An-Najah National University

Faculty of Graduate Studies

COMPARISON OF POST-OPERATIVE AGITATION BETWEEN INHALATIONAL ANESTHESIA AND TOTAL INTRAVENOUS ANESTHESIA IN CHILDREN UNDERGOING TONSILLECTOMY\ ADENOIDECTOMY.

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Dedication

I thank God Almighty and I dedicate this research to the owner of a fragrant biography and enlightened thought, for he had the first credit in attaining higher education (my beloved father), may God prolong his life.

To those who set me on the path of life, made me calm, and took care of me until I become old (my great mother).

I dedicate this achievement to my lovely and kind wife who has always been beside me and supported me in my period of study.

Acknowledgment

First, we thank God for His grace and blessings on us for completing this study, who helped us overcome all the obstacles and difficult times that we faced throughout the years of our study.

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Declaration

I, the undersigned, declare that I submitted the thesis entitled:

COMPARISON OF POST-OPERATIVE AGITATION BETWEEN INHALATIONAL ANESTHESIA AND TOTAL INTRAVENOUS ANESTHESIA IN CHILDREN UNDERGOING TONSILLECTOMY\ ADENOIDECTOMY.

I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

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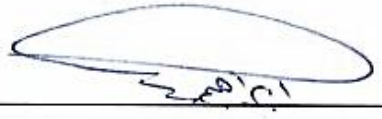
Signature: 

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ABSTRACT

Background: Tonsillectomy is a surgical procedure performed with or without adenoidectomy that completely removes the tonsil, a common complication in children undergoing general anesthesia is postoperative agitation.

Aim: To compare the effect of inhalation anesthesia (sevoflurane) and total intravenous anesthesia (TIVA) by using propofol on postoperative emergence agitation in pediatric patients undergoing tonsillectomy/adenoidectomy.

Methods: 80 children between the ages of 3 and 10 who were classified as ASA I and II received elective tonsillectomy/adenoidectomy as part of this prospective randomized, controlled, double-blinded research. The subjects were divided into two anesthetic groups at random: group 1 (P) Propofol (experiment group), which included 40 patients, and group 2 (S) Sevoflurane (control group), which included the same number of patients. A bolus injection of 3 mg/kg of propofol was used to produce anesthesia in group 1 (P), and a propofol infusion at a rate of 100–250 µg/kg/min was used to maintain it. Sevoflurane 7% was used to induce anesthesia in group 2(S), which was then maintained with 1MAC sevoflurane according to this age group and a bolus dose of 3 mg/kg of propofol was given at induction.

Results: The mean of SAS in group S (Mean=4.55) is significantly higher than the mean of SAS in group P (Mean=3.83), P= <0.001. According to this, patients in the S group exhibit higher emerging agitation than those in the P group. The mean of VAS_P in group S (Mean=1.75) is significantly higher than the mean of VAS_P in group P (Mean=0.8), p=0.037. And the incidence of pain in the area of surgery cases in group S (N=40, P=100%) is significantly higher than the incidence of pain in group P (N=28,

P=70%), P= 0.032, this demonstrates that the S group has a higher incidence and severity of pain than the P group.

The mean of VAS_N in group S (Mean=1.69) is significantly higher than the mean of VAS_N in group P (Mean=0.55), P= 0.004. And the incidence of nausea in group S (N=19, P=48%) is significantly higher than the incidence of nausea in group P (N=8, P=20%). Regarding the incidence of vomiting in group S (N=12, P=30%) is significantly higher than the incidence of vomiting in group P (N=1, P=3%), P= 0.001. The incidence of retching in group S (N=8, P=20%) is significantly higher than the incidence of retching in group P (N=2, P=5%), this shows that the S group experiences nausea, vomiting, and retching more frequently and intensely than the P group. The incidence of drowsiness / dizziness in group S is significantly higher than the incidence of the drowsiness/dizziness in group P (N=3, P=8%), P= 0.001.

Conclusions: In comparison to inhalational anesthesia with sevoflurane, total intravenous anesthesia with propofol decreased the likelihood of postoperative emergence of agitation, intensity of nausea, vomiting, retching, bleeding, hunger, thirsty and drowsiness/dizziness in children patients following tonsillectomy/adenoidectomy.

Keywords: Tonsillectomy, Adenoidectomy, Total intravenous anesthesia (TIVA) Inhalational anesthesia, Sevoflurane, propofol, Emergence of Agitation, Nausea, Vomiting.

Chapter One

Introduction

1.1 Overview

Every day, millions of youngsters throughout the world receive anesthetics. Because they are stable, dependable, safe, simple to use, and effective. Inhalational anesthetics are frequently utilized. There are five different inhalation anesthetics that can be used on children: nitrous oxide, sevoflurane, isoflurane, desflurane, and halothane. Sevoflurane inhalation induction by the mask is frequently used in pediatric anesthesia (A. L. Miller, Theodore, & Widrich, 2022). Total intravenous anesthesia (TIVA) is a general anesthetic treatment that utilizes a mix of medications supplied exclusively intravenously, without the use of inhalation medications and using a syringe pump (Anderson & Bagshaw, 2019). The first instance of total intravenous anesthesia in children was in 1989. Need, advantage, and preference are the basic justifications or complete intravenous anesthetic(Anderson & Bagshaw, 2019) .

Emergence agitation (EA) is an abnormal mental state that can last up to two days and happens when a person goes from being completely unconscious to fully awake. Since their initial description in 1960, the emergence agitation has been linked to disruptions in the child's consciousness, perception, and cognition as well as physical agitation and hypersensitivity to external stimuli(Abdel-Ghaffar, Abdel-Wahab, & Roushdy, 2019); (Ramachandran et al., 2021). EA is characterized by thrashing, agitation, excitement, disorientation, and restlessness (Lee & Sung, 2020).

Emergent agitation is a common problem and a frequent issue that can develop following the administration of general anesthesia(Haile, Girma, & Akalu, 2021). Currently, the main purposes of propofol are to minimize surgical nausea and vomiting and to lessen emerging agitation (Haile et al., 2021). The incidence of EA ranges from 0.25 percent to 90.5 percent, depending on factors including age, the assessment method employed, definitions, anesthetic methods, the type of surgery, and the time of EA assessment during recovery (Lee & Sung, 2020).

Andriyanto et al(. 2019) found that emerging agitation occurred in 40% of juvenile patients after elective surgery (Lucky Andriyanto, Elizeus Hanindito, Kohar Hari

Santoso, & Hamzah, 2019) The two procedures that are most frequently performed on children are tonsillectomy and adenoidectomy. Children who need surgery frequently experience worry, anxiety, and reluctance because they are afraid of the pain and the unfamiliar environment of the operating room (Li, Wang, Xu, Lu, & Zhang, 2018).

The study aims to compare the effect of inhalation anesthesia (sevoflurane) and total intravenous anesthesia (TIVA) by using propofol on postoperative emergence agitation in pediatric patients undergoing tonsillectomy/adenoidectomy.

1.2 Background

Tonsillectomy with or without adenoidectomy has long been practiced and is one of the most commonly performed surgical procedures in the pediatric age group around the world. From approximately 1.4 million in 1959 to approximately 2 lakh per year today, the number has decreased by approximately 50.

Tonsils are removed by dissection. Either local or general anesthesia can be employed. The mouth is kept open and the tongue depressed with a Davis' gag (The original Davis' gag was invented by Dr Davis, of Boston, Mass. Henry Edmund Gaskin Boyle, 1875 to 1941, anesthetist, St Bartholomew's Hospital, London, improved it).

The tonsil is seized with vulsellum forceps. An incision is made through the mucous membrane, and the capsule of the tonsil is exposed. The tonsil is removed by dissection, starting at the upper (palatal) pole. When the pedicle is defined, it is severed by a wire snare. Bleeding can be accurately stopped by ligating any bleeding vessels, arteries or veins.

A chest stethoscope, pulse oximeter, electrocardiogram, end tidal capnography, automated blood pressure, and temperature monitoring are all part of standard monitoring (especially in children). Heavy preoperative sedation may be unnecessary when the tonsils are excessively hypertrophied. An antisialagogue agent should be included in the premedication.

Depending on the need for intravenous access, an inhalational or intravenous induction can be used. Propofol (2-3 mg/kg) mixed with lidocaine (1-2 mg/ml) can be used to induce anesthesia1.Anesthesia can be maintained with inhalational or intravenous

agents. Desflurane reduces intraoperative bleeding and improves awakening compared to sevoflurane during tonsillectomy and adenoidectomy procedures.

In pediatric surgery, the most commonly used anesthetics are propofol and sevoflurane45 Propofol, a short-acting intravenous anesthetic with the advantages of rapid onset, rapid recovery, stability, and nausea and vomiting prevention, is widely used for the induction and maintenance of intravenous anesthesia. (Zhang S, Wang J, Ran R, Peng Y, Xiao Y. 2022).

Sevoflurane, a versatile inhalational anesthetic with advantages such as rapid induction, easy control of anesthetic depth, quick recovery, and limited respiratory stimulation, is widely used in paediatric anesthesia. Despite the widespread use of these anesthetics, 26% of pediatric patient's still experience emergence agitation (EA), 25% continue to experience postoperative nausea and vomiting (PONV), 24% continue to experience postoperative pain (POP), and some continue to experience short-term memory impairment.(Yin J, Wang SL, Liu XB. 2014).

1.2.1 Tonsillectomy and adenoidectomy

The tonsil, along with its capsule, is fully removed during a tonsillectomy by cutting into the peritonsillar gap between the tonsil capsule and the muscle wall. In accordance with the American Academy of Otolaryngology-Head and Neck Surgery(Bohr & Shermetaro, 2022), the adenoid is a single mass of tissue that attaches to the throat at the back of the nose. The surgical removal of an adenoid, or an adenoidectomy is most frequently done on youngsters. It was invented in the nineteenth century by Hans Wilhelm Meyer(B. J. Miller & Gupta, 2022). Adenoidectomy/Tonsillectomy procedures are frequently performed for a variety of causes, including sleep disordered breathing (SDB) and recurring throat infections(Bohr & Shermetaro, 2022). It enhances children with OSA's quality of life. Surgery is generally risk-free, but side effects could include bleeding, vomiting, trouble eating, and trouble speaking (Torretta, Rosazza, Pace, Iofrida, & Marchisio, 2017).

Following surgery, throat discomfort normally lasts one to two weeks. Following a tonsillectomy, this discomfort usually peaks around day seven (Dhaduk, Rodgers, Govindan, & Kalyoussef, 2021). About 1% of instances on the first day and another 2%

following that have bleeding. Death occurs after between 1 in 2,360 and 56,000 operations(Mitchell et al., 2019).

1.2.2 Total intravenous anesthesia and inhalational anesthesia

Total intravenous anesthesia (TIVA) is a type of anesthesia in which general anesthesia is maintained through intravenous drug infusion rather than inhalant agents (Anderson & Bagshaw, 2019). A combination of injectable anesthetic, sedative, and tranquilizer drugs is used to maintain an anesthetic plane (Anderson & Bagshaw, 2019). The most commonly used induction agent is propofol. Furthermore, when compared to isoflurane, propofol maintenance reduces the occurrence of PONV. The most commonly used volatile agent for maintenance is isoflurane, which is followed by halothane and sevoflurane (Clar, Patel, & Richards, 2022).

A type of anesthesia known as total intravenous anesthesia (TIVA) uses intravenous drug infusion rather than inhalants to maintain general anesthesia According to A. L. Miller et al., (2022); Nair,(2019).

Anesthetic inhalation is used in order to provide general anesthesia for surgery, agents are drugs that are generally employed in the operating room. They result in unconsciousness and amnesia The most frequently used inhalation anesthetics today are nitrous oxide, halothane, isoflurane, desflurane, and sevoflurane. These substances are liquids at room temperature and must be administered using vaporizers (A. L. Miller et al., 2022).

As they increase signals to chloride channels (GABA receptors) and potassium channels while decreasing signals to neurotransmission pathways, inhaled anesthetics have an impact on the central nervous system. These routes include acetylcholine, muscarinic and nicotinic receptors, glutamate or NMDA receptors, and serotonin (5-HT receptors). Additional classifications include volatile and non-volatile inhalation agents. The most popular anesthetic gases include halothane, nitrous oxide, isoflurane, sevoflurane, and desflurane. The most popular method of delivery is inhalation by a face mask, laryngeal mask airway, or tracheal tube(A. L. Miller et al., 2022).

1.2.3 Instruments used to measure emergent agitation, nausea and vomiting

The Riker Sedation-Agitation Scale (SAS) provides a detailed description of patient behavior along with seven stages of sedation and agitation, ranging from severe agitation to deep sedation (Zhong et al., 2019). In pediatrics, the SAS can be used effectively for preoperative sedation assessment and it may help avoiding serious side effects brought on by midazolam overdose (Zhong et al., 2019).

Riker Sedation-Agitation Scale (SAS)

Score	Term	Descriptor
7	Dangerous Agitation	Pulling at ET tube, trying to remove catheters, climbing over bedrail, striking at staff, thrashing side-to-side
6	Very Agitated	Requiring restraint and frequent verbal reminding of limits, biting ETT
5	Agitated	Anxious or physically agitated, calms to verbal instructions
4	Calm and Cooperative	Calm, easily arousable, follows commands
3	Sedated	Difficult to arouse but awakens to verbal stimuli or gentle shaking, follows simple commands but drifts off again
2	Very Sedated	Arouses to physical stimuli but does not communicate or follow commands, may move spontaneously
1	Unarousable	Minimal or no response to noxious stimuli, does not communicate or follow commands

Guidelines for SAS Assessment

1. Agitated patients are scored by their most severe degree of agitation as described
2. If patient is awake or awakens easily to voice ("awaken" means responds with voice or head shaking to a question or follows commands), that's a SAS 4 (same as calm and appropriate – might even be napping).
3. If more stimuli such as shaking is required but patient eventually does awaken, that's SAS 3.
4. If patient arouses to stronger physical stimuli (may be noxious) but never awakens to the point of responding yes/no or following commands, that's a SAS 2.
5. Little or no response to noxious physical stimuli represents a SAS 1.

This helps separate sedated patients into those you can eventually wake up (SAS 3), those you can't awaken but can arouse (SAS 2), and those you can't arouse (SAS 1).

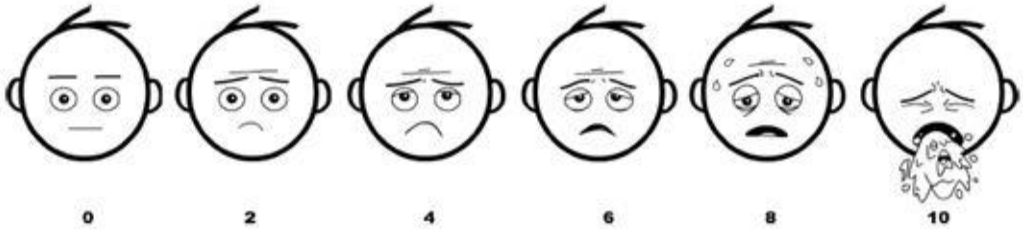
1. Prospective evaluation of the sedation-agitation scale in adult ICU patients. *Crit Care Med* 1999; 27:1325-1329.
2. Assessing sedation in ventilated ICU patients with the bispectral index and the sedation-agitation scale. *Crit Care Med* 1999; 27:1499-1504.
3. Confirming the reliability of the Sedation-Agitation-Scale in ICU nurses without prior experience in its use. *Pharmacotherapy* 2001; 21:431-436.
4. Validating the Sedation-Agitation Scale with the bispectral index and visual analog scale in adult ICU patients after cardiac surgery. *Intensive Care Med* 2001; 27:853-858.

VAS-N Scale

The VAS-N scale is Baxter Retching Faces scale (BARF). The BARF scale is a helpful tool in the treatment of pediatric postoperative nausea since it has construct, convergent, discriminant, and test-retest validity in evaluating nausea severity in children (Watcha, Medellin, Lee, Felberg, & Bidani, 2018). The nausea Scale in the faces are 0, 2, 4, 6, 8, and 10 points.

Figure 1.A

Measure of nausea using VAS-N :

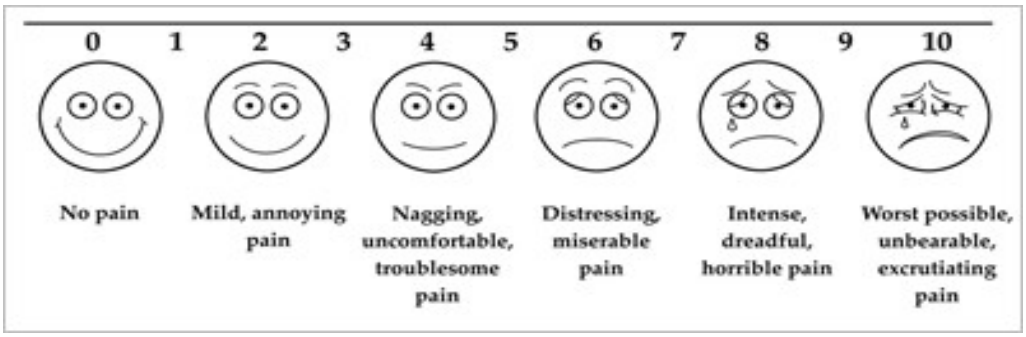


VAS-P Scale

Choosing a picture of a face to symbolize one's level of suffering is required for the faces scales as shown below. The child can complete the task by simply associating their feelings with one of the faces (Thomas, Robinson, Champion, McKell, & Pell, 1998). Children typically choose faces with scales (de Tovar et al., 2010; Luffy & Grove, 2003; Miro & Huguet, 2004). The Pain Scale in the faces are 0, 2, 4, 6, 8, and 10 points (Hicks, von Baeyer, Spafford, van Korlaar, & Goodenough, 2001).

Figure 1.B

Measure of pain using VAS-P:



1.2.4 Significance of study

Postoperative agitation and delirium have detrimental effects on the child as well as his or her parent. In the pediatric population, emergent agitation (EA) has been noted as a prevalent issue following general anesthetic recovery. EA has been defined as a mental disorder in children which includes bewilderment, hallucinations, and delusions that appear as moaning, restlessness, uncontrollable physical movement and tossing and turning in bed. EA affects youngsters on average at a rate of 10 to 67 percent. This incidence includes a period of intense agitation, confusion, and/or uncontrollable weeping following anesthetic emergence (Ali et al., 2020).

Therefore, the results of this study will support the role of (TIVA) in lowering the prevalence of this phenomena and its negative effects on patients and their parents. Also, The results of this study will benefit patients and their beloved by reducing their avoidable suffering, as well as hospitals by shortening the length of patients' hospital stays which will lessen the financial burden on the hospitals. This study would be the unique one in Palestine.

Moreover, This study will be a reference guide for anesthesia teams and the outcomes of this study may have an implication on patient safety, mental health, reduction of medical-legal issues and economical outcomes for the patients and health system implications.

1.2.5 Aims of the study

To compare the effect of inhalation anesthesia (sevoflurane) and total intravenous anesthesia (TIVA) by using propofol on postoperative emergence agitation in pediatric patients undergoing tonsillectomy/adenoidectomy.

1.2.6 Objectives

1. Describing pediatric emergence agitation and associated features of the phenomenon.

2. Identifying risk factors that contribute to cases of emergence agitation

3. Describing the incidence and impact of emergence agitation.

4. Analyzing the current evidence-based interventions for the prevention and management of emergence agitation.

1.2.7 Research question

The study seeks to answer the following questions?

Does TIVA reduce post-operative emergence agitation compared to inhalational anesthesia?

What is the effect of two inhalational anesthesia on the post-operative symptoms including pain, nausea, vomiting, retching, bleeding, tiredness, thirst and drowsiness/dizziness?

1.2.8 Study Null Hypothesis

There is no significant difference at 0.05 level related to the incidence of emergence agitation between TIVA (Propofol) group and inhalational anesthesia (sevoflorane) group in pediatric tonsillectomy/adenoidectomy patients.

There is no significant difference at 0.05 level related to vomiting and nausea between TIVA (Propofol) group and inhalational anesthesia (sevoflorane) group in pediatric tonsillectomy/adenoidectomy patients.

There is no significant difference at 0.05 level related to pain between TIVA (Propofol) group and inhalational anesthesia (sevoflorane) group in pediatric tonsillectomy/adenoidectomy patients

There is no significant difference at 0.05 level related to the incidence of dizziness/drowsiness, hunger and thirst between TIVA (Propofol) group and

inhalational anesthesia (sevoflorane) group in pediatric tonsillectomy/adenoidectomy patients.

Chapter Tow

Literature Review

2.1 Literature review

This chapter is an overview of previous studies of child patients undergoing elective surgery tonsillectomy, adenoidectomy or both under the effect of two inhalational anesthesia and total intravenous anesthesia post-operative emergence agitation compared.

The current literature review was conducted using PubMed, MEDLINE, and GOOGLE, Articles were selected based on the following three criteria for inclusion: sevoflurane inhalational general anesthetic, propofol as an adjunct to sevoflurane general anesthetic and propofol TIVA techniques.

Emergent agitation is defined as an abnormal mental state transition from unconsciousness to complete wakefulness, as well as a disturbance in the child's awareness, perception, cognition, and physical agitation. According to the literature, it can lead to self-harm, the unintentional removal of intravenous (IV) cannulas and dressings (Ramachandran et al., 2021).

Adenotonsillectomy is one independent risk factor for emergence agitation (Tsiotou et al., 2018). Emergence agitation can occur in people of all ages, but it is more common in children, with incidence rates ranging from 20% to 80% depending on the type of anesthesia used, the age of the child, and the type of surgery performed (Haile et al., 2021).

According to Wu et al.,(2019), there randomized 120 patients who received inhaled sevoflurane for pediatric anesthesia and an intravenous infusion of propofol (2 mg/kg) made up the observation group. The remaining 80 cases, who were only sevoflurane-anesthetized, made up the control group. In accordance with (Wu et al., 2019), propofol can be used to treat children who have become agitated following sevoflurane anesthesia as well as avoid it in some cases

Propofol is preferable to sevoflurane for the induction and maintenance of general anesthesia in children undergoing adenotonsillectomy, according to a randomized controlled trial carried out in Egypt. It lessens postoperative agitation, nausea, and

vomiting, as well as early postoperative pain and painkiller use. Propofol is used to induce and maintain anesthesia, however, it also has a prolonged recovery period (Ismail, Atef, Abuelnaga, & Midan, 2021).

Numerous studies have found that discomfort, shivering, nausea/vomiting, coughing, and agitation/delirium are the most frequent side effects seen in young individuals recovering from sevoflurane anesthesia (Brioni, Varughese, Ahmed, & Bein, 2017; Chandler et al., 2013; Ghoneim, Azer, Ghobrial, & El Beltagy, 2015; Paris et al., 1997).

In 2018, Kocaturk& Keles, undertook a prospective, randomized clinical trial research on the characteristics of recovery. After TIVA, there was a decrease in the prevalence of ED and an increase in parental satisfaction. With no increase in extubation or recovery time, TIVA also produced a more comfortable postoperative phase due to decreased postoperative pain (Kocaturk & Keles, 2018).

A prospective cohort study involving 90 individuals was carried out in Ethiopia. Propofol users who consumed 1 mg/kg at the conclusion of surgery were classified as exposed, but those who did not, were classified as nonexposed. From a total of 90 pediatric ENT and ophthalmology procedures carried out under general anesthesia for the study, emerging agitation was acquired by 64 percent of the non-exposed group and 31 percent of the exposed groupwhich was statistically significant with $p = 0.002$. Additionally, the non-exposed group's agitation was more severe than the exposed groups. The research recommends administering 1 mg/kg of propofol at the conclusion of surgery to lessen the possibility of emergency agitation (Haile et al., 2021).

When compared to sevoflurane anesthesia, EA in children is less likely to happen after propofol anesthesia, according to a meta-analysis of randomized controlled trials study conducted in the United Kingdom. Sevoflurane and propofol were administered to a combined total of 560 patients across 14 studies in the meta-analysis. Propofol anesthesia resulted in a decreased incidence of EA, as evidenced by the pooled OR for EA of 0.25 with a 95 percent confidence interval (CI) of 0.16-0.39 ($P = 0.000$). Sensitivity analysis improved the case for propofol's decreased frequency of EA (Kanaya, Kuratani, Satoh, & Kurosawa, 2014).

According to a 2019 study done in China, Propofol can be used to stop child agitation following sevoflurane anesthesia Hundred and twenty patients who received inhaled

sevoflurane for pediatric anesthesia , an intravenous infusion of propofol (2 mg/kg) were included in the observation group after the clinical data from 200 children were retrospectively examined. The remaining 80 patients were given sevoflurane anesthesia and nothing else (Wu et al., 2019).

In Iranian clinical trial research using randomization in children following tonsillectomy, the effects of propofol and ketofolon on emerging agitation were contrasted. Ketofol infusion causes a quicker recovery and a lower incidence of EA in children after tonsillectomy surgery, despite the non-significant difference with propofol (Jalili, Esmaeeili, Kamali, & Rashtchi, 2019).

Two medications, nalbuphine 0.1 mg/kg and midazolam 0.03 mg/kg were used in children undergoing adenotonsillectomy under sevoflurane anesthesia to decrease the incidence and severity of emergence agitation in an Egyptian study published in 2017 in order to prevent emergence agitation after sevoflurane anesthesia in pediatric patients undergoing tonsillectomy with or without adenoidectomy (Mohammed, Ali, Ahmed, & Ibrahem, 2017).

It has also been demonstrated that maintaining anesthesia with propofol might lessen emerging agitation. Sevoflurane had a considerably higher frequency of emerging agitation than propofol (38%) in this cross-over trial of preschool-aged children having minor surgery (Uezono et al., 2000).

Randomized Controlled Trials: A Meta-Analysis result when compared to sevoflurane anesthesia, propofol anesthesia significantly reduced the incidence of emergency agitation, postoperative nausea and vomiting, and postoperative pain in children. There was evidence that propofol anesthesia significantly reduced the incidence of postoperative nausea and vomiting, postoperative pain, and emergency agitation in children. There were 1,550 children enrolled in these 20 randomized controlled trials for general anesthesia(Zhao, Qin, Liu, Dai, & Cen, 2022).

In 2016, Peng et al.'s previous meta-analysis indicated that sevoflurane anesthesia had a statistically increased incidence of EA and PONV in pediatric patients compared to propofol anesthesia(PENGHan-fei & LIZhen, 2016).

The use of any and all inhaled anesthetics, including nitrogen dioxide (N2O), increases the likelihood of POV.The use of opioids and anticholinesterases exacerbates this. Because TIVA works just as well as a single-dose antiemetic, its use may be considered(Schaefer et al., 2017).

Results of Propofol TIVA versus Sevoflurane Anesthesia Recovery in Children Undergoing Cleft Palate Repair The modified Hannallah score was used to evaluate the quality of emergence. There was a significant decrease in the number of patients who developed agitation following propofol TIVA compared to sevoflurane anesthesia (P 0.001) 80 patients were randomly divided into two groups of 40 each groups(Omara, Abdelrahman, & Elshiekh, 2019).

Comparing Inhalation Anesthesia to Total Intravenous Anesthesia for Pediatric Ambulatory Dental Surgery, Propofol Maintenance of General Anesthesia was associated with lower postoperative pain scores in pediatric patients than Sevoflurane Maintenance. In pediatric dental surgery, TIVA via propofol infusion is an efficient method for maintaining general anesthesia with improved quality of recovery. Patients in Group S had higher postoperative pain scores than those in Group P, as demonstrated by the findings of this study and previous research. Even though propofol has been associated with a lower risk of PONV in previous studies, this study's findings did not demonstrate the same correlation. Sevoflurane administration has been shown to have a lower PACU LOS than propofol administration in previous studies. However, a PACU LOS that was comparable between the two groups was found in this study (Neal, 2015).

For children having adenotonsillectomy, Pieters et al. (2010) compared the effects of se voflurane versus propofol anesthesia on the degree of recovery. The authors discovered less fentanyl was administered in the Post Anesthesia Care Unit (PACU) with propofol anesthesia compared to sevoflurane anesthesia when examining the management of post operative pain. Between the eight groups, there was a substantial difference in the incide nce of PONV, with 36.8% in the sevoflurane group and 5.4% in the propofol group (Pie ters et al., 2010).Propofol was proven to be an effective substitute for sevoflurane for pe diatric anesthetic maintenance, with comparable parental and PACU nurse satisfaction a nd overall time in the PACU(Pieters et al., 2010).

Children undergoing strabismus surgery were given either sevoflurane inhalation or TI VA with propofol and remifentanil, according to Chandler et al(2013) . a study

The Face, Legs, Activity, Cry, and Consolability (FLACC) Scale was used by the resear chers to measure postoperative pain, and results showed that the sevoflurane group had a higher FLACC score than the TIVA group did.

Those who underwent TIVA anesthesia spent more time in the PACU than those who u nderwent sevoflurane anesthesia, but the researchers believed that a superior postoperati ve experience with less discomfort was more important than a shorter stay in the PACU (John R Chandler et al., 2013).

A randomized, double-blinded study by Hasani, Gecaj-Gashi, Llullaku, and Jashari (2013) compared propofol and sevoflurane as anesthesia for children undergoing hernia repair surgery. The hyperalgesic effects of inhalation anesthetics and postoperative analgesia were the primary areas of study. Children anesthetized with propofol reported less postoperative pain and did not require analgesics for the first 120 minutes after the procedure, according to the study (Hasani, et al.,2013).

Children anesthetized with sevoflurane, on the other hand, had significantly higher pain scores and required analgesics right after surgery, according to the researchers. Even though the researchers found that the sevoflurane group had a shorter recovery time, the incidence of PONV was higher than in the propofol group.

In laparoscopic day-case surgery, Tan, Bhinder, Carey, and Briggs (2010) compared propofol and sevoflurane anesthesia, evaluating postoperative pain and recovery quality. While this study included just grown-up patients, comparative outcomes with respect to diminished postoperative torment with propofol use have been displayed in near examinations including the pediatric populace.

Patients in the sevoflurane bunch announced fundamentally more torment, and thus, morphine utilization was higher in the postoperative period in the sevoflurane bunch contrasted with the propofol bunch(Tan, Bhinder, Carey, & Briggs, 2010).

The researchers discovered that the incidence of PONV did not differ between the groups and that the propofol group had a shorter time to discharge, in contrast to other studies. This study's findings were in line with those of (Cheng, Yeh, & Flood, 2008),

who found that patients anesthetized with propofol experienced less postoperative pain than patients anesthetized with inhalation anesthetics.

Chapter Three

Methodology

This chapter provides an overview of the research conducted for this study. It consists of the following elements: structured design, study population, site and setting, sample and sampling, randomization, blindness, inclusion and exclusion criteria, tools, tools' validity, and reliability, protocol, procedure, and ethical considerations for anesthesia.

3.1Study Design

A prospective, randomized, controlled, double-blind study with 80 patients, 40 patients in each group was conducted.

3.2 Study population

The target population consists of 80 children between the ages of 3 and 10 who were undergoing elective tonsillectomy/adenoidectomy and who had ASA I and II.

3.3 Inclusion criteria

- Patients undergoing elective tonsillectomy/adenoidectomy surgery.

- Patients between 3 and 10 years of age.

- American Society of Anesthesiologists (ASA) 1 and II.

3.4 Exclusion criteria

-Major systemic disease

-Complicated surgeries.

-Psychological disorder.

-Patients with co-morbid conditions like anemia, diabetes mellitus, asthma, hypertension, cardiac diseases and other systemic problems.

-Patients belonging to ASA class III and above.

3.5 Sample size calculation

The Pocock formula for sample size is used.

A formula that can be used to compare proportions P1 and P2 in two groups of equivalent size is Pocock's sample size formula:

n = [P1 (1-P1) + P2 (1-P2)] (Zα/2 + Z β) 2(P1-P2) 2Where :

needed sample size

P1: the estimated percentage of the study's results in the group that received combination therapy (P1 = 0.40).

P2: the estimated percentage of the study's result in the placebo-treated group (P2 = 0.70).

The intensity of statistical significance

Z/2: Denotes the desired degree of statistical significance (1.96 for p = 0.05, for example).

Z: Stands for the required power (typically 0.84 for 80 percent power)

n = [0.40(1-0.40) + 0.70 (1-0.70)] (1.96+ 0.84) 2 (0.40-0.70) 2 n = [0.40 (0.60) + 0.70(0.30)] (2.8) 2 (0.30) 2 n = [0.24 + 0 .21] (7.84) 0.09 n = [0.45] (7.84) 0.09

N 39 individuals. So, a total of 80 patients should be looked out for the study (40 in each group).

3.6 Blindness

The group assignment was hidden from the patients as well as the nursing staff who were caring for the patients postoperatively.

3.7 Randomization

Randomization is accomplished by using opaque and well-sealed envelopes. A computer was used to generate the sequence. The number was printed on envelopes, and the group type, along with the serial number, is written on the card. When the patients arrive, the envelopes are opened to reveal the group to which they will be assigned.

Table1

Assign subjects to Groups

Subject #	Group Assigned	Subject #	Group Assigned	Subject #	Group Assigned	Subject #	Group Assigned
1	A	25	B	49	B	73	B
2	B	26	B	50	B	74	B
3	A	27	A	51	A	75	B
4	A	28	A	52	A	76	A
5	A	29	A	53	A	77	A
6	B	30	B	54	B	78	B
7	A	31	A	55	A	79	B
8	B	32	B	56	A	80	A
9	A	33	B	57	A		
10	B	34	B	58	B		
11	A	35	B	59	A		
12	B	36	B	60	B		
13	B	37	B	61	B		
14	A	38	A	62	B		
15	B	39	A	63	B		
16	A	40	A	64	A		
17	A	41	B	65	B		
18	B	42	A	66	A		
19	A	43	A	67	A		
20	B	44	B	68	A		
21	B	45	A	69	B		
22	A	46	B	70	A		
23	A	47	B	71	B		
24	A	48	B	72	A		

3.8 Data Collection

1. Information regarding the patient's demographics (age, sex, height, weight, and BMI), anesthetic time, and surgery time were gathered. The total number of medications that were administered to the patient during the procedure and afterward were noted. Fentanyl dose, Propofol/mg dose, Atracurium dose, and Inhalation Anesthesia dose were documented

2. Eighty ASA-I & II children aged 3 to 10 years underwent elective tonsillectomy/adenoidectomy with the approval of the Institutional Review Board (IRB) of An-Najah National University and the Research Committee of the Palestinian Ministry of Health and informed written consent and assent were obtained. One of two groups was randomly chosen for the patients.

Propofol group 1 (P) (experimental group) n=40 patients

Sevoflurane group 2 (S) (control group), n=40 patients.

Patients were observed using an electrocardiogram (ECG), heart rate (HR), non-invasive blood pressure, pulse oximetry, and rectal temperature. According to the hospital's protocol, normal saline was administered at a rate of 4 mL/kg/hr during the perioperative phase. In group 1(P) (experimental group), anesthesia was induced with a 3 mg/kg propofol bolus injection and maintained with a 100–250 µg/kg/min of propofol infusion , Air/O2 (50:50) was used in all patients to maintain normo-capnia , In group 2(S) (control group) Sevoflurane was used to induce and maintain anesthesia in the group at rates of 7% and 1 MAC sevoflurane according to this age group. Intubation was facilitated by using atracurium (0.5 mg/kg) and fentanyl (1-2 µg/kg) was administered. Air/O2 (50:50) was used in all patients to maintain normo-capnia (EtCO2 between 35 and 40 mm Hg). As side effects during induction such as coughing, holding one's breath, laryngospasm, and pain after receiving a propofol injection were noted. All children were administered acetaminophen 20 mg/kg after being intubated.

Based on clinical indicators like Bp and HR, the anesthesiologist would modify the sevoflurane concentration or propofol infusion rate to maintain sufficient anesthesia. All the patients were given neostigmine 40 µg/kg and atropine 20 µg/kg to reverse residual neuromuscular block.

The use of anesthetics was then gradually end. Once the gag reflex has returned, the patient was breathing regularly, had intentional movement in all of their extremities, and had opened their eyes, the endotracheal tube was removed. The patient was subsequently moved to the post-anesthesia care unit and placed in the lateral decubitus posture (PACU). Every child in PACU received oxygen at a rate of 4-6 liters per minute using a facemask. Heart rate, non-invasive blood pressure, and respiration rate were documented in PACU.

Time of anesthesia (from the beginning of induction to the end of extubation); length of surgery (after anesthetic induction till the end of surgery)); time to extubation (End of surgery till the recovery of the patients with ensuring spontaneous breathing were documented. A VAS-P was used to measure pain. When the child's VAS-P score was 4 or above, rescue analgesia which is Diclofen suppository 12.5 mg was administered.

3.9 TIVA-p group

In order to induce anesthesia, an intravenous line with gauge 22 was set up, 1-2 µg /kg fentanyl and 3 mg/kg of propofol mixed with 1 mg/kg of Lidocaine were supplied to induce anesthesia, and 0.5 mg/kg of Atracurium was given to help with endotracheal intubation using a cuffed tube. The anesthesiologist adjusted the dose of fentanyl 0.5-1 µg/kg while maintaining anesthesia with an infusion of propofol at 100-250 µg/kg/h and Air/O2 (50:50) was used in all patients to maintain normo-capnia .

3.10 SEVO anesthesia group

Each patient in the SEVO group underwent intubation by the same anesthetist. Sevo 7% in 100% O2 was used as a starting point, and then an IV cannula was placed so that fentanyl 1-2 µg/kg and propofol 3 mg/kg could be administered. Atracurium was administered using a cuffed tube at a dose of 0.5 mg/kg to aid in endotracheal intubation. A combination of 50 percent Air and 50 percent O2 was used to maintain anesthesia while titrating the amount of 1 MAC sevoflurane according to this age group.

3.11 Data sheet and its validity

The data collection form was created after reviewing the pertinent literature. The content validity of the data collection form was determined after a review by a panel of experts. Among the experts were two anesthesia nurses, two anesthesiologists, one PACU nurse, and one statistician. Each item on the data collection form was evaluated for its relevance and appropriateness. The contents of the data collection form were discussed by the panelists. All of the panelists' comments were considered when the final data collection form was revised. The panelists approved the study's final data collection form. The questionnaire gathered demographic information from the participants and continued with the items on the datasheet.

3.12 Ethical Consideration

The study is being carried out in accordance with the Helsinki Declaration, has been approved by An-Najah National University's Institutional Review Board (IRB), and has been approved by the Palestinian Ministry of Health's research ethical committee. Prior to participation, parental consent forms and assent from children were obtained. Because the research involves human subjects, strict ethical principles must be followed. The participants were asked to consent and are assured that their participation or information would not be used against them. They were also guaranteed their right to privacy and anonymity. Anonymity is preserved by coding the participants and erasing the names associated with the numbers.

3.13 Privacy

Confidentiality is protected by preventing unauthorized access to the data. All patients who participate in the study are fully informed about the research's purpose and assured that their anonymity will be maintained during analysis and reporting of the findings. Patients were reassured that the data would not be associated with any individual names in order to protect their anonymity and confidentiality.

3.14 Harm

Participation would produce no harm to the participants, and their names would never be revealed to anyone.

3.15 Statistical Methods

SPSS Version 20 is used for data analysis. Descriptive statistics (frequencies, percentages, Means, Standard Deviations) were used. The following Tests and Methods were used to analyze the results assuming that the P-Value < 0.05 is considered significant:

1. Chi-Square test: tests the differences in percentages between the study groups of patients for qualitative variables such as: Gender and the indicators of : Thirstiness, Tiredness, Hungriness, Bleeding, Incidence of Vomiting, Incidence of Nausea, Retching, Pain on the Area of Surgery, Analgesic (morphine), Drowsiness / Dizziness.

2. Two Independent Samples T test: test the differences in means between the study groups for quantitative variables such as: Age, Weight, Length, BMI, Anesthesia time, surgery time, Total Fentanyl, Total Propofol, Total Atracorum, SAS (Sedation Agitation Scale), VAS_N (Measure of Nausea), VAS_P (Measure of Pain).

Chapter Four

Results

80 children between the ages of 3 and 10 who were classified as ASA I and II received elective tonsillectomy/adenoidectomy as part of this prospective randomized, double-blind research. Two anesthetic groups with a total of 40 patients each were randomly assigned to the subjects: group 1 (P), which received propofol, and group 2 (S), which received sevoflurane.

Table 2.4

Comparisons between Group S (Inhalational Anesthesia (Sevoflorane)) and Group P (TIVA (Propofol)) regarding Demographic data (N=80).

Variable	Group S (N=40)	Group P (N=40)	Total (N=80)	P-value*
Gender: Male	26(65%)	23(58%)	49(61%)	0.491
Female	14(35%)	17(43%)	31(39%)	
Age	5.6 ± 2	6.7 ± 2.11	6.15 ± 2.12	0.019
Weight	22.03 ± 4.99	24.4 ± 6.1	23.21 ± 5.67	0.060
Length	111.78 ± 12.54	118.78 ± 15.2	115.28 ± 14.29	0.028
BMI	17.46 ± 2.24	17.08 ± 2	17.27 ± 2.12	0.417

* P-values are related to the Two independent samples T-test test for Quantitative variables and the Chi-square test for Qualitative variables, the numbers in the table represent (Mean ± Standard deviation) or N (%).

The results in table (2.4) above show that there are significant differences at 0.05 level between group S and group P only in age, and length. The results show that the mean of the ages in group S (Mean=5.6) is significantly lower than the mean of the ages in group P (Mean=6.7), the P-value of the test is 0.019<0.05. Also, the results show that the mean of the lengths in group S (Mean=111.78) is significantly lower than the mean of the lengths in group P (Mean=118.78. P-value of the test is 0.028<0.05.

Table 3.4

Comparisons between Group S (Inhalational Anesthesia (Sevoflorane)) and Group P (TIVA (Propofol)) regarding the Intraoperative Measurements.

Variable	Group S (N=40)	Group P (N=40)	Total (N=80)	P-value*
surgery time	47.5 ± 14.92	42.13 ± 13.49	44.74 ± 14.37	0.099
Total Anesthesia time (Anesthesia time+ surgery time	57.5 ± 15.46	52.13 ± 13.49	54.74 ± 14.64	0.105
Total Fentanyl/ µg	26.75 ± 8.81	25.95 ± 7.52	26.35 ± 8.15	0.664
Total Propofol/mg	66.38 ± 21.27	175.25 ± 62.69	120.81 ± 71.86	0.000
Total Atracorum	10.43 ± 3.41	12.25 ± 3.66	11.34 ± 3.63	0.024

* P-values are related to the two independent samples T-test and the numbers in the table represent (Mean ± Standard deviation).

The results in the table (3.4) above show that there are significant differences at 0.05 level between group S and group P only in the total propofol and the total Atracurium. The results show that the mean of the total propofol in group S (Mean=66.38) is significantly lower than the mean of the total propofol in group P (Mean=175.25), the P-value of the test is <0.001. Also, the results show that the mean of the total Atracurium in group S (Mean=10.43) is significantly lower than the mean of the total atracorum in group P (Mean=12.25. P-value of the test is 0.024<0.05.

Table 4.4

Comparisons between Group S (Inhalational Anesthesia (Sevoflorane)) and Group P (TIVA (Propofol)) regarding SAS (Sedation Agitation Scale), VAS_N (Measure of Nausea), and VAS_P (Measure of Pain).

Variable	Group S (N=40)	Group P (N=40)	Total (N=80)	P-value*
SAS (Sedation Agitation Scale)	4.55 ± 0.93	3.83 ± 0.71	4.19 ± 0.9	0.000
VAS_N (Measure of Nausea)	1.69 ± 2.23	0.55 ± 0.9	1.11 ± 1.78	0.004
VAS_P (Measure of Pain)	1.75 ± 2.45	0.8 ± 1.42	1.28 ± 2.04	0.037

* P-values are related to the two independent samples T-test and the numbers in the table represent (Mean ± Standard deviation).

The results in table (4.4) above show that there are significant differences at 0.05 level between group S and group P in SAS (Sedation Agitation Scale), VAS_N (Measure of Nausea), and VAS_P (Measure of Pain).

The results show that the mean of SAS in group S (Mean=4.55) is significantly higher than the mean of SAS in group P (Mean=3.83), the P-value of the test is <0.001. And, the results show that the mean of VAS_N in group S (Mean=1.69) is significantly higher than the mean of VAS_N in group P (Mean=0.55), the P-value of the test is 0.004<0.05. And also, the results show that the mean of VAS_P in group S (Mean=1.75) is significantly higher than the mean of VAS_P in group P (Mean=0.8). P-value of the test is 0.037<0.05.

Table 5.4

Comparisons between Group S (Inhalational Anesthesia (Sevoflorane)) and Group P (TIVA (Propofol)) regarding the Thirstiness Indicator.

Quesyion: Are you thirsty?	Group S (N=40)	Group P (N=40)	Total (N=80)	P-value*
1 hour after operation	24(60%)	9(23%)	33(41%)	0.001
2 hours after operation	35(88%)	31(78%)	66(83%)	0.239
3 hours after operation	31(78%)	30(75%)	61(76%)	0.793
4 hours after operation	33(83%)	30(75%)	63(79%)	0.412
5 hours after operation	25(63%)	27(68%)	52(65%)	0.639
6 hours after operation	23(58%)	13(33%)	36(45%)	0.025
Total	40(100%)	40(100%)	80(100%)	-----

* P-values are related to the Chi-square test for Qualitative variables, the numbers in the table represent frequencies and percentages N (%).

The results in table (5.4) above show that there are significant differences at 0.05 level between group S and group P in the thirstiness indicator only at 1 hour after operation, and at 6 hours after operation. Regarding at 1 hour after operation, the percentage of the thirst cases in group S (N=24, P=60%) is significantly higher than the percentage of the thirst cases in group P (N=9, P=23%), the P-value of the test is 0.001<0.05. Regarding at 6 hours after operation, the percentage of the thirst cases in group S (N=23, P=58%) is significantly higher than the percentage of the thirst cases in group P (N=13, P=33%). P-value of the test is 0.025<0.05.

Figure 2

Regarding the Thirstiness Indicator.

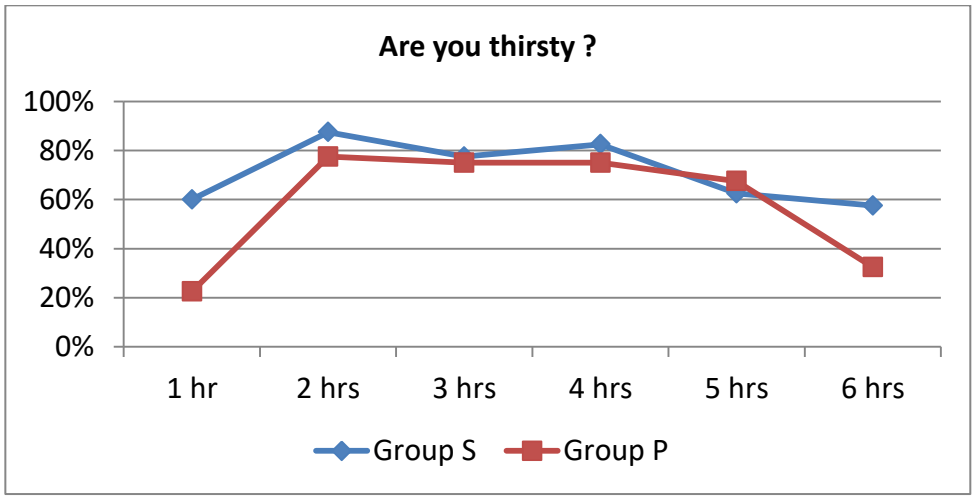


Table 6.4

Comparisons between Group S (Inhalational Anesthesia (Sevoflorane)) and Group P (TIVA (Propofol)) regarding Tiredness Indicator.

Question: Are you tired?	Group S (N=40)	Group P (N=40)	Total (N=80)	P-value*
1 hour after operation	28(70%)	7(18%)	35(44%)	0.000
2 hours after operation	22(55%)	18(45%)	40(50%)	0.371
3 hours after operation	8(20%)	9(23%)	17(21%)	0.785
Total	29(73%)	23(58%)	52(65%)	0.160

* P-values are related to the Chi-square test for Qualitative variables, the numbers in the table represent frequencies and percentages N(%).

The results in table (6.4) above show that there are significant differences at 0.05 level between group S and group P in the tiredness indicator only at 1 hour after operation, the percentage of the tired cases in group S (N=28, P=70%) is significantly higher than the percentage of the tired cases in group P (N=7, P=18%).

Figure 3

Regarding Tiredness Indicator.

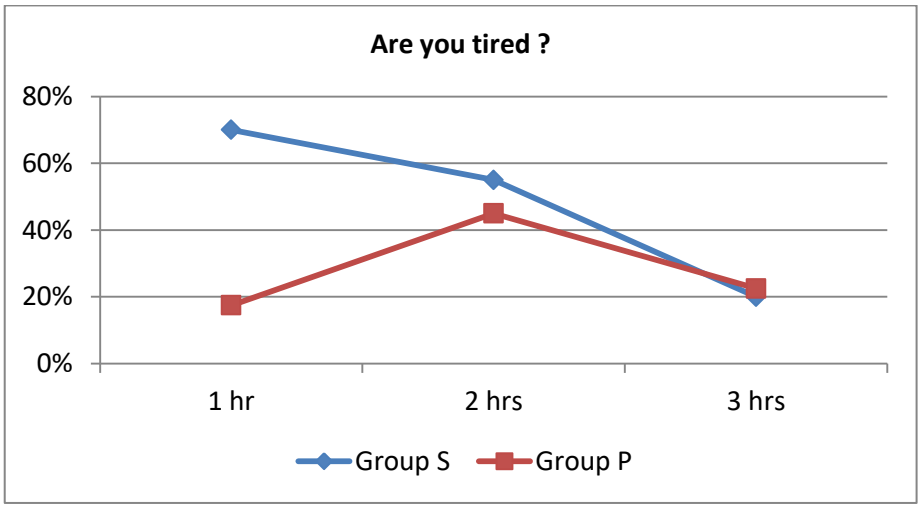


Table 7.4

Comparisons between Group S (Inhalational Anesthesia (Sevoflorane)) and Group P (TIVA (Propofol)) regarding the Hungriness Indicator.

Question: Are you hungry?	Group S (N=40)	Group P (N=40)	Total (N=80)	P-value*
1 hour after operation	19(48%)	0(0%)	19(24%)	0.000
2 hours after operation	27(68%)	11(28%)	38(48%)	0.000
3 hours after operation	36(90%)	30(75%)	66(83%)	0.077
4 hours after operation	36(90%)	24(60%)	60(75%)	0.002
5 hours after operation	29(73%)	25(63%)	54(68%)	0.340
6 hours after operation	18(45%)	11(28%)	29(36%)	0.104
Total	40(100%)	39(98%)	79(99%)	0.314

* P-values are related to the Chi-square test for Qualitative variables, the numbers in the table represent frequencies and percentages N(%).

The results in table (7.4) above show that there are significant differences at 0.05 level between group S and group P in the hungriness indicator only at 1 hour after operation, at 2 hours after operation, and at 4 hours after operation. Regarding at 1 hour after operation, the percentage of the hungriness cases in group S (N=19, P=48%) is significantly higher than the percentage of the hungriness cases in group P (N=0, P=0%), the P-value of the test is <0.001. Regarding at 2 hours after operation, the percentage of the hungriness cases in group S (N=27, P=68%) is significantly higher than the percentage of the hungriness cases in group P (N=11, P=28%), the P-value of the test is <0.001. And at 4 hours after operation, the percentage of the hungriness cases in group S (N=36, P=90%) is significantly higher than the percentage of the hungriness cases in group P (N=24, P=60%). P-value of the test is 0.002<0.05.

Figure 4

Regarding the Hungriness Indicator

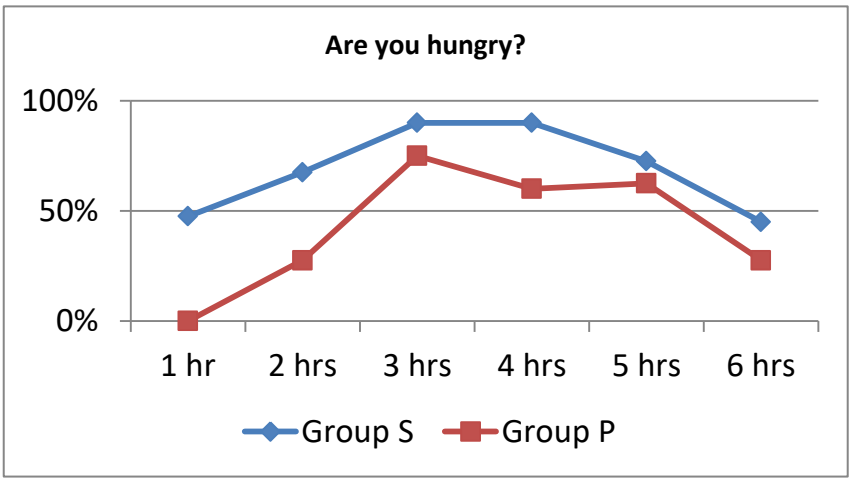


Table 8.4

Comparisons between Group S (Inhalational Anesthesia (Sevoflorane)) and Group P (TIVA (Propofol)) regarding Bleeding Indicator.

Question: If there's any bleeding?	Group S (N=40)	Group P (N=40)	Total (N=80)	P-value*
1 hour after operation	6(15%)	0(0%)	6(8%)	0.011
2 hours after operation	3(8%)	0(0%)	3(4%)	0.077
3 hours after operation	1(3%)	1(3%)	2(3%)	1.000
4 hours after operation	0(0%)	0(0%)	0(0%)	-----
5 hours after operation	0(0%)	0(0%)	0(0%)	-----
6 hours after operation	0(0%)	0(0%)	0(0%)	-----
Total	7(18%)	1(3%)	8(10%)	0.025

* P-values are related to the Chi-square test for Qualitative variables, the numbers in the table represent frequencies and percentages N (%).

The results in table (8.4) above show that there are significant differences at 0.05 level between group S and group P in the bleeding indicator only at 1 hour after operation, and in the total of time intervals. Regarding at 1 hour after operation, the percentage of the bleeding cases in group S (N=6, P=15%) is significantly higher than the percentage of the bleeding cases in group P (N=0, P=0%), the P-value of the test is 0.011<0.05. Regarding the total of time intervals, the percentage of the bleeding cases in group S (N=7, P=18%) is significantly higher than the percentage of the bleeding cases in group P (N=1, P=3%). P-value of the test is 0.025<0.05.

Figure 5

Regarding Bleeding Indicator.

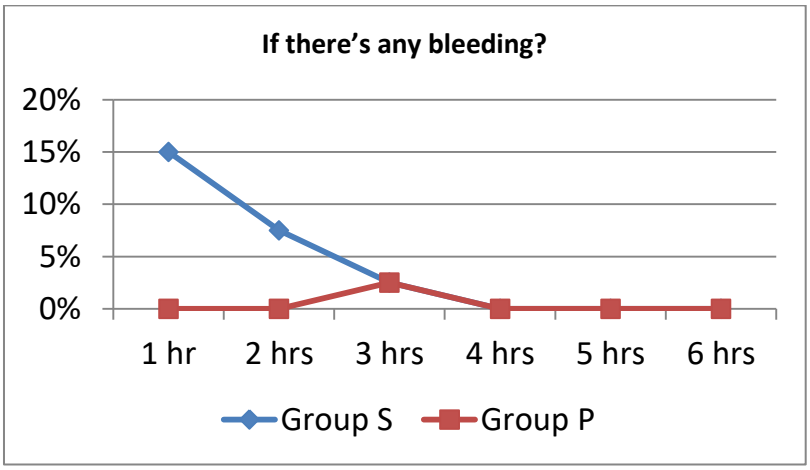


Table 9.4

Comparisons between Group S (Inhalational Anesthesia (Sevoflorane)) and Group P (TIVA (Propofol)) regarding Incidence of Vomiting Indicator.

Question: Incidence of vomiting?	Group S (N=40)	Group P (N=40)	Total (N=80)	P-value*
1 hour after operation	12(30%)	1(3%)	13(16%)	0.001
2 hours after operation	6(15%)	3(8%)	9(11%)	0.288
3 hours after operation	1(3%)	0(0%)	1(1%)	0.314
4 hours after operation	0(0%)	1(3%)	1(1%)	0.314
5 hours after operation	0(0%)	1(3%)	1(1%)	0.314
6 hours after operation	0(0%)	0(0%)	0(0%)	-----
Total	15(38%)	5(13%)	20(25%)	0.010

* P-values are related to the Chi-square test for Qualitative variables, the numbers in the table represent frequencies and percentages N(%).

The results in table (9.4) above show that there are significant differences at 0.05 level between group S and group P in the incidence of vomiting indicator only at 1 hour after operation, and in the total of time intervals. Regarding at 1 hour after operation, the percentage of the incidence of vomiting cases in group S (N=12, P=30%) is significantly higher than the percentage of the incidence of vomiting cases in group P (N=1, P=3%), the P-value of the test is 0.001<0.05. Regarding the total of time intervals, the percentage of the incidence of vomiting cases in group S (N=15, P=38%) is significantly higher than the percentage of the incidence of vomiting cases in group P (N=5, P=13%). P-value of the test is 0.010<0.05.

Figure 6

Regarding Incidence of Vomiting Indicator

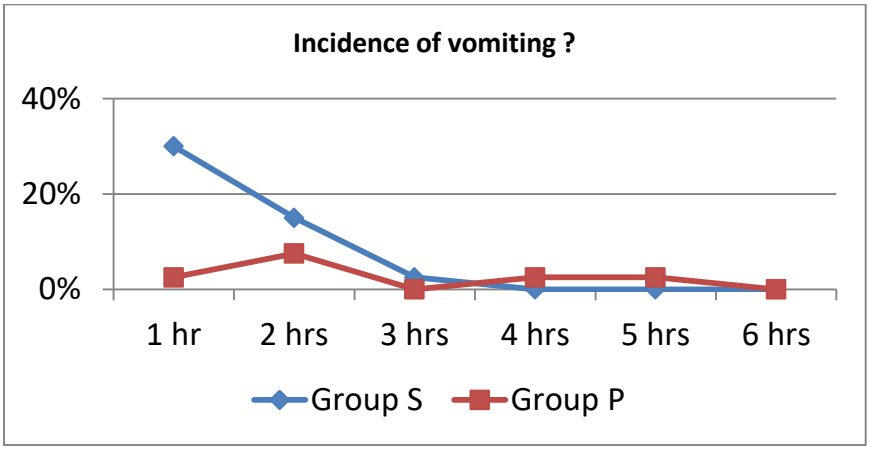


Table 10.4

Comparisons between Group S (Inhalational Anesthesia (Sevoflorane)) and Group P (TIVA (Propofol)) regarding the Incidence of Nausea.

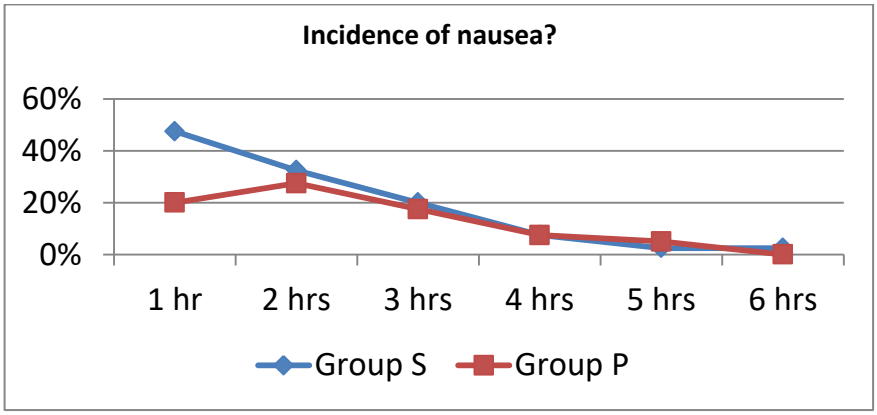
Question: Incidence of nausea?	Group S (N=40)	Group P (N=40)	Total (N=80)	P-value*
1 hour after operation	19(48%)	8(20%)	27(34%)	0.009
2 hours after operation	13(33%)	11(28%)	24(30%)	0.626
3 hours after operation	8(20%)	7(18%)	15(19%)	0.775
4 hours after operation	3(8%)	3(8%)	6(8%)	1.000
5 hours after operation	1(3%)	2(5%)	3(4%)	0.556
6 hours after operation	1(3%)	0(0%)	1(1%)	0.314
Total	22(55%)	23(58%)	45(56%)	0.822

* P-values are related to the Chi-square test for Qualitative variables, the numbers in the table represent frequencies and percentages N (%).

The results in the table (10.4) above show that there are significant differences at 0.05 level between group S and group P in the Incidence of nausea indicator only at 1 hour after operation. The percentage of the Incidence of nausea cases in group S (N=19, P=48%) is significantly higher than the percentage of the Incidence of nausea cases in group P (N=8, P=20%). P-value of the test is 0.009<0.05.

Figure 7

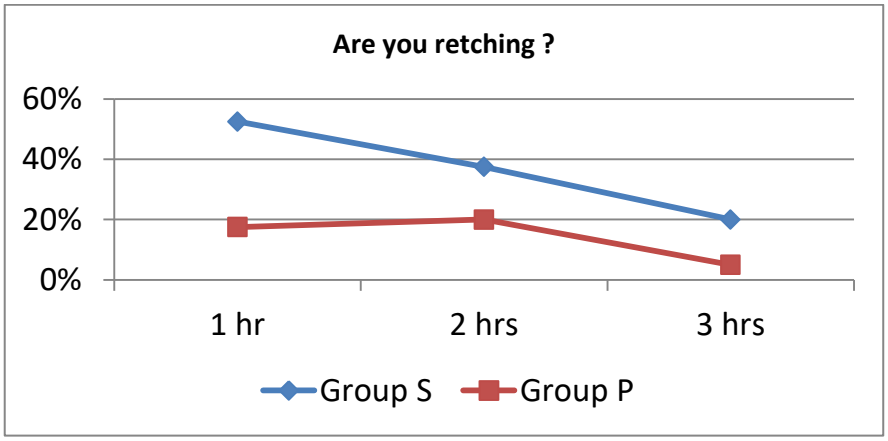
Regarding the Incidence of Nausea.



The results in the table (D.1) above show that there are significant differences at 0.05 level between group S and group P in the retching indicator at 1 hour after operation, at 3 hours after operation and in the total of time intervals. Regarding at 1 hour after operation, the percentage of the retching cases in group S (N=21, P=53%) is significantly higher than the percentage of the retching cases in group P (N=7, P=18%), the P-value of the test is 0.001<0.05. Regarding at 3 hours after operation, the percentage of the retching cases in group S (N=8, P=20%) is significantly higher than the percentage of the retching cases in group P (N=2, P=5%), the P-value of the test is 0.043<0.05. And regarding the total time range, the percentage of the retching cases in group S (N=24, P=60%) is significantly higher than the percentage of the retching cases in group P (N=15, P=38%). P-value of the test is 0.044<0.05.

Figure 8

Regarding the Retching Indicator.



The results in the table (D.2) above show that there are significant differences at 0.05 level between group S and group P in the pain on the area of surgery indicator only at 2 hours after operation, at 4 hours after operation, at 5 hours after operation, and in the total of time intervals.

Regarding at 2 hours after operation, the percentage of the pain on the area of surgery cases in group S (N=34, P=85%) is significantly higher than the percentage of the pain on the area of surgery cases in group P (N=21, P=53%). P-value of the test is 0.002<0.05.

Regarding at 4 hours after operation, the percentage of the pain on the area of surgery cases in group S (N=32, P=80%) is significantly higher than the percentage of the pain

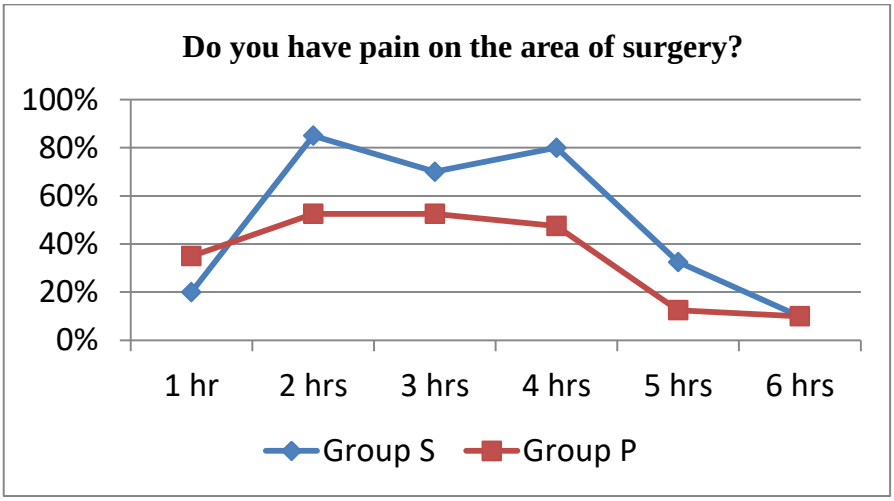
on the area of surgery cases in group P (N=19, P=48%). P-value of the test is 0.002<0.05.

Regarding at 5 hours after operation, the percentage of the pain on the area of surgery cases in group S (N=13, P=33%) is significantly higher than the percentage of the pain on the area of surgery cases in group P (N=5, P=13%). P-value of the test is 0.032<0.05.

Finally, regarding the total of time intervals, the percentage of the pain on the area of surgery cases in group S (N=40, P=100%) is significantly higher than the percentage of the pain on the area of surgery cases in group P (N=28, P=70%). P-value of the test is <0.001.

Figure 9

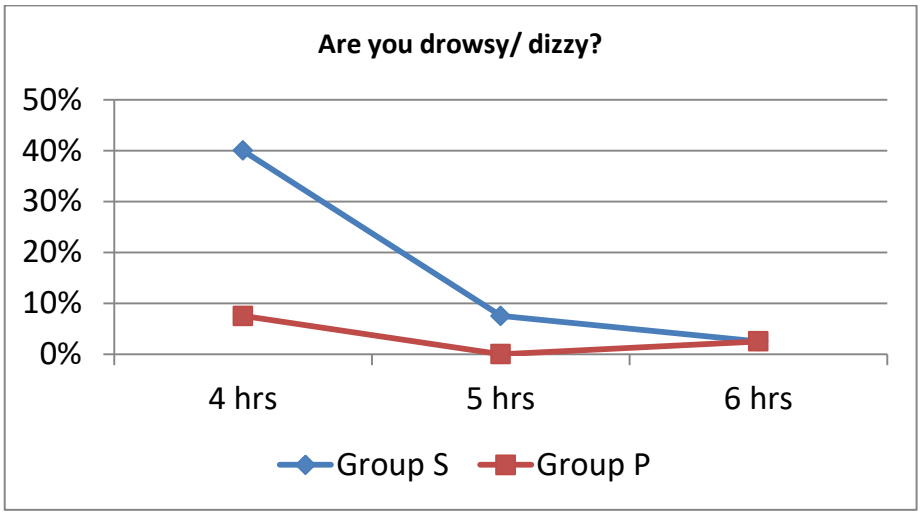
Regarding the Pain on the Area of Surgery Indicator.



The results in table (D.3) above show that there are significant differences at 0.05 level between group S and group P in the drowsiness / dizziness indicator only at 1 hour after operation, and in the total of time intervals. Regarding at 1 hour after operation, the percentage of the drowsiness / dizziness cases in group S (N=16, P=40%) is significantly higher than the percentage of the drowsiness / dizziness cases in group P (N=3, P=8%). P-value of the test is 0.001<0.05. And regarding the total of time intervals, the percentage of the drowsiness / dizziness cases in group S (N=16, P=40%) is significantly higher than the percentage of the drowsiness / dizziness cases in group P (N=4, P=10%). P-value of the test is 0.002<0.05.

Figure 10

Regarding the Drowsiness / Dizziness Indicator.



Chapter Five

Discussion and Conclusions

5.1 Main study findings

This chapter reviews the discussion of the study result where they are compared with previous literature.

The purpose of this study is to compare the effects of sevoflurane inhalation anesthesia and total intravenous anesthesia (TIVA) with propofol on postoperative emergence agitation in pediatric patients undergoing tonsillectomy/adenoidectomy.

5.2 Length of anesthesia time

With a mean anesthetic time of 57.5 ±15.46 in the sevoflurane group and 52.13 ± 13.49in the P group and a p-value of 0.105, there is no discernible difference between the two groups. This finding conflicts with that of a study conducted by Ahmed et al., which showed that sevoflurane significantly decreased the time of anesthesia when compared to the propofol group(Ahmed, Siddique, Malshetwar, Nagbhire, & Yennawar, 2021).

5.3 Postoperative emergence of agitation

In the current study, Group P (TIVA, Propofol) and Group S (Inhalational Anesthesia, Sevoflurane) in terms of SAS (Sedation Agitation Scale) are contrasted. The findings indicate that the mean of SAS in group S (Mean=4.55) being significantly higher than the mean of SAS in group P.

These findings are in line with those of a study conducted by (Sheikhzade, Razaghipour, Seyedhejazi, Aliakbari Sharabiani, & Marahem, 2020). These findings concur with those of the study, which revealed that postoperative agitation occurred more frequently (62%) in sevoflurane group than in TIVA group (5%), who experienced it less frequently (P 0.001) (Sheikhzade, and associate 2020). Additionally, this finding is in line with research by Kanaya et al., who discovered that using propofol as an anesthetic lowered the incidence of EA (Kanaya et al., 2014).

The finding is also in line with the analysis of data from 116 patients which revealed that the incidence of ED after SEVO was higher than the incidence after TIVA (65.5 vs. 3.4 percent, P=0.00). The SEVO group experienced more postoperative discomfort (median 3 vs 1, P=0.000). A statistically significant, moderate correlation between the Face, Legs, Activity, Cry, ability, and Pediatric Anesthesia Emergence Delirium ratings was seen (rs=0.46, P0.0001). In the TIVA group, parental satisfaction was higher (Kocaturk & Keles, 2018).

In children, EA is a common side effect of sevoflurane anesthesia. During the development of EA, several risk variables such as pain, age, different types of surgery, inhaled anesthetics with rapid emergence, and anesthetic procedures such as sevoflurane may be evaluated (Jo et al., 2019).

The incidence of ED is higher following SEVO anesthesia than after TIVA-p according to earlier research which is consistent with our data. The prevalence of ED, according to reports, ranged from 40% to 80%, depending on several number of circumstances such as rapid awakening in a new environment, immaturity, and irregular recovery, which led to a dissociative state and a pain sensation (Chandler et al., 2013; Moore & Anghelescu, 2017).

According to earlier studies, children who were sedated with SEVO for MRI scans experienced emergence agitation (EA) at a rate of 80% (Dalens, Pinard, Letourneau, Albert, & Truchon, 2006).

One cause of EA has been attributed to rapid awakening (Lee & Sung, 2020). Recent research found no statistically significant differences in extubation and recovery periods between propofol anesthesia and SEVO anesthesia (Kocaturk & Keles, 2018). In keeping with past research, the TIVA-p and SEVO groups experienced the same time to extubation and recovery. In a meta-analysis did not employ extubation time as a primary endpoint, nor did they typically have extubation criteria that were described (Kanaya et al., 2014), which agrees with the current study.

The increased incidence of ED following SEVO anesthesia is caused by unidentified reasons. There are numerous ideas explaining the origins of epileptiform EEG abnormalities, transitory neurological impairment, fast recovery, and pain responses. Gaynor and Ansermino demonstrated the benefits of TIVA over inhalation anesthetics

in their research of pediatric patients under anesthesia. He found that in pediatric patients who got TIVA, laryngospasm, nausea/vomiting, developing delirium, airway responsiveness, stress hormone release, and pain all significantly decreased (Gaynor & Ansermino, 2016).

5.4 Postoperative intensity of nausea, vomiting and retching

In the current study, the mean VAS-N in group S (mean=1.69) is substantially higher than the mean VAS-N in group P (mean=0.55), with a p-value of 0.004. Vomiting and nausea are two of the most frequent causes of postoperative misery in children. Additionally, parents believe that vomiting is the most risky post-operative side effect. In the current trial, utilizing TIVA resulted in a relative risk reduction for vomiting of 0.66 and for retching of 0.36. In comparison to inhalational anesthesia, it is now generally acknowledged that TIVA with propofol reduces the likelihood of intensity of postoperative nausea and vomiting. As a result, TIVA with propofol is the preferred anesthetic for high-risk PONV patients (Oriby & Elrashidy, 2021).

On the other hand, PONV is a common adverse effect of sedation and general anesthesia. The incidence is highest with narcotic- and volatile-based anesthesia and lowest with total intravenous anesthesia based on propofol. Colombian researchers looked at the prevalence of postoperative vomiting in children, and they found that it was 18.95 percent of the time (Jaimes Daza, Alarcón Tarazona, Duarte Villamizar, Meléndez, & Torres, 2020). Similar to our findings, past research in the same field discovered that post-operative nausea and vomiting were significantly less common in the propofol group than in the sevoflurane group (Matsuura, Inoue, & Kawaguchi, 2016).

5.5 Incidence of nausea and vomiting

In the present study, the incidence of nausea cases in group S (N=19, P=48%) is significantly higher than the incidence of nausea cases in group P (N=8, P=20%), the P-value is 0.009. The percentage of the incidence of vomiting cases in group S (N=15, P=38%) is significantly higher than the incidence of vomiting cases in group P (N=5, P=13%), the P-value is 0.010. Same to our results, according to (Pieters et al., 2010), those who underwent propofol anesthesia had a 5.4% chance of contracting PONV and anesthesia with sevoflurane (36.8%). In a study which is not supported ours was shown

that, the TIVA group had more postoperative nausea and vomiting, although the difference was not significant. Sevoflurane anesthesia has been linked to a higher rate of nausea and vomiting than propofol anesthesia in some studies (Sheikhzade et al., 2020).

5.6 Postoperative pain intensity

According to the recent study's results, group P's mean VAS P (Mean=0.8) is substantially lower than group S's mean VAS P (1.75), with a p-value of 0.037. Contradicting our assertion, an Egyptian randomized controlled trial investigation discovered that propofol is superior to sevoflurane for generating and maintaining general anesthesia in children having adenotonsillectomy. It reduces early postoperative pain and the need for painkillers, as well as postoperative agitation, nausea, and vomiting (Atef, Ismail, Al-Touny, & Abo-rehab, 2019).

5.7 Incidence of postoperative Pain in the surgical area

The proportion of patients with pain in the surgical area in group S (N=40, P=100%) is higher than the percentage of cases with pain in the surgical area in group P (N=28, P=70%). P-value of the test is <0.001. in the current study. These results support research by Sheikhzade et al., which found that patients who used sevoflurane experienced more postoperative pain than those who used TIVA (Sheikhzade et al., 2020). Sevoflurane, a halogenated inhalational anesthetic. During surgical and procedural treatments, the volatile anesthetic sevoflurane induces hypnosis, amnesia, analgesia, akinesia, and autonomic blockade(Amanda L Miller, Theodore, & Widrich, 2020). The analgesic effects of seveflorane, may have contributed to the patients in group S experiencing more pain than those in group P. In contrast, According to earlier research (Georgiyants, Pushkar, Vysotska, & Porvan, 2017), sevoflurane anesthesia caused discomfort in 24.3% of children while propofol anesthesia caused pain in 4.5% of children (Georgiyants et al., 2017). Furthermore, (Chandler et al., 2013) discovered that TIVA can reduce pain scores after administration of sevoflurane versus propofol.

5.8 Postoperative Hunger and thirsty

In our results, we compared the Hunger Indicator, thirsty indicator between Group S (Inhalational Anesthesia (Sevoflorane)) and Group P (TIVA (Propofol)). There are significant differences in hunger between groups S and P. The percentage of hunger cases in group S (N=36, P=90%) is significantly higher than the percentage of hunger cases in group P (N=24, P=60%); p=0.002. The thirsty indicator results show significant differences between groups S and P at the 0.05 level is significantly greater than the percentage of thirst cases in group P (group S (N=23, P=58%) vs. group P (N=13, P=33%). The current study's findings are in line with those of (Zhang et al., 2020), who found that long-term fasting, drinking, and parent-child separation may all contribute to irritability following surgery.

5.9 Postoperative bleeding

The percentage of bleeding cases in group S (N=7, P=18%) is significantly higher than the percentage of bleeding cases in group P (N=1, P=3%), with a P-value of 0.025. These findings were similar to those of postoperative primary hemorrhage in adenoidectomy, which occurred in 2.43 percent (20/824) of the patients, with a leading tonsil being one of the most feared consequences in this group of people. It is a medical emergency that, if untreated, can cause rapid hemodynamic deterioration. Hemorrhage is classified into three types: primary bleeding at the time of surgery, secondary bleeding between 4-6 days, and reactionary bleeding between 8-48 hours after surgery (Bangera, 2017). The researcher hypothesized that the child's sobbing and agitation, both of which are linked to irritability, maybe the cause of the bleeding around the surgical site.

5.10 Postoperative drowsiness/dizziness

The percentage of drowsiness/dizziness cases in group S (N=16, P=40 percent) is significantly higher than the percentage of drowsiness/dizziness cases in group P (N=4, P=10 percent), p=0.0020. Halogenated anesthetic exposure may result in drowsiness and lightheadedness (Tannenbaum & Goldberg, 1985).

5.11 Conclusions

In comparison to inhalational anesthesia with sevoflurane, total intravenous anesthesia with propofol decreased the likelihood of postoperative emergence of agitation, intensity of nausea, vomiting, retching, bleeding, hunger, thirsty and drowsiness/dizziness in children patients following tonsillectomy/adenoidectomy.

5.12 Recommendations

Use of total intravenous anesthesia in the induction and maintenance of anesthesia in the form of propofol is advised for anesthesiologists and anesthesia nurses in order to lower the incidence of postoperative agitation in children having onsillectomy/adenoidectomy.

Reducing the likelihood of EA during the perioperative phase, as viable strategies. It is suggested that more research be done on a different drug therapy, such as dexmedetomidine, for the prevention of emergent delirium in children having tonsillectomy under propofol anesthesia.

5.13 Limitation

The fact that the study was limited to a single location may have an impact on the generalizability of the findings.

List of Abbreviation

EA	Emergence Agitation
TIVA	Total Intravenous Anesthesia
OSA	Pediatric Obstructive Sleep Apnea
PONV	Postoperative Nausea Vomiting
SAS	Riker Sedation–Agitation Scale
IV	Intravenous
VAS	Visual Analogue Scale
ASA	American Society of Anesthesiologists'
ECG	Electrocardiogram
BMI	Body Mass Index

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Appendixes

Appendix A

IRP Approval

An-Najah
National University
Health Faculty of medicine&
Sciences
IRB

جامعة النجاح
الوطنية
كلية الطب وعلوم الصحة
لجنة اخلاقيات البحث العلمي

Ref : Mas , May /20/13

IRB Approval Letter

Study Title:

"A comparison of post-operative emergence agitation between inhalational anesthesia and total intravenous anesthesia in children undergoing tonsillectomy/adenoidectomy. A prospective, randomized, double-blind, controlled study

Submitted by:
Ibrahim Sweity

Supervisor:
Dr. Aidah Alkaissi, Dr . Nouraldin Almasri

Date Approved:
28th May 2020

Your Study Title **"A comparison of post-operative emergence agitation between inhalational anesthesia and total intravenous anesthesia in children undergoing tonsillectomy/adenoidectomy. A prospective, randomized, double-blind, controlled study** was reviewed by An-Najah National University IRB committee and was approved on **28th May 2020**.

Hasan Fitian, MD
IRB Committee Chairman
An-Najah National University

IRB

نابلس - ص.ب 7 أو 707 || هاتف 14/8/7/4/7/2342902(09) (970) || فاكسميل 2342910 (09) (970)

Nablus - P.O Box :7 or 707 | Tel (970) (09) 2342902/4/7/8/14 | Faximile (970) (09) 2342910 | E-mail : hgs@najah.edu

Appendix B

Facilitate the search

State of Palestine
Ministry of Health - Nablus
General Directorate of Education in Health

دولة فلسطين
وزارة الصحة– نابلس
الإدارة العامة للتعليم الصحي

Ref.: .....
Date:.....

الرقم: ع ت/١٦٦٨/٢٠١٥ ت
التاريخ: ١٩/٧/٢٠١٥ ت

الأخ مدير عام الإدارة العامة للمستشفيات المحترم ،،،

تحية واحترام،،،

الموضـــوع: تسهيل مهمة بحث

لاحقاً لموافقة معالي وزيرة الصحة، يرجى التكرم بتسهيل مهمة بحث الطالب:

ابراهيم تيسير سويطي، برنامج ماجستير تمريض التخدير، جامعة النجاح، لاجراء رسالة الماجستير بعنوان:

"A comparison of post-operative emergence agitation between inhalational anesthesia and total intravenous anesthesia in children undergoing tonsillectomy/adenoidectomy. A prospective, randomized, double-blind, controlled study "

وذلك تحت اشراف د. عايدة القيسي، ود. نور الدين المصري، حيث سيقوم الباحث بجمع المعلومات وتعبئة استبانة الدراسة في:

- **مستشفى رفيديا.**

كما سيتم الالتزام باساليب واخلاقيات البحث العلمي.

وتقبلوا فائق الاحترام،،،

دولة فلسطين وزارة الصحة الإدارة العامة للتعليم الصحي

د. أمل ابو عوض
مدير عام التعليم الصحي

نسخة: مشرفة الدراسة المحترمة/ جامعة النجاح

P.O .Box: 14
Tel.:09-2333901

ص.ب. 14
تلفون: 09-2333901

Appendix C

Collecting Data Sheet

1. اسم المريض
2. رقم المريض في البحث
3. رقم ملف المريض في المستشفى
4. الجنس
5. العمر
6. رقم الهاتف/ الجوال
7. مكان الاقامة
8. الوزن (كالغرام)
9. الطول (سم)
10. BMI

Intraoperative

1. نوع العملية
2. مده التخدير (دقيقة)
3. مده الجراحة (دقيقة)

Total intra operative drugs
Total Fentanyl/ µg: Total Propofol/mg: Total atracorum : Inhalation anesthesia dose

section-1

Riker Sedation-Agitation Scale (SAS)

Score	Term	Descriptor
7	Dangerous Agitation	Pulling at ET tube, trying to remove catheters, climbing over bedrail, striking at staff, thrashing side-to-side
6	Very Agitated	Requiring restraint and frequent verbal reminding of limits, biting ETT
5	Agitated	Anxious or physically agitated, calms to verbal instructions
4	Calm and Cooperative	Calm, easily arousable, follows commands
3	Sedated	Difficult to arouse but awakens to verbal stimuli or gentle shaking, follows simple commands but drifts off again
2	Very Sedated	Arouses to physical stimuli but does not communicate or follow commands, may move spontaneously
1	Unarousable	Minimal or no response to noxious stimuli, does not communicate or follow commands

Guidelines for SAS Assessment

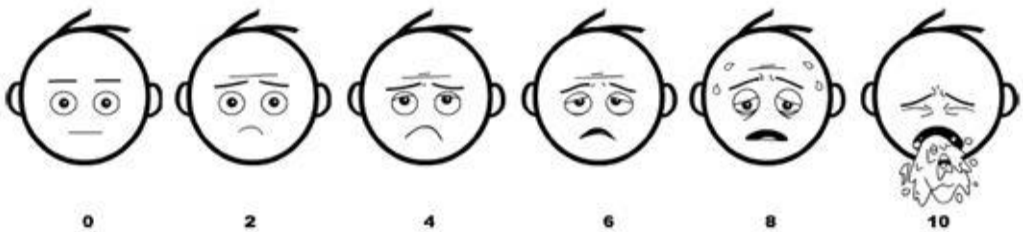
1. Agitated patients are scored by their most severe degree of agitation as described
2. If patient is awake or awakens easily to voice ("awaken" means responds with voice or head shaking to a question or follows commands), that's a SAS 4 (same as calm and appropriate – might even be napping).
3. If more stimuli such as shaking is required but patient eventually does awaken, that's SAS 3.
4. If patient arouses to stronger physical stimuli (may be noxious) but never awakens to the point of responding yes/no or following commands, that's a SAS 2.
5. Little or no response to noxious physical stimuli represents a SAS 1.

This helps separate sedated patients into those you can eventually wake up (SAS 3), those you can't awaken but can arouse (SAS 2), and those you can't arouse (SAS 1).

1. Prospective evaluation of the sedation-agitation scale in adult ICU patients. *Crit Care Med* 1999; 27:1325-1329.
2. Assessing sedation in ventilated ICU patients with the bispectral index and the sedation-agitation scale. *Crit Care Med* 1999; 27:1499-1504.
3. Confirming the reliability of the Sedation-Agitation-Scale in ICU nurses without prior experience in its use. *Pharmacotherapy* 2001; 21:431-436.
4. Validating the Sedation-Agitation Scale with the bispectral index and visual analog scale in adult ICU patients after cardiac surgery. *Intensive Care Med* 2001; 27:853-858.

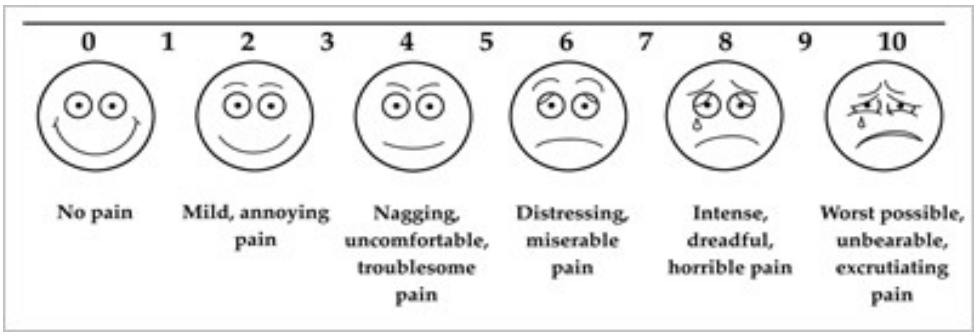
Section- 2

Measure of nausea using VAS-N : The Baxter Retching Faces scale (BARF)



Section -3

Measure of pain using VAS-P:



Section 4

One hour interval

No	Questions	1 hr's aft OP		2 hr's aft OP		3 hr's aft OP	
• 3-	Are you thirsty ?	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
• 4-	Are you tired ?	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
• 5-	Are you hungry ?	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
• 7-	If there's any bleeding?	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
• 9-	Incidence of vomiting ?	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
• 0-	Frequency of vomiting						
• 1-	Incidence of nausea	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
• 3-	Are you retching ?	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
• 5-	Do you have pain on the area of surgery	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
•	Analgesic (morphine 0.03 mg/kg)	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No

No	Questions	4 hr's aft OP		5 hr's aft OP		6 hr's aft OP	
• 2-	Are you drowsy/ dizzy?	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
• 3-	Are you thirsty?	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
• 5-	Are you hungry?	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
• 7-	If there's any bleeding?	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
• 9-	Incidence of vomiting?	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
• 10-	Frequency of vomiting						
• 11-	Incidence of nausea	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
• 12-	Intensity of nausea using VAS-N:						
• 14-	Frequency of retching						
• 15-	Do you have pain on the area of surgery	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
•	Analgesic (morphine 0.03 mg/kg)	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No

Appendix D

Tables

Table D.1

Comparisons between Group S (Inhalational Anesthesia (Sevoflorane)) and Group P (TIVA (Propofol)) regarding the Retching Indicator.

Question: Are you retching?	Group S (N=40)	Group P (N=40)	Total (N=80)	P-value*
1 hour after operation	21(53%)	7(18%)	28(35%)	0.001
2 hours after operation	15(38%)	8(20%)	23(29%)	0.084
3 hours after operation	8(20%)	2(5%)	10(13%)	0.043
Total	24(60%)	15(38%)	39(49%)	0.044

* The P-values are related to the Chi-square test for Qualitative variables, the numbers in the table represent frequencies and percentages N(%).

Table D.2

Comparisons between Group S (Inhalational Anesthesia (Sevoflorane)) and Group P (TIVA (Propofol)) regarding the incidence Pain on the Area of Surgery Indicator.

Question: Do you have pain on the area of surgery?	Group S (N=40)	Group P (N=40)	Total (N=80)	P-value*
1 hour after operation	14(35%)	8(20%)	22(28%)	0.133
2 hours after operation	34(85%)	21(53%)	55(69%)	0.002
3 hours after operation	28(70%)	21(53%)	49(61%)	0.108
4 hours after operation	32(80%)	19(48%)	51(64%)	0.002
5 hours after operation	13(33%)	5(13%)	18(23%)	0.032
6 hours after operation	4(10%)	4(10%)	8(10%)	1.000
Total	40(100%)	28(70%)	68(85%)	0.000

* The P-values are related to the Chi-square test for Qualitative variables, the numbers in the table represent frequencies and percentages N(%).

Table D.3

Comparisons between Group S (Inhalational Anesthesia (Sevoflorane)) and Group P (TIVA (Propofol)) regarding the Drowsiness / Dizziness Indicator.

Question: Are you drowsy/ dizzy?	Group S (N=40)	Group P (N=40)	Total (N=80)	P-value*
4 hours after operation	16(40%)	3(8%)	19(24%)	0.001
5 hours after operation	3(8%)	0(0%)	3(4%)	0.077
6 hours after operation	1(3%)	1(3%)	2(3%)	1.000
Total	16(40%)	4(10%)	20(25%)	0.002

* The P-values are related to the Chi-square test for Qualitative variables, the numbers in the table represent frequencies and percentages N(%).

جـامعـــة النجاح الوطنية

كليـــة الدراســـات العليـــا

مقارنة الاستفاقة من التخدير بعد الجراحة بين التخدير الاستنشاقي والتخدير الوريدي الكلي لدى الاطفال الذين يخضعون لاستئصال اللوزتين او اللحمية

إعداد

ابراهيم السويطي

إشراف

د .عايدة القيسي

د .نور الدين المصري

قدمت هذه الرسالة استكمالا لمتطلبات الحصول على درجه الماجستير في تمريض التخدير، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس –فلسطين.

2022

مقارنة الاستفاقة من التخدير بعد الجراحة بين التخدير الاستنشاقي والتخدير الوريدي الكلي لدى الاطفال الذين يخضعون لاستئصال اللوزتين او اللحمية

إعداد

ابراهيم السويطي

إشراف

د. عايدة القيسي

د. نور الدين المصري

الملخص

تمهيد: استئصال اللوزتين واللحمية، هو" إجراء جراحي يتم إجراؤه مع أو بدون استئصال اللحمية التي تزيل اللوزتين تمامًا، ومن المضاعفات الشائعة عند الأطفال الذين يخضعون للتخدير العام التحريض بعد الجراحة.

الاهداف: لمقارنة تأثير التخدير عن طريق الاستنشاق) سيفوفلوران (والتخدير الوريدي الكلي (TIVA) باستخدام البروبوفول على التحريض الناشئ بعد الجراحة في مرضى الأطفال الذين يخضعون لاستئصال اللوزتين / استئصال الغدانية.

تصميم الدراسة: في هذه الدراسة المرتقبة والمزدوجة التعمية، خضع 80 طفلاً تتراوح أعمارهم بين 10-3 سنوات، منASA – I & II، لاستئصال اللوزتين الاختياري واستئصال اللحمية .تم تعيين المواضيع بشكل عشوائي لواحدة من مجموعتي تحريض التخدير :المجموعة (P) 1 مجموعة البروبوفول، ن 40 = مريضا. -المجموعة (S) 2 مجموعة سيفوفلوران، ن 40 = مريضًا .في المجموعة(P) 1 ، سيتم تحريض التخدير بحقنة بلعة مقدارها 3 مجم / كجم من البروبوفول ويتم الاحتفاظ بها مع تسريب البروبوفول من-100 250 ميكروجرام / كجم دقيقة. في المجموعة(S) 2 ، سيتم إحداث التخدير والحفاظ عليه باستخدام سيفوفلوران7 ٪ و3-2٪ على التوالي.

النتائج: : متوسط SAS في المجموعة S (المتوسط = 4.55) أعلى بكثير من متوسط SAS في المجموعة P (المتوسط = 3.83) ، P = <0.001. ومتوسط VAS_N في المجموعة S (المتوسط = 1.69) أعلى بكثير من متوسط VAS_N في المجموعة P (المتوسط = 0.55) ، P = 0.004. متوسط VAS_P في المجموعة S (المتوسط = 1.75) أعلى بكثير من متوسط VAS_P في المجموعة P (المتوسط = 0.8) ، p = 0.037. فيما يتعلق بحدوث القيء، فإن المجموعة S (N = 12 ، P = 30٪(أعلى بكثير من حدوث القيء في المجموعة P (N = 1 ، P = 3٪ (، P = 0.001. ونسبة حدوث الغثيان في المجموعة S (N = 19 ، P = 48٪(أعلى بكثير من نسبة حدوث الغثيان في المجموعة P (N = 8 ، P = 20٪(. نسبة حدوث التهوع في المجموعة S (N = 8 ، P = 20٪(أعلى بكثير من حدوث التهوع في المجموعة P (N = 2 ، P = 5٪(، نسبة حدوث الألم في منطقة حالات الجراحة في المجموعة S (N = 40 ، P = 100٪(أعلى بكثير من نسبة حدوث الألم في المجموعة P (N = 28 ، P = 70٪ (، P = 0.032 ، ونسبة حدوث النعاس / الدوخة في المجموعة S بشكل ملحوظ أعلى من نسبة حدوث النعاس / الدوخة في المجموعة P (N = 3 ، P = 8٪ (، P = 0.001.

الاستنتاجات: بالمقارنة مع التخدير عن طريق الاستنشاق بالسيفوفلوران، فإن التخدير الكلي عن طريق الوريد مع البروبوفول قلل من احتمالية ظهور الهياج بعد الجراحة، وشدة الغثيان، والقيء، والتهوع، والألم في منطقة الجراحة والنعاس / الدوخة لدى الأطفال المرضى بعد استئصال اللوزتين / استئصال اللحميه.

الكلمات المفتاحية: استئصال اللوزتين، اللحمية، التخدير الوريدي الكلي، التخدير الوريدي، التخدير الاستنشاقي سيفوفلوران، البروبوفول، ظهور التهيج، الغثيان، القيء.