شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

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قسم

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Intranasal dexmedetomidine versus intranasal midazolam as pre anesthetic medication in pediatric age group undergoing adenotonsillectomy

Thesis

Submitted for Partial Fulfillment of M.D. Degree
in Anesthesiology

By

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Haidi Nashaat Shohdy Ghobrial

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List of Abbreviations

Abbr.	Full-term
AR	: Adrenoceptors
ASA	: American Society of Anesthesiologists
AVP	: Antidiuretic Action of vasopressin
BBB	: Blood Brain Barrier
BZDs	: Benzodiazepines
CBF	: Cerebral Blood Flow
CHD	: Congenital Heart Disease
CMRO2	: Cerebral Metabolic Rate of Oxygen
CNS	: Central Nervous System
CPSP	: Chronic postsurgical pain
CRT	: Corticotropin Releasing Hormone
FDA	: Food and Drug Administration
GABA	: g-aminobutyric acid
HPA	: Hypothalamic Pituitary Adrenal
HR	: Heart rate
ICU	: Intensive Care Unit
IM	: Intramuscular
IN	: Intranasal
IV	: Intravenous
IVRA	: Intravenous Regional Aneasthesia
MAS	: Mask Acceptance Scale

MCC : Mucociliary Clearance

MOAA/S : Modified Observers Assessment of Alertness/ Sedation Scale

MOPS : Modified Objective Pain Scale

OT : Operating Theatre

PACU : Post Anesthesia Care Unit

PICU : Pediatric Intensive Care Unit

PONV : Postoperative Nausea and Vomiting

PPI : Proton Pump Inhibitor

PVN : Paraventricular Nucleus

SBP : systolic blood pressure

SOL : Sleep Onset Latency

TSPO : Translocator Protein

UK : United Kingdom

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Introduction

Adenotonsillectomy is one of the most common surgical procedures performed on pediatric patients. Relieving pre- and post- operative anxiety is an important concern for the pediatric anaesthesiologist. Anxiety can produce aggressive reactions, increase distress and may make the control of postoperative pain difficult. Pre anaesthetic medication in children should aim at relieving this anxiety and psychological trauma and also to facilitate the induction of anesthesia without prolonging the recovery ***(Ghali et al., 2011).***

A premedicant drug must have an acceptable, non-traumatic route of administration in order not to add extra stress to the child. Many studies have shown that intranasal route is an effective way to administer premedication and sedation to children. It is a relatively easy non-invasive route with high bioavailability and rapid onset of action comparable to that of intravenous (IV) administration because of the rich blood supply of the airway mucosa and bypassing the first pass hepatic metabolism. Also, this route is not painful and does not require trained personnel ***(Wang and Bu, 2002).***

The benzodiazepine, midazolam a GABA receptor inhibitor is the most commonly used sedative drug for premedication in children. Administered intranasal, midazolam is an effective option for conscious sedation ***(Mostafa and Morsy, 2013).***

Midazolam has a number of beneficial effects when used as premedication in children: sedation, fast onset, and limited duration of action. Despite having a number of beneficial effects, it is far from an ideal premedicant having side effects such as restlessness, paradoxical hyperactive reaction, cognitive impairment, amnesia, and respiratory depression ***(Bergendahl et al., 2006).***

Dexmedetomidine is a newer alpha 2-agonist with a more selective action on the alpha 2-adrenoceptor with both sedative and analgesic properties and is devoid of respiratory depressant effect. Its bioavailability is (72.6–92.1%) when administered via the nasal mucosa. These properties render it potentially useful for anaesthesia premedication ***(Darshna et al., 2015).***

So considering all these aspects, the present study was planned to evaluate sedation level and ease of child parent separation and postoperative analgesia by comparing intranasal dexmedetomidine with intranasal midazolam as premedication in pediatric patients posted for adenotonsillectomy.

Aim of the Work

The purpose is to compare between dexmedetomidine and midazolam effects as premedications on preoperative sedation, the ease of child parent separation, mask acceptance (primary outcome), hemodynamics stability, postoperative analgesia and agitation (secondary outcome).

Anatomical consideration (Anatomy of the Nasal cavity)

Anatomy of the nasal cavity

The nasal cavity is divided by the nasal septum into two symmetrical halves, opening at the nostrils and extending posteriorly to the nasopharynx. Both halves consist of four areas, the nasal vestibule, atrium, respiratory region and olfactory regions. The cavity is lined with nasal mucosa that has a total surface area of approximately 150 cm^2 ***(Mygind and Dahl, 1998).***

With the largest surface area, the nasal respiratory mucosa is considered the most important section for systemic drug delivery. Its epithelium consists of pseudostratified columnar epithelial cells, goblet cells, basal cells and mucous and serous glands. The vascularity of the nasal mucosa significantly influences systemic drug absorption. The vascularization of the vestibule and atrium areas is low whereas the respiratory and olfactory regions are highly vascularized ***(Pires et al., 2009).***

Volume of the nasal cavity

The nasal cavity has a total volume of 150-200 μL. Due to mucociliary clearance and the limited amount of available water as a solvent, drugs for intranasal application are best administered as solutions in an ideal volume range of between 25 - 150 μL per nostril. The maximum volume that should be administered per nostril is 1ml. If the drug volume delivered exceeds the recommended volume, low viscosity solutions tend to flow into the nasopharynx and swallowed ***(Pires et al., 2009).***

Mucociliary clearance

Many epithelial cells of the nasal respiratory mucosa are covered with microvilli and fine projections called cilia. Microvilli enhance the respiratory surface area while cilia are essential to transport nasal mucus posteriorly toward the nasopharynx ***(Merkus et al., 1998).***

Under physiological conditions, nasal epithelium is covered with a thin mucus layer produced by secretory glands and goblet cells. This layer plays an important role in the defense of the respiratory tract as agents adhering to the mucus layer are transported by ciliary action to the nasopharynx and eventually to the gastrointestinal tract. This process is known as mucociliary clearance (MCC) and significantly influences nasal drug absorption ***(Pires et al., 2009).***

Method of intranasal administration

The method of intranasal administration used affects the site of drug deposition and subsequent absorption. Methods include aerosol sprays, drops and a liquid stream. The position of a patient in an upright or supine position during intranasal administration may be important especially when larger