An-Najah National University

Faculty of Graduate Studies

COMPARISON BETWEEN PROPOFOL VS LIDOCAINE PRETREATMENT FOR PROPOFOL INJECTION PAIN AMONG PATIENTS UNDERGOING GENERAL ANESTHESIA

By

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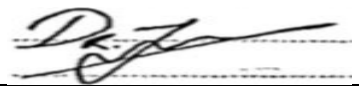
Dr. Jamal Qaddumi	
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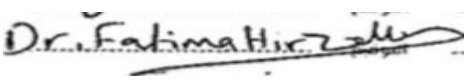
Dr.Fatima Herzallah	
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Dedication

This thesis is dedicated to:

My beloved mother and my great father, for being my first teacher, who have always light my bath and have encouraged me to believe in myself during my long journey and the reason of what I become today .

My beloved brothers and sisters, to all my family, the blessing of life.

My friends who encourage and support me, all people who trust and believes in me

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Finally, special thanks for all people who have cooperated with me in order to achieve the research work directly or indirectly.

Declaration

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

COMPARISON BETWEEN PROPOFOL VS LIDOCAINE PRETREATMENT FOR PROPOFOL INJECTION PAIN AMONG PATIENTS UNDERGOING GENERAL ANESTHESIA

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.

Student's Name: سمر حسين حيان

Signature:

Date: 21/10/2023

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COMPARISON BETWEEN PROPOFOL VS LIDOCAINE PRETREATMENT FOR PROPOFOL INJECTION PAIN AMONG PATIENTS UNDERGOING GENERAL ANESTHESIA

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Abstract

Background: A common general anesthesia that is quick and efficient is propofol. However, anesthesiologists who rate clinical anesthesia outcomes still rank discomfort following propofol administration as a 7-33 clinical issue.

Methodology: A quantitative research approach, true experimental) RCT) study of 100 patients whose ages (18-60) years who were subjected to the criteria of the study general anesthesia for elective surgery was included in this study. Patients were classified into two groups: the first group (study), in which 50 patients were injected with propofol only 3mg / kg,As for the second group (the control group) 40 ml of lidocaine was given pretreatment to propofol and given to 50 patients.

Results: The effect of propofol after injection was to reduce (SBP, DBP, HR, and RR), and increase OSL, as the percentages of change for these variables were (-15.94%, -19.01). %, -5.22%, 1.89%, and -9.52%) respectively. The study also indicated that there were statistically significant differences at $p \leq 0.01$ between the experimental and control groups in favor of the experimental group, and no statistically significant differences were observed between the two groups in HR, OLS, and RR. This means that propofol reduced blood pressure to a greater extent than propofol with lidocaine 40 mg in healthy adult patients undergoing general anesthesia. The trial group experienced significantly less discomfort from propofol injections than the control group (90% of patients did not feel pain from propofol injection and only 10% of patient felt mild pain). The study also showed that only in the control group, the patient's vital signs change following a propofol infusion.

Conclusions: The use of intravenous lidocaine as a pre-treatment in adult patients lessens the discomfort of propofol injections. This method is simple to use, doesn't waste time, and doesn't cost extra money.

keywords :Propofol, Injection, Pain, Lidocaine, anesthesia and hospital.

Chapter One

Introduction and Theoretical Background

This chapter deals in detail with the problem which this study focused on. It is divided into three parts: The first part consists of an introduction of the study, statement of problem, discussion of the significant of the study, the purpose and objectives in addition to research questions. The second part, discusses operational concepts and definitions. The third part, presented the previous studies related to the research problem.

1.1 Introduction

Modern healthcare places a strong emphasis on pain management, with the goal of enhancing patients' comfort and wellbeing throughout medical treatments. The induction of general anesthesia is one such treatment that commonly presents difficulties in terms of patient comfort. (WHO, 2019). According to a meeting held by the World Health Organization (WHO) on October 11, 2004, Geneva hosted the first World Day Against Pain, which aimed to raise awareness about the urgent need for better pain relief for people who are afflicted with diseases like cancer and AIDS. The campaign, run by the International Association for the Study of Pain (IASP) and the European Federation of IASP Chapters (EFIC), calls for the right to the best possible level of physical and mental health to be recognized as including the right to pain relief. (WHO, World Health Organization supports global effort to relieve chronic pain. World Health Organization, 2014). General anesthesia is a medically induced coma with absent of reflexes, this condition could be medically done by inhalation anesthesia or intravenous anesthesia (Sullivan, 2021). Modern medical practice depends heavily on the provision of anesthesia which makes surgical interventions and procedures bearable. Anesthesia can be induced quickly and smoothly exited with propofol, a typical injectable anesthesia, propofol belongs to a group of phenol can irritate the skin, mucous membranes, and venous intima. Modern surgical and procedural practices depend on the routine induction of general anesthesia. Due to its quick start and offset of action and favorable side-effect profile, the short-acting intravenous anesthetic drug propofol has become quite popular. However, there are certain difficulties with propofol's therapeutic utility, one of which is the discomfort brought on by its

intravenous infusion. Due to its quick onset and early recovery without accumulation, propofol is frequently employed to induce general anesthesia; yet, pain is a frequent side effect of propofol injection. (Fu et al., 2022). Propofol injection pain (PIP) has been identified as a frequent and upsetting adverse event that puts patients at risk for discomfort and worry at a crucial juncture in their healthcare journey (Pandey & Tiwari, 2022). Propofol injections can cause either immediate or delayed pain. In high-risk patients, a change in hemodynamics brought on by injection discomfort may result in myocardial ischemia. Therefore, reducing injection discomfort is crucial to preventing such serious side effects and enhancing patients' anesthesia comfort (Fu et al., 2022). Afferent nerve endings located in the veins may be directly irritated to induce immediate pain, whereas the kin in cascade is more likely to be the indirect cause of delayed pain. Bradykinin may increase the interaction between the aqueous phase of propofol and the perivascular free nerve ending, resulting in pain on injection, by producing local vasodilatation and hyper-permeability. This discomfort begins 10 to 20 seconds later (Shabana, 2013).Numerous approaches have been used to stop injection discomfort. The two most successful therapies are selecting an antecubital vein and preinjecting lidocaine along with the venous occlusion approach. On the other hand, the venous occlusion approach might be challenging to execute. Just 50% of patients experienced no injection pain when given the recommended dosage of lidocaine. Propofol injection pain is still not totally eliminated today. (Fu et al., 2022) The occurrence of injection pain, which can make patients uncomfortable and anxious, is a key disadvantage of administering propofol. (Kam et al., 2004). Millions of patients choose propofol every year to induce anesthesia due to its quick onset and short duration of action, simple titration, and acceptable side effect profile. Despite these benefits, roughly three out of five patients report feeling pain after receiving a propofol injection, with one of these patients describing the discomfort as being severe or terrible. A number of patients reported that the process of inducing anesthesia was the most uncomfortable part of the preoperative phase. Consequently, several treatments have been studied to decrease the pain associated with propofol injection (Patyal et al., 2019).From a therapeutic perspective, pharmacological therapies are more practical and convenient to use than the venous occlusion technique because they just call for medication injection as an additional treatment before propofol (Fu et al., 2022).The prevalence of injection discomfort is considered to be between 28 and 90%. The

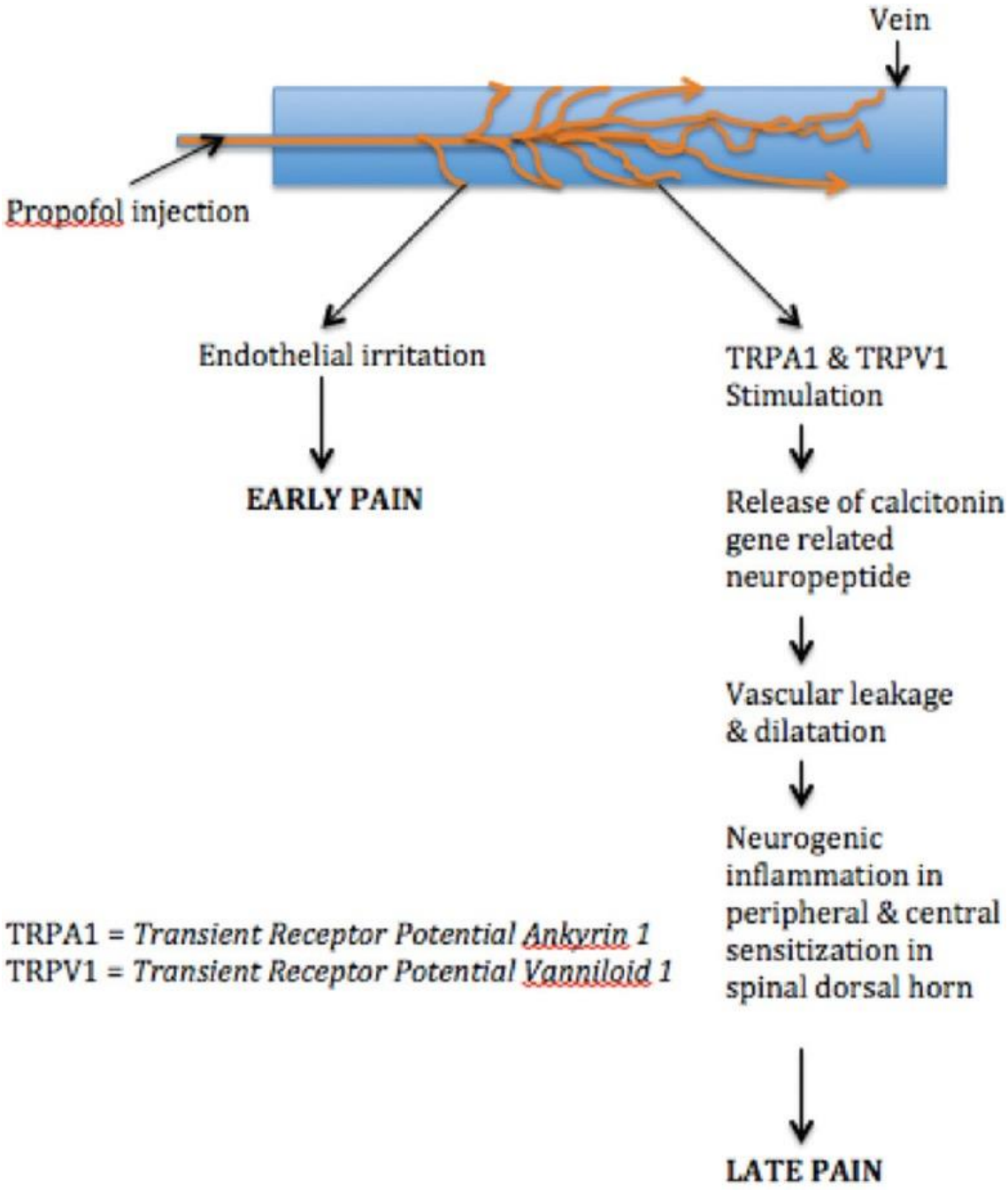
administration of propofol via the antecubital fossa in the forearm, a quick injection of the drug, altering the lipid emulsion form, and administering lidocaine, opioids, or NSAIDs beforehand have all been used to reduce the severity of propofol pain. The most effective method involved pretreatment with lidocaine and vascular occlusion before administering propofol (Pandey & Tiwari, 2022). Lidocaine is an tertiary amide anesthetic medication initially used intravenously as an anti-arrhythmic agent and also used as local and topical anesthesia (Gabriel et al., 2022).A comprehensive evaluation conducted in 2000 found that vascular occlusion with lidocaine (lignocaine) pretreatment was the most effective approach. That advise however, the technique was never extensively used. As a result, over 100 new studies have looked into different and complementary ways to lessen the discomfort associated with the propofol injection (Jalota et al., 2011). Since using lignocaine with propofol has been practically standard for many years, the number of clinical trials using lignocaine, either by itself or in combination with other medications, was likely at its highest. One study found that 60 mg of lignocaine was the most effective dose for venous blockage; nevertheless, 40 mg is the most often utilized dose when premixed with 200 mg of propofol. Propofol-induced discomfort can be effectively treated with lignocaine-based venous occlusion; some publications suggest a 60-second occlusion period. However, when the length of venous occlusion was 15, 30, or 60 seconds, another investigation revealed no change. In one trial, there was no benefit shown in the pediatric patient group when lignocaine was administered prior to propofol infusion (Desousa, 2016).

Pain from injections continues to be the most typical adverse effect. Even though there may not be any serious side effects from the discomfort, most patients recall it as one of their unfavorable interactions with anesthesiologists. Pain following a propofol injection the biggest issue in present practice with clinical anesthesia, the discomfort might not be instantaneous. If discomfort is the source while delayed pain is brought on by venous endothelium release of mediators from the kin in chain, including kininogen numerous pharmacological and non-pharmacological interventions, including those based on the injection site, vein size, infusion rate, temperature, microfiltration, venous blockage, brine, and others, have been researched and produced. Although several research have demonstrated the effectiveness of pretreatment with a lidocaine injection in treating this pain, very few studies have examined the effectiveness of using varying concentrations and volumes of lidocaine in considerably lowering pain (Patyal et al., 2019). The

purpose of the current study is to evaluate and contrast the effectiveness of intravenous lidocaine in lowering the intensity of pain after propofol injections. Propofol injection discomfort is apparently lessened by lidocaine and nitroglycerin. By acting as a local anesthetic on the vein, lidocaine stabilizes the kinin system and lessens the discomfort associated with receiving a propofol injection. The occurrence and severity of discomfort associated with propofol injections can be decreased by injecting lidocaine into a vein either before or after propofol. (Jeong & Yoon, 2016). Although topical warming and lidocaine appear to relieve pain associated with propofol injection, lidocaine can have adverse effects on the circulation and circulatory system, produce edema at the intravenous access site, and make it difficult to determine the appropriate dose of propofol for induction (Jeong & Yoon, 2016). Various methods and substances have been investigated to lessen the discomfort brought on by administering propofol. One such tactic is the application of local anesthetics, with lidocaine being a popular choice. Lidocaine, a well-known local anesthetic, has been useful in easing pain brought on by propofol injection. Nevertheless, disagreements surround the best strategy for PIP prevention and the selection of the pretreatment agent. By thoroughly contrasting propofol and lidocaine pretreatment for the reduction of PIP in patients having general anesthesia, this study intends to address this pressing problem. This research aims to investigate and compare the effectiveness of two different pretreatment options (propofol and lidocaine) in reducing or preventing pain associated with the injection of propofol in patients who are undergoing general anesthesia and to provide a greater understanding of the benefits and drawbacks connected with each strategy by doing a thorough analysis of the existing literature, synthesizing the available data, and maybe presenting fresh insights from our own investigation.

Figure 1.1

Mechanism of angialgia with propofol



1.2 Theoretical Framework

Introduction

Propofol injection pain is still a prevalent worry while general anesthesia is being induced. The purpose of this study is to investigate and contrast the efficaciousness of lidocaine and propofol as prospective pretreatment medications for reducing the discomfort associated with propofol injections. The study is based on the theoretical underpinnings of anesthesia management, pharmacology, and pain regulation.

Introduction to Anesthesia-Related Pain:

It is by describing the pain associated with anesthesia during propofol injection. In addition to how important it is to reduce pain during induction for the patient's comfort and enjoyment, it is necessary to emphasize how pain affects the patient's experience and potential outcomes (Jeong & Yoon, 2016).

Mechanism of Propofol Injection Pain: (Patyal et al., 2019).

The pharmacological characteristics of propofol and its interactions with the vascular system are just two of the many variables that contribute to the intricate process that underlies the discomfort associated with propofol injections. Propofol injection-related discomfort can be ascribed to the release of pain mediators as well as direct vascular irritation. An outline of the relevant mechanisms is provided below:

Irritation of Blood Vessels:

Propofol Emulsion:

Because propofol is administered quickly, the vascular endothelium may become mechanically irritated. Propofol is manufactured as a lipid emulsion. Pain and discomfort could result from the injection's disruption of blood vessels.

Vasodilation:

Vasodilatory effects of propofol may be a factor in pain perception. Pain receptors may get activated and blood flow may increase as a result of blood vessel dilatation.

Release of Pain Mediators:

Histamine Release:

A powerful inflammatory mediator called histamine has been linked to propofol administration. Pain and a feeling of warmth can result from histamine release-induced bronchoconstriction, vasodilation, and activation of pain receptors.

Kinin System Activation:

Bradykinin may also be released as a result of propofol's activation of the kinin system. One well-known pain mediator that can excite nerve terminals and influence how pain is perceived is bradykinin.

Activation of Nociceptors:

Nociceptive Pathways:

Specialized nerve endings called nociceptors react to unpleasant stimuli. When pain mediators are released together with the irritation that a propofol injection causes, nociceptors in the surrounding tissues may become active.

Transmission of Pain Signals:

The brain and spinal cord of the central nervous system receive pain signals from activated nociceptors. This transmission is a component of the intricate process of feeling pain.

Patient-Related Factors:

Individual Sensitivity: Different people may experience different levels of pain during a propofol injection. Individual pain thresholds, age, gender, and past anesthetic experiences are just a few variables that may affect how sensitive an injection is.

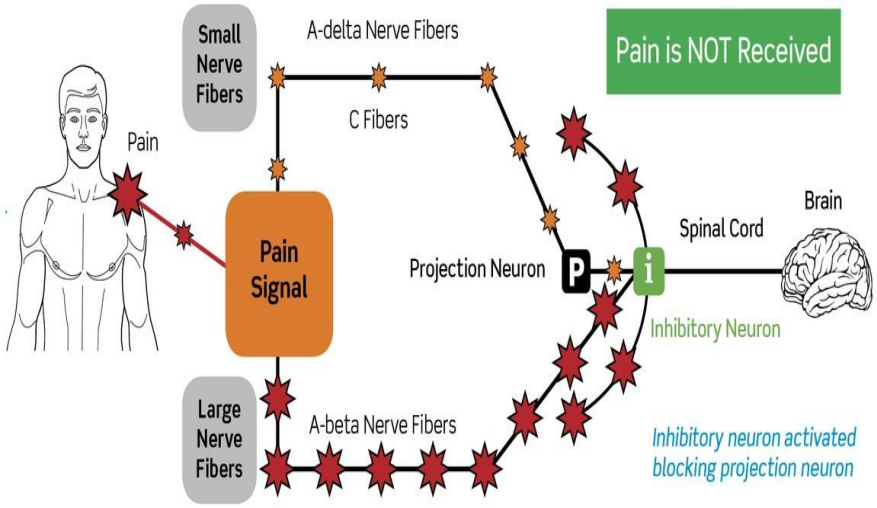
Gate Control Theory of Pain: (Campbell et al., 2020)

Gate Control Theory of Pain is a scientific theory concerning how people perceive pain psychologically. In the 1960s, two scientists Wall and Melzack, carried out research that resulted in publications pertaining to gate control theory. According to the gate control theory, certain pain impulses can pass through "gates" on the spinal cord and reach the brain, while other signals are either completely blocked or significantly reduced. There

are various sorts of nerves and they are not all the same. The two primary afferent axons, referred to as A and C fibers, are nerves that receive information from the body and transmit impulses to the brain. Every one of these categories has subgroups., including A-delta, A-beta, and A-alpha. The diameter of every A type fiber is greater than that of every C type fiber. Myelination is another physical distinction between the two kinds. A myelin sheath made up of unique cells surrounds the A type nerve fibers, aiding in the quick transmission of electrical information. The nerve fibers of the C type lack myelination. Although the electrical signals go down the fibers, they do so more slowly than they would otherwise due to the absence of specialized cells. According to the Gate Control Theory, the balance between pain and non-pain signals in the input controls how much pain is perceived. By preventing nerve transmission and reducing pain signals during propofol injection, the local an aesthetic lidocaine may function as a gate control mechanism, according to the study's application of this idea.

Figure 1.2

How Gates Control the Flow of Pain Signals



Neuroscience of Pain and Anesthesia:

Peripheral and Central Nervous System Mechanisms of Pain Perception

(Stein et al., 2008)**.**

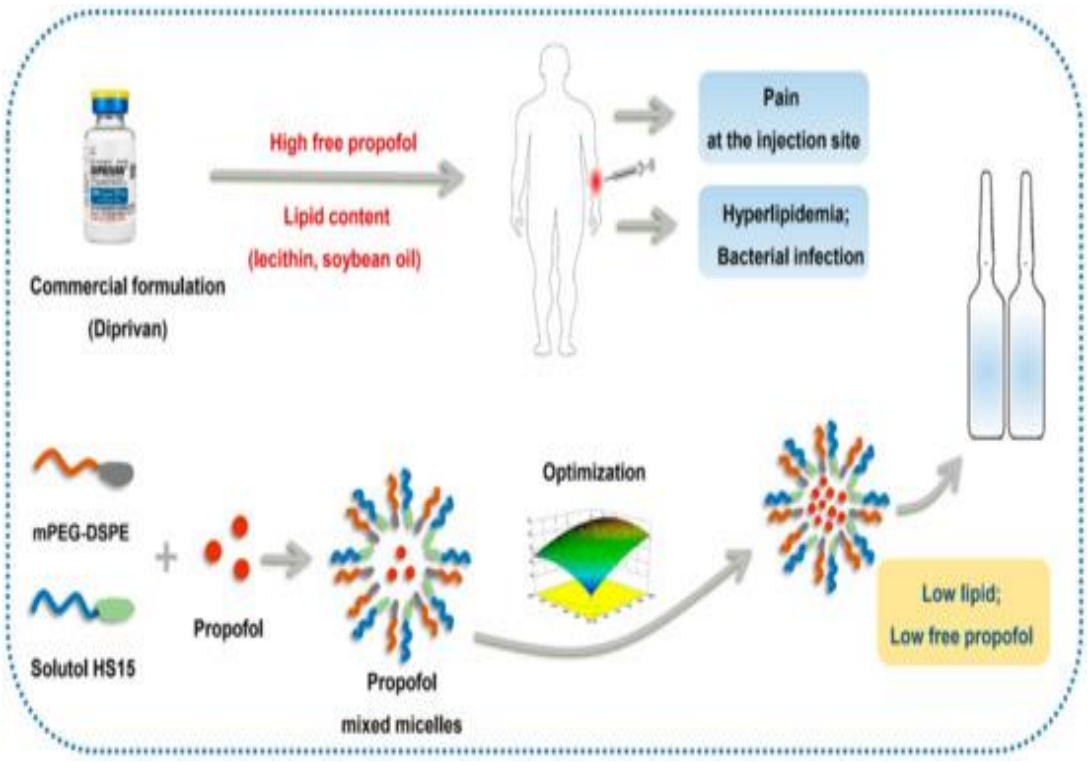
An inflammatory reaction is often linked to tissue damage, aberrant immunological response, and/or nerve harm. Primary afferent neurons in peripherally injured tissue (skin, muscles, joints, viscera) convert painful mechanical, chemical, or thermal inputs into action potentials. These neurons cell bodies are found in the dorsal root ganglia (DRG) and trigeminal areas. They produce small-diameter unmyelinated (C-fibers) and myelinated (Aδ) axons. The latter are thought to be the main fibers in clinical pain and are especially sensitive to capsaicin, a legend at the transient receptor potential vanilloid-1 (TRPV1) channel. Nociceptive signals travel to the brain via synaptic transmission and modification in the primary sensory neuron and spinal cord. There, they are ultimately interpreted as "pain" in the context of cognitive and environmental factors. Determining the effectiveness of pretreatment medicines requires an understanding of the neurophysiological underpinnings of pain. Propofol and lidocaine function in the peripheral and central nerve systems through different methods. The cerebral processing of pain may be affected by propofol, which is largely a GABAergic agonist, while peripheral nerve terminals may be affected by the local an aesthetic effect of lidocaine.

Pharmacological Properties of Propofol and Lidocaine

A thorough analysis of the pharmacological characteristics of lidocaine and propofol is necessary. Propofol may cause discomfort due in part to its quick onset and lipid solubility. On the other hand, the quick onset and sodium channel blocking properties of lidocaine may counterbalance the discomfort that propofol induces by blocking the transmission of nociceptive signals (Euasobhon et al., 2016).

Figure 1.3

The schematic representation for the propofol mixed micelles.



Patient's Variables and Individual Differences:

It is important to acknowledge the impact of individual diversity in pain perception. Propofol and lidocaine's effectiveness as pretreatment drugs may be influenced by patient-specific characteristics like age, gender, and past pain experiences (Loryan et al., 2011).

Anesthesia Management and Patient Comfort:

The process of an aesthesia is complex and goes beyond managing pain. The study takes into account more general implications, like how pretreatment affects patient comfort, satisfaction, and the preoperative experience as a whole (Pandey & Tiwari, 2022).

Clinical Relevance and Practical Application:

The practical implementation of research findings in clinical settings is encompassed within the theoretical framework. Creating a successful pretreatment regimen can

improve an aesthesia management technique, lessen the incidence of propofol injection pain, and improve the overall patient experience (Fujii & Nakayama, 2004).

Summary

This study intends to provide a thorough analysis of the relative effectiveness of propofol and lidocaine as pretreatment agents for propofol injection pain by integrating these theoretical perspectives. This will help anesthesiologists make valuable decisions and improve an aesthesia protocol.

1.3 Problem Statement

In modern an aesthesia, the administration of propofol is a standard procedure that is essential to the induction of general an aesthesia. The presence of pain following a propofol injection, however, is an often-reported problem that can negatively affect the patient's experience and level of pleasure with the aesthetic procedure. Lidocaine has been suggested as a possible pre-administration pretreatment to try and reduce this pain.

Successful completion of many surgical and diagnostic treatments depends on the effective induction of general anesthesia, which is a critically important and frequently performed medical technique. However, due to the difficulty and distress involved in receiving an infusion of propofol, a common intravenous anesthetic drug, it often poses a major therapeutic problem. Because it has the potential to have a detrimental impact on the patient's experience and overall procedure outcomes, this uncomfortable event, also known as propofol injection pain (PIP), is receiving increasing attention. PIP is a complex etiology that includes both mechanical and chemical components. It has been suggested that the formulation of propofol, in particular its lipid emulsion, activates pain receptors, causing a burning or stinging sensation after injection. This pain might compromise the smooth induction of anesthesia and the entire patient-surgeon interaction by causing patient anxiety, discomfort, and even exacerbating needle fear. Pretreatment techniques have been among the most extensively researched strategies to reduce PIP in response to this clinical problem. Notably, the well-known local anesthetic lidocaine has been used frequently as a pretreatment medication to lessen the discomfort brought on by the injection of propofol. There isn't any agreement on the best pretreatment method, and the decision between propofol and lidocaine is still up for debate. The problem statement of the study revolves around the need to elucidate the

comparative effectiveness and safety of propofol versus lidocaine pretreatment in mitigating PIP among patients undergoing general anesthesia. Furthermore, as the healthcare landscape evolves and patient-centered care gains prominence, understanding the most effective approach to manage PIP becomes even more critical. Patients increasingly expect a comfortable and pain-free experience during their healthcare encounters, and healthcare providers are challenged to meet these expectations. Therefore, addressing the problem of PIP is not only a clinical necessity, but also aligns with the broader goals of enhancing patient satisfaction and improving the overall quality of healthcare delivery. This study aims to investigate and compare the effectiveness of two different pretreatment options (propofol and lidocaine) in reducing or preventing pain associated with the injection of propofol in patients who are undergoing general anesthesia at Rafedia hospital. To improve anesthesia inductions and patients' experiences in the preoperative situation.

Key Facets of the Statement of Problem Include:

The frequency and severity of discomfort following propofol injection varies among patient groups and therapeutic settings, despite its ubiquitous use. A careful analysis of both propofol and lidocaine pretreatment is required due to the lack of agreement on the best way to treat propofol injection pain Incidence and severity of propofol injection pain.

Variable Responses to Pain Mitigation Strategies:

Patients' reactions to pain management techniques might vary depending on number of factors, including age, sex, past medical history, and general health. Personalized an aesthesia treatment requires the identification of patient-specific factors that affect how well propofol and lidocaine reduce injection discomfort.

Overall Patient Experience and Satisfaction:

Because pain perception is subjective, it is necessary to investigate the full patient experience, including satisfaction, comfort levels, and any aftereffects of an aesthesia. Clinicians can improve patient care by customizing an aesthesia regimen based on their understanding of the effects of propofol and lidocaine on the overall patient experience.

Safety and Adverse Effects:

Ensuring patient safety requires examining the safety profile related to pretreatment with propofol and lidocaine. In order to properly inform the risk-benefit analysis of various pain mitigation techniques, any potential negative effects, such as allergic reactions or systemic problems, must be thoroughly investigated.

Taking these factors into account, this study compares the efficaciousness of pretreatment techniques with lidocaine and propofol in order to address the complex issue of injection pain. The aim of the study's findings is to offer evidence-based perspectives that can improve clinical practice and an aesthesia procedure, thereby improving the perioperative period for patients receiving general an aesthesia.

1.4 The Significance of study

The research study on the influence of lidocaine as a pretreatment for propofol injection discomfort tackles a real-world problem in medical practice that may have an effect on patient comfort, safety, and the effectiveness of medical treatments as a whole. It is a significant contribution to the field of anesthesiology and perioperative care since its findings may have an impact on anesthesia protocols, patient care, and medical guidelines.

First: Theoretical Significance

The theoretical significance of the study lies in its potential to increase patient satisfaction and comfort, enhance safety during induction, improve anesthesia procedures, advance knowledge of pain modulation, and benefit the medical profession. It will contribute to the body of general scientific knowledge while at the same time addressing a specific practical issue in the field of anesthesiology. Through the following points:

- Clinical Practice Improvement: Due to its quick onset and brief duration of action, propofol is frequently used to induce anesthesia However, individuals who receive propofol injections may experience pain and discomfort. This study examines whether preparation with the local anesthesia lidocaine can lessen the discomfort brought on by a propofol injection in clinical settings, which is a practical problem.

- Patient Comfort and Satisfaction: Even quick medical treatments like a propofol injection can cause pain, which can make patients uncomfortable. Researchers are investigating the use of lidocaine as a pretreatment with the goal of improving patient comfort during an important stage of anesthesia induction. Because tension and anxiety are reduced, improved outcomes and more patient satisfaction may result from improved patient comfort.
- Anesthesia Safety and Efficacy: Patient cooperation is crucial during the crucial stage of medical treatments known as anesthesia induction. Pain and discomfort during this stage could result in consequences like patient resistance or involuntary movements. The study could lead to less painful anesthesia inductions with lidocaine pretreatment, which would be advantageous to patients and medical professionals alike.
- Mechanism of Action and Pharmacology: Research may focus on the processes underlying the pain brought on by a propofol injection and how a local anesthetic like lidocaine can lessen that pain. It may be possible to expand the scope of pain management research by better understanding the pharmacological interactions between these two drugs and the neurological circuits involved in pain perception and anesthesia induction.
- Optimizing Anesthesia Protocols: To enhance patient outcomes, anesthesia protocols are continually being improved. If the study reveals that lidocaine is efficient in lowering the discomfort associated with propofol injections, this could lead to the inclusion of this pretreatment in conventional anesthesia protocols. The broad objectives of evidence-based medicine are in line with the narrower objectives of protocol optimization, which can assist medical practitioners in providing better treatment to patients undergoing anesthesia Contribution to Scientific Literature: In many domains, scientific study adds to the body of knowledge. This study might contribute to the body of knowledge already available on anesthesia practices, pain management procedures, and drug interactions. The findings may be pertinent to researchers and healthcare workers interested in pain modulation and patient-centered care in addition to anesthesiologists

Second: Applied Significance

In the disciplines of anesthesiology, surgery, and perioperative care, research comparing propofol and lidocaine preparation for propofol injection pain (PIP) in patients having general anesthesia is of important practical significance. This study tackles a critical clinical issue and has wide-ranging effects on patient care, healthcare spending, and overall healthcare quality. The following major points might be used to summaries the practical significance of the study:

- Enhanced Patient Comfort and Satisfaction: PIP can significantly worsen patients' pain and anxiety during surgery or other medical procedures. This study can increase patient comfort and satisfaction, which are crucial components of patient-centered care, by determining the most efficient pretreatment technique.
- Optimized Anesthesia Induction: A crucial stage of surgical and procedural therapy is anesthesia induction. PIP reduction using evidence-based pretreatment strategies might lead to a more efficient and effective anesthesia induction, minimizing patient discomfort and procedural delays.
- Reduced Postoperative Complications: Anesthesia induction pain and anxiety can result in postoperative problems such heightened stress reactions, hemodynamic instability, and sluggish recovery. These problems may be reduced and patient outcomes may be enhanced with effective PIP management.
- Healthcare Resource Allocation: The resources needed to administer anesthesia can vary depending on the pretreatment strategy chosen. Finding the most cost-effective strategy can help healthcare organizations allocate resources more effectively, which may lower healthcare expenditures.
- Clinical Guideline Development: Clinical guidelines for inducing anesthesia may be influenced by the findings of this study, which could also standardize procedures in hospitals and give anesthesia physicians with unambiguous advice.
- Enhanced Patient Safety: By minimizing uncomfortable and anxious adverse events, PIP reduction helps to ensure patient safety. Enhancing patient safety during anesthesia induction is in line with larger healthcare efforts.
- Professional Practice Enhancement: Evidence-based insights on PIP management can help anesthesia clinicians and healthcare workers, improving professional

practice standards and possibly lowering medicolegal concerns associated with anesthesia care.

- Quality Improvement Initiatives: The results of this study will help healthcare organizations improve the quality of patient care, which is becoming increasingly recognized as a crucial component of healthcare delivery.

In conclusion, the comparison of propofol and lidocaine pretreatment for PIP has important practical consequences for the provision of healthcare in addition to being relevant from an intellectual standpoint. The potential of this research to improve clinical procedures, improve patient experiences, and advance the more general objectives of patient-centered care and healthcare quality improvement is what gives it its practical significance.

1.5 Aim of study

The current study aims mainly to investigate and compare the effectiveness of two different pretreatment options (propofol and lidocaine) in reducing or preventing pain associated with the injection of propofol in patients who are undergoing general anesthesia.at Rafedia hospital

1.6 Study Objectives

- To determine the effect of propofol injection on demographic characteristics (sex, age & weight)) among healthy adults undergoing general anesthesia at Rafidia Hospital.
- To assess the severity of pain at the injection site among healthy adults undergoing general anesthesia at Rafidia Hospital.
- To investigates the effect of lidocaine as pretreatment on propofol injection site pain among healthy adults undergoing general anesthesia at Rafidia Hospital.
- To determine the effect of lidocaine on hemodynamic state(vital signs) such as (Blood pressure, Heart rate, Respiratory rate & O2 saturation) among healthy adults undergoing general anesthesia at Rafidia Hospital.
- To determine the effect of propofol on hemodynamic state(vital signs) such as (Blood pressure ,Heart rate ,Respiratory rate & O2 saturation) among healthy adults undergoing general anesthesia at Rafidia Hospital.

1.7 Study Hypothesis

H1: There is no statistically significance relation between lidocaine pretreatment injection and demographic characteristics (gender, age, and weight) among healthy adults undergoing general anesthesia at Rafidia Hospital.

H2: There is no statistically significance relation between propofol injection and demographic characteristics (gender, age, and weight) among healthy adults undergoing general anesthesia at Rafidia Hospital.

H3: There is no statistically significant relationship between lidocaine pretreatment injection and the hemodynamic state (Blood pressure, Heart rate, Respiratory rate & O2 saturation) among healthy adults undergoing general anesthesia at Rafidia Hospital.

H4: There is no statistically significant relationship between propofol injection and the hemodynamic state (Blood pressure, Heart rate, Respiratory rate & O2 saturation) among healthy adults undergoing general anesthesia at Rafidia Hospital.

H5: There is no statistically significance positive relations between the patient's feeling of pain during the injection of propofol among healthy adults undergoing general anesthesia at Rafidia Hospital.

H6: There is no statistically significance relation between intravenous lidocaine pretreatment administration and pain relief resulting from propofol injection among healthy adults undergoing general anesthesia at Rafidia Hospital.

1.8 Concepts and Operational Definition

Introduction: In this section, the conceptual definitions and operational definitions related to this study are defined. Conceptual definitions for (RCT, Effect, Lidocaine, Pretreatment, Propofol Injection Pain, Healthy Adults & General Anesthesia). While the operational definitions are (Basic vital signs before and after lidocaine or propofol injection, Visual analog score (VAS) during injection propofol, VAS after propofol injection directly.

1.8.1 Concepts Definition

Randomized controlled trial (RCT): An experimental research design known as an RCT is used to assess the efficacy of interventions or therapies. To evaluate the impact of the intervention, participants are randomly chosen to several groups, including a treatment group and a control group. This is so that any differences in result can be attributed to the research intervention. Randomization balances participant characteristics (observed and unobserved) between groups (Hariton & Locascio, 2018).

Effect:

The term "effect" in the context of this study refers to the influence or impact of administering lidocaine as a pretreatment on the pain felt by healthy persons undergoing a propofol injection. The result could be a decrease in or prevention of the pain brought on by a propofol injection (Patyal et al., 2019).

Lidocaine:

A topical anesthetic called lidocaine can be used to numb or desensitize a bodily part. It's utilized as a pretreatment in this study, perhaps to lessen any pain or discomfort that the injection of propofol would induce (Beecham et al., 2022).

Pretreatment:

In the context of this study, pretreatment is defined as giving certain drugs or other treatments in advance of the main propofol injection in an effort to lessen or avoid the discomfort associated with the injection. Pretreatment can involve the use of a variety of drugs; in this study, the efficacy of two pretreatment options—propofol and lidocaine—is being compared. refers to a method or action used in advance of the main therapeutic intervention. In this trial, lidocaine is administered as a pretreatment in an attempt to potentially reduce any pain that may arise following the propofol injection (Voutchkov, 2017).

Propofol Injection Pain (PIP):

It refers to the discomfort or agony that may be brought on by administering propofol, a popular intravenous anesthetic. Propofol is known to cause discomfort after injection; the study seeks to determine whether pretreatment with lidocaine can lessen this pain (Desousa, 2016).

Healthy Adults:

In this situation, healthy adults are the target demographic being studied for the research. Typically, health (hypertension, diabetic patient, cardiac or vascular or renal or hepatic or respiratory or neurologic diseases, or any allergy for propofol neither lidocaine). Everyone's health might differ, and being healthy as an adult doesn't imply that you won't occasionally get sick or have small health problems. It usually refers to those who can perform their everyday duties without major obstacles and who are in generally good bodily and mental condition. Furthermore, keeping excellent health frequently necessitates consistent work and focus on stress management, preventive care, and lifestyle choices (Alam et al., 2023).

General Anesthesia:

In order to induce unconsciousness and a lack of sensation in a patient during a surgical or medical operation, the state known as general anesthesia is used. It is usually carried out by a nurse anesthetist or an anesthesiologist and uses medicine to accomplish a number of important objectives, such as:

Unconsciousness:

The patient is not conscious of their surroundings or the surgical procedure and is in a deep, reversible state of unconsciousness.

Analgesia:

During surgery or other medical procedures, general anesthesia offers the patient extremely effective pain relief, keeping them from feeling discomfort.

Muscle Relaxation:

It causes the muscles to relax, which is crucial for keeping the patient immobile and enabling safe execution of surgical procedures.

Amnesia:

Neither the anesthesia administration process nor the actual procedure are remembered by the patients In order to make surgical or medical procedures easier, a combination of intravenous and inhaled anesthetic chemicals are usually used to make the patient immobile, numb to pain, and oblivious that they are undergoing an operation or receiving medical care. Under general anesthesia, patients who may experience pain or trauma during treatments are guaranteed comfort, safety, and compliance.

Comparative Analysis:

In this study setting, comparative analysis refers to the methodical assessment and comparison of the efficacy of two distinct pretreatment strategies—propofol and lidocaine—in lowering injection pain during general an aesthesia in patients. The purpose of this analysis is to shed light on the relative effectiveness of various interventions and how they could affect patient happiness and comfort.

Control Group:

A set of participants in an RCT who do not get the experimental therapy (in this case, lidocaine pretreatment) makes up the control group. To gauge the effect of the treatment, we compare them to a baseline. (American Society of Anesthesiologists, 2019).

Treatment Group:

Participants who receive the experimental intervention (lidocaine pretreatment) before to receiving a propofol injection are included in the treatment group. To assess the impact of the pretreatment, the results for this group are contrasted with those of the control group.

1.8.2 Operational Definition

Introduction:

In order to ensure that the research findings are trustworthy, repeatable, and understandable when comparing propofol and lidocaine pretreatment for propofol injection pain in patients undergoing general an aesthesia, these operational definitions give the study's essential variables clarity and uniformity.

Propofol Injection Pain:

Refers to the nociceptive and subjective feeling that a patient has when receiving propofol intravenously for the purpose of inducing general an aesthesia. (Pandey & Tiwari, 2022)

Measurement:

A standardized pain scale, such as the Numeric Rating Scale (NRS) or Visual Analogue Scale (VAS), will be used to measure the pain associated with propofol injections. Patients will be asked to rate the intensity of their pain on a scale of 0 to 10, with 10 denoting the greatest pain possible.

Lidocaine Pretreatment:

The use of the local an aesthetic lidocaine before receiving a propofol injection in order to lessen or avoid the pain that comes with it (Beecham et al., 2022).

Measurement:

The precise timing of lidocaine delivery in relation to propofol injection will be standardized, and the pretreatment will be provided with a defined dosage and method (e.g., intravenous). For every participant, the use of lidocaine as a pretreatment will be noted.

Incidence of Propofol Injection Pain:

The frequency of pain experienced by patients receiving a propofol injection during general an aesthesia (Desousa, 2016).

Measurement:

The percentage of patients who report any level of pain (e.g., NRS or VAS score > 0) during or just after propofol delivery will be used to quantify incidence.

Severity of Propofol Injection Pain:

The level of pain that individuals reporting general an aesthesia reported at the time of the propofol injection.

Measurement:

Patients' numerical responses on a pain scale (e.g., NRS or VAS) were used to determine severity; higher scores correspond to more severe pain.

Demographic and Clinical Factors:

Factors including gender, age, body mass index (BMI), past medical history, and any pertinent clinical features that could impact the frequency and intensity of pain from propofol injections.

Measurement:

To find potential links with pain experiences, demographic and clinical data will be gathered via patient interviews, medical records, and standardized forms.

Overall Patient Satisfaction:

the comprehensive assessment of a patient's satisfaction and ease during the aesthesia procedure, taking into account variables other than pain, like anxiety, communication, and perceived level of care.

Measurement:

A validated satisfaction questionnaire or anesthesia experience questionnaire was used to measure patient satisfaction. Patients were asked to rate different aspects of treatment in the perioperative period.

Safety and Adverse Effects:

Any unfavorable or dangerous side effects that may arise from administering lidocaine with propofol, such as allergic responses, cardiovascular issues, or systemic adverse effects.

Measurement:

Comprehensive clinical monitoring, vital sign assessments, and documentation of any reported adverse events were used to monitor safety and adverse effects.

Basic Vital Signs: Measurements of the heart rate, blood pressure, respiratory rate, and oxygen saturation are considered to be basic vital signs. These markers offer essential details regarding a participant's physiological status.

Before Injection: Before giving propofol or lidocaine, check basic vital signs. Prior to any intervention, scales will be used as baseline values to assess the physiological status of the participant.

After Injection: After receiving an injection of propofol or lidocaine, reassess basic vital signs. Measurements taken after the injection will be used to ascertain whether the interventions caused any acute physiological effects.

The following is the operational process for taking basic vital signs both before and after an injection.

Pre-Injection Assessment: Participants are at rest before to injection. Utilizing the proper tools and methods, heart rate, blood pressure, respiratory rate, and oxygen saturation will be monitored.

Injection: Following baseline measures, the individual will receive the proper intervention (lidocaine or propofol) in accordance with group assignment.

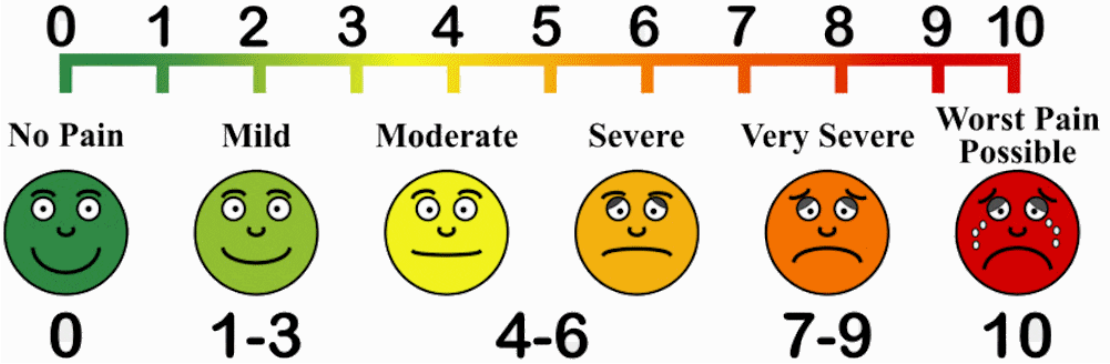
Post-Injection Evaluation: To detect any immediate changes in physiological parameters following injection, baseline vital signs will be taken once more after a predetermined amount of time (for example, immediately following injection or a few minutes later).

Data Recording: Each participant's pre-and post-injection measures will be meticulously and consistently documented.

Visual Analog Score (VAS) during Injection of Propofol: An instrument for measuring subjective pain is the Visual Analogue Score (VAS), which is used during propofol injection to gauge participants' level of discomfort. The VAS is a horizontal line with linguistic adjectives at either end that, at one end, represents "No Pain" (score of 0) and "Worst Pain Imaginable" (score of 10), respectively (Figure 1).

Figure 1.4

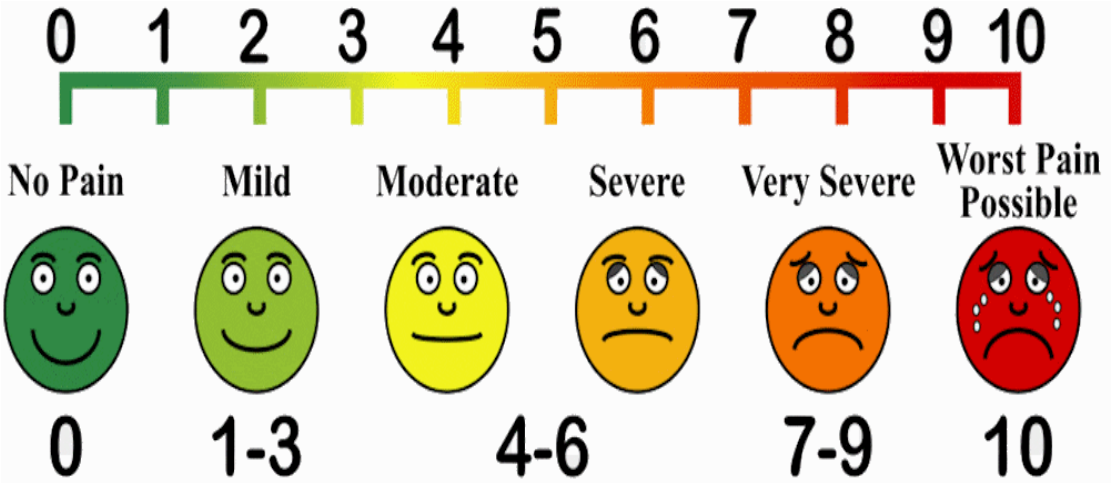
Visual analog score during injection propofol



Visual analog score (VAS) of adding 40 mg Lidocaine Before Injecting Propofol: A tool for subjective pain measurement is the Visual Analog Score (VAS), which is used when adding 40 mg lidocaine before injecting propofol to measure participants' level of relief. A VAS is a horizontal line with linguistic adjectives at either end, representing, at one end, "no pain" (score 0) and "worst conceivable pain" (score 10), respectively. (Figure 2).

Figure 1.5

Visual analog score (VAS) of adding 40 mg lidocaine Before injecting propofol



1.9 Previous Studies and Theoretical Background

Introduction:

A systematic review was used to collect previous published papers, which discussed the same title, objectives, and keywords for this study. This gives us access to a robust database for our research. The keywords used in the database search process are: Effect:, Lidocaine, Pretreatment, Propofol Injection Pain, Healthy Adults, General anesthesia Control Group, Treatment Group, Basic Vital Signs and Visual Analog Score (VAS) . A set of keywords linked to the study title and study objectives were pre-selected. The literature review of scientific research is the basis for clarifying the researchers' approach to topics related to the research topic. Previous studies are considered a nucleus for drawing scientific frameworks for research, as it is not possible to establish any scientific research without previous studies. The following is a presentation of the most important studies available to researchers from previous studies that have been addressed. The subject of this study, some of which are directly related to the current study and others are partly related to its components. The focus was on the main objectives of the studies and the most important results that were reached so that we can compare them with the results of the current research. The studies were presented in the form of international studies, Arab studies and local studies.

1.9.1 International Studies

A study was conducted in Nepal by (Alam et al., 2023),which sought to determine the extent to which the propofol injection following it reduced pain Give 40 milligrams of lidocaine. 64 people who satisfied all inclusion requirements participated in the cross-sectional descriptive study. The American Physical Status Association reported that from March to August 2015, in an operating room at a tertiary care hospital, patients of all genders and ages ranging from 16 to 65 years were seen with venous occlusion for one minute while under propofol treatment with 60 mg of lidocaine. A four-point rating system was used to describe pain (0 = none, 1 = mild, 2 = moderate, and 3 = severe). According to the data, 56 individuals (87.5%) receiving 40 mg of lidocaine did not experience any discomfort, whereas 8 patients (12.5%) experienced mild to moderate pain. There was zero (0%).On the other hand, a study was conducted in Thailand by (Wasinwong et al., 2021) showed that one explanation for the discomfort associated with propofol injection is the direct activation of afferent nerve terminals in the venous endothelium. It has been shown in previous research that ondansetron also blocks sodium channels. This has an effect similar to that of lidocaine. The primary objective was to determine how well ondansetron reduces the discomfort associated with propofol injections compared with placebo and lidocaine. The 240 patients in this experiment were between the ages of 18 and 65, classified as I-III by the American Society of Anesthesiologists, were undergoing elective surgery, and had a 20-gauge intravenous catheter inserted at the hand dorsum. Each of the three patient groups (O, L, and C) got 8 mg of ondansetron, 40 mg of lidocaine, and normal saline, respectively. There were 80 patients in each group. A 20-gauge intravenous catheter was positioned on the hand dorsum to provide the study drugs to the patients in a blind fashion. A minute later, a 30-second syringe pump was used to infuse a 50-milligram dosage of propofol at a rate of 600 milliliters per hour. After then, the propofol syringe pump was momentarily stopped, and the patients were asked to score there, in comparison to the O (82.5%) and C groups (85.0%), the L 40 mg. group had the lowest incidence of pain (66.2%) ($P < 0.01$). In the L, O, and C groups, the median pain scores were 2, 0–4, 4, and 4.5 (2–6), respectively ($P < 0.01$). As compared to the O group (17.5%, 31.2%, 31.2%, and 20.0%, respectively) and the C groups (15.0%, 22.5%, 40.0%, and 22.5%, respectively), the incidences of no pain, mild, moderate, and severe pain were also significantly different in the L group (33.8%, 37.5%, 21.2%, and 7.5%, respectively) ($P < 0.01$).

In conclusion, the incidence and severity of propofol-induced pain can be decreased by pretreatment with intravenous lidocaine as opposed to ondansetron. A randomized, prospective, double-blind study was conducted in Germany by (Kam et al., 2004) to compare injection pain after administration of two different formulations of propofol in 200 adult patients scheduled for elective surgery under general anesthesia. Patients were randomly divided into two groups to receive either Propofol without lidocaine added the study solution was injected at a steady rate over 15 seconds and patients rated any associated pain or discomfort using a four-point verbal rating scale. And the second group injected them with propofol after giving lidocaine. The incidence of pain was propofol injection Almost identical in the two study groups with (38%) patients experiencing pain or discomfort after Propofol compared to (36%) after lidocaine ($p = 0.88$). The study found no significant difference in pain scores between groups ($p = 0.67$). moderate or Acute injection pain (12%) of the patients treated with Propofol Lipuro was comparable with (8%) administered lidocaine ($p = 0.48$). In another context, a study was conducted in the USA by (Patyal et al., 2019) with the aim of evaluating and comparing the effectiveness of intravenous lidocaine at a concentration of 0.4% and 2% in reducing the incidence and severity of pain from propofol injection. The study was conducted on 126 patients in the American Society of Anesthesiologists The patients were divided randomly into two groups, the first was propofol injection and the second was given LIDOCAIN before propofol injection. The outcomes showed that taking LIDOCAIN at various doses prior to a propofol injection reduced the intensity of the pain. Whereas a prospective, double-blind, randomized controlled trial was conducted in South Korea by (Jeong & Yoon, 2016) to compare the effects of pre-administration lidocaine and local warming of the intravenous access site on propofol injection pain. The study was conducted on 96 patients who underwent resection. Thyroid under general intravenous anesthesia with propofol was randomly assigned to a control group, with lidocaine before administration (LA) or local warming (LW).The results indicated that the local warming of the intravenous access site by 43 °C with forced air for 1 minute was slightly more effective in reducing the pain of propofol injection compared to the pre-administration of lidocaine. While a study was conducted in Tilland by (Euasobhon et al., 2016) with the aim of determining the efficacy and adverse effects of lidocaine in preventing severe pain when injected with propofol. in the control group it was 63.7% (95% CI 60% to 67.9%) and 37.9% (95% CI 33.4% to

43.1%), respectively while those in the lidocaine group were 30.2% (95% CI 26.7% to 33.7%) and 11.8% (95% CI 9.7% to 13.8%). Results also indicated that both lidocaine and pretreatment combinations were effective in reducing pain when propofol was injected (lidocaine OR 0.19 mixture, 95% CI 0.15 to 0.25, 31 studies, 4927 participants, high-quality evidence; lidocaine OR 0.13 treatment, 95% CI 0.10 to 0.10). 0.18, 41 randomized controlled trials, 3918 participants, high-quality evidence). Similarly, administration of lidocaine can significantly reduce the incidence of pain when pretreated with propofol (OR 0.19, 95% CI 0.15 to 0.24, 36 studies, 5628 participants, high-quality evidence) or pretreated before propofol injection (OR 0.14, 95% CI 0.11 to 0.18, 50 studies, 4722 participants, high-quality evidence). Adverse effects of lidocaine administration were rare. Thrombophlebitis was reported in only two studies (or not estimated, low quality evidence). No studies recorded patient satisfaction. On the other hand, a randomized controlled study was conducted. in China by (Xing et al., 2018). Which aimed to determine the mechanism of pain relief for lidocaine. The results indicated that the incidence of pain of group RL40 was lower than that of group PR. The incidence of pain of group LL1.2 was higher than that of other groups. In the same vein, a study was conducted in Korea by (Walker et al., 2011). The study aimed to evaluate the optimal time to cinch with intravenous lidocaine. The results indicated for age, sex, weight and height all groups were comparable. The group that received an injection of lidocaine after applying a tourniquet for five minutes showed the least amount of pain. However, the difference in pain rates between the 3- and 5-minute groups was not statistically significant. On the other hand, A study was conducted while, a study in Greece (Loryan et al., 2011) was to investigate the impact of age, gender, and genetic variants of the key metabolic enzymes, uridine diphosphate (UDP)-glucuronosyltransferase 1A9 (UGT1A9) and cytochrome P450 2B6 (CYP2B6), on the transformation. Propofol biosynthesis in vitro. additionally in vivo. A single intravenous injection of propofol was given to 105 patients, and over the course of 20 minutes, the plasma concentrations of propofol, 4-hydroxypropofol, and related glucuronides were measured. Next, CYP2B6 protein, genotypes, and the activity of propofol 4-hydroxylation were assessed in 68 human livers. Common single nucleotide polymorphisms (SNPs) of the CYP2B6 and UGT1A9 genes were investigated using polymerase chain reaction (PCR).The findings indicate that there was significant interindividual heterogeneity in the plasma levels of propofol metabolites (range of

coefficient of variation: 89–128%). This was corroborated by in vitro results that demonstrated a 1.9-fold increase in CYP2B6 protein concentration in female livers and comparable variability in propofol 4-hydroxylation in liver microsomes. There were no discernible connections found between the propofol metabolism and the SNPs examined. However, the metabolism of propofol was significantly impacted by the patients' sex. The weight-corrected area under the time-plasma concentration curve of metabolites indicated that women had greater levels of propofol glucuronide (1.25-fold; $p = 0.03$), 4-hydroxypropofol-1-glucuronide (2.1-fold; $p = 0.0009$), and 4-hydroxypropofol-4-glucuronide (1.7-fold; $p = 0.02$). Furthermore, in 4-hydroxypropofol glucuronidation, the 35–64-year-old subgroup showed a strong sexual dimorphism. On the other hand, a study was conducted in Japan by (Fujii & Nakayama, 2004). It aimed to compare the effectiveness of flurbiprofen, lidocaine, and a combination of the two in reducing pain when injecting propofol. There were 120 patients in total, 56 male of whom were scheduled for elective plastic surgery and 64 of them were female. The patients ranged in age from 20 to 66. Intravenous injections of lidocaine (20 mg), flurbiprofen (50 mg), placebo (saline), and manual venous occlusion (two minutes) were given to the patients ($n = 30$ in each group). Propofol (2 mg/kg) was then injected into the hand's dorsal vein. Each patient was asked to rate the level of discomfort (0 = none, 1 = mild, 2 = moderate, and 3 = severe) during a propofol injection by a blinded investigator. The outcomes demonstrate Patients who received lidocaine (27%, pain score 0 [median]), flurbiprofen (43%, 0), or both (3%, 0) in addition to venous occlusion experienced lower incidence and intensity of pain than those who received a placebo (90%, 2) in addition to venous occlusion ($p < 0.01$). The most successful treatment involved venous occlusion combined with flurbiprofen and lidocaine ($p < 0.05$). During the first 24 hours following surgery, no side effects, including pain, oedema, wheal, or flare response, were seen at the injection sites.

For patients scheduled for elective plastic surgery, a combination of 20 mg of lidocaine and 50 mg of flurbiprofen, together with venous occlusion for two minutes, proved to be quite successful in minimizing pain during propofol injection. While, a recent study conducted in Brazil by (Luiza et al., 2020) aimed to assess the number required to treat (NNT) of patients who were given lidocaine to lessen the pain that came with administering propofol during the induction of anesthesia. In this double-blind, randomized study, 970 adults were given propofol at the time of anesthesia induction.

Previously, the study groups were asked about discomfort during propofol injections after being randomly allocated to receive either saline or lidocaine treatment. The outcomes indicate the study groups did not differ in terms of demographics. Compared to saline (14.2%; 95% CI, 12.0-16.4), patients who got lidocaine (5%; 95% CI, 3.63–6.37) experienced less pain. The number needed to treat (NNT=10.9) was notably high in order to prevent this impact. Though. in light of the patient's risk characteristics and the procedure's associated savings, the study concluded that there is no reason to administer lidocaine before propofol. While, a study conducted in Thailand by (Euasobhon et al., 2016) , sought to ascertain whether injecting lidocaine with propofol may prevent high-intensity pain, as well as any potential negative consequences. Out of the 85 studies that were considered in the review, 82 (with 10,350 individuals) could be subjected to quantitative analysis. The participants were American Society of Anesthesiologists (ASA) I-III patients undergoing elective surgery, with ages ranging from 13 to 89. Every study was carried out at a single facility in high-, middle-, and low-income nations across the globe. Eighty-two studies were included in the meta-analysis after the risk of bias evaluation showed that all but five of the studies had acceptable methodological quality. Five of the eighty-two studies were deemed to have a high risk of bias: three due to inadequate outcome data, one for participant and staff blinding, and one for additional possible sources of bias. Following a propofol injection, the incidence of pain and severe pain was 37.9% (95% CI 33.4% to 43.1%) and 63.7% (95% CI 60% to 67.9%) in the control group, respectively. 30.2% (95% CI 26.7% to 33.7%) and 11.8% (95% CI 9.7% to 13.8%) made up the combo. When propofol was injected, both the pretreatment and the mixture of lidocaine were effective in reducing pain (pretreatment OR 0.13, 95% CI 0.10 to 0.18, 41 (Randomized controlled trials, 3918 participants, high-quality evidence); lidocaine mixture OR 0.19, 95% CI 0.15 to 0.25, 31 studies, 4927 participants, high-quality evidence). Similarly, when premixed with propofol (OR 0.19, 95% CI 0.15 to 0.24, 36 studies, 5628 individuals, high-quality evidence), or pretreated before to propofol injection (OR 0.14, 95% CI), lidocaine administration can also considerably lower the incidence of discomfort. CI 0.11 to 0.18, 4722 people, 50 studies, and excellent evidence). Administering lidocaine did not always have negative side effects. Only two studies (or not estimated, low-quality evidence) documented cases of thrombophilia. Regarding patient satisfaction, no studies were found.

1.9.2 Regional Studies

A regional study was conducted in Turkey by (Kaya et al., 2008) aimed to compare the effectiveness of different venous occlusion times with lidocaine analgesics to prevent pain during propofol injection. The results indicated that Compared to the other treatment groups, group 5 patients experienced discomfort more frequently (18 [90%] individuals; P 0.05). Pain was experienced during propofol injection in 6 (30%), 7 (35%), and 2 (10%) patients in groups 2, 3, and 4, where venous occlusion was used. The incidence of reported pain was comparable in group 1 when compared to groups 2 and 3, but it was substantially higher in group 1 (lidocaine without venous occlusion) than in group 4 (P 0.05). While a study was conducted in Iran by (Alipour et al., 2023) aimed to explore the effects of lidocaine on pain caused by propofol injection induction of anesthesia and assessment of patients' hemodynamic status, The outcomes showed that group C experienced the least amount of propofol injection pain. In contrast to group P (P0.001), groups C were followed by groups L and S in that order (C, L, S). No statistically significant differences between the groups were seen in the circulatory alterations. While a study was conducted in Iran by (Rafiei et al., 2022), where the study aimed to evaluate the quality of anesthesia using the three methods propofol + fentanyl, propofol + fentanyl + lidocaine, propofol + fentanyl + lidocaine + ketamine. The results indicated that the demographic traits of the three groups were comparable. Patient apnea, cough, O2 saturation, and proceduralist satisfaction in the group of patients who were sedated with four medicines were substantially greater (P 0.05) than those in other groups, according to the impacts of the three sedation protocols on the variables. Comparing the recovery period and requirement for a jaw push during the surgery, however, did not reveal any appreciable differences between the three groups. In Iran, by (Bakhtiari et al., 2021) in order to assess the effectiveness of pharmaceutical measures used to manage propofol injection pain. A database search was carried out to lessen the pain associated with propofol injections, randomized clinical trials comparing pharmaceutical therapies with a placebo or active ingredient were chosen. Pain that returned was the outcome. Based on the kind of control, three subgroups of the data were examined. 95% confidence intervals (CIs) for relative risk (RR) were computed using a random effect model. There were 52 publications total with 105 investigations on 7315 persons. 40.91% and 66.27%, respectively, of the intervention and control groups experienced pain. The most successful treatments as compared to placebo

included combination therapy using two medications (RR = 0.29 95% CI = (0.11, 0.75)), opioids (RR = 0.39 95% CI = (0.28, 0.54), and five HT3 antagonists (RR = 0.39 95% CI = (0.30, 0.50)). When compared to lidocaine as the control, combination therapy proved to be the most successful intervention (RR = 0.51 95% CI = (0.46, 0.55)). When compared to long-chain triglyceride propofol as a control, opioids were the most successful intervention (RR = 0.27, 95% CI = (0.15, 0.49)).

1.9.3 Arab Studies

A study conducted in Egypt by (AbouSlemah, 2018) aimed to compare the efficacy of pretreatment with ondansetron, a common Antiemetic agent, with lidocaine, the most common drug/method of prevention pain. The results indicated that with 17 (34%) versus 13 (26%) patients, group L experienced a higher incidence of discomfort than group O, but both groups were equivalent (P>0.05). Four (8%) patients in group L compared to three (6%) patients in group O reported experiencing severe pain (P>0.05). Each group had three patients (6%) with moderate pain (P>0.05). Mild pain was reported by 7 (14%) patients in group O versus 10 (20%) individuals in group L (P>0.05). On the other hand, a study was conducted in Jordan by) (El-Radaideh , 2007). The study aimed to evaluate the effectiveness of previous intravenous treatment with lidocaine, intravenous paracetamol (Perfalgan), or lidocaine mixed with fentanyl in reducing the pain of propofol injection. The result showed In contrast to paracetamol (54% pain-free) and placebo (36% pain-free), lidocaine and lidocaine-fentanyl significantly reduced the pain of a propofol injection (p 0.05). The difference between lidocaine and lidocaine-fentanyl in lowering the incidence of propofol injection pain did not reach statistical significance. When compared to a placebo, paracetamol significantly outperformed it (p 0.05). On the other hand, a study was conducted in Jordan by (Kaya et al., 2008) sought to investigate the impact of lidocaine-induced venous occlusion duration on the incidence and degree of propofol-induced discomfort. Between October and November of 2007, a randomized, double-blind trial was planned at the University of Jordan Hospital in Amman, Jordan. Surgical operations were performed on 150 patients, ages 14 to 70, who were part of the American Society of Anesthesiologists (ASA) Clinical Case I and II. three groups under general anesthesia. Following lidocaine-induced venous embolization, each of the three groups received an infusion of 1% propofol at a consistent rate. For 15 s (Group I, n = 50), 30 s (Group II,

n = 50), and 60 s (Group III, n = 50), occlusion was used. A verbal pain score was used to measure the pain experienced during injection. In group I, 14 patients (28%) experienced discomfort; in group II, 16 patients (32%) and in group III, 9 patients (18%) experienced pain. The difference in the frequency and intensity of pain did not reach statistical significance ($p>0.05$). Although propofol-induced pain can be effectively relieved by venous occlusion with lidocaine, there was no discernible difference in pain relief after 15, 30, or 60 seconds of venous occlusion.

Chapter Two

Methodology

Introduction

In this chapter, methods that were used to achieve the study objective are presented in details. This reflects on study design, study setting, participants, used tool, study sample and sampling technique.

2.1 Study Design

Randomized Controlled Trial (RCT), single blind design

2.2 Study Setting

The study was conducted at Rafidia Governmental Hospital which is the largest surgical hospital in the north west bank located in Nablus city. The research done specially in the operation room

2.3 Study Population

The population of the current study consisted of 100 healthy subjects undergoing general anesthesia at Rafidia Hospital, aged between 18-60 years.

- **Inclusion criteria**

Healthy adult patients undergoing general anesthesia between the ages of 18-65 years

- **Exclusion criteria**

1. Spinal or epidural anesthesia
2. Respiratory system disease
3. Cardiovascular disease
4. Psychiatric pt
5. Neurological disease
6. Cesarean section pt
7. Allergy to propofol
8. Allergy to lidocaine
9. Renal disease
10. Peripheral vascular disease

11. Liver disease

2.4 Study Sample

In order to choose participants who are relevant to the research design, the researcher used Randomize controlled trial -probability sampling technique through all among healthy adults undergoing general anesthesia with a 95% confidence level and a 5% error margin. On the basis of the sample size equation, 362 participants were reached. (Raosoft's Sample Size Calculator, available at raosoft.com/sample size) After matching the criteria on the sample, the sample was divided randomly into two groups, the first is an experimental group(50 p) , which is by adding lidocaine before injection with propofol, and the second is a control group(50 p), which is by injecting patients with propofol without lidocaine , the 100 pt who was included in the study were randomly randomized in a computerized table to decide which on will take lidocaine before propofol and propofol alone.

2.5 Study Time Frame

The study was carried out between (20 April 2023 -30 August (2023) at Rafidia Hospital in the operating room.

2.6 Data collection tool

Participants who met the eligibility requirements for the study were divided into two groups, a control group and an experimental group, and their demographic information was obtained by consulting their medical records. Their data included vital signs collected by the vital signs device before and after taking the drug, in addition to pain intensity data collected through the VAS scale before and after taking the drug.

2.7 Study Procedures

A patient scheduled for elective surgery under general anesthesia underwent a prospective randomized controlled trial. Any patient who did not meet the study criteria was excluded after taking a quick profile of the patients in the operating room. After entering the operating room. no patient received any medication,100 patients (aged from 18 to 60 years) who met the study criteria participating in the study were divided into two groups, the first study group that met the criteria, the name of the experimental group (L), numbering 50 (who received lidocaine 40 mg before propofol), the second

group, numbering 50 The control group(P) (those who were injected with propofol without lidocaine), and according to a random schedule created on the computer, we will give the first patient either propofol alone or lidocaine before propofol, a (20 G) cannula was used to inject a dose of propofol with or without lidocaine into the vein on the back of the patient's non-dominant hand. The patient rated the frequency and intensity of pain after Inject propofol during 5- and 15-second intervals.

The patient was connected to a monitoring device including: non-invasive blood pressure, heart rate, oxygen saturation, ECG device**.** Dr. Akram Kahla gave the patient 40 mg of lidocaine, monitored him for one minute to see if there were any adverse reactions (changes in vital signs, loss of consciousness, ringing in the ears, or dizziness), and then quickly gave the patient 200 mg. Hydrocortisone infusion if necessary 0.9% N/S, note V/S**.**If there was no reaction, administer 3 mg/kg propofol using the same cannula and then pain was measured on a scale of 0 to 3 (0 being no pain, 1 mild, 2 moderate, and 3 severe). During propofol infusion, 1 mg/kg fentanyl was administered. Apply 500 cc N/S 0.9% infusion. A 7 mm ETT for females and a 7.5 mm ETT for males were then used for induction**.** Monitor vital signs when the patient is connected to a ventilator. Make sure that patient awakens before removing the tube and transferring him to the recovery room at the conclusion of the treatment.

2.8 Data Analysis

Statistical Package for the Social Sciences (SPSS) version 21 was used to analyses the data. Mean and standard deviation were used to characterize quantitative data, and the t test was used to compare the quantitative variables for the differences between pre and posttests of physiological vital signs for the experimental group. A *p* value of less than 0.01 was regarded as significant.

2.9 Ethical Consideration

Obtaining the approval of postgraduate studies (Annex " A" ethical approval by the Institutional Review Board “IRB” at An-Najah National University in Nablus-Palestine (Annex "B") Approval of the Department of Health Education and Scientific Research In the Palestinian Ministry of Health in Palestine, (Annex "C "), consent form from patient .

Chapter Three

Results

In this chapter, the socio-demographic characteristics of study participants who met eligibility requirements were described. It also shows a comparison of vital signs for two groups of patients - the control group and the group that received the addition of the drug**.** The pain scale was also used to compare the two groups' levels of discomfort.

3.1 Socio-demographic Characteristics

To identify the distribution of the variable values, a descriptive analysis was done on the data, dividing it into ratios and numbers. The number of responses provided by respondents is referred to as frequency in descriptive analysis. The study's analysis of the patients' demographic traits is depicted in Table (3.1). It was discovered that the control group patients had an average age of (32.6±10.7), an average weight of (70.4±4.76), and a 48% of male participation, Female participants 42% of Control group (P), whereas male participants make up 48%. The patients in the experimental group (L) had an average age of (39.3±9.7) and weight of (60.8±6.7), Male participants constituted 38% of the total participants in the same group, while female participants constituted 62%. Participants in both groups had ages with p values of 0.5. While the p-value for gender was 0.83 in both groups, the p-value for weight was 0.65 in both groups.

Table 3.1

Demographic characteristics of participants in the (P) & (L) group

Variable	Group (P) 3mg \kg N=50 (Control group)	Group (L) with lidocaine 40 ml n=50 (experimental group)	*P* Value
Age (mean ±SD)	(32.6±10.7)	(39.3+_9.7)	0.5
Wight (mean±SD)	(70.4±4.76)	(60.8+_6.7)	0.65
Gender (mean±SD)	Mal 29 (48%) Fe-mal 21(42%)	Mal 19 (38%) Fe-mal 31(62%)	0.83

3.2 The Effect of Propofol on the Physiological Vital Signs in Healthy Adult Patients Undergoing General Anesthesia (Control Group) (P)

Paired t- test was used as shown in table (3.2). The results of paired t- test shown in table (3.2) indicated that there were statistically significant differences at $p \leq 0.01$ between pre- injection and post injection of all physiological vital signs for the reference group. These results emphasis the after injection significant effect of propofol on reducing (SBP, DBP, HR, and RR), and increasing OSL for heathy adult patients undergoing general anesthesia, as the percentages of change for these variables were (-15.94%, -19.01%, -5.22%, 1.89%, and -9.52%) respectively.

Table 3.2

Paired t- test results for the differences between pre and post injection of physiological vital signs for the control group (P) (n= 50)

Vital signs	Pre injection M±SD	Post injection M±SD	T- value	P- value	Δ %
SBP (mmHg)	123.94± 10.63	104.18± 7.35	24.27	0.000*	-15.94
DBP (mmHg)	79.66± 6.86	64.52± 6.96	22.27	0.000*	-19.01
HR (beats/min)	80.38± 6.94	76.18± 6.57	4.61	0.000*	-5.22
OSL (%)	97.22± 1.30	99.06± 0.74	8.29	0.000*	1.89
RR (breaths/min)	14.28± 0.86	12.92± 0.75	8.32	0.000*	-9.52

Note. Values that M±SD= Mean and Standard Deviation; SBP= Systolic Blood Pressure; DBP= Diastolic Blood Pressure; HR= Heard Rate; OSL = Oxygen Saturation Level; RR= Respiratory Rate; Δ %= Percentage of Change; * Significant Differences (Pre vs Post) at $p \leq 0.01$.

3.3 The synergistic effect of propofol and Lidocaine on the Physiological Vital Signs in Heathy Adult Patients Undergoing General Anesthesia (Experimental Group) (L)

T- test was used as shown in table (3.3). The results of Paired t- test shown in table (3.3) indicated that there were statistically significant differences at $p \leq 0.01$ between pre and post injection of all physiological vital signs. These results emphasis the significant synergistic effect of propofol and lidocaine on reducing (SBP, DBP, HR, and RR), and increasing OSL for healthy adult patients undergoing general anesthesia, as the percentages of change for these variables were (-4.38%, -5.85%, -4.78%, 1.68%, and-10.56%) respectively.

Table 3.3

Paired t- test results for the differences between before and after injection of physiological vital signs for the experimental group (L) (n= 50)

Vital signs	Pre lidocaine M±SD	Post lidocaine M±SD	T- value	P- value	Δ %
SBP (mmHg)	122.56± 12.34	117.18± 10.64	3.30	0.002*	-4.38
DBP (mmHg)	78.92± 7.61	74.30± 8.30	4.03	0.000*	-5.85
HR (beats/min)	81.10± 6.11	77.22± 6.27	6.11	0.000*	-4.78
OSL (%)	97.40± 1.05	99.04± 0.92	10.52	0.000*	1.68
RR (breaths/min)	14.20± 1.01	12.70± 0.76	8.38	0.000*	-10.56

Note.values that M±SD= Mean and standard deviation; SBP= Systolic blood pressure; DBP= Diastolic blood pressure; HR= Heard Rate; OSL = Oxygen saturation level; RR= respiratory rate; Δ %= Percentage of change; * significant differences (before vs after) at $p \leq 0.01$.

3.4 Comparison Between Group (P) and Group (L) in Physiological Vital Signs Among Healthy Adult Patients Undergoing General Anesthesia According to the Group Variable

Independent Sample t- test was used as shown in table (3.4).The results of Independent Sample t- test shown in table (3.4) indicated that there were no statistically significant differences at $p \leq 0.01$ in the pre injection of all physiological vital signs among healthy adult patients undergoing general anesthesia according to the group variable. In the post injection of SBP and DBP, there were statistically significant differences at $p \leq 0.01$ between experimental and control group in favor of experimental group, and no statistically differences were noticed between the two groups in HR, OLS, and RR. It means that the propofol reduced largely the blood pressure in comparison with the propofol with lidocaine in heathy adult patients undergoing general anesthesia.

Table 3.4

Independent Sample t- test results for the differences in the physiological vital signs among healthy adult patients undergoing general anesthesia according to the group variable (n= 100)

Vital signs	Time	Experimental Group(L) N= 50 M±SD	Control Group(P) N= 50 M±SD	T- value	P- value
SBP (mmHg)	Pre	122.56± 12.34	123.94± 10.63	-0.60	0.55
	post	117.18± 10.64	104.18± 7.35	7.11	0.000*
DBP (mmHg)	Pre	78.92± 7.61	79.66± 6.86	-0.51	0.611
	post	74.30± 8.30	64.52± 6.96	6.38	0.000*
HR (beats/min)	Pre	81.10± 6.11	80.38± 6.94	0.55	0.583
	post	77.22± 6.27	76.18± 6.57	0.81	0.420
OSL (%)	Pre	97.40± 1.05	97.22± 1.30	0.76	0.488
	post	99.04± 0.92	99.06± 0.74	-0.12	0.905
RR (breaths/min)	Pre	14.20± 1.01	14.28± 0.86	-0.43	0.670
	post	12.70± 0.76	12.92± 0.75	-1.45	0.149

Note. Values that M±SD= Mean and Standard Deviation; SBP= Systolic Blood Pressure; DBP= Diastolic Blood Pressure; HR= Heard Rate; OSL = Oxygen Saturation Level; RR= Respiratory Rate; Δ %= Percentage of Change; * Significant Differences (pre vs post) at $p \leq 0.01$.

3.5 Comparison of Pain Intensity through the VAS Scale between the Control Group during Propofol Injection and the Experimental Group 1 Minute after Indochina Medication

First: Control group during propofol injection {P) n= 50

The results shown in Table (3.5) indicated that the intensity of pain during propofol 3mg/kg injection according to a VAS scale of 1-2 among healthy adult patients under general anesthesia .Where 20 people of both sexes reported mild pain at a rate of 40%, where the percentage of females who felt mild pain was 4%, while the percentage of males who felt mild pain was 34%, while 31 people reported the presence of pain at a rate of 62% of both sexes, where the percentage of females who felt Pain: 42%, while the percentage of males who felt pain was 20%. Which means that there was a statistically significant at $p \leq 0.01$relationship between the intensity of pain during propofol injection and the gender variable in favor of females. The results also indicated that there were no statistically significant at $p \leq 0.01$.differences between pain during propofol injection according age and weight variables.

Second: Experimental Group after 1min lidocaine Injection (L) n= 50

On the other hand, the results shown in Table (3.5) indicated that the intensity of pain after one minute of administering 40ml of lidocaine according to the VAS scale was from 0-1 among healthy adult patients under general anesthesia. Where 45 of both sexes reported the absence of any pain by 90% of the members of the experimental group, where the percentage of males who did not feel pain was 88%, while 2% were females, while 5 by 10% of people, all of them females, reported the presence of mild pain, and this It means that when lidocaine was given pretreatment propofol injection, there was no pain, and that there were no statistically significant at $p \leq 0.01$ differences between giving lidocaine with propofol injection with variable weight and age.

Table 3.5

Comparison between two groups (P) & (L) of VAS pain scale

NAS scale	Group (P) During propofol injection 3mg/ kg N=50	Group (L) after 1min with 40mlg lidocaine n=50	*P* value
0= no pain	0	45 from 50 (90%) M 44(88%) , F 1 (2%)	0.01
1= mild pain	20 from 50 (40%) M 17(34%) , F 3 (4%)	5 F from 50 (10%)	
2= moderate pain	31 from 50 (62%) M10(20%) F21(42%)	0	
3= sever pain	0	0	

Note. P= Propofol injection, L= lidocaine, VAS

Chapter Four

Discussion, Conclusion, and Recommendations

In this chapter, a discussion, conclusions, and recommendations will be presented.

4.1 Discussion

In the essential phase of preoperative care known as general anesthesia induction, patient comfort is of utmost significance. Propofol injection pain and discomfort have long been a source of worry in anesthesia practice. In order to assess their relative efficacy and safety in reducing pain from propofol injections (PIP), this research thoroughly examined two popular pretreatment strategies propofol and lidocaine. In this debate, main conclusions are considered, their ramifications, and the overall importance of this study. Examining the prior data that was gathered from the study population, which was split into two groups after meeting the study's eligibility requirements.

The study goal, which involved examining the impact of utilizing lidocaine as the primary treatment for the pain of propofol injection in healthy patients receiving general anesthesia at Rafidia Hospital, was successfully accomplished. The outcomes were therefore discussed. Additionally, it was compared to earlier studies in order to generate a number of significant recommendations that would aid decision-makers in creating what is known as pain management in healthcare facilities. The results in this study indicated that the incidence of pain when injecting propofol without using any analgesic is 62%, and according to the published literature, the incidence of pain when injecting propofol without using any analgesic was 80% (Patyal et al., 2019). While the results of a study by (Walker et al., 2011) with the results of this study, which indicated that propofol injection without any analgesic causes pain to patients**,** Pretreatment with propofol and lidocaine reduces PIP more effectively than pretreatment in the control group. However, it is evident that in terms of reducing pain, the well-known local anesthetic lidocaine routinely outperforms propofol pretreatment. Therefore, the hospital administration should make a concerted effort to provide an analgesic that relieves pain during the injection of the anesthetic in order to ensure the provision of good health services and thereby achieve patients' satisfaction with these services. This is especially important during the injection of propofol.

The findings of the study also showed that pain was significantly reduced to almost nonexistent levels when propofol 3 mg/kg and 40 mg. of lidocaine were administered; this was supported by a study by (Tian et al., 2020), which also found that administering lidocaine is the most efficient approach. to lessen the pain that a propofol infusion causes. Additionally, a study by (AbouSlemah, 2018) supported the findings of the present study and found that lidocaine is an effective medication for easing the discomfort of propofol injections. Safety concerns are of the utmost importance in anesthesia care. While it is important to note that both propofol and lidocaine pretreatment are often well tolerated, the resent study indicated that lidocaine may have a somewhat superior safety profile, with fewer reports of adverse events including allergic responses or hypersensitivity.

Decision-makers should therefore accept lidocaine as a medication that alleviates pain during injections in accordance with the objectives of the Palestinian Ministry of Health addressing the issue of pain management in order to finally reach patient satisfaction. On the other hand, the results indicated that there were no statistically significant differences at the level of $p \leq 0.01$ in all vital signs according to the group variable, and this is consistent with the study (Bhat, 2018) that indicated that vital signs are affected by injections where these vital signs are normal. The study also indicated that there was a decrease in diastolic and systolic blood pressure when patients were injected with propofol only, and this result was consistent with a study by (Tan et al., 2021), which indicated that the patient's vital signs changed when propofol was injected, especially blood pressure, where a decrease was observed. In another context, the results indicated that injection of lidocaine as a pretreatment to propofol did not lower blood pressure, and this was supported by a study conducted by (Zou et al., 2020). According to the results, injection of propofol with lidocaine had no effect on blood pressure.

Therefore, the Ministry of Health, in cooperation with the Department of Dangerous Drugs, must approve lidocaine as a medication along with propofol injections for patients in order to relieve or eliminate pain in response to these results, which are considered one of the rare studies in Palestine.

4.2 Conclusions

Because it reduces or eliminates injection pain and doesn't affect diastolic and systolic blood pressure, injection of lidocaine with propofol is a significant and extremely beneficial medication that also makes the patient feel comfortable. With the extra benefit of utilizing lidocaine in conjunction with the injection and avoiding the administration of other medicines that may be undesirable in some situations, the results of this study offer a straightforward and safe method to reduce the occurrence of pain when propofol is administered.

There are substantial clinical ramifications for anesthesia practice from the comparison of propofol and lidocaine preparation for PIP. In terms of safety and pain relief, lidocaine proves to be the better option, but patient characteristics and resource availability must also be taken into account. This study adds to the corpus of information about PIP management with the ultimate goal of improving patient satisfaction and comfort during the induction of general anesthesia. To improve the patient experience and ensure a secure induction of anesthesia, anesthesia clinicians should carefully consider the evidence and patient-specific criteria before selecting the best pretreatment method.

This study that compared the effectiveness of propofol and lidocaine as pretreatments for propofol injection pain in patients receiving general anesthesia provides important insights into the relative merits of these two approaches. The results of this study offer significant new information to the field of perioperative care and could have applications in improving patient comfort during anesthesia induction.

The findings of the study show that pretreatment with both propofol and lidocaine is effective in reducing the pain associated with propofol injections, giving medical professionals practical solutions to deal with this frequently occurring problem while administering anesthesia. The goal of enhancing the overall preoperative patient experience is in line with the noted decrease in injection discomfort.

Additionally, differences in the efficacy and possible adverse effects of propofol and lidocaine as pretreatment drugs are shown by comparison. Pretreatment alternatives might vary depending on a number of factors, including procedural considerations, clinician preferences, and patient characteristics. The study emphasizes how crucial it is

to modify pretreatment plans in accordance with the specific demands of each patient and the protocols involved. Propofol and lidocaine both showed promise in easing the pain associated with propofol injections; nonetheless, the study emphasizes the need for more research into patient groups, ideal dosages, and potential side effects related to each pretreatment strategy. Subsequent investigations may investigate other factors that could impact the results, offering a more thorough comprehension of the relative advantages and constraints of propofol versus lidocaine pretreatment.

In conclusion, this study adds important evidence to the continuing efforts to enhance patient outcomes and improve anesthesia protocols. The comparative study's findings can help anesthesia professionals make well-informed judgements about pretreatment approaches, which will ultimately improve the general anesthesia patients' perioperative experiences. The results of this study provide a foundation for future investigation and development of anesthesia techniques, guaranteeing the ongoing enhancement of patient care in the anesthesiology sector as medical knowledge advances.

4.3 Limitation of the Study

This study is regarded as one of the more intriguing ones. To ensure that results are correctly interpreted and to direct future study, its limits should be acknowledged. Here are some potential restrictions to take into account:

- Sample Size: Due to a lack of resources or a challenge in finding volunteers, the study population's size may be constrained. A lower sample size may have an impact on how broadly applicable the results are.
- Single-Center Study: If the study was carried out at a single medical facility, the results might not be generalizable to the entire community. Practices and patient demographics may vary among healthcare settings.
- Concurrent Medications: Patients may take additional drugs that could affect how they perceive pain or react to propofol. These drugs ought to be listed and taken into account as potential confounding variables.
- Publication Bias: The study can be subjected to publication bias, in which only noteworthy or encouraging findings are reported. This may bias the public's perception of the subject.

- Resource Constraints: The study's breadth could be constrained by a lack of funding, restricting the examination of other factors or the inclusion of a control group.
- Extraneous Variables: Uncontrolled extraneous factors, such as ambient noise and room temperature, could influence participants' perceptions of discomfort during the injection.
- Variables Related to the Administration of General Anesthesia: These variables should be taken into account as they may affect how painful a propofol injection feels. Examples include the induction method and anesthetics utilized.

4.4 Recommendations

The results of this study clearly point to the necessity of creating evidence-based clinical practice guidelines for the management of injection discomfort from propofol during the induction of general anesthesia. The advantages and disadvantages of both propofol and lidocaine pretreatment approaches should be taken into account in these guidelines, giving anesthesia doctors precise advice on how to maximize patient comfort. A shift in patient care towards greater individualization, acknowledging the possible impact of clinical and demographic factors on the effectiveness of pain reduction techniques are advocated. When determining the best strategy for reducing the discomfort associated with propofol injections, anesthesia doctors should take into account patient-specific factors such age, sex, and medical history.

4.4.1 Recommendations for Policy Makers

This study addresses a critical clinical problem regarding pain control during induction of general anesthesia and provides information that could influence how healthcare policy is determined. The following suggestions aiming to guide policymakers towards putting evidence-based practices into practice and enhancing patient care through:

- Incorporate Evidence-Based Protocols: Encouraging healthcare organizations to implement evidence-based policies that make the pretreatment of patients receiving general anesthesia with propofol a standard procedure. This can considerably lessen both the frequency and intensity of pain after injection.

- Training and Education :Spending money on educational and training programmers for medical personnel who deliver anesthesia. Making sure they are informed about the advantages and successful use of lidocaine pretreatment to effectively reduce propofol injection pain.
- Quality Assurance and Monitoring: To guarantee adherence to the advised protocols, establishing quality assurance programmers and ongoing monitoring methods inside healthcare facilities. This will keep patient outcomes and methods for pain treatment consistent.
- Guidelines Integration: Collaborating with appropriate regulatory and medical organizations to include lidocaine pretreatment as a recommended practice within clinical standards and recommendations for induction of anesthesia.
- Research Funding: Allocating research money to examine the possible reductions in postoperative complications, discomfort, and patient satisfaction that may result from lidocaine pretreatment in more detail. Encourage research examining this intervention's cost-effectiveness.

By putting these recommendations into practice, policy makers may play a crucial part in ensuring that evidence-based practices are incorporated into healthcare policies, improving patient outcomes as well as the general standard of care.

4.4.2 Recommendations for Further Studies

- An investigation of the relationship between propofol and lidocaine pretreatment dose and response should be conducted. Determining the best dosing for each drug to minimize discomfort from propofol injection while preventing side effects such as systemic toxicity.
- Examining the effect of patient-specific variables on the efficiency of propofol and lidocaine pretreatment in lowering injection pain, including age, gender, body weight, and medical history. This will make it easier to customize therapies for different patient populations.
- Examining the possible advantages of pretreatment with both propofol and lidocaine. Finding out if combining both of these medications together provides better pain relief than using each one alone.

- Contrasting the effectiveness of pretreatment with propofol and lidocaine with other pain-relieving strategies, such as employing warmed propofol or different local anesthetics. Identify the technique that provides the best pain relief with the fewest negative effects.
- Future research should include evaluations of patient-reported outcomes, such as quality of life and satisfaction with the anesthesia experience. This can give important information about the overall effect of pretreatment with propofol and lidocaine on patient wellbeing.

List of Abbreviations

Abbreviation	Meaning
WHO	World Health Organization
IASP	International Association for the Study of Pain .
VAS	Visual Analog Score
MOH	Ministry of Health
P	Propofol
L	Lidocain
BP	Blood Pressure
HR	Heart Rate
RR	Respiratory Rate
SAO	O2 Saturation
BPS	Systolic Blood Pressure
BPD	Diastolic Blood Pressure
G	The main system is Body Cooling under Birmingham Gauge also known as Stubs Iron Wire Gauge
PIP	Injection Pain from Propofol (PIP)

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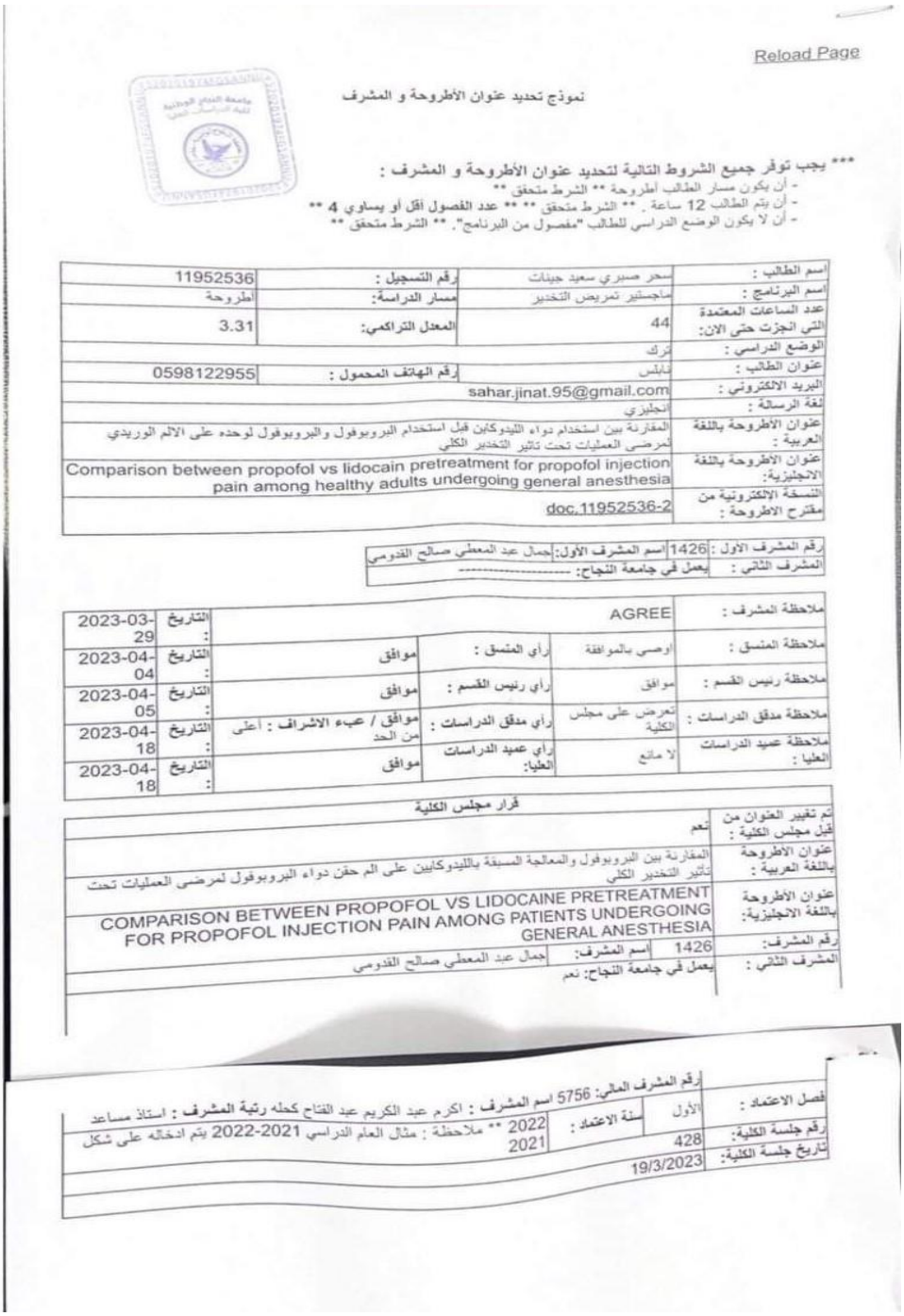
Appendices

Appendix A

Approval of studies on the title of the dissertation



Reload Page

نموذج تحديد عنوان الأطروحة و المشرف

*** يجب توفر جميع الشروط التالية لتحديد عنوان الأطروحة و المشرف :
- أن يكون مسار الطالب أطروحة ** الشرط متحقق **
- أن يتم الطالب 12 ساعة . ** الشرط متحقق ** ** عدد الفصول أقل أو يساوي 4 **
- أن لا يكون الوضع الدراسي للطالب "مفصول من البرنامج". ** الشرط متحقق **

اسم الطالب :	سحر صبري سعيد جبنات	رقم التسجيل :	11952536
اسم البرنامج :	ماجستير تمريض التخدير	مسار الدراسة:	أطروحة
عدد الساعات المعتمدة التي انجزت حتى الان:	44	المعدل التراكمي:	3.31
الوضع الدراسي :	ترك		
عنوان الطالب :	نابلس	رقم الهاتف المحمول :	0598122955
البريد الالكتروني :	sahar.jinat.95@gmail.com		
لغة الرسالة :	انجليزي		
عنوان الأطروحة باللغة العربية :	المقارنة بين استخدام دواء الليدوكايين قبل استخدام البروبوفول والبروبوفول لوحده على الالم الوريدي لمرضى العمليات تحت تاثير التخدير الكلي		
عنوان الاطروحة باللغة الانجليزية:	Comparison between propofol vs lidocain pretreatment for propofol injection pain among healthy adults undergoing general anesthesia		
النسخة الإلكترونية من مقترح الاطروحة :	doc.11952536-2		

رقم المشرف الاول :	1426	اسم المشرف الأول:	جمال عبد المعطي صالح القدومي
المشرف الثاني :	يعمل في جامعة النجاح: ----------		

ملاحظة المشرف :	AGREE				2023-03-29 :التاريخ
ملاحظة المنسق :	اوصي بالموافقة	رأي المنسق :	موافق	التاريخ :	2023-04-04
ملاحظة رئيس القسم :	موافق	راي رئيس القسم :	موافق	التاريخ :	2023-04-05
ملاحظة مدقق الدراسات :	تعرض على مجلس الكلية	رأي مدقق الدراسات :	موافق / عبء الاشراف : أعلى من الحد	التاريخ :	2023-04-18
ملاحظة عميد الدراسات العليا :	لا مانع	راي عميد الدراسات العليا:	موافق	التاريخ :	2023-04-18

قرار مجلس الكلية

تم تغيير العنوان من قبل مجلس الكلية :	نعم
عنوان الأطروحة باللغة العربية :	المقارنة بين البروبوفول والمعالجة السبقة بالليدوكايين على الم حقن دواء البروبوفول لمرضى العمليات تحت تاثير التخدير الكلي
عنوان الأطروحة باللغة الانجليزية:	COMPARISON BETWEEN PROPOFOL VS LIDOCAINE PRETREATMENT FOR PROPOFOL INJECTION PAIN AMONG PATIENTS UNDERGOING GENERAL ANESTHESIA
رقم المشرف:	1426 اسم المشرف: جمال عبد المعطي صالح القدومي
المشرف الثاني :	يعمل في جامعة النجاح: نعم

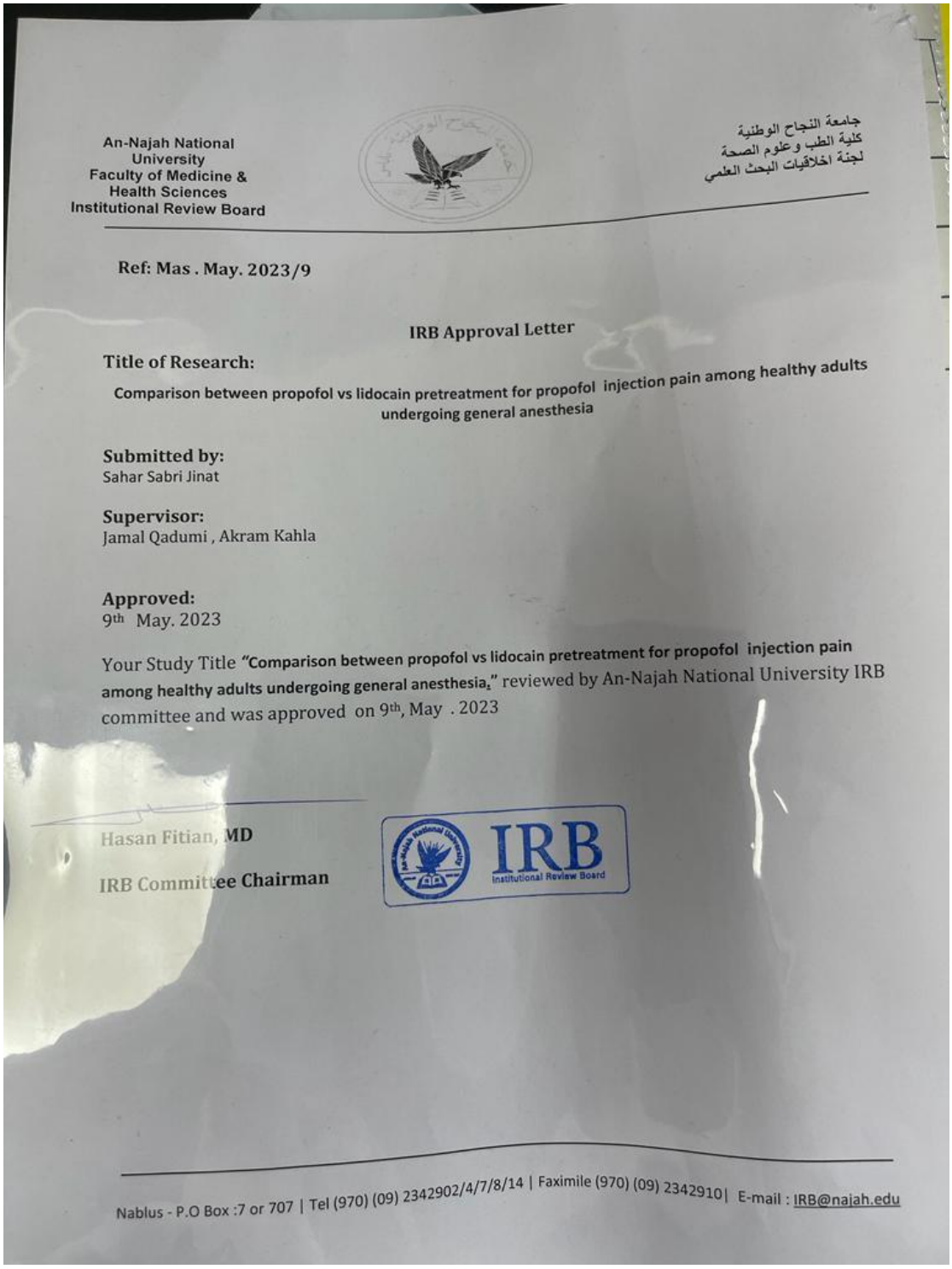
رقم المشرف المالي: 5756 اسم المشرف : اكرم عبد الكريم عبد الفتاح كحله رتبة المشرف : استاذ مساعد

فصل الاعتماد :	الأول	سنة الاعتماد :	2022 2021
رقم جلسة الكلية:	428		
تاريخ جلسة الكلية:	19/3/2023		

** ملاحظة : مثال العام الدراسي 2021-2022 يتم ادخاله على شكل

Appendix B

IRB Approval



An-Najah National University
Faculty of Medicine & Health Sciences
Institutional Review Board

جامعة النجاح الوطنية
كلية الطب وعلوم الصحة
لجنة اخلاقيات البحث العلمي

Ref: Mas . May. 2023/9

IRB Approval Letter

Title of Research:

Comparison between propofol vs lidocain pretreatment for propofol injection pain among healthy adults undergoing general anesthesia

Submitted by:
Sahar Sabri Jinat

Supervisor:
Jamal Qadumi , Akram Kahla

Approved:
9th May. 2023

Your Study Title **"Comparison between propofol vs lidocain pretreatment for propofol injection pain among healthy adults undergoing general anesthesia,"** reviewed by An-Najah National University IRB committee and was approved on 9th, May . 2023

Hasan Fitian, MD

IRB Committee Chairman

IRB Institutional Review Board

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

Appendix C

Facilitating the research task

State of Palestine
Ministry of Health
Education in Health and Scientific
Research Unit

دولة فلسطين
وزارة الصحة
وحدة التعليم الصحي
والبحث العلمي

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

الرقم: ٢٦٧/١٠٤/٢٠٢٤
التاريخ: ٢٠٢٤/٦/٤

ق. أ. الوكيل المساعد لشؤون المستشفيات والطوارئ المحترم،،،

تحية واحترام،،،

الموضـــوع: تسهيل مهمة بحث

يرجى تسهيل مهمة الطالبة: **سحر صبري جينات**– برنامج ماجستير تمريض العناية المكثفة– جامعة النجاح، في عمل بحث بعنوان:

" Comparison between propofol vs lidocaine pretreatment for propofol pain among patients undergoing general anesthesia"

حيث ستقوم الطالبة بجمع معلومات من غرف العلميات عن طريق المشاهدة والمراقبة ولن تقوم باعطاء المرضى اية ادوية، وحيث ان طبيب التخدير (د. أكرم الكحلة)، كما ورد من مشرف البحث، هو الذي سيقوم بالاجراء الطبي وحسب البروتوكول المعتمد في المشفى، علما ان البحث تحت اشراف د. جمال القدومي، وذلك في:

- **مستشفى رفيديا**

على ان يتم الالتزام باساليب واخلاقيات البحث العلمي، وعدم التعرض للمعلومات الشخصية للمرضى.
على ان يتم تزويد الوزارة بنسخة PDF من نتائج البحث.

مع الاحترام،،،

د. عبد الله القواسمي
رئيس وحدة التعليم الصحي والبحث العلمي

دولة فلسطين وزارة الصحة
وحدة التعليم الصحي والبحث العلمي

نسخة: مديرة دائرة التمريض والقبالة المحترمة/ جامعة النجاح

Telfax.:09-2333901 scientificresearch.dep@gmail.com تلفاكس: 09-2333901

Appendix D

Consent form

مقدمة

أخي/ أختي المشارك/ة:

انا الباحث " سحر صبري سعيد جينات" طالب ماجستير تمريض " في جامعة النجاح الوطنية يسرني أن أدعوك/ي إلى المشاركة في بحثي بعنوانمقارنة بين الم حقن البروبوفول والبروبوفول مع حقن يدوكائين بين البالغين الأصحاء اثناء الخضوع للتخدير العام" ولك/ي كامل الحرية والإرادة في المشاركة في هذا البحث, ولك/ي الحق في أخذ الوقت الكافي للتفكير في المشاركة من عدمها , وسؤال الباحث اذا كان لديك/ي أي استفسار , والتحدث لأي شخص أو جهة عن هذا البحث مع العلم ان المشاركة طوعية وفي حال قمت/ي بالمشاركة , يحق لك الانسحاب في أي وقت.

كما يمكنك الاستفسار من الباحث عن أي جزء يتعلق في البحث الآن أو فيما بعد, وستجد/ين الوقت والإجابة الكافيتين.

رقم هاتف الباحث: 0598122955

البريد الالكتروني: Sahar.jinat.95@gmail.com

<u>هذا ويضمن البحث سرية المعلومات المتعلقة بالمشاركة.</u>

Appendix E

Study tool

Patient Demographic Data :

Age :**weight (kg)** :

Gender : M / F

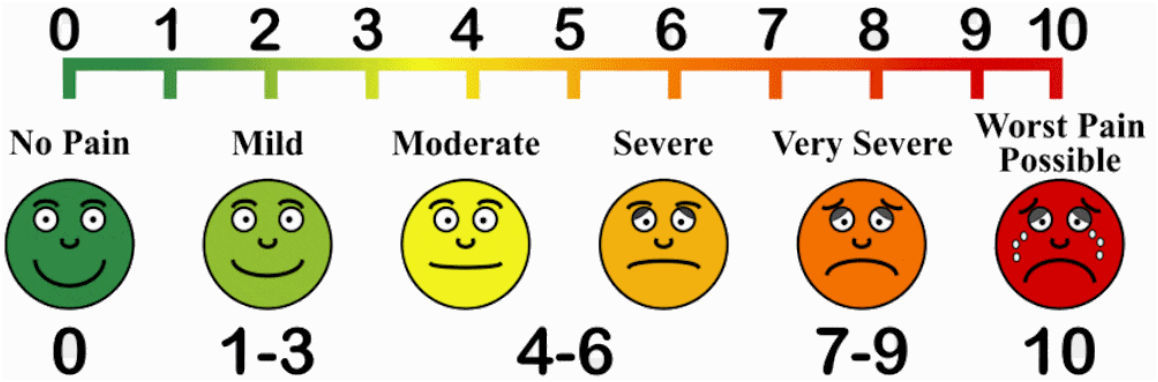
Inclusion and exclusion criteria :

Item	Yes	No
spinal or epidural anesthesia		
Respiratory system disease		
Cardiovascular disease		
Psychiatric pt		
Neurological disease		
Cesarean section pt		
Allergy to propofol		
llergy to lidocaine		
Renal disease		
Peripheral vascular disease		
Liver disease		

Basic vital signs before lidocaine or propofol injection :

Blood Pressure	
HeartRate	
Respiratory Rate	
O2 Saturation	

Visual analog score during injection propofol :



Num	Pian discrebtion	Patient pain
0	No pain	
1	Mild pain	
2	Moderate pain	
3	Sever pain	

Vital signs 1 min after propofol injection :

Blood pressure	
Heart rate	
Respiratory rate	
O2 saturation	

Vital signs 5 min after propofol injection :

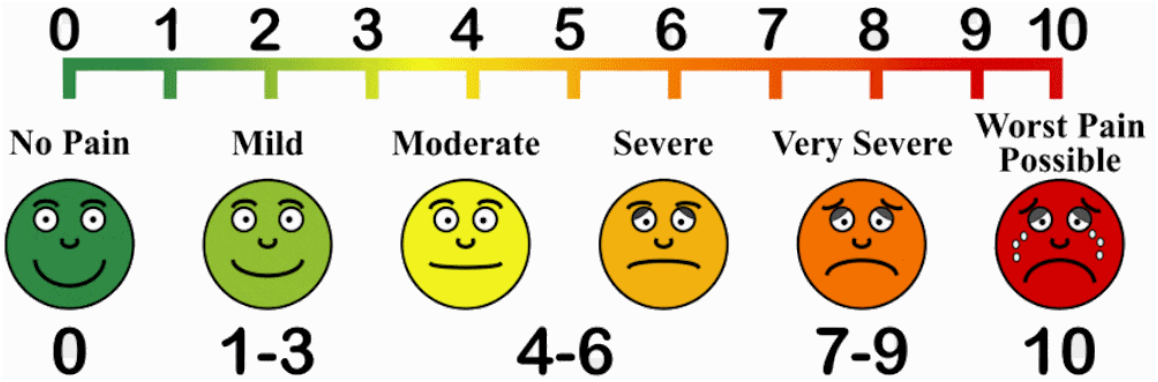
Blood pressure	
Heart rate	
Respiratory rate	
O2 saturation	

Pt who took 40 mg lidocain before propofol injection:

Vital signs after giving lidocain injection :

Blood pressure	
Heart rate	
Respiratory rate	
O2 saturation	

1- Describe patient VAS after propofol injection directly



Num	Pian discrebtion	Patient pain
0	No pain	
1	Mild pain	
2	Moderate pain	
3	Sever pain	

Vital signs 1 min after propofol injection :

Blood pressure	
Heart rate	
Respiratory rate	
O2 saturation	

Vital signs 5 min after propofol injection :

Blood pressure	
Heart rate	
Respiratory rate	
O2 saturation	

جـامعـــة النجاح الوطنية

كليـــة الدراســـات العليـــا

مقارنة بين البروبوفول والمعالجة المسبقة باليدوكائين على الم

حقن دواء البروبوفول لمرضى العمليات تحت تأثير التخدير الكلي

إعداد

سحر جينات

إشراف

د. جمال القدومي

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

2023

مقارنة بين البروبوفول والمعالجة المسبقة باليدوكائين على الم حقن دواء البروبوفول لمرضى العمليات تحت تأثير التخدير الكلي

إعداد

سحر جينات

إشراف

د. جمال القدومي

الملخص

الخلفية: أحد أدوية التخدير العام الشائع والسريع والفعال هو البروبوفول. ومع ذلك، فإن أطباء التخدير الذين يقيمون نتائج التخدير السريري ما زالوا يصنفون الانزعاج بعد تناول البروبوفول كمشكلة سريرية.

منهجية البحث: منهج البحث الكمي، التجريبي الحقيقي، دراسة من 100 مريض تتراوح أعمارهم بين 18–60 سنة الذين خضعوا لمعايير دراسة التخدير الكلي لعملية جراحية اختيارية شملت في هذه الدراسة. تم تصنيف المرضى الى مجموعتين، المجموعة الاولى(التجريبية) تم حقن 50 مرضيا بالبروفول 3 ملغم/كغم فقط، أما المجموعة الثانية (الضابطة) فقد تم اعطاء50 مريضا 40 ملم من دواء الليدوكاين قبل اعطائه البروبوفول.

النتائج: كان تأثير البروبوفول بعد الحقن في تقليل(الضغط، ضربات القلب، معدل التنفس) وزيادة نسبة الاوكسجين، حيث كانت نسب التغير لهذه المتغيرات(–15.94%، 19.01%، 9.52%) على التوالي كما أشارت الدراسة الى وجود فروق ذات دلالة احصائية عند القيمة الاحصائية اقل او يساوي كم 0.01 بين المجموعتين التجريبية والضابطة لصالح المجموعة التجريبية، ولم تلاحظ فروق ذات دلالة احصائية بين المجموعتين في ضربات القلب ونسبة الاكسجين ومعدل التنفس وهذا يعني أن البروبوفول يخفض ضغط الدم الى حد أكبر من البروبوفول مع الليدوكاين في المرضى البالغين الاصحاء الذين يخضعون

للتخدير الكلي. عانت المجموعة التجريبية من انزعاج أقل بكثير من حقن البروبوفول مقارنة بالمجموعة الضابطة (90% من المرضى لم يشعرو بالألم من حقن البروبوفول وشعر 10% فقط من المرضى بألم خفيف). وأظهرت الدراسة أيضا أن العلامات الحيوية للمريض تغيرت بعد حقن البروبوفول في المجموعة الضابطة.

الاستنتاجات: استخدام الليدوكاين عن طريق الوريد كعلاج مسبق في المرضى البالغين يقلل من الانزعاج من حقن البروبوفول. هذه الطريقة سهلة الاستخدام، ولا تضيع الوقت، ولا تكلف المزيد.

الكلمات المفتاحية: البروبوفول، الحقن، الالم، الليدوكاين، التخدير، المشفى.