Ain Shams University

Faculty of Medicine

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Midazolam, Propofol and Dexmedatomedine In Sedation For Patients Undergoing Vitreoretinal Surgeries Under Local Anesthesia

Thesis

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List of Abbreviations

ACTH	:	Adrenocorticotropic Hormone
ASA	:	American Society of Anesthesiology
AVP	:	Arginine Vasopressin
BIS	:	Bispectral Index
BPM	:	Beat Per Minute
CBF	:	Cerebral Blood Flow
CMRO2	:	Cerebral Metabolic Rate for Oxygen
CNS	:	Central Nervous System
CPP	:	Cerebral Perfusion Pressure
CRA	:	Central Retinal Artery
CT	:	Computerized Axial Tomography
DBP	:	Diastolic Blood Pressure
ECG	:	Electrocardiogram
EEG	:	Electroencephalogram
FDA	:	Food and Drug Administration
G	:	Gauge
GA	:	General Anesthesia
GABA	:	Gamma Amino Butyric Acid
HA	:	Hyaluronan Enzyme
HR	:	Heart Rate
ICA	:	Internal Carotid Artery
ICP	:	Intracranial Pressure
ICU	:	Intensive Care Unit
IOF	:	Inferior Orbital Fissure

List of Abbreviations (Cont.)

IOP	:	Intra-ocular Pressure
IV	:	Intravenous
LA	:	Local Anesthesia
LPS	:	Levator Palpebrae Superioris
MAC	:	Monitored Anesthesia Care
MAP	:	Mean Arterial Pressure
MRI	:	Magnetic Resonance Imaging
NAS	:	Neurobehavioral Assessment Scale
NIBP	:	Non-Invasive Blood Pressure
NMDA	:	N-methyl-D-Aspartate
OAA/S	:	Observer's Assessment of Alertness/ Sedation
pKa	:	Ionization Constant
PONV	:	Postoperative Nausea and Vomiting
RR	:	Respiratory Rate
RSS	:	Ramsay Sedation Score
SBP	:	Systolic Blood Pressure
SOF	:	Superior Orbital Fissure
SpO2	:	Peripheral Oxygen Saturation
t½	:	Half Life
UMSS	:	University of Michigan Sedation Scale
V1	:	Ophthalmic Division of Trigeminal Nerve

V2	:	Maxillary Division of Trigeminal nerve
Vdss	:	Volume of distribution Steady State
VLPO	:	Ventrolateral Preoptic Nucleus
VSRS	:	Vancouver Sedative Recovery Scale

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INTRODUCTION

Introduction

For many ophthalmic procedures, local anesthesia has become the preferred option over general anesthesia because of the quicker rehabilitation and the avoidance of possible complications of general anesthesia. Several methods of local anesthesia for vitreoretinal surgery have been described including retrobulbar, peribulbar, sub-tenon's block, and even topical anesthesia in some cases. The classic extraconal (peribulbar) block was introduced in 1986 as a safer alternative to the retrobulbar block in which the needle tip remains outside the muscle cone away from retinal artery and optic nerve. Although peribulbar block has a delayed onset of action, it is a safe needle block technique. Vitreoretinal surgery is commonly done under peribulbar anesthesia supplemented with intravenous sedation. **(Okasha et al., 2016)**

Sedation is regarded as an important adjunct to ophthalmic anesthesia. Pharmacological sedation results in depression of the level of consciousness that is enough to achieve anxiolysis, amnesia and somnolence without loss of verbal communication. Although sedation may be given preoperatively in general anesthesia, its role in enhancing patient comfort and cooperation is particularly crucial for procedures performed under local or regional anesthesia. The clinical practice of sedation during ophthalmic local anesthesia varies among procedures and clinicians and is not without complications. **(Woo et al., 2009)**

The ideal sedative for ophthalmic procedures performed under local anesthesia should have a rapid onset but a short duration of action to ensure rapid awakening and early return-to-home readiness, especially in the setting of day surgery. The agent should be non-toxic, non-accumulating and have predictable activity with minimal side effects. In a cost-conscious environment, cost-effectiveness is another important attribute. **(Woo el al., 2009)**

The available drugs are benzodiazepines, intravenous anesthetic induction agents (e.g. propofol), opiates and α_2 agonists such as dexmedetomidine or clonidine. **(Greenhalgh et al., 2008)**

Common adverse effects of midazolam include delayed recovery after long term or high-dose use, hypoxemia, hypotension and respiratory depression when paired with an opioid. The adverse respiratory profile, unpredictable attenuation of stress response to surgery (tachycardia and hypertension) and associated post-operative nausea and vomiting of benzodiazepines and opioids create the need for a sedative drug that can be used safely during monitored anesthesia care. **(Ramaswamy et al., 2016)**

Propofol is commonly used for conscious sedation, mainly because its half-life is brief, and because it allows accurate control of the depth of sedation. Propofol has a low incidence of side effects, particularly excitatory phenomena, involuntary movements and post-operative nausea and vomiting (PONV) but has no analgesic properties **(Holas et al., 1999)**. Since propofol has no analgesic component, an opioid is often given to prevent the unintentional reflex to painful stimuli, and thus may result in a higher incidence of confusion, excessive sedation, disorientation or respiratory depression. **(Gratz et al., 2013)**

The α_2 agonist dexmedetomidine provides "conscious sedation" with adequate analgesia and minimal respiratory depression. It is a sedative – hypnotic, anxiolytic and sympatholytic that can attenuate the stress response to surgery (mitigating tachycardia, hypertension) and also decrease intraocular pressure during ophthalmic surgery under local anesthesia. It is the primary sedative drug for orthopedic, ophthalmic (posterior segment surgery), dental, plastic surgeries, for sedation in intensive care and for various diagnostic procedures. Dexmedatomidine is labelled for intensive care and procedural sedation in the USA and India. **(Ramaswamy et al., 2016)**

AIM OF THE WORK

Aim of the work

The aim of this work is to compare the efficacy and safety of propofol, midazolam and Dexmedatomedine in sedation for patients undergoing vitreoretinal surgery under peribulbar block.

REVIEW OF LITERATURE

Chapter One

Ocular Anatomy

As with all regional anesthetic techniques, knowledge of the anatomy of the orbit and its contents is essential for safe practice of ophthalmic regional anesthesia.

I. The bony orbit

The eyeball is safely lodged in a bony socket called the orbit on the two sides of the nose. The four-sided orbital cavity is pyramidal in shape with an open base in front and an apex on the back. The four walls of the orbit converge posteriorly to reach the apex on their back formed by the optic foramen **(Ansari et al, 2016).** The orbit narrows progressively to the orbital apex, through and around which enter the important nerve vessels and, of course, the optic nerve **(Fig.1)**. **(Smerdon, 2000)**

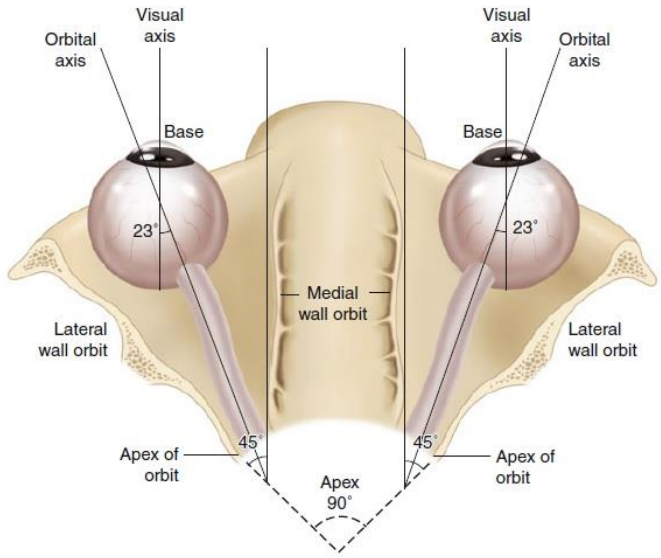

Fig. 1: The orbit **(Ansari et al, 2016).**

The four walls are called the roof, floor, and medial and lateral walls. The lateral wall, which has a protective function, is the strongest. The medial wall is the thinnest and contains the ethmoidal sinuses with ethmoid air cells **(Ansari et al, 2016)**.