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Comparative study of the preoperative intramuscular sedative effect of dexmedetomidine-ketamine combination versus midazolam-ketamine inpediatric patients scheduled for anesthesia in cardiac catheter lab

Thesis Submitted For Partial Fulfillment of the Master Degree in Anaesthesiology.

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Abstract

The current study was carried out on fifty two pediatric patients aged 6 months - 6 years old suffering from Acyanotic congenital heart disease scheduled for diagnostic or interventional cardiac catheterization. All patients received premedication 30 minute before induction of anesthesia via intramuscular route. Twenty six patients in Group (M) received intramuscular combination of 0.05mg/kg midazolam (Midathetic ,AmounPharmacetical CO), 2mg/kg ketamine (Ketamine ,Sigma Tec) and 0.02 mg/kg atropine while other twenty six patients in group (D) received intamuscular combination of 1ug/kg Dexmedetomidine (Precedex, Hospira, Lake Forest, Illinois) , 2mg/kg ketamine (Ketamine ,Sigma Tec), and 0.02 mg/kg atropine.

The results of this study showed no statistically significant differences between intramuscular dexmedetomidine and intramuscular midazolam as a premedication in pediatric Acyanotic cardiac patients with respect to blood pressure, sedation scores, easiness of parent separation, and acceptance of venous line. However, significant increase in heart rate was recorded with intramuscular midazolam compared to intramuscular dexmedetomidine.

Keywords: Intramuscular sedation – Dexmedetomidine – Midazolam – Cardiac catheter lab.

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Ayman Amin Abou gabal

Aim of the work

The aim of the study is to compare the efficacy of intramuscular combination of Dexametomiditne and ketamine versus intramuscular combination of midazolam and ketamine as preoperative sedative and anxiolytic drugs in pediatric patients undergoing cardiac catheterization.

List of Abbreviations

ACEP	The American College of Emergency Physicians
ANOVA	Analysis of Variance
ASA	The American Society of Anesthesiologists
ASD	Atrial Septal Defect
AR	Adrenergic Receptors
BP	Blood Pressure
CBF	Cerebral Blood Flow
CCL	Cardiac Catheter Lab
CNS	Central Nervous System
CHD	Congenital Heart Disease
CT	Computed Tomography
DP	Diastolic Pressure
EEG	Electroencephalogram
GABA	Gama Amino Buytric Acid
HR	Heart rate
IM	Intra Muscular
ICP	Intracranial Pressure
ICU	Intensive Care Unit
IV	Intravenous
KG	Kilogram
MAP	Mean Arterial Pressure
MRI	Magnetic resonance imaging
NMDA	N-methyl-D-aspartate
PCO2	Arterial Carbon Dioxide Tension
PSA	Procedural Sedation Anesthesia
PDA	Patent Ductus Arteriosus
PO2	Arterial Oxygen tension
PS	Pulmonary Stenosis
SD	Standard Deviation
SP	Systolic Pressure
Spo2	Oxygen Saturation
SVR	Systemic Vascular Resistance
TGA	Transposition of great arteries
VSD	Ventricular Septal Defect

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Introduction

Introduction

The preoperative period is a stressful event that faces the majority of individuals undergoing surgery or interventional procedure. Pharmacological and behavioral interventions are used to treat preoperative anxiety in children and their parents. (1)

Among the different results that may be achieved with premedication such as amnesia, optimization of preoperative conditions, and prevention of physiological stress, the primary aim in children is anxiolysis.(1) It has been reported that there are correlations between heart rate, blood pressure, and behavioral ratings of anxiety. (2)

In order to alleviate physiological and psychological effects of preoperative anxiety in children, most anesthesiologists use either parental presence or sedative premedication, since separation from parents and induction of anesthesia are considered the most perioperative stress inducing phases. Both approaches are considered appropriate choice of interventions. (3)

The ideal premedication agent in children should be readily acceptable and should have a rapid and reliable onset with minimal side effects. Choosing

the appropriate agent or combination is crucial in order to alleviate noxious stimuli, stress and anxiety, while minimizing the risk of adverse effects. The desired goals of each pediatric patient's sedation should be identified and carefully considered by the practitioner before initiation of any drug therapy. (4)

Non pharmacologic-based methods may be used to initially allay anxiety in the child and parents before the procedure, including the involvement of child-life practitioners followed by a discussion of the planned procedure, duration, and plan for provision of sedation and analgesia. Careful attention to patient and parental preferences is important, and prior adverse experiences with certain drugs or methods of drug administration should be discussed and clarified, along with any drug allergies. Most patients with congenital heart disease (CHD) have had multiple hospital experiences and, as a result, not infrequently have definitive preferences in these areas. (5)

A highly selective α2-adrenoreceptor, dexmedetomidine has been found to have sedative, anxiolytic, and analgesic effects without respiratory impairment. (6)(7) Dexmedetomidine induced sedation through alpha 2 receptor in the locus coeruleus in the central nervous system , the quality of sedation simulate normal deep sleep that is to say you can arousal the child easy. (8)(9)

One of the main advantages of dexmetedomidine over other sedative agents used in children is intact upper air way reflex and minimal effect on the respiratory center derives. (10)

Chapter (1)
Pediatric cardiac catheter lab

Chapter (1): Pediatric Cardiac Catheter Lab

In the last 2 decades the number of infants, children, and adults who survived with congenital heart disease (CHD) has continued to grow substantially. [11] Several investigations will be needed for defining the anatomy, subsequent to echocardiography, primarily for evaluation of thoracic venous and arterial anomalies. Complete angiographic definition of aortopulmonary collateral arteries, complex aortic arch anomalies, and pulmonary arterial and venous anomalies optimizes surgical planning and intervention. [12]

Classification of Congenital Heart Disease

Congenital heart disease is a problem with the heart's structure and function that is present at birth.

Congenital heart disease is often divided into two types: non-cyanotic and cyanotic. The following lists cover the most common congenital heart diseases. [13]

Non-cyanotic Heart Disease:

- Aortic stenosis
- Atrial septal defect (ASD)