International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/

Vol. 47 No. 2 November 2024, pp. 179-189

Prevalence Of General Anesthetics In The General Surgery Clinic At The University Clinical Center Of Kosovo

[1]Vesa Hoxhaj, [2]Arlind Mala

[1]Nardent Clinic, Prizren, Republic of Kosovo

[2]Main Family Medicine Center Fatmir Krasniqi, Fushe Kosovo, Republic of Kosovo

Correspondent author: Arlind Mala

Abstract

Introduction – Anesthesia is a controlled, temporary state of insensitivity or unconsciousness induced for various medical purposes. It involves the use of medications (called anesthetics) to prevent pain during procedures or surgery.
Objective – The aim of this study is to examine the use of anesthetics in general surgery at UCCK, identifying the most commonly used types, their role and importance, methods of administration, and dosing during anesthesia.
Methodology – This study is descriptive research, which, in addition to an in-depth literature review, utilized data from patient protocols in the General Surgery Department at UCCK, covering the period from January to June 2022.
Results – The results include data from all general surgery patients within the specified time period. The findings provide detailed information on anesthesia, types of anesthetics, administration methods, and their usage. It was observed that the prevalence of general anesthetics was dominant each month, while spinal anesthesia was the least used. The results are presented with graphs and accompanied by a detailed commentary.
Conclusions – Based on the study results, we conclude that the use of anesthetics is significantly high, with a large number of cases. General and neuraxial (spinal) anesthesia were the most commonly used, followed by intravenous anesthesia, and finally, anesthesia with a laryngeal mask. Most cases in this surgical department were conducted using general and spinal anesthesia.

Keywords – Prevalence, anesthetics, their usage

I. INTRODUCTION

Anesthesia is a state of reversible calm and physiological stability for the patient before, during, and after surgical interventions. Anesthesiology practices date back to ancient times, where civilizations used substances like opium, coca leaves, mandrake roots, or alcohol during surgical procedures. Ancient Egyptians used an opium-Hyoscyamus combination, similar to the modern morphine-scopolamine premedication mix. The first general anesthetics, such as nitrous oxide, ether, and chloroform, were administered through inhalation. In 1846, William Morton performed the first general anesthesia using ether in Boston.

General anesthesia is a reversible, descending depression of the central nervous system (CNS), initially causing loss of consciousness, followed by analgesia (pain insensitivity), amnesia (memory block of the surgical procedure), and muscle relaxation. The progression of general anesthesia does not follow the anatomical order of body organs. It begins in the cerebral cortex—the brain's most recent phylogenetic area—then affects the cerebellum, basal ganglia, and finally, the spinal cord (medulla spinalis),

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 47 No. 2 November 2024, pp. 179-189

while the medulla oblongata, containing vital centers, is impacted last. This “skipping” of the medulla oblongata’s vital centers is crucial for the safety of general anesthesia.

The triad of general anesthesia includes hypnosis, analgesia, and muscle relaxation. It is characterized by loss of sensation and pain, unconsciousness, amnesia, immobilization, loss of somatic and autonomic reflexes, and muscle relaxation.

Stages of Anesthesia:

Induction: Initiating anesthesia with intravenous (IV) and inhalational anesthetics. In pediatric cases, inhalational anesthetics are often preferred for comfort and to simplify venous line placement. After anesthetic induction, endotracheal intubation is performed.

Maintenance: Administered with oxygen (O_2), nitrous oxide (N_2O), IV or inhalational anesthetics, muscle relaxants, and analgesics.

Emergence: Anesthesia is terminated by ceasing anesthetics, followed by extubation and patient monitoring (Nehat Baftiu, 2021).

Classification of Anesthesia

General anesthetics render patients unconscious during procedures, whereas local and regional anesthetics numb only a part of the body, allowing the patient to remain awake. Depending on the required level of pain relief, anesthetics are administered through injection, inhalation, topical lotions, sprays, eye drops, or skin patches.

General Anesthesia affects the entire body, making patients unconscious and unable to move. Surgeons use it for internal organ operations and other invasive or lengthy procedures, such as spinal surgery. Without general anesthesia, life-saving procedures like open-heart surgery, brain surgery, and organ transplants would not be possible (National Institute of General Medical Sciences, 2022).

General anesthesia works by interrupting nerve signals between the brain and the body, preventing pain sensation and memory formation of the surgery (Tyler Wheeler, 2022).

Regional Anesthesia involves infiltrating a peripheral nerve with an anesthetic agent, blocking transmission to alleviate or prevent pain. Unlike general anesthesia, it does not affect the patient's consciousness. Regional anesthesia has advantages over general anesthesia, such as avoiding airway manipulation, reducing systemic drug side effects, faster recovery, and significantly lower post-operative pain levels (Li J, Lam D, King H, Credaroli E, Harmon E, Vadivelu N, 2019).

Local Anesthesia provides a reversible nerve blockade, resulting in loss of pain sensitivity. It is applied superficially and directly at the incision site. Regional blocks aim to anesthetize larger areas through nerve or field blocks (Michelle DiBaise, 2007).

II. Literature Review

Anesthesia in general surgery enables the execution of surgical procedures and other interventions by quickly and safely providing analgesia (pain control), anxiolysis (or unconsciousness with general anesthesia), and adequate muscle relaxation. A critical aspect of perioperative anesthetic care is the maintenance of physiological homeostasis (e.g., hemodynamic stability, blood pressure, oxygenation, ventilation, and temperature regulation).

Anesthesia clinicians (anesthesiologists, licensed anesthetists, anesthesia assistants) select and manage general, neuraxial, or regional anesthesia intraoperatively (e.g., peripheral nerve blocks) or provide monitored anesthesia care (MAC) for sedation. Anesthesia teams offer care in operating rooms (OR) as well as in non-OR locations, such as endoscopy suites, interventional radiology rooms, and interventional cardiology labs. Other anesthesia services include preoperative assessment, postoperative management in the post-anesthesia care unit (PACU) or the intensive care unit (ICU), and management of acute and chronic perioperative pain. (Scott A Falk, Lee A Fleisher, May, 2022)

Premedication

Premedication involves the administration of medications prior to anesthesia induction to prepare the patient both physically and mentally. It aims to achieve mild patient relaxation for enhanced comfort, improve efficiency during anesthesia induction, stabilize

the clinical condition during intubation, and reduce the risk of gastric content aspiration by using prokinetics and antacids. (Clinical Critical Care Medicine, 2006)

In the operating room, the patient should be calm, lying down, and cooperative. Achieving this requires administering the appropriate medications in the correct dose (based on the patient's weight and age) within a suitable preoperative timeframe.

Anxiolysis: Psychological preparation during the preoperative examination reduces possible fear and anxiety in patients, thus lowering the required dose of premedication drugs. Benzodiazepines are the most commonly used medications for premedication, typically administered orally 45–90 minutes before surgery.

Amnesia: To prevent the patient from remembering perioperative procedures and to achieve anterograde amnesia, benzodiazepines such as midazolam and diazepam are used.

Antiemetics: Surgical interventions can be associated with postoperative nausea and vomiting. To reduce gastric acidity, antacids or H2-receptor antagonists may be given during premedication. (Nehat Baftiu, Anesthesiology and Resuscitation, 2021)

General Anesthesia

General anesthesia induces a sleep-like state through a combination of drugs known as anesthetics, administered before and during surgery or other medical procedures. General anesthesia usually involves a combination of intravenous drugs and inhaled gases. You feel asleep, but general anesthesia does not put you to sleep; rather, it prevents the brain from responding to pain signals or reflexes.

Your team may recommend general anesthesia for specific procedures, particularly those that:

Are lengthy

Require muscle relaxants

Involve significant blood loss

Substantially impact breathing, blood pressure, or heart rate (Mayo Clinic, 2023)

Indications: Surgeries that cannot be adequately performed under local or regional anesthesia require general anesthesia. Procedures that may result in significant blood loss or impact breathing necessitate general anesthesia.

Contraindications: There are no absolute contraindications for general anesthesia except patient refusal. However, several relative contraindications exist. These include patients with unfit medical conditions before elective surgery, patients with difficult airway paths, or patients with significant comorbid conditions that influence the choice of anesthesia (e.g., severe aortic stenosis, significant pulmonary disease). For such patients, regional or neuraxial anesthesia may be considered to avoid airway manipulation and the physiological changes associated with general anesthesia. Patients scheduled for general anesthesia should undergo preoperative evaluation. (Eichelsbacher C, Ilper H, Noppens R, Hinkelbein J, Loop T, 2018)

Pharmacokinetics of Anesthetics

Pharmacokinetics explains what happens to a drug in the body, while pharmacodynamics describes the actions produced by the drug within the body. Therefore, the effects of a drug result from a combination of its pharmacokinetic and pharmacodynamic characteristics in an individual. Upon administration of an anesthetic, whether through inhalation, intravenously, or rarely rectally, the speed of the anesthetic reaching the tissues depends on several factors. Primarily, the rate of entry into the bloodstream is crucial. Subsequent factors include the concentration gradient between blood and tissues, closely linked to the tissue's vascularization. Lastly, tissue permeability and affinity for the administered anesthetic are also important. Generally, the movement of a drug or anesthetic through the body can be divided into three distinct phases: absorption, distribution, and elimination (Fred Roberts, Dan Freshwater-Turner, 2007).

Pharmacodynamics of Anesthetics

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 47 No. 2 November 2024, pp. 179-189

Pharmacodynamics describes the effects of anesthetics on tissues, organs, and systems throughout the body. Anesthetics impact the cardiovascular system by depressing the myocardium, reducing heart contractility, and lowering cardiac output. Blood pressure may decrease or remain unchanged. Anesthetics also act on the central and autonomic nervous systems (initially stimulating them before causing depression), as well as the liver and kidneys, respiratory system (causing respiratory depression), metabolism (decreasing metabolic rate), and the uterus (crossing the placental barrier with depressive effects on the fetus) (Anthony G Hudetz, 2012).

III. Declaration Of The Problem

The topic I have chosen for my thesis has captured my attention for a long time, which is why I aimed to expand my knowledge on it. Given the increasing number of surgical interventions across all clinics, procedures that cannot be performed without anesthesia, I became intrigued to delve into the study of case numbers, types of anesthesia, and anesthetics used in general surgery in our country. The majority of surgeries are performed under general anesthesia, with anesthetics used being of the same category. The incidents caused by improper use of anesthetics are concerning, and it is essential to be better informed about their dosages and methods of administration. This paper, in addition to anesthetics and their characteristics, covers all types of anesthesia and the medications used in general surgery, which assist in completing all phases of general anesthesia and other types of anesthesia.

IV. Aim And Methodology Of The Research

The purpose of this research is to quantify the use of anesthetics and their administration methods in general surgery at the University Clinical Center of Kosovo (QKUK). Additionally, this study aims to report the number of patients administered anesthetics during the period from January to June 2022.

The research follows a descriptive model, focusing on the quantity and method of anesthetic administration during the specified timeframe. The study was conducted at the abdominal surgery clinic within QKUK.

For data collection, the clinic's medical records were reviewed for the period from January to June 2022. Data collection was conducted with the authorization of QKUK's administration.

V. Results Findings

EMPIRICAL PRESENTATION OF RESULTS

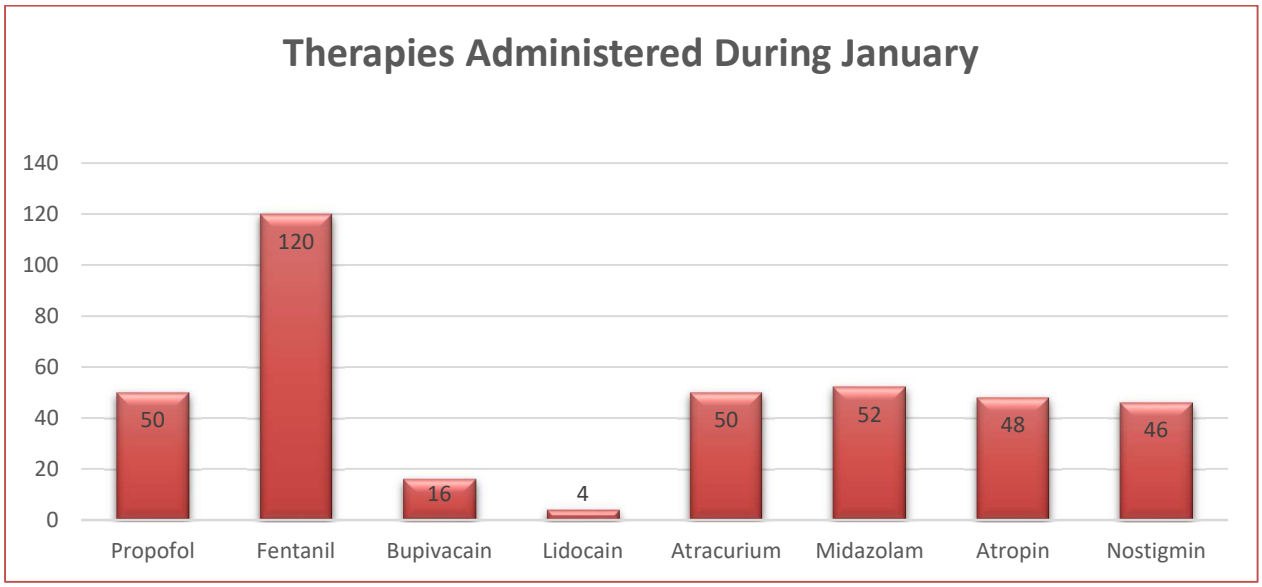
This section of the research presents the findings in both tabular and graphical formats.

RESULTS PRESENTATION FOR JANUARY

The empirical data for the month of January includes detailed tables and graphs that illustrate the frequency and types of anesthetic agents administered, as well as patient demographics and any relevant procedural information. This analysis offers a clear overview of anesthetic practices and trends within the specified timeframe.

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 47 No. 2 November 2024, pp. 179-189



Graph 1. Graphic Representation of Anesthetic Use in January

The chart above illustrates the usage rates of various anesthetics in the General Surgery Clinic at QKUK for January 2022, with a total of 74 cases reported. Among the hypnotic class, Propofol was consistently administered. Fentanyl was predominantly used as a potent analgesic, while Atracurium was employed as the muscle relaxant in all cases. In terms of local anesthetics, Bupivacaine was the most frequently administered, with Lidocaine used in only four instances. From the benzodiazepine class, Midazolam (Flormidal), a short-acting benzodiazepine, was utilized. For decurarization, Atropine and Neostigmine were administered as necessary.

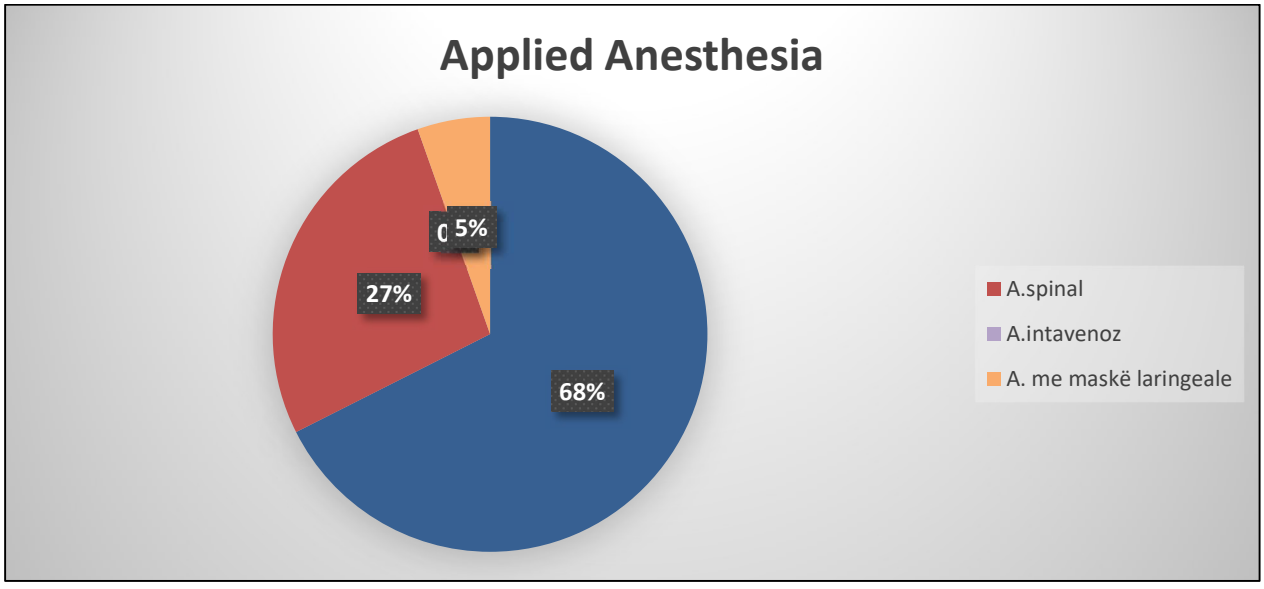


Figure 1.1 Graphical Representation of the Type of Anesthesia Applied in January

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 47 No. 2 November 2024, pp. 179-189

The graph above displays the types of anesthesia administered during January 2022. As shown, general anesthesia is the most commonly recommended type for surgical interventions in the General Surgery department at QKUK, followed by spinal anesthesia.

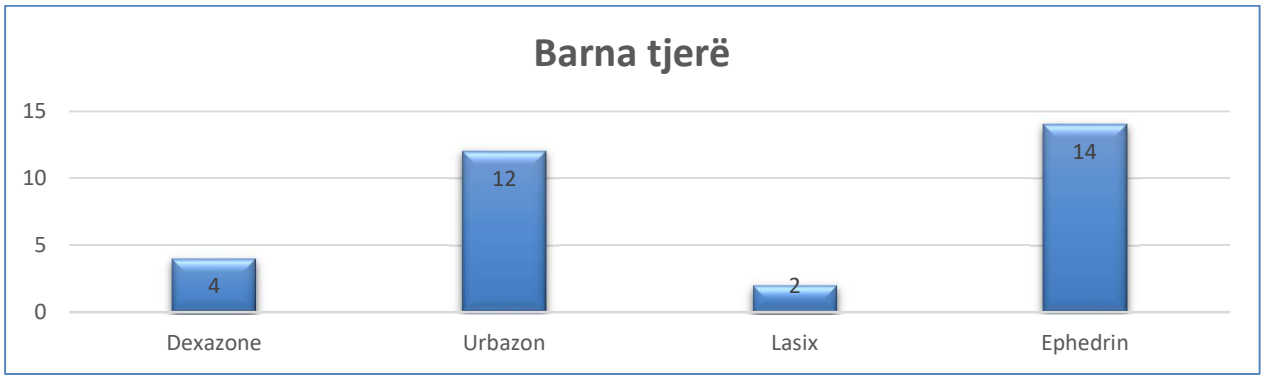
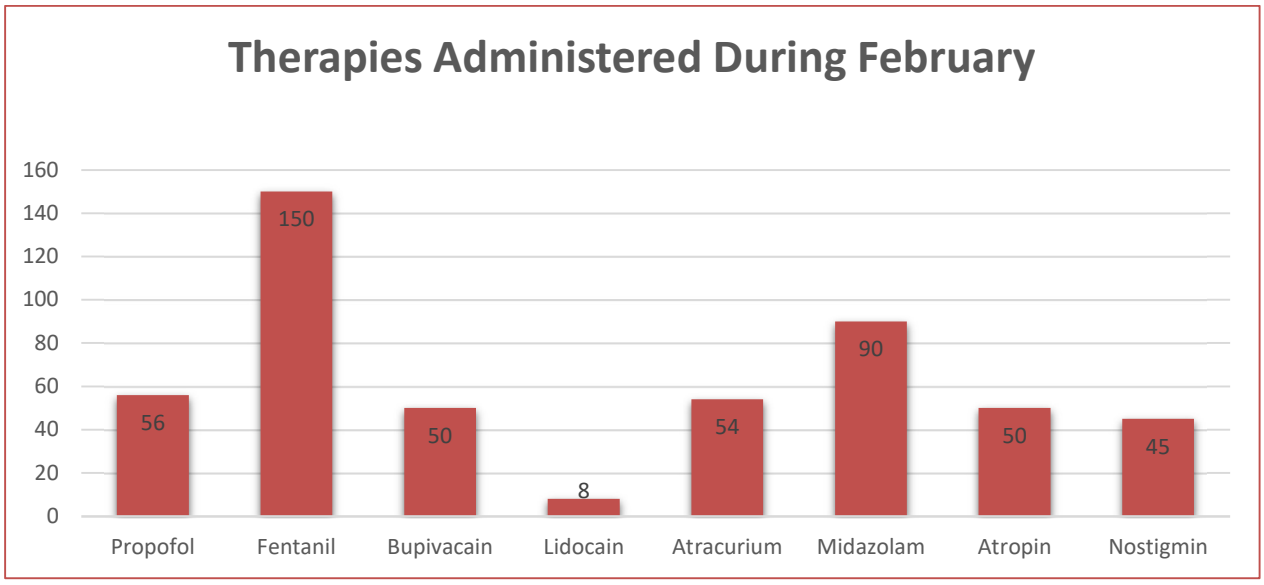


Figure 1.2: Graphical Representation of Supplementary Medications Administered During Anesthesia in January

The above graph shows the supplementary medications administered during the anesthesia period in general surgery at QKUK during January 2022. As observed, Ephedrine and Urbazone are the most commonly used. Ephedrine was primarily used to manage and treat hypotension. Additionally, Lasix, a diuretic, was used in two cases.

PRESENTATION OF RESULTS FOR THE MONTH OF FEBRUARY



Graph 2. Graphic representation of the quantity of anesthetics used during February

In the graphic representation above, it can be observed that in general surgery at QKUK during February 2022, the following anesthetics were most frequently used, with a total of 106 reported cases. From the hypnotic class, Propofol was used in every case. As a strong analgesic, Fentanyl was used in all cases. As a muscle relaxant, Atracurium was used in every instance. Among local anesthetics, Bupivacaine was the most frequently used, while Lidocaine was only used in 8 cases. From the benzodiazepine class, Midazolam (Flormidal) was used as a short-acting benzodiazepine. The de-curarizing agents used were Atropine and Neostigmine.

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 47 No. 2 November 2024, pp. 179-189

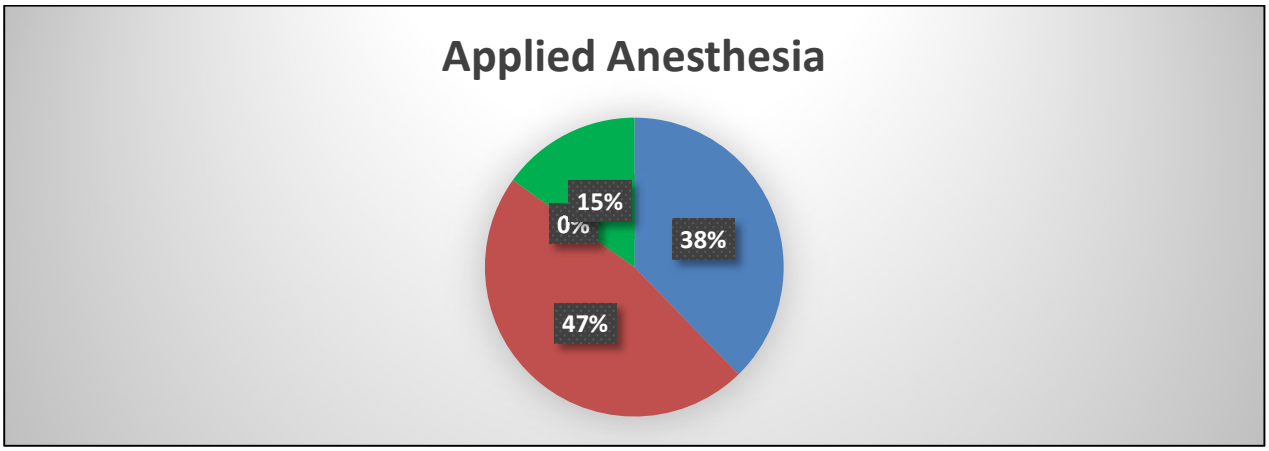


Figure 2.1 Graphical Representation of Types of Anesthesia Applied in February

The above graph illustrates the types of anesthesia applied during February 2022. As shown, spinal anesthesia was the most recommended for general surgery procedures, accounting for 47%, followed by general anesthesia at 38%, while intravenous anesthesia was not used at all.

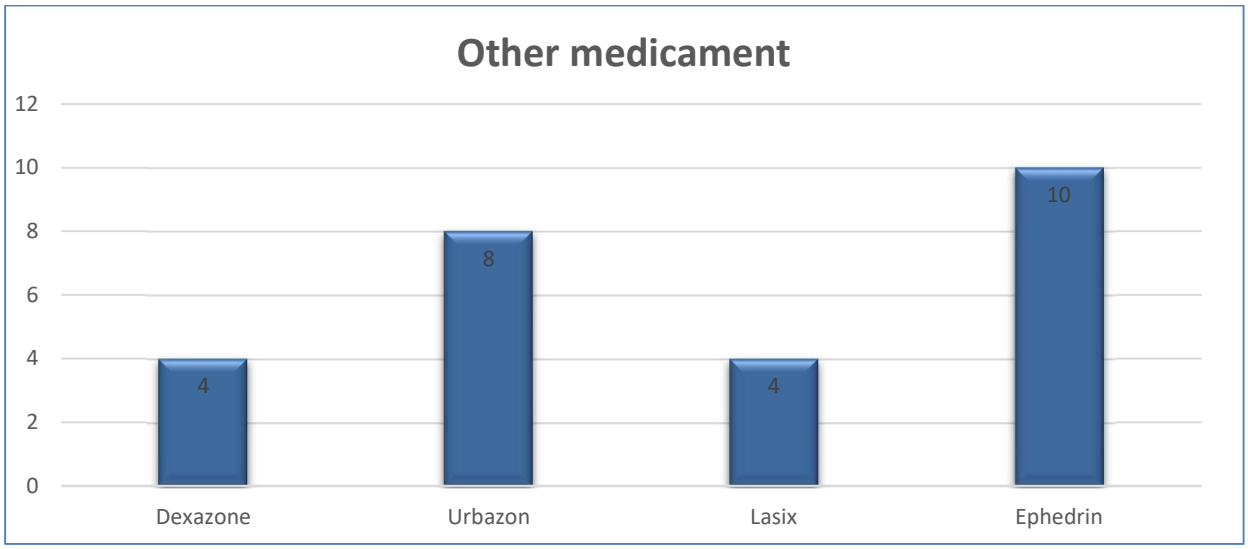


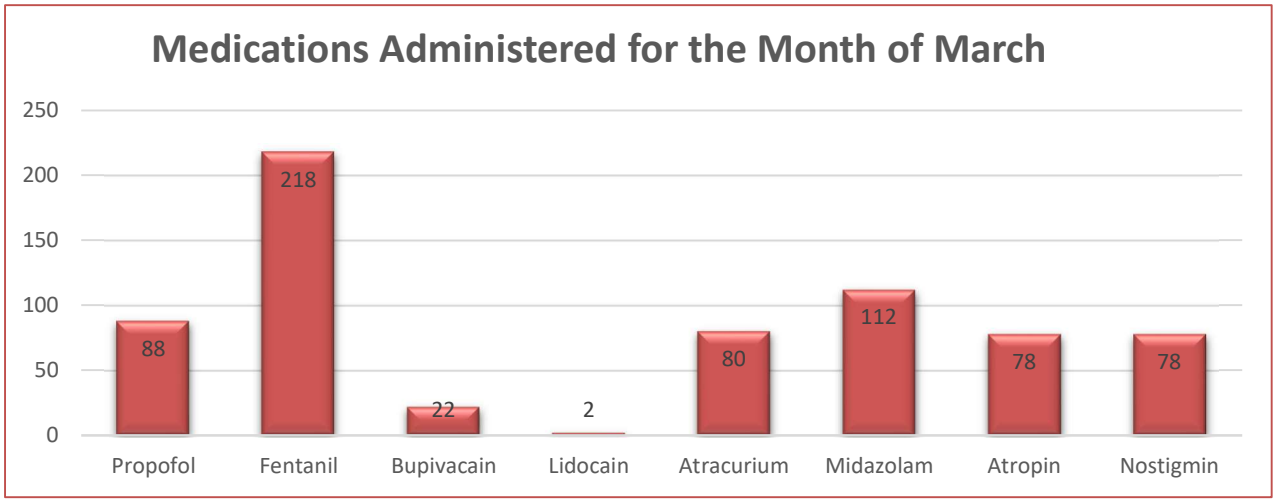
Figure 2.2 Graphical Representation of Additional Therapies Administered During Anesthesia in February

The above graph shows the additional medications administered during the anesthesia period in general surgery for February 2022. It is observed that Ephedrine and Urbason are among the most frequently used.

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

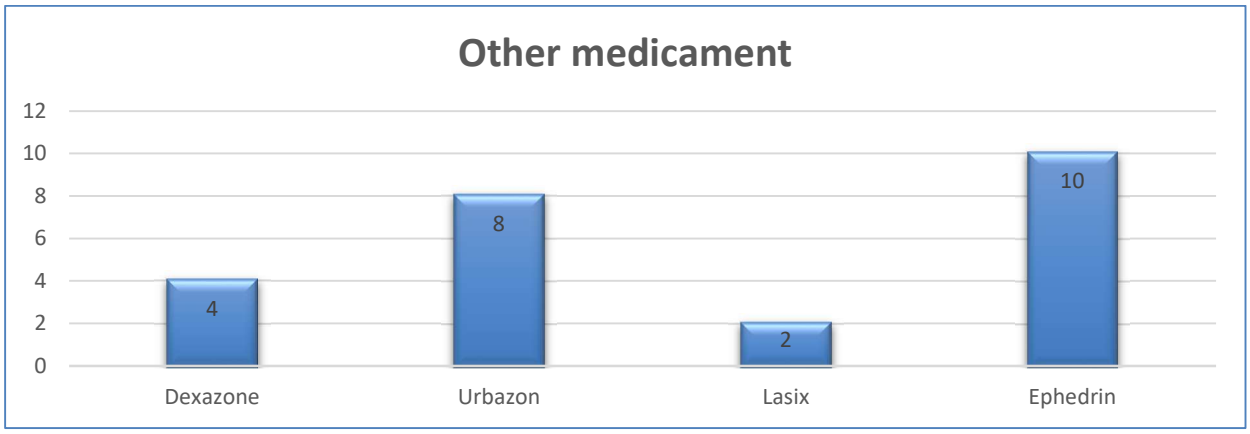
https://ijpsat.org/
Vol. 47 No. 2 November 2024, pp. 179-189

PRESENTATION OF RESULTS FOR THE MONTH OF MARCH



Graph 3: Graphic Representation of the Usage Frequency of Anesthetics During March

The results presented in the graph above indicate the use of anesthetics in general surgery at UCCK during March 2022, with a total of 112 reported cases. For hypnotics, Propofol was consistently used in every case. Fentanyl served as the primary analgesic across all cases. Atracurium was the chosen muscle relaxant in every instance. Among local anesthetics, Bupivacaine was most frequently used, while Lidocaine was administered in only two cases. From the benzodiazepine class, Midazolam (Flormidal), a short-acting benzodiazepine, was used. In general anesthesia, Atropine and Neostigmine were administered as reversal agents for muscle relaxation. The most utilized drug in March was Fentanyl, with a total of 218 administrations.

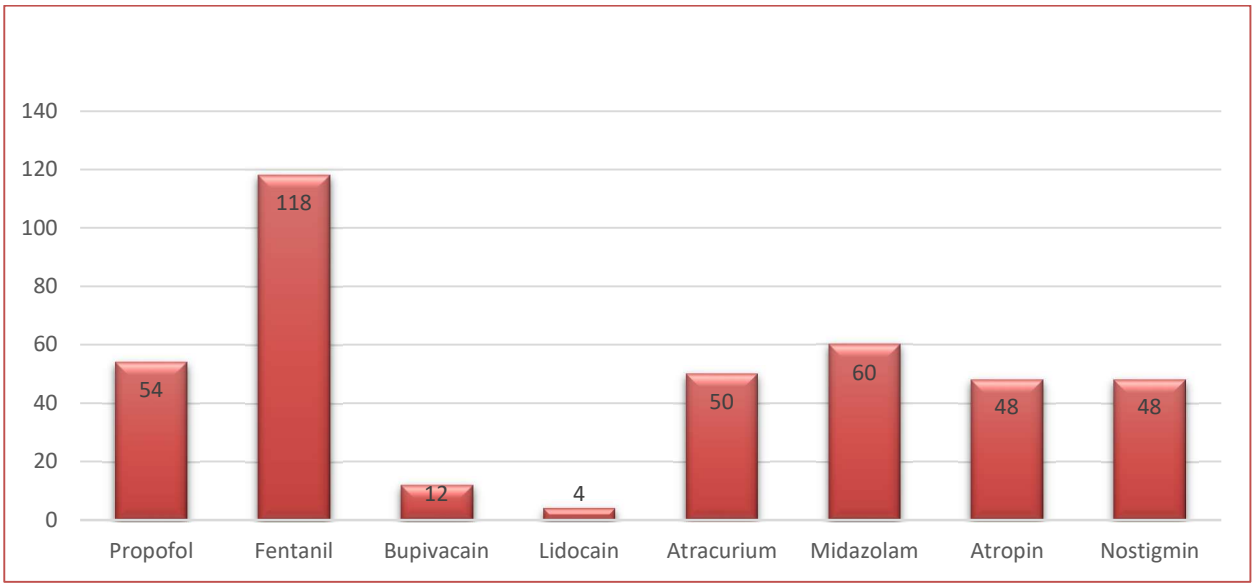


Graph 3.1: Graphic Representation of Additional Therapies Administered During the Anesthesia Period in March

The graph above displays the supplementary medications administered during anesthesia in general surgery at UCCK in March 2022. Notably, Ephedrine and Urbason were among the most frequently used drugs during this period

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

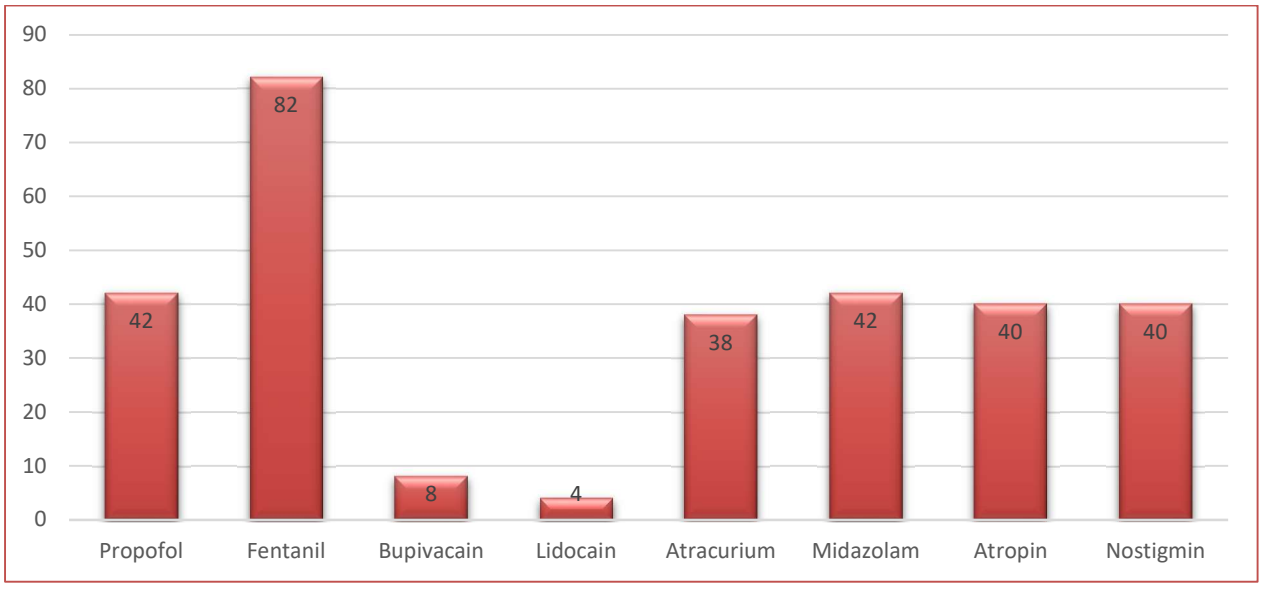
https://ijpsat.org/
Vol. 47 No. 2 November 2024, pp. 179-189



Graphic Representation of Anesthetic Usage During April

The graph above illustrates the usage of anesthetics in general surgery at UCCK during April 2022, with a total of 68 reported cases. Among hypnotics, Propofol was consistently used in each case, while Fentanyl served as the primary strong analgesic. Atracurium was the muscle relaxant used in all instances. For local anesthetics, Bupivacaine was predominantly administered, with Lidocaine used in only four cases. From the benzodiazepine class, Midazolam (Flormidal), a short-acting benzodiazepine, was used. For reversal agents, Atropine and Neostigmine were employed.

PRESENTATION OF RESULTS FOR THE MONTH OF MAY



Graphic Representation of Anesthetic Usage During May

The results presented in the above graph show the usage of anesthetics in general surgery at UCCK during May 2022, with a total of 52 reported cases. Propofol was consistently used as the hypnotic in each case, while Fentanyl was the primary strong analgesic. Atracurium was used as the muscle relaxant in all instances. Among local anesthetics, Bupivacaine was administered in 8 cases,

and Lidocaine in 4 cases. From the benzodiazepine class, Midazolam (Flormidal), a short-acting benzodiazepine, was used. Atropine and Neostigmine were employed as reversal agents.

VI. Conclusions And Recommendations

Based on the results obtained from this study, it can be concluded that the use of anesthetics is significantly increased, and the number of cases is very high. General anesthesia and neuroaxial (spinal) anesthesia are the most commonly used in general surgery, followed by intravenous anesthesia, and finally, laryngeal mask anesthesia. The majority of cases in this surgery were performed with general and spinal anesthesia. The most commonly used hypnotic is propofol. The most frequently used analgesic was fentanyl, while the most mentioned muscle relaxant was atracurium. In most of the procedures performed under general anesthesia, atropine and neostigmine were used as decurarization drugs. In operations subjected to spinal anesthesia, the most used local anesthetic was bupivacaine, with lidocaine used in rarer cases.

Recommendations:

Continued studies and data collection on the use of anesthetics should be carried out to monitor the effectiveness and safety of the treatments used, ensuring compliance with acceptable protocols.

The use of proven effective anesthetics is recommended, with careful monitoring for side effects, especially for those used in prolonged procedures.

Consideration should be given to increasing the use of newer and safer anesthetics for patients with a history of allergies or sensitivity to certain substances.

There should be an evaluation of opportunities to improve anesthesia administration techniques to ensure that patients have a shorter recovery period with fewer side effects.

Additionally, it is important to provide continuous training for medical staff in the use of advanced technologies for anesthesia administration and management of side effects.

References

[1]. Nehat Baftiu, Anesteziologjia dhe reanimacioni, botimi I 2të, 2021, kapitulli 2- Anestezia e përgjithshme, faqe 7.

[2]. National Institute of General Medical Sciences, fact-sheets, anesthesia.

[3]. Tyler Ëheeler, MD on November 05, 2022, Written by WebMD Editorial

[4]. Li J, Lam D, King H, Credaroli E, Harmon E, Vadivelu N. Novel Regional Anesthesia for Outpatient Surgery. Curr Pain Headache Rep. 2019 Aug. [PubMed]

[5]. Michelle DiBaise, in Essential Clinical Procedures (Second Edition), 2007

[6]. Scott A Falk, Lee A Fleisher, uptodate, overvieë of anesthesia, May 13, 2022

[7]. Eichelsbacher C, Ilper H, Noppens R, Hinkelbein J, Loop T. [Rapid sequence induction and intubation in patients with risk of aspiration : Recommendations for action for practical management of anesthesia]. Anaesthesist. 2018 Aug

[8]. Clinical Critical Care Medicine, 2006, Chapter 27- A Physiologically Based Approach to Perioperative Management of Obese Patients, pages 263-273

[9]. Mayo Clinic, General Anesthesia, february 16,2023

[10]. Hewer CL (August 1937). "The Stages and Signs of General Anaesthesia". British Medical Journal.

[11]. Fred Roberts, MB ChB FRCA, Dan Freshwater-Turner, MA MB BChir MRCP Continuing Education in Anaesthesia Critical Care & Pain, Volume 7, Issue 1, February 2007, Pages 25–29

[12]. Hudetz AG. General anesthesia and human brain connectivity. Brain Connect. 2012

[13]. Boles JM, Bion J, Connors A, Herridge M, Marsh B, Melot C, Pearl R, Silverman H, Stanchina M, Vieillard-Baron A, Welte T. Ëeaning from mechanical ventilation. Eur Respir J. 2007 May;29(5):1033-56

[14]. Prof. Nehat, Anesteziologjia dhe reanimacioni, botimi I 2të, 2021, kapitulli 3- Barnat për anestezinë e përgjithshme, faqe 17

[15]. Zafirova Z, Sheehan C, Hosseinian L. Update on nitrous oxide and its use in anesthesia practice. Best Pract Res Clin Anaesthesiol. 2018 Jun;

[16]. Black GË. A revieë of the pharmacology of halothane. Br J Anaesth. 1965 Sep;

[17]. Jones MV, Brooks PA, Harrison NL. Enhancement of gamma-aminobutyric acid-activated Cl- currents in cultured rat hippocampal neurones by three volatile anaesthetics. J Physiol. 1992 Apr;.