolam is the most commonly used premedicant in children, intranasal dexmedetomidine has shown promising results as an alternative and more effective premedicant. The purpose of this project is to answer the following clinical question: In pediatric patients undergoing general anesthesia, is premedication with intranasal dexmedetomidine compared to oral midazolam more effective in decreasing preoperative anxiety and facilitating parental separation?

Methods: A literature search was conducted using a systematic approach. The exclusion criteria included patients with an ASA score greater than II; pediatric patients presenting for non-elective, emergent, or diagnostic procedures; and the use of other pharmacological interventions to decrease anxiety, such as clonidine, ketamine, without the comparison of both intranasal dexmedetomidine and oral midazolam. The CINAHL, MEDLINE, and the Cochrane Library search generated 682 studies. Application of exclusion criteria yielded two systematic reviews, five randomized double-blinded controlled trials, and one randomized open-label clinical trial related to the use of intranasal dexmedetomidine and oral midazolam as premedicants in pediatric patients.

Results: All studies compared the use of oral midazolam to intranasal dexmedetomidine as a premedicant in healthy pediatric patients undergoing elective surgical procedures. The research strongly supports the use of dexmedetomidine as a premedicant in this population. Sedation scores were higher in the dexmedetomidine group in six out the eight studies. Five studies showed decreased anxiety upon parental separation in the dexmedetomidine group. Lower pain scores were noted in four of the eight studies in the dexmedetomidine group. Lower heart rate and mean arterial pressures were seen after the administration of dexmedetomidine, however, these changes were determined not to be hemodynamically significant.

Conclusion: Children premedicated with midazolam may retain an implicit but not explicit memory causing them to unconsciously remember potentially stressful events associated with the perioperative period without being able to pull them into conscious memory and make sense of them. Midazolam may also result in ineffective prevention of emergence agitation and delirium. Dexmedetomidine has shown promising results as an alternative for pediatric premedication producing sedation, anxiolysis, and analgesia without causing respiratory depression. Poor oral bioavailability makes intranasal administration preferable over oral administration. Intranasal dexmedetomidine produces satisfactory preoperative sedation levels, facilitates parental separation, and has better analgesic properties than oral midazolam. Dexmedetomidine does not produce paradoxical reactions, or postoperative behavioral changes.

Title:

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Keywords:

dexmedetomidine, midazolam and pediatric premedication

Abstract Summary:

Oral midazolam has been the premedication of choice for healthy pediatric patients undergoing elective surgical procedures. However, undesirable adverse effects include respiratory depression, paradoxical reactions, and postoperative behavioral changes. Intranasal dexmedetomidine produces satisfactory preoperative sedation levels, facilitates parental separation, and has better analgesic properties than oral midazolam without respiratory depression.

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