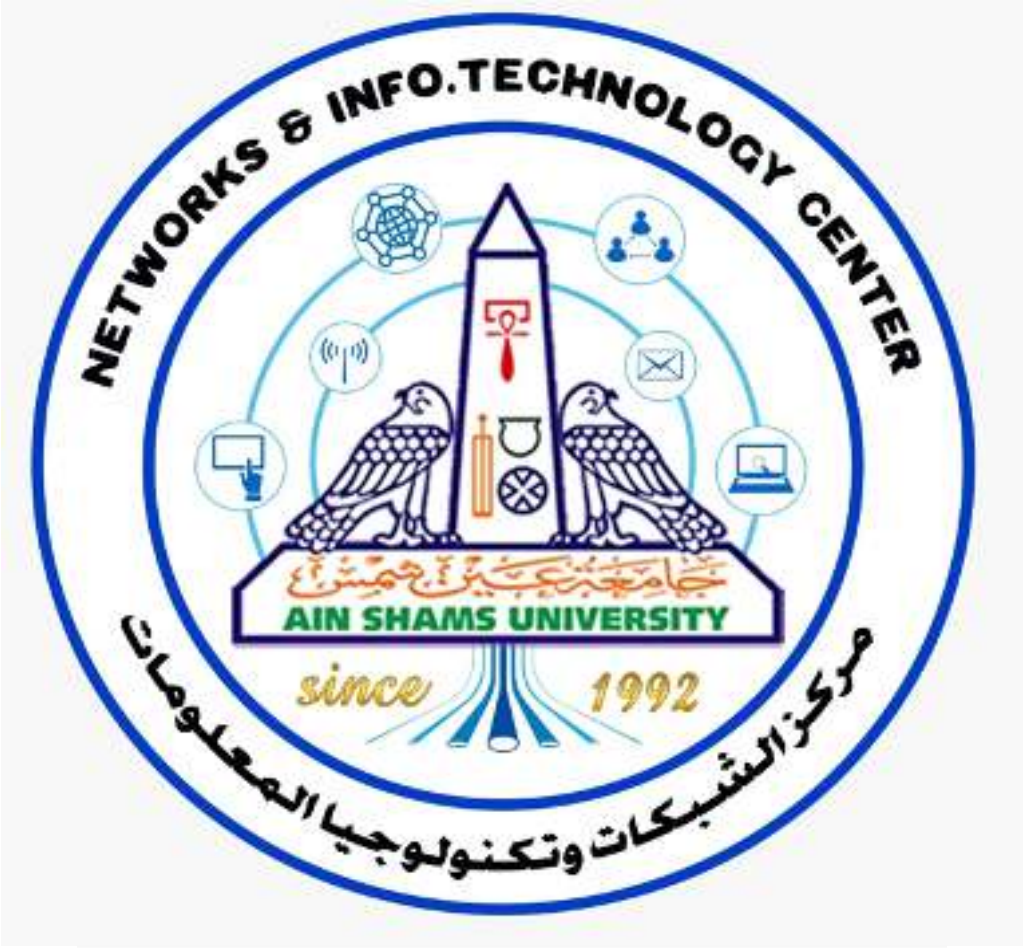
Hanaa Mohammed

بسم اللّه الرحمن الرحيم

مركز الشبكات وتكنولوجيا المعلومات

قسم التوثيق الإلكتروني



Safaa Mahmoud

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم باللّه العظيم أن المادة التي تم توثيقها وتسجيلها

علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

A Comparative study between Nebulized Ketamine, Nebulized Dexmedetomidine and Topical Lidocaine as Premedications for Flexible Fiberoptic Bronchoscopy in Pediatrics

A Thesis

Submitted for the Partial Fulfillment of the Requirements of Master Degree in Anesthesiology

By

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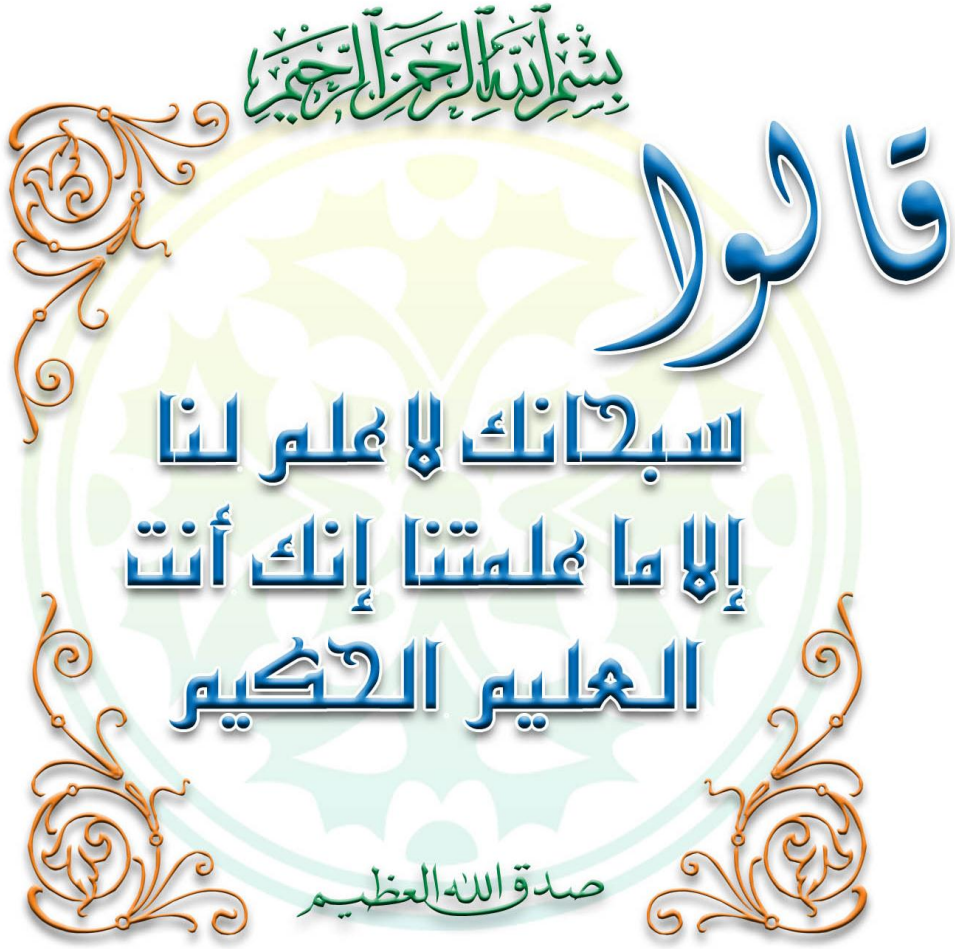

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Abdelhamid Ahmad Elhawary

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List of Abbreviations

Abb.	Full term
ASA	American Society of Anesthesiologists
CNS	Central nervous system
DBP	Diastolic blood pressure
DEX	Dexmedetomidine
ECG	Electrocardiography
FDA	Food and Drug Administration
HDU	High Dependency Unit
HR	Heart rate
IQR	Interquartile range
LMA	Laryngeal Mask Airway
MBP	Mean arterial blood pressure
NIBP	Non-invasive blood pressure
NMDA	N-methyl-D-aspartate
PACU	Post Anesthesia Care Unit
PCP	Phencyclidine
PSAS	Parental separation anxiety scale
SBP	Systolic blood pressure
SD	Standard deviation
SO_2	O_2 saturation
TPO	Tracheobronchopathia osteochondroplastica

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INTRODUCTION

Flexible fiberoptic bronchoscopy remains an invaluable tool in the evaluation and management of infant and pediatric respiratory disease. Because of their developmental capabilities, children generally require general anesthesia for this procedure ***(Terkawi et al., 2016).***

Anesthetic strategies in pediatric fiberoptic bronchoscopy should aim at minimizing respiratory complications related to the procedure as oxygen desaturation, hypoxemia, cough, bronchospasm, trauma and obstruction of the airway. An ideal premedication is one that provides satisfactory sedation in addition to minimizing such complications ***(Berkenbosch et al., 2004).*** This could be achieved by using the inhalation route for administration of sedative drugs. Inhalation of nebulized drug is an alternative method of administration that is relatively easy to set up, does not require venipuncture, and is associated with high bioavailability of the administered drug ***(Zanaty and El Metainy, 2015).***

Preprocedural sedation is of great importance in children undergoing bronchoscopic procedures to alleviate anxiety and distress, minimize separation anxiety and allow for smooth induction of anesthesia. Sedative premedication in children is commonly administered via the oral, rectal, sublingual, and intranasal routes with varying degrees of patient acceptance ***(McCormick et al., 2008).***

Ketamine is an N-methyl-D-aspartate (NMDA) receptor antagonist that produces a state of sedation, anesthesia, immobility, analgesia, amnesia, and dissociative anesthesia ***(Cortiñas et al., 2010).*** Ketamine nebulization has a few advantages over oral administration; it spares the patient from the bitter taste of ketamine; much smaller volume is required as opposed to larger volumes required for oral with risk of aspiration if accidentally swallowed; hence better patient cooperation is likely. Owing to its local anesthetic properties at higher doses, nebulized ketamine has a potential role in preventing postoperative sore throat ***(Ahuja et al., 2015).***

Dexmedetomidine (DEX), a highly selective α2 adrenergic receptor agonist, has a more favorable pharmacokinetic profile than clonidine ***(Pan et al., 2016).*** Previous studies have reported that DEX, as compared with midazolam, propofol, fentanyl, and remifentanil, could be safely and effectively used for bronchoscopic procedures ***(Liao et al., 2012, Ryu et al., 2012).*** Administration of dexmedetomidine through inhalational route could be a new promising noninvasive method. The bioavailability of dexmedetomidine is 65% and 82% through nasal and buccal mucosa, respectively, following nebulization ***(Mason and Lerman, 2011).***

Lidocaine, reversibly blocks nerve conduction near the site of administration by targeting free nerve endings in the mucosa, thereby producing temporary loss of sensation in a limited area, this is achieved by decreasing nerve cell

membrane permeability to sodium ions, thus decreasing depolarization and increasing excitability threshold until the ability to generate an action potential is lost ***(Heavner, 2007).***

The most common upper airway anaesthetic procedure in current use is a metered dose lignocaine spray, given in repeated dosages immediately prior to the procedure ***(Kirkpatrick, 1989).***

AIM OF THE WORK

The aim of this study is to compare between the efficacy and safety of nebulized ketamine, nebulized dexmedetomidine and topical lidocaine as premedication for flexible fiberoptic bronchoscopy in pediatrics.

Chapter 1

THE PEDIATRIC AIRWAY

The airway of the pediatric patient differs in many ways which impact the anesthesiologist's management of the airway. Predictably, these differences are most pronounced at birth and the most unfamiliar (non-adult like) airway is encountered in neonates and infants under 1 year of age ***(Heinrich et al., 2012).***

The first anatomical difference between the pediatric and adult patient becomes important when positioning the child prior to or immediately after the induction of anesthesia. The head of a pediatric patient is larger relative to body size, with a prominent occiput. This predisposes to airway obstruction in asleep children, because the neck is in flexed when they lie on a flat surface. A folded towel is often required as a shoulder roll to achieve a neutral position of the neck and open up the airway. This is demonstrated visually in **Figure 1**. The larger occiput combined with a shorter neck makes laryngoscopy relatively more difficult by providing obstacles to the alignment of the oral, laryngeal, and tracheal axes ***(Carr et al., 2001).***