شبكة المعلومات الجامعية

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بسم الله الرحمن الرحيم

HANAA ALY

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جامعة عين شمس

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Comparative Study between Intranasal Dexmedetomidine and Intranasal Ketamine as a Premedication for Anxiolysis and Sedation before Pediatric General Anesthesia

Thesis
Submitted for Partial Fulfillment of M.D. Degree in Anesthesiology
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Ahmed Elsayed

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List of Abbreviations

Abb.	Full term
ASA	American society of anesthesia
CNS	Central nervous system
CYP2A6	Cytochrome P450
D	Dexmedetomidine
ECG	Electrocardiogram
GABA	Gamma aminobutyric acid
GDRS	Groningen distress rating scale
hr	hour
HS	Highly significant
K	Ketamine
kg	kilogram
MAP	Mean arterial blood pressure
mcg	Microgram
mg	Milligram
Mg2+	Magnesium
ml	Milliliter
MRSS	Modified Ramsay Sedation Scores
N2O	Nitrous oxide
NMDA-R	N-methyl-D-aspartate receptor
No.	Number
non REM	non rapid eye movement
NS	Non significant
OR	Operating Room
PACU	Post anesthesia care unit
RR	Respiratory rate
S	Significant
SD	Standard deviation

List of Abbreviations Cont...

Abb.	Full term

SPO2..... Arterial oxygen saturation

t1/2 ..... Half life

UGT2B10, UGT1A4.. Uridine 5'-diphospho-glucuronosyltransferase

α2A-AR ..... Alpha 2 A adrenergic receptor

α2B-AR ..... Alpha 2 B adrenergic receptor

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Introduction

Premedication in children is helpful for both separating the child from their parents and reducing the child's stress and anxiety, thus facilitating smooth induction of anesthesia. Even though intended procedures are explained to children in appropriate details, they are anxious about needle sticks and are often technically challenging to sedate. Furthermore, the drugs given for this purpose should have little effect on hemodynamics and respiration so as to allow the child to recover quickly and to facilitate early discharge without side effects ***(Jun et al., 2017).***

Anxiety of the young pediatric patient can add to the challenging nature of procedures performed before induction of general anesthesia. Pharmacologic and non-pharmacologic means of distraction and anxiolysis are commonly used to optimize the patient and family experience as well as to allow for the successful procedure completion. Intranasal medication delivery has been described as safe and effective and provides high patient and provider satisfaction ***(Neville et al., 2016).***

A lot of drugs can be taken by the intranasal route such as glucocorticoids, nasal decongestants, naloxone, midazolam, ketamine and dexmedetomidine. Intranasal route

is a very effective route for administration of drugs. The nasal mucosa can be used for non-invasive systemic administration of drugs. The surface of the nasal mucosa is a tissue well supplied by blood vessels. This ensures a rapid absorption of most drugs which generate high systemic blood levels and avoids the first pass metabolism ***(Marx et al., 2015).***

Dexmedetomidine is a selective alpha 2 agonist similar to clonidine, but with greater affinity to the alpha 2 receptor. As a sedative agent dexmedetomidine has a favorable working profile. It provides sedative properties similar to natural sleep and attenuates the stress response to the procedure and anxiolysis with minimal respiratory depression. Through the action of dexmedetomidine on the central and peripheral alpha 2 receptors it leads to reduction of heart rate and a decrease of systemic vascular resistance. The most common side effects of dexmedetomidine are hypotension, bradycardia, nausea and vomiting ***(Bos et al., 2017).***

The ability of dexmedetomidine to maintain spontaneous ventilation and upper airway tone makes dexmedetomidine an attractive choice for procedural sedation, sleep endoscopy and imaging studies especially in pediatrics ***(Absalom & Mason, 2017).***

Ketamine has been endorsed for its potential ability to offer multimodal analgesia rather than the targeted therapy, focused solely on the opioid receptors as offered by opioid medications. Ketamine is known to interact with multiple receptors, including the N-methyl-D-aspartate receptor (NMDA-R) causing a dissociative anesthesia. Ketamine is postulated to reduce central sensitization to pain, prevent opioid induced hyperalgesia, and possibly decrease overall opioid utilization ***(Reynolds et al., 2017).***