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Common Side Effects and Complications of Anesthesia in Public Hospitals in Sana'a

Research Graduation Submitted to the anesthesia Department, Deanship of Environment and community service**.** 21 September University of medical & Applied Sciences as A Partial Fulfillment of the Requirement for Diploma anesthesia

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بسم الله الرحمن الرحيم


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Dedication

To my dear parents, thank you for your continuous support and countless sacrifices.

To my esteemed professors, who generously shared their knowledge and guidance.

To my friends and colleagues, partners in success and cherished moments.

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To the soul that illuminated my path and guided me, my dear mother, thank you for every moment of support, for every word of encouragement and love.

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Abstract

Background: Elective surgeries performed under general or spinal anesthesia can carry various side effects and complications. Common side effects may include nausea, vomiting, sore throat, shivering, and drowsiness. More serious complications, though rare, can include respiratory depression, cardiac arrhythmias, and nerve damage. Careful patient monitoring and appropriate anesthetic management are crucial to minimize these risks. Patients should be informed of the potential side effects and complications prior to their procedure in order to set realistic expectations.

Objective: To identify the common side effects and complications in elective surgery under general and spinal anesthesia at Public Hospitals.

Methodology: A descriptive cross-sectional study was conducted on Public Hospitals in Sana'a 2024-2025. Data were collected through a closed questionnaire. Data were analyzed using (SPSS version 24).

Results: The sample was 43, mean±sd of age was 27.4±14.8, while weight was 56.7±15.8, and height was 1.6±0.2, and BMI 24.1±7.3, majority of sample in gender was male 62.8%, majority of sample in Pervious surgery with anesthesia was GA 53.5%, previous complication was more than half 69.8%, and previous side effects was more than half 79.1%, most preoperative vital signs was normal, general anesthesia the most drugs used was propofol, spinal was Marcaine, the side effect associated with general anesthesia was less than half 32.6%, side effect associated with spinal anesthesia was less than half 39.5%, most side effect associated with general anesthesia was bradycardia, bleeding and shivering, most side effect associated with spinal anesthesia was hypotension and headache, The most caused of side effects was surgery stimulation and drugs,

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Abbreviations	Means
AIH	**Anaesthesia-Induced Hepatitis.**
ALT	**Alanine Aminotransferase.**
ASA	**American Society of Anesthesiologists**
AST	**Aspartate Aminotransferase**
COPD	**Chronic Obstructive Pulmonary Disease.**
CSF	**Cerebrospinal Fluid**
GA	**General Anesthesia**
IV	**Intravenous**
MAC	**Minimal Alveolar Concentration.**
MAP	**Mean Arterial Pressure.**
NPO	**Nil Per Os.**
OR	**Operating Room.**
PACU	**Postanesthesia Care Unit.**
PDPH	**Post Dural Puncture Headache.**
PONV	**Postoperative Nausea and Vomiting.**
SA	**Spinal Anesthesia.**

Chapter One: Introduction

1.1 Background of the Study

Elective surgeries are procedures that are scheduled in advance and are not considered emergencies or life-threatening, often requiring the use of either general anesthesia or spinal anesthesia to ensure patient comfort and pain management during the procedure. General anesthesia, in which the patient is placed in an unconscious state, or spinal anesthesia, in which the lower part of the body is numbed while the patient remains conscious.[1] Although these anesthesia techniques are generally safe, there are potential side effects and complications that can occur that patients and health care providers should be aware of Choosing between general anesthesia and spinal anesthesia for a particular elective surgery involves evaluating the risks and benefits of each approach.[2] Unwanted side effects and complications associated with general anesthesia and spinal anesthesia can range from mild to severe, and may affect patient recovery and surgical outcomes.[3] Common side effects of general anesthesia can include nausea, vomiting, sore throat, and cognitive impairment. More serious complications may include respiratory depression, cardiovascular instability, and allergic reactions. Spinal anesthesia carries its own set of potential problems, such as hypotension, headache after dural puncture, and neurological deficits. The occurrence and severity of these side effects and complications can be affected by several patient factors, including age, body type, and pre-existing medical conditions. Careful patient selection, appropriate anesthetic doses, and vigilant monitoring are critical to reduce risk and improve patient safety.[4] Previous research has investigated the incidence and nature of side effects and complications associated with elective surgeries under general anesthesia and spinal anesthesia. A study by Apfelbaum et al. (2006) examined data from more

than 40,000 anesthesia cases and found that the most common side effects included nausea and vomiting (in 20–30% of cases), postoperative pain (in 30% of cases), and postoperative shivering (in 5– 5% of cases). 65 cases). Percentage of cases)[5] . More serious complications such as respiratory depression, cardiovascular problems, and anaphylaxis were less common but still occurred in a small percentage of patients. Another study by Bateman et al. (2013) looked specifically at spinal anesthesia and found the overall complication rate to be approximately 12%, with the most common problems being headache after dural puncture, hypotension, and transient neurological symptoms [6] . Understanding the comparative safety profiles of these two anesthetic techniques is important to ensure that patients are able to make informed decisions about perioperative care. Developing effective strategies to anticipate, prevent, and manage anesthesia-related complications is an important area of research and clinical practice[3]. Understanding the comparative safety profiles of general anesthesia and spinal anesthesia is critical for patients considering elective surgical procedures, as well as for anesthesia providers responsible for administering and managing these techniques. Identifying risk factors and developing strategies to mitigate complications can enhance patient safety and improve surgical outcomes[2].

1.2 Statements of problem

Despite the role that anesthesia plays in saving lives and enabling critical surgeries, it entails some health risks that may threaten life. Lumbar blockades are also performed to control pain. Although this procedure is relatively safe, the use of nerve blockers may cause neurological complications. Due to the seriousness of these complications, we felt it necessary to study this topic due to its importance in benefiting society

and to identify the factors that contribute to its appearance, as this affects the future of surgeries and their reliability.

What is common side effects and complications in elective surgery under general and spinal anesthesia at Public Hospitals?

1.3 Importance of the Study

1. It helps the staff to develop their knowledge about common side effects and complications in elective surgery under general and spinal anesthesia at Public Hospitals.

2. Preparing a questionnaire to identify common side effects and complications in elective surgery under general and spinal anesthesia at Public Hospitals.

3. Clarify the importance of common side effects and complications in elective surgery under general and spinal anesthesia at Public Hospitals.

4. It is the first study that dealt with the subject of common side effects and complications in elective surgery under general and spinal anesthesia at Public Hospitals

5. It could open the way for researchers to conduct a number of studies about the common side effects and complications in elective surgery under general and spinal anesthesia at Public Hospitals.

1.4 Objectives of the Study

1.4.1. General objective:

To identify the common side effects and complications in elective surgery under general and spinal anesthesia at Public Hospitals.

1.4.2. Specific Objective:

1. To identify the common side effects in elective surgery under general and spinal anesthesia at Public Hospitals

2. To determine the complications in elective surgery under general anesthesia at Public Hospitals

3. To determine the complications in elective surgery under spinal anesthesia at Public Hospitals

4. To compare between the effects and complications of general anesthesia and spinal anesthesia

1.5. Questions of the study:

1. What are the common side effects of elective surgery under general and spinal anesthesia in Public Hospitals?

2. What are the complications of elective surgery under general anesthesia in Public Hospitals?

3. What are the complications of elective surgery under spinal anesthesia in public hospitals?

4. What are the differences and similarities between general anesthesia and spinal anesthesia?

5. What are the factors contributing to the occurrence of these effects and complications?

Chapter Two: Literature Review

2.1 Complications and side effects of general anesthesia:

2.1.1 Post-operative nausea and vomiting

The most common minor post-operative side effects include nausea, vomiting, sore throat or dental issues from the usage of endotracheal intubation, shivering and sleepiness. Nausea is a state of discomfort often followed by the expulsion of stomach contents, also known as vomiting. it was noted that postoperative nausea and vomiting (PONV) was more frequent after operations that used general anesthesia compared to operations that used regional anesthesia. The occurrence in the recovery room ranges from an overall percentage of 20% to 30%. Postoperative nausea and vomiting is due to the effects of combined factors such as the background of the patient, surgery done, anesthesia and medication used and the environmental factors. Patient factors are female gender, previous postoperative nausea and vomiting history, tendency of motion sickness, nonsmoking status and age. Anesthesia related risk factors include the use of volatile anesthetics, extended time of surgery and anesthesia and postoperative opioid use. Anesthesia risk rises through the use of volatile anesthetic agents contributing to brain stimulation leading to nausea and vomiting. usually high doses of opioids are used for pain alleviation and they are recognized to trigger nausea and vomiting. Post-operative nausea and vomiting could be prevented and treated through a set of measures ranging from all the way from pre-admission to post-operative care. Those measures are the use of antiemetic medicine throughout the care and proper hydration through I.V. fluids. In the post-operative phase, relying on the circumstance, the patient can be kept nil per os (NPO), nothing by mouth, to forbid further nausea, although the use of ice chips was aid in the prevention. [1]

2.1.2 Pulmonary complications

Breathing is major part of a surgical procedure done in general anesthesia. The patient is dependent on the caregivers solely as his or her respiratory system is manually kept going through the use of respiratory machines. The muscle relaxants used in the induction make it so that the patients tongue blocks the airways, thus an intubation tube is inserted in order to keep the airways open. Patient Breathing should be monitored closely after the procedure as well to ensure right oxygenation levels and effortless respiration. The objective of the post-operative care related to respiration is to stabilize breathing of patients. Post-operative pulmonary complications, shortly referred as PPCs, are a group of complications, which are related to the respiratory system of the patients. These complications may cause in the worst-case scenario lead to further treatment after the surgery, such as intensive care unit care or further hospital stay, although through monitoring and preventive procedures the risk can be reduced. Risk factors for PPCs include higher American Society of Anesthesiologists classification, obesity, diabetes, smoking, advanced age, and chronic obstructive pulmonary disease (COPD) or other respiratory condition. General anesthesia is listed as one of the anesthetic causes factors, which increases the risk for said issues as it in multiple ways decreases the post-operative oxygenation levels by affecting the patient respiration and depressing pulmonary functions. Residual anesthetic drugs can also cause issues by inducing residual paralysis or residual neuromuscular blockage. [2]

2.1.2.1 Hypoventilation

Hypoventilation, inadequate ventilation, can happen during and after the surgery and affects post-operative care. If a patient experiencing hypoventilation he can develop hypoxemia, oxygen deficiency in arterial

blood, or hypoxia, impaired tissue oxygenation. Those are challenging pulmonary complications of general anesthesia. Hypoventilation can be caused by various reasons making it difficult to pinpoint the reason: fluid overload or pulmonary embolism, cardiac arrest, atelectasis, the complications of an underlying respiratory illness such asthma or COPD, a breathing machine error or a diffusion deficit which are all lead to a lower concentration of oxygen and higher concentration of carbon dioxide in the blood. Low oxygenation level is shown in the patient through cyanotic skin and affect the status of the patient through the higher risk of infection of wound and possible inducement of delirium. Inspecting the triggering agent behind the low oxygen levels starts the treatment. Patient Oxygenation is extremely important to raise the oxygenation levels to the desired range. Proper oxygenation is very important even in the transfer from the operating theater to the recovery room if the general condition of the patient indicates so. [4]

2.1.2.2 Pulmonary atelectasis

Pulmonary atelectasis, the collapse or impaired functioning of a lung or a part of a lung, is usually common among anesthetized patients. First symptoms could be coughing, chest pain and difficulty in breathing with breathlessness. Atelectasis induce reduction of functional residual capacity, which decreases inhaled oxygen volumes. Atelectasis occurs in a complication called pneumothorax. It could be triggered by the changes in the absorption of gases and pressures occurring during general anesthesia or by a bronchial obstruction. That is results in the deflation of the alveoli, also called blebs, in the lungs. then Air is leaked into the pleural cavity from the ruptured blebs in the lung, which balances the pressure within the pleural cavity to air pressure, result in lung collapse followed by insufficient respiratory function. This occurrence adds to the

risks of re-intubation and result in post-operative hypoxemia. the Mild cases of atelectasis are treated post-surgically through physiotherapy and breathing exercises, while in more major cases surgical removals of obstructions or suctioning may be necessary. This condition needs immediate medical attention; the air needs to be released from the cavity and the lung to be reflated. This could be done through insertion of a pleural drain or a chest tube. Nurse assists the doctor in the insertion of the drain through preparation of the required instruments and by assembling the draining device. [5]

2.1.2.3 Pulmonary aspiration

Pulmonary aspiration of gastric contents is a serious complication, the contents of the patient's stomach flow from the esophagus and end up in the trachea as the patient is under heavy sedation and can not control swallowing and couching him or herself. The consequences can be acute lung damage or pneumonia that can ultimately result in death of the patient. It could happen post-operatively due to several factors. These risk factors includes emergency surgery, general anesthesia, an inexperienced anesthetist and patient dependent reasons such as lack of fasting, delayed gastric emptying or gastric hyper secretion.[3]

2.1.2.4 Bronchospasm and laryngospasm

Patients with an underlying respiratory condition have a higher risk of having a bronchospasm, which is a contraction of the smooth muscles in the bronchus, or a laryngospasm, the full closure of the vocal cords muscles. These both lead to insufficient airflow and respiratory defect, then latter with a complete halt of spontaneous breathing. Spasms could develop due to a faulty state of anesthesia during the endotracheal intubation or extubation phase of the operation or because of a foreign matter or irritant. Switching to 100% oxygen and manual ventilation

starts the acute treatment of bronchospasms, If the patient is still under anesthesia, it must be deepened, as most of the volatile anesthetic agents are bronchodilators. The Medications used in the treatment are nebulized or slow I.V. salbutamol, which is a selective beta 2-agonist, and the inhaled ipratropium bromide, which is an anticholinergic bronchodilator, Both the medications block the bronchoconstriction in the smooth muscles. In a more extreme cases adrenaline, magnesium sulphate, aminophylline and ketamine are used. The development of spasms can be prevented thorough cleaning of the upper airways, the avoidance of incorrect intubation and premature extubation.[6]

2.1.2.5 Pulmonary edema

Described a patient who developed pulmonary edema as a result of a difficult laryngospasm repeated tries of inhaling with closed upper airways with a case of hypoxemia resulted in an acute pressure change in the blood circulation, creating accumulation of fluid in the lungs. Then patient was treated with oxygen and further on with to relieve the hypoxemia, pulmonary edema and the aftereffects of the laryngospasm. A state of the patient where there is accumulating of fluids in the lungs is called a pulmonary edema or pleural effusion. Pulmonary edema is usually a result of heart failure, as the removal of blood in the circulation of the lungs is not done adequately, Damage done to the parenchyma or vascular tissue of the lungs also results in pulmonary edema. This damage can be caused by, as previously mentioned in the patient case, repeated inhalations against the upper airway obstruction, through the aspiration of gastric fluids or through the sudden changes of pressure in the lung blood circulation. The opioids used to treat pain may also induce post-operative opioid-induced respiratory depression, where the effect of the used opioids is above the therapeutic margin, which then causes a respiratory

arrest. This is a serious complication ultimately leading to death of the patient which could be prevented with proper recognition and monitoring. Residual neuromuscular block is also of the main causes for postoperative pulmonary complications.[7]

2.1.3.1 Hypotension

Post-operative hypotension can occur due to a variety of different factors, either in combination or alone. These factors either decrease the cardiac output, the systemic vascular resistance, or both of the above. These factors are vasodilation, hypovolemia, cardiac arrhythmias or reduced myocardial contractility. [8]

2.1.3.2 Hypovolemia

Hypovolemia is considered the most common cause of hypotension after general anesthesia. Reason for hypovolemia most commonly is postoperative bleeding or fluid loss. Intra-operative bleeding often is more obvious and can be treated accordingly during the operation, but postoperative bleeding has a higher chance of being unnoticed. Gwinnut (2004) states that fluid loss can occur because of evaporation, which is a result of a prolonged surgery on body cavities, or as a result of tissue damage causing edema. The diagnosis of hypovolemia can be confirmed by finding tachycardia, hypotension, inadequate urine output, or reduced peripheral perfusion. To what extent these symptoms show up, it rely on the degree of hypovolemia. In the management of hypovolemia sufficient oxygenation is needed along with adequate intravenous fluids, either crystalloids or more rarely colloids. In this situation, pressure can be used to increase the speed rate of administration. In case of external hemorrhage direct pressure should be used and if any internal hemorrhage is suspected, surgical assistance should be asked.[9]

2.1.3.3 Hypertension

Post-operative hypertension is the most common amidst patients with already underlying hypertension. The existing condition can be aggravated, or entirely caused by events such as; hypoxemia, hypothermia, hypercapnia, confusion or by pain. Primary treatment for hypotension, is correcting the above-mentioned conditions – if it exists. Although making unconditional recommendations about the treatment is difficult, because of the inconsistent definitions of hypertension. If hypertension prevails even after correcting the condition, consulting anesthesiologist and using vasodilation medicine or beta-blockers could be a help. Treatment of hypertension in the postoperative period is essential, because if not it can lead in grave neurological and cardiovascular complications. [10]

2.1.3.4 Cardiac arrhythmias

Cardiac arrhythmias can happen during or after general anesthesia. Most of the arrhythmias are benign, which is require no treatment and revert back to sinus rhythm before the patient is discharged. Preventive measures, such as monitoring, risk factor charting and choosing of the correct anesthetic agents, should be done prior the surgery. Risk factors for arrhythmias are age, ASA rating of 3 or 4, electrolyte imbalance and previous cardiovascular diseases. Some anesthetic agents could cause dysrhythmias; anesthetic drugs can exacerbate the arrhythmias if the patient has a history of cardiovascular disease. The more severe arrhythmias can be corrected by the use of antidysrhytmic drugs. An early recognition of arrhythmia decrease the amount of potential harm caused by them: for example an increased beating rate of the heart, tachycardia, can result in ischemia through increased myocardial oxygen consumption.[11]

2.1.3.5 Hypothermia

Post-operative hypothermia more likely appears to develop in patient that has undergone surgery with general anesthesia than with spinal anesthesia. Studies indicate that even a slight descend in core temperature of the body has great effects on some patients in certain risk groups. The effects are; two- to three times more unwanted cardiac events, doubling the amount of blood loss, and three times more likely to get infection of wound and it lengthens the time of recovery from anesthesia and the operation. During surgery, there are many factors that affect the body and core temperature of the patient. General anesthesia itself could lower the core temperature of the patient even over one Celsius. This is because general anesthesia's deactivation of the thermoregulation center of the pituitary gland, which then results in coreto-peripheral redistribution of body heat. This is the main cause of hypothermia in surgeries under general anesthesia. The usage of muscle relaxants during the operation can greatly affects the patient's muscles ability to shiver and produce heat, and that result in the temperature drop. If the temperature is not controlled and managed during the time of operation, it can result in postoperative hypothermia. This can then result in unwanted physiological changes in the patient after the operation. Because of the poor temperature distribution caused by contracted peripheral circulation, prevention of hypothermia is easier than fixing already existing one. The ways to raise temperature could be roughly divided in to two: active and passive methods. Active method stands for generating heat and passive as in preserving and isolating. [12] Neurologic Complications Post-operative care of the patient has to take in account the neurological issues one can have after being under general anesthesia. Post-operative cognitive dysfunction is a fairly common occurrence approximately 9.9% of patients have a cognitive level change after the surgery. Inducement of

emergence delirium, emotional distress and a state of psychomotor agitation with disorganized thinking after emerging from general anesthesia, causes the patient discomfort and may even be harmful to the care if their behavior turns agitated or violent. A study done by Card et al. (2015) they describes that 19% of the 400 enrolled patients in the study had agitated emergence and 31% had delirium signs when admitted to the post-anesthesia care unit, with a hypoactive features being the most prominent. There is No specific nursing interventions exist for treating post-operative delirium, but post-operative monitoring, early mobilization and patient guidance can help in preventing from injury or damage during hyperactive delirium[13].

2.1.4 Renal complications

Initial reports described the effects of ether anaesthesia where, following induction, a marked increase in both urine output and non-protein nitrogen excretion was noted. However, after 90 min of anaesthesia, both parameters had decreased to just 3.6% and 2.2% of baseline, respectively. At 24 h postoperatively, recovery to 43% and 84% of baseline was observed, with earlier recovery of secretory rather than nitrogenous excretory function. Acute kidney injury may complicate up to 20% of all hospital admissions and is recognized as a major complication of surgery, with approximately 30–40% of cases of hospital-acquired occurring in the perioperative setting. Moreover, the development of in the perioperative period is associated with increased risks of sepsis, coagulopathy and prolonged mechanical ventilation.[14]

2.1.5. Hepatic complications

Clinically significant derangements of the liver enzymes alanine aminotransferase (ALT) and aspartate aminotransferase (AST) are uncommon after anaesthesia in healthy individuals. Elevations in serum

bilirubin are more common, multifactorial in nature, and usually clinically insignificant. De novo acute liver dysfunction as a complication of anaesthesia occurs rarely. However, anaesthesia-induced hepatitis (AIH) is associated with significant mortality. Severe liver dysfunction as a consequence of anaesthesia is not uncommon in patients with preexisting liver disease. It is important that this high-risk patient group is recognized pre-operatively Anaesthesia-induced hepatitis (AIH) has been associated most commonly with halothane.[15]

2.2 Complications and side effects of spinal anesthesia:

2.2.1 Sympathetic Blockade Related Complications

2.2.1.1 Hypotension and bradycardia

These are the most frequent immediate complications of spinal anaesthesia due to preganglionic sympathetic blockade. Calculations have shown that incidence of hypotension cases ranges from 8 to 33%, depending on the parameters used to define it (systolic blood pressure, usually <80-90 mmHg) or on a 30% reduction of the initial systolic blood pressure. Hypotension that occurs during neuraxial anaesthesia is one of the most important etiological factors for intraoperative nausea and vomiting[7] . Risk factors for hypotension in spinal anaesthesia are also considered the presence of hypertension, a systolic blood pressure greater than 120 mmHg, an advanced age (>40 years old), a high body mass index, an increased foetal weight, the spinal anaesthesia associated with general anaesthesia, a punction level above L2-L3, the addition of phenylephrine local anaesthetic, the chronic alcohol consumption, the emergency surgery and a high blockade. A blockade below T10 does not modify peripheral resistance because the sympathetic innervations of unanaesthetized levels cause vasoconstriction. Hypotension may be

prevented with a good prehydration (colloid or crystalloid solutions), or may be eliminated by using small doses of vasoactive drugs such as ephedrine. Bradycardia is a consequence from blocking heart-accelerating fibres (T1-T4) or from a decreased venous return. There are certain risk factors for the appearance of bradycardia: heart rate lower than 60 bpm, ASA I, beta-blockers, block level above T6, age under 50 years and longer PR interval.[16]

2.2.1.2 High blockade

High blockade is the name given to the excessive spread of locking dermatome, and may occur both in spinal or epidural anaesthesia. It is commonly shown as a spinal or subdural diffusion of local anaesthetic causing hemodynamic and respiratory effects. Spinal total blockade is the full expression of high blockade, which is associated to total sympathetic blockade and respiratory arrest. Puncture level and dosing are the most important factors determining the height of analgesia. Also the injection speed and the patient tall and age have a lesser influence into this[14] . Pregnancy considerably modifies the spread of local anaesthetics injected in spinal, epidural o subdural spaces. In these cases the volume of local anaesthetics administered must be consequently reduced. The sensitive and sympathetic level of blockade is essential for this. If blockade level surmounts T4 cardio accelerator fibres could be blocked, being its effects hypotension and bradycardia. The symptoms of a high blockade are a difficulty for breathing and the numbness or weakness of upper extremities. Also nauseas appear together with hypotension. When blockade reaches cervical levels it happens together with hypotension, bradycardia and respiratory insufficiency, which should be treated applying assisted ventilation and orotracheal intubation. Hypotension must be treated with intravenous liquids, trendelemburg position and

vasopressor drugs[13]. Co-hydration is more efficient than pre-hydration and colloid solutions are also very effective for cardiac rhythm and blood pressure maintenance. Bradycardia should be treated with atropine and ephedrine. In severe cases adrenaline is also recommended. In pregnant women ephedrine breaks through the placental barrier, stimulates betaadrenergic receptors and increases fetal acidosis but it doesn´t happen phenylephrine. Actually this issue is being studied because the different works haven´t found significant differences between these two drugs in the fetal´s Apgar. Administering a dose of local anesthetic subdural level or accidental intrathecal to perform an epidural or caudal intervention may cause bad consequences, i.e. high blocking or total spinal (when extended to cranial nerves) with symptoms and treatments described, until lock yields[17] .

2.2.1.3 Heart arrest

Severe bradycardia and cardiac arrest are the most serious complications associated with spinal anaesthesia. They are most frequently present in general anaesthesia spinal blocks. The incidence of heart failure has been significantly higher at subarachnoid anaesthesia after epidural and vary according to different studies. Recently the incidence of cardiac arrest during regional anaesthesia is estimated at 2.73/10,000 patients. Patients are usually healthy, ASA I or II, male and with an increased basal vagal tone. In most cases a higher level T2 sensitive is detected with bilateral mydriasis after the cardiac arrest. The influence of cardioaceleradoras fibers has a crucial role in maintaining blood pressure and heart rate, so the high cord lock, the intravascular volume depletion or the insufficient fluid intake and the presence of deep sedation are considered as risk factors. Surgery may also trigger bradycardia and cardiac arrest producing vagal shock or embolization. Treatment is based on atropine and

ephedrine, and if no answers are detected adrenaline should be early administered[18] . Both heart failure and respiratory failure may be related to an inadverted injection of the anesthetic solution to intravascular, intrathecal or subdural level during administration of epidural doses. Survival rate is higher in patients with cardiac arrest observed during spinal anaesthesia compared to general anaesthesia[19] .

2.2.1.4 Urinary retention

Spinal anaesthesia affects urination by blocking nerve fibers (S2- S4), as a consequence of which the patient does not feel the distended bladder or urinary urgency. In other words, it means an abolition of reflex micturition. The distended bladder produces postoperative discomfort and if not resolved can lead to more serious complications such as permanent damage of the detrusor. Several studies indicate that the urology detrusor muscle function recovers after about 100 minutes to recover the sensory level in S2-S3 [17]. Urinary retention is a common complication in men older than 50 years with urological problems. The incidence is higher in anorectal surgery, inguinal hernia, orthopedic surgery (hip), abdominal surgery and gynecological surgery. The use of additives to the local anesthetic such as opioids or epinephrine can increase the time for urination. Hydrophilic opioids contributed more in a meta-analysis to urinary retention than lipophilics [20]. Besides neuraxial anaesthesia, some intraoperative or anaesthesia-related factors prolong the time of anaesthesia or surgery, increase the volume of intraoperative fluids (>750 ml), the requirements of atropine, the drop in temperature and the use of opioids, which may also increase urinary retention. Urinary catheterization is necessary in the perioperative or immediately after surgery[20] .

2.2.1.5 Horner's syndrome

Horner syndrome has a variable incidence that sometimes goes unnoticed, being this a rare complication. It increases in epidural anaesthesia administered to pregnant patients, because their epidural space is reduced by engorgement of the epidural veins because of compression of the gravid uterus on the vessel. This phenomenon is explained by the subdural local anesthetic spread from peridurla space and is revealed when the preganglionic sympathetic fibers that innervate the iris dilator muscle, lift the upper eyelid, the conjunctiva and face are achieved and locked, producing miosis, ptosis and enophthalmos. It is rarely associated with hypotension.[21]

2.2.2 Drug Effects Related Complications

The incidence of systemic toxicity due to the local anesthetic is estimated at around 0.01%. It has been reduced significantly over the last 30 years, with peripheral nerve blocks, which are associated with a higher incidence of toxic reactions is related to the anesthetic agent, adjuvants, injection rate, absorption and distribution, concentration and total dose of local anesthetic, as well as the route of administration and patient characteristics[11].

2.2.2.1 Local toxicity

The local toxicity covers a wide spectrum of manifestations, ranging from a localized allergic reaction to para-aminobenzoic acid (ester metabolite) to the myotoxicity and neurotoxicity. Myotoxicity affects smooth and striated muscle in a dosedependent way. To discuss this issue it should be present a persistent neurological damage, ruling out any trauma caused by needles. This complication has been closely related to intrathecal administration of high concentrations lidocaine (5%), and to the use of a

microcatheter. Other local toxicity cases are transient neurological symptoms and transient radicular irritation, characterized by back pain radiating to the legs without sensory or motor deficits, which takes place after the resolution of spinal anaesthesia and disappears spontaneously after some days. The highest incidence occurs with the use of hyperbaric lidocaine, at men and on lithotomy position.[18]

2.2.2.2 Systemic toxicity

Systemic toxicity ranges from neurological and cardiovascular symptoms to anaphylaxis. The central nervous system is more sensitive, so a lower dose and blood concentration of local anesthetic is required to produce toxicity effects. Cardiovascular collapse can nevertheless occur without any previous neurological changes. CNS toxicity is commonly described in two stages, that is, an excitatory initial phase followed by a phase of depression. Early symptoms include numbness of face or tongue, metallic taste and tinnitus, followed by confusion or agitation to reach generalized seizures afterwards. These symptoms are followed by a phase of depression with coma and respiratory depression. Cardiovascular toxicity is described in three phases, that is, an initial phase with hypertension and tachycardia, a second one with myocardial depression and hypotension and a third one with deep intense vasodilation, hypotension and diverse arrhythmias such as sinus bradycardia, conduction blocks, ventricular tachyarrhythmias and asystole. Anaphylaxis is rare and most commonly occurs with local anesthetics of amide ester type. Methemoglobinemia is another complication that may appear after administration of prilocaine.

Three cases from 1997 to 2007 have been described after administration of EMLA Cream (lidocaine made 25 mg/ml and prilocaine 25 mg/dl) used for laser hair removal. The main clinical manifestation of acquired methemoglobinemia is cyanosis unresponsive to supplemental oxygen at

high flow, although low saturation in arterial blood was confirmed. In severe cases it was treated with intravenous methylene blue, obtaining a good response[19] .

2.2.3 Needle/Cannula Placement Related Complications

2.2.3.1 Backache

The incidence of backache is approximately similar after spinal or general anaesthesia. In fact, 25-30% of the patients undergoing general anaesthesia refer backache. Investigators observed that the incidence of backache went from about 18% in surgeries lasting less than 1 hr to 50% when surgery lasted 4 to 5 hr. As causes of this were highlighted intervertebral disc injury, cutaneous haematoma, loosening of the paraspinal musculature lordosis, muscle spasm, an excessive administration of local anaesthetic in the epidural space, as well as the use of additional substances like EDTA to chloroprocaine in epidural anaesthesia. These complications usually last some days or weeks, and treatment has to be based on non-steroidal anti-inflammatory drugs and cold or hot compresses. Even when this is a benign complication, it may also show an epidural abscess or haematoma, so the first to do is ruling out these serious complications. The most important factor associated with back pain following a surgery is the duration of surgery, regardless of the used anaesthetic technique.[20]

2.2.3.2 Dural punction, subdural injection and post dural puncture headache (PDPH)

When small needles are used the normal incidence of PDPH is 0%14.5%. The cause of migraine is postpuncture CSF leakage from a dural defect and intracranial hypotension, which may occur following spinal anaesthesia or dural puncture after epidural needle when CSF outflow

through Tuohy needle is evidenced. Postpuncture headache may also happen after an inadverted dural puncture or by simply tearing dura with the needle without any LCR output. It is widely known that needle design has dramatically reduced the risk of PDPH associated with spinal anaesthesia to about 1%. In a prevalence study by Lambert et al. it was observed that the probability of PDPH was significantly lower when a 25G Whitacre needle was used in comparison with 27G Quincke, and absolute values required fewer blood patch treatment. Thorbjon S. et al. in a prospective study found that the incidence of PDPH was significantly lower with the use of noncutting tip needles sprotte type or caliber 25G Whitacre in comparison with the use of 22G Quincke to perform diagnostic lumbar punctures, with a significantly lower rate of lost working days, hospitalization time and number of done hematological patches. Hammond et al also concluded that the use of smaller and noncutting needles has a lower incidence of PDPH. First line treatment for this are supine position, hydration, analgesics, corticotropin and caffeine, even when if at 24-48 hr after initiation of treatment Tory has not submitted it is also needed the use of a blood patch with 10 ml of autologous blood. A case has been also described of PDPH resolution after surgical repair of the dura. Some other risk factors linked with postural puncture headache have also been found, apart from needle gauge, age, gender pregnancy, and bevel design or bevel orientation.

Diplopia and tinnitus is also related to intracranial hypotension. Diplopia has an incidence ranging from 1 in 400 to 1 in 8,000. The window period for extraocular muscles paralysis (EOMP) to manifest is from 1 day to 3 weeks after dural puncture, but it most often happens 4 to10 days after dural puncture. The exact pathophysiology is unclear, being the most generally accepted mechanism a nerve lesion such as neurapraxia or axonotmesis caused by stretch and/or compression secondary to

intracranial hypotension due to cerebrospinal fluid (CSF) leakage. The main damaged structure is the VI cranial nerve, but can coexist with oculomotor nerve (cranial nerve III) or trochlear nerve (cranial nerve IV) palsies. It is unilateral in 80% of cases. Errors often occur at the time of diagnosis, especially when diplopia appears after the resolution of PDPH box. It is to be noted dural puncture because of diplopia, and historial must be examined because sometimes you can fall into a misdiagnosis as pachymeningitis or diagnostic lumbar punctures causing further hypotension and worsen the neurological picture made. Treatment of headache postpuncture with blood patch does not interfere in the evolution and prognosis of diplopia. This treatment is conservative, recovering from 2 weeks to 8 months.[22]

2.2.3.3 Neurological complications

It has been repeatedly detected that needle trauma and local anaesthetic neurotoxicity are at the origin of most neurological complications. Brull et al. reported that the incidence of permanent neurological injury following spinal anaesthesia varied between 0-4.2 per 10000 patients. It should be ruled out first a hematoma or epidural abscess. In a French survey the incidence was nearly half the amount in obstetric patients compared to the non-obstetric population. Direct needle trauma appears here to be one of the preventable reasons for neurological complications.

Auroy et al. and Moen et al. reported that direct needle or catheterinduced trauma rarely results in permanent or severe neurological injury. In fact there is a lower frequency of persistent paresthesia/radiculopathy following epidural techniques, which are typically associated with (epidural) catheter placement, compared to single injection spinal anaesthesia. Auroy et al. also observed that two-thirds of the patients with neurological complications experienced pain during needle placement or

injection of local anaesthetic. It is very convenient to withdraw the needle in the case of par aesthesia to avoid postoperative radiculopathy. Repeated local anaesthetic injection should also avoid in order preventing toxic concentrations in the spinal cord.[13]

2.2.3.4 Meningitis and epidural abscess

Bacterial infection of the central neuraxis may appear as meningitis or cord compression secondary to abscess formation. Bacterial meningitis is a medical emergency. Mortality reaches about 30% even when antibiotic therapy is applied. Meningitis after a neuraxial block is a rare but eventually serious effect that might happen as a consequence of an unintentional chemical inoculation of microorganism (virus or bacteria) or chemical into the cerebrospinal fluid. Incidence is low (about 0 to 2 cases every 10,000 procedures) and only 30 of these cases are considered at bibliography. The presence of fever and neurologic disturbance may provide a differentiation from PDPH. Postanesthetic spinal meningitis may be classified etiologically in septic, aseptic and viral. Bacteria are produced first. Diverse cases have been described: Staphylococcus aureus, Enterococcus faecalis, Pseudomonas aeruginosa, Streptococcus agalactiae and Listeria monocytogenes. Streptococcus viridans is the most common agent. It doesn't usually appear in humans, unless local or general, spontaneous or iatrogenic immunosuppression occurs.

Streptococcus salivarius, belonging to viridans group, causes more than a 60% of iatrogenic meningitis and more than a 90% of the bibliographically described spinal meningitis postpuncture[7] .

2.2. Previous studies.

1- John T, at al, 2017, Efficiency of spinal anesthesia versus general anesthesia for lumbar spinal surgery: a retrospective analysis of 544 patients, USA, Previous studies have shown varying results in selected outcomes when directly comparing spinal anesthesia to general in lumbar surgery. Some studies have shown reduced surgical time, postoperative pain, time in the postanesthesia care unit (PACU), incidence of urinary retention, postoperative nausea, and more favorable cost-effectiveness with spinal anesthesia. Despite these results, the current literature has also shown contradictory results in between-group comparisons. Materials and methods: A retrospective analysis was performed by querying the electronic medical record database for surgeries performed by a single surgeon between 2007 and 2011 using procedural codes 63030 for diskectomy and 63047 for laminectomy: 544 lumbar laminectomy and diskectomy surgeries were identified, with 183 undergoing general anesthesia and 361 undergoing spinal anesthesia (SA). Linear and multivariate regression analyses were performed to identify differences in blood loss, operative time, time from entering the operating room (OR) until incision, time from bandage placement to exiting the OR, total anesthesia time, PACU time, and total hospital stay. Secondary outcomes of interest included incidence of postoperative spinal hematoma and death, incidence of paraparesis, plegia, post-dural puncture headache, and paresthesia, among the SA patients. Results: SA was associated with significantly lower operative time, blood loss, total anesthesia time, time

from entering the OR until incision, time from bandage placement until exiting the OR, and total duration of hospital stay, but a longer stay in the PACU. The SA group experienced one spinal hematoma, which was evacuated without any long-term neurological deficits, and neither group experienced a death. The SA group had no episodes of paraparesis or plegia, post-dural puncture headaches, or episodes of persistent postoperative paresthesia or weakness. Conclusion: SA is effective for use in patients undergoing elective lumbar laminectomy and/ or diskectomy spinal surgery, and was shown to be the more expedient anesthetic choice in the perioperative setting.[23]

2- Khosrou N, at al, 2012, The comparison of spinal anesthesia with general anesthesia on the postoperative pain scores and analgesic requirements after elective lower abdominal surgery: A randomized, double‐blinded study, Iran, The aim of this study was to compare the postoperative pain scores and morphine requirements between spinal anesthesia (SA) with hyperbaric bupivacaine 0.5% and general anesthesia (GA) with 1 Minimal alveolar concentration minimal alveolar concentration (MAC) of isoflurane in 50% N2 O and O2 after elective lower abdominal surgery. Materials and Methods: In this randomized clinical trial, 68 patients with American Society of

Anesthesiologists (ASA) I or II undergoing lower abdominal surgery were randomly assigned to have elective lower abdominal surgery under SA (n = 34) or GA (n = 34). The SA group received 3 cc of 0.5% hyperbaric bupivacaine (15 mg), at L3–L4 interspace intrathecally and also 2 mic/kg fentanyl and 0.15 mg/kg morphine intravenously for intraoperative analgesia. In the GA group, induction of anesthesia was carried out with Na thiopental 6 mg/kg body weight, fentanyl 2 mic/kg body weight, morphine 0.15 mg/kg, and atracurium 0.6 mg/kg body weight, and then, trachea was intubated. The primary outcome was

postoperative pain scores at rest and under stress on a visual analog scale and the secondary outcome was morphine requirement by the patients. Outcome measures were recorded at 2, 4, 6, 12, and 24 h postoperatively. The duration of postanesthesia care unit (PACU) and hospital stay were recorded. Intraoperative parameters, postoperative pain scores, complications, recovery time, and the duration of hospital stay at follow up were compared between the two groups. Results: Patients in SA group had significantly lower scores of a postoperative pain at rest (3.4 ± 1.6 and 4.1 ± 1.2 at 2 and 4 h postoperatively vs. 5.2 ± 1.5 and 5.8 ± 0.9 in the GA group with $P < 0.05$), but there were no significant differences between both groups for scores of postoperative pain at 6, 12, and 24 h. The amount of morphine requirement in 6 h postoperatively was significantly lower in the SA group (10.2 ± 4.3 mg vs. 15.6 ± 5.6 mg in the GA group with $P < 0.05$), but there were not significant differences between the two groups after 6 h postoperatively. The duration of PACU stay was shorter for the GA group than the SA group (75 ± 6 vs. 126 ± 12 min, $P < 0.001$), but there was no significant differences between the duration of hospital stay between the two groups (1.8 ± 0.6 vs. 2.1 ± 0.8 days). Conclusion: Although in patients undergoing elective lower abdominal surgery with SA may have lower pain scores and also lower morphine requirement in the first 6 h postoperatively, but after that there were no significant differences between SA and GA regarding postoperative pain scores and analgesic requirements and so more attention should be given to their post operation pain relief.[24]

3- Gholamreza M, at al, 2019, Comparison Between Spinal and General Anesthesia in Percutaneous Nephrolithotomy, This study compared the preference of spinal anaesthesia (SA) or general anaesthesia (GA) in respect to mentioned concerns. In this randomized clinical trial, 59 patients who underwent PCNL divided into SA and GA groups. 15-20 mg

from intra-thecal bupivacaine 0.5%, and premedication of 0.01-0.02 mg from midazolam, were given to patients in SA group (n = 29). Patients in GA group (n = 30) received premedication of 1-2 µg/kg from fentanyl and 0.01-0.02 mg/kg from midazolam, and intravenously anaesthetized with 100 µg/kg/min of propofol and 0.5 mg/kg of atracurium, given by continuous infusion and N2O/O2 50%. Mean arterial pressure (MAP) and heart rate were recorded intra-operatively and during recovery. Results: MAP and heart rate show no significant differences at designated time points between two groups (P > 0.05). Surgery time, anesthesia time, bleeding volume, and analgesic intake were significantly reduced in SA group (P < 0.05). Conclusions: It seems that, in patients undergoing PNCL, SA is as effective and safe as GA. Patients who undergo PNCL under SA require smaller amounts of analgesic dose and show hemodynamic stability during surgery and recovery time. Also, SA technique provides decreased blood loss and shortened surgery as well as anesthesia times compared to GA.[25]

4- Sahar I, at al, 2022, Comparison of the Effects of General Anesthesia and Spinal Anesthesia on Quality of Life among Women Undergoing Elective Cesarean Section in Erbil City/Iraq, Cesarean section (CS) is considered as a significant surgical intervention necessitating a high level of professional skill and a choice between general anesthesia (GA) and spinal anesthesia (SA). Anesthesia type can significantly influence postoperative recovery, patient satisfaction, and, ultimately, the quality of life. This article aims to compare the impacts of GA and SA on the quality of life among women who undergo elective C-sections. Methods: This study was carried comparatively on 200 Kurdish pregnant women who undergoing to have a cesarean section with a spinal anesthesia and general anesthesia preference to mothers or physician were included in a purposive sample was carried out in the operating theatre at Maternity

Teaching Hospital from 25th January, 2022 to 18th December, 2022. The EuroQoL-5 Dimensions-3 Levels (EQ-5D-3L) selfadministered questionnaire was used by the participants to measure their health at four different time points; two hours prior to cesarean birth, 24 hours following the procedure, one week, and one month thereafter. Results: At 24 hours, spinal anesthesia resulted in significantly better outcomes for mobility (70% vs. 44% no problems), self-care (8% vs. 11% no issues), and pain (83% vs. 75% moderate pain) ($p<0.05$). After one week, the advantages of spinal anesthesia remained for self-care (78% vs. 44% no problems) and anxiety/depression (66% vs 47% not anxious) ($p<0.05$). After one month post-delivery, health outcomes were similar between anesthesia methods. Conclusions: The study found that spinal anesthesia offers better healthrelated quality of life (HRQoL) outcomes than general anesthesia for cesarean delivery. As a result, spinal anesthesia is commonly preferred to as the anesthesia technique for cesarean delivery in many countries.[26]

5- Xi Chen, at al, 2022, Comparison of risk of complication between neuraxial anaesthesia and general anaesthesia for hip fracture surgery: a systematic review and metaanalysis, China, The aim was to compare the risk of complication of neuraxial anaesthesia with that of general anaesthesia in patients undergoing hip fracture surgery. Methods: This systematic review was performed according to Preferred Reporting Items for Systematic Reviews and MetaAnalysis guidelines and was registered at PROSPERO (CRD42022337384). The study included eligible randomised controlled trials published before February 2022. Data synthesis was performed to compare the differences between general and neuraxial anaesthesia. Meta-regression analysis was performed to investigate the influence of the publication year. A subgroup analysis was performed based on patient age and the anaesthetic technique used. A

grading of recommendations, assessment, development and evaluations assessment was performed to assess the quality of each outcome. Results: Twenty randomised controlled trials and 4802 patients were included. Data synthesis revealed significant higher risk of acute kidney injury in the general anaesthesia group (P=0.01). There were no significant differences between the two techniques in postoperative short-term mortality (P= 0.34), delirium (P= 0.40), postoperative nausea and vomiting (P= 0.40), cardiac infarction (P =0.31), acute heart failure (P= 0.34), pulmonary embolism (P= 0.24) and pneumonia (P=0.15). Subgroup analysis based on patient age and use of sedative medication did not reveal any significant differences. Meta-regression analysis of the publication year versus each adverse event revealed no statistically significant differences. Conclusion: A significantly higher risk of postoperative acute kidney injury was found in patients receiving general anaesthesia. This study revealed no significant differences in terms of postoperative mortality and other complications between general and neuraxial anaesthesia. The results were consistent across the age groups[26] .

Chapter Three: Research Methodology

3.1. Study Design

A descriptive cross-sectional study design was conducted to identify the common side effects and complications in elective surgery under general and spinal anesthesia at Public Hospitals.

3.2. Study Setting

The study was conducted on three Public Hospitals in Sana'a as follows:

1- Thawra General Hospital Authority.

2- Republican Teaching Hospital Authority.

3- Kuwait University Hospital.

3.3. Population of the Study

All patients undergoing elective surgical operations in the hospitals in which the study was conducted**.**

3.4. Sampling Method

A purposive sample method to identify the common side effects and complications in elective surgery under general and spinal anesthesia at Public Hospitals.

3.5. Sample Size

A total sample was 43 patients on Public Hospitals in Sana'a.

3.6. Inclusion and Exclusion Criteria

3.6.1 The inclusion criteria were included:

A patient on Public Hospitals in Sana'a.

3.6.2 The exclusion criteria were included:

A patients undergoing elective surgical operations in the hospitals in which the study was conducted.

3.7. Data Collection Tool

A questionnaire was designed to identify the common side effects and complications associated with elective surgery under general and spinal anesthesia at Public Hospitals. The questionnaire was divided into three parts (see Appendix A):

- Part I: Demographic Data

- Part II: Operation Data

- Part III: Postoperative Data

3.8. Data Analysis

Data were analyzed using the SPSS V24.

descriptive statistical processors, and analysis as follows: Frequency, percentages

Arithmetic mean and standard deviation of the data for analyzed of the data collected by closed questionnaire.

3.9. Limitation of the Study

The limits of the research include The following:

1.Topical limits: Common effects and complications of general and spinal anesthesia

2.Spatial limits: Public Hospitals in Sana'a.

3.Human limits: Patients undergoing surgical operations under general and spinal anesthesia

4.Time limits:

This research was conducted between (20/11/2024 to //2024)

3.10. Ethical Consideration

Receiving dispatches from the Medical Center’s administration, obtaining approval from hospital administrations to collect data, and giving freedom of decision to patients in order to collect data.

Chapter Four: Results and Discussion

Table 1: Distribution of sample according to age and weight.

From table 1: the result showed that the mean±sd of age was 27.4±14.8, while weight was 56.7±15.8, and height was 1.6±0.2, and BMI 24.1±7.3.

Sociodemographic data of patient	max	min	mean	SD
weight	**81**	**12**	**56.7**	**15.8**
Height	**1.9**	**0.75**	**1.6**	**0.2**

Figure 1: Distribution of sample according to age

From figure 1: the result showed that the majority of sample in age was 40-59 y 44.2%

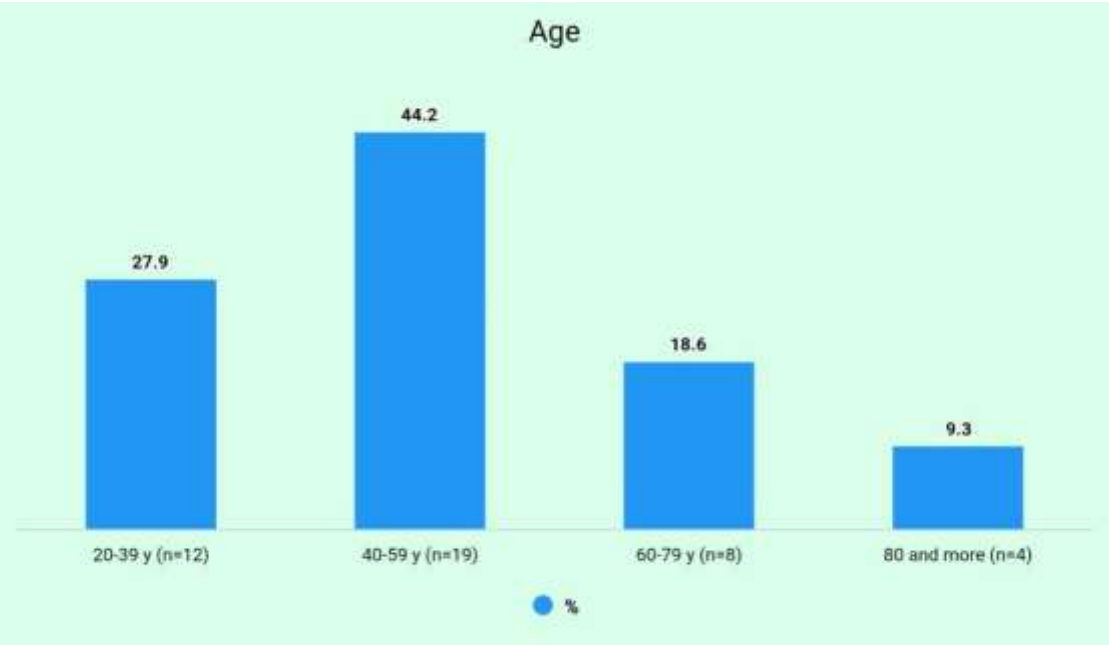

Figure 2: Distribution of sample according to BMI

From figure 2: the result showed that the majority of sample in BMI was 18-24.9 62.8%

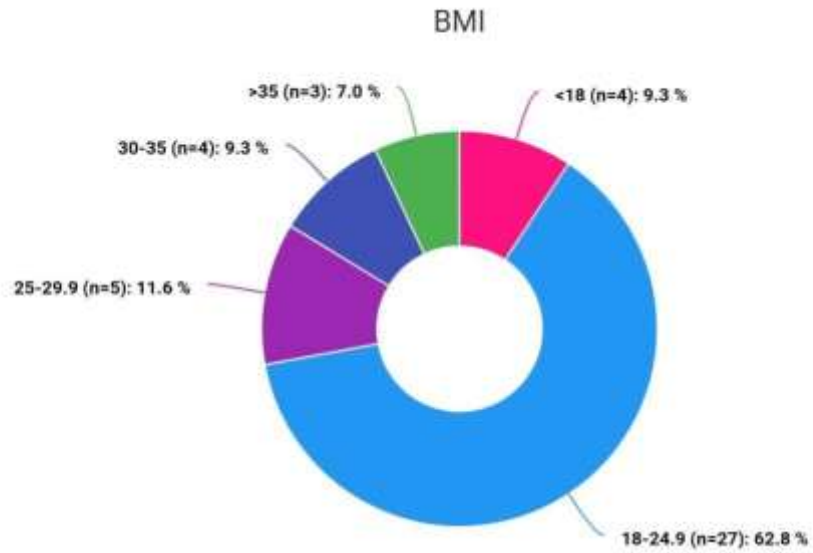

Figure 3: Distribution of sample according to sex

From figure 3: the result showed that the majority of sample in sex was male 62.8%

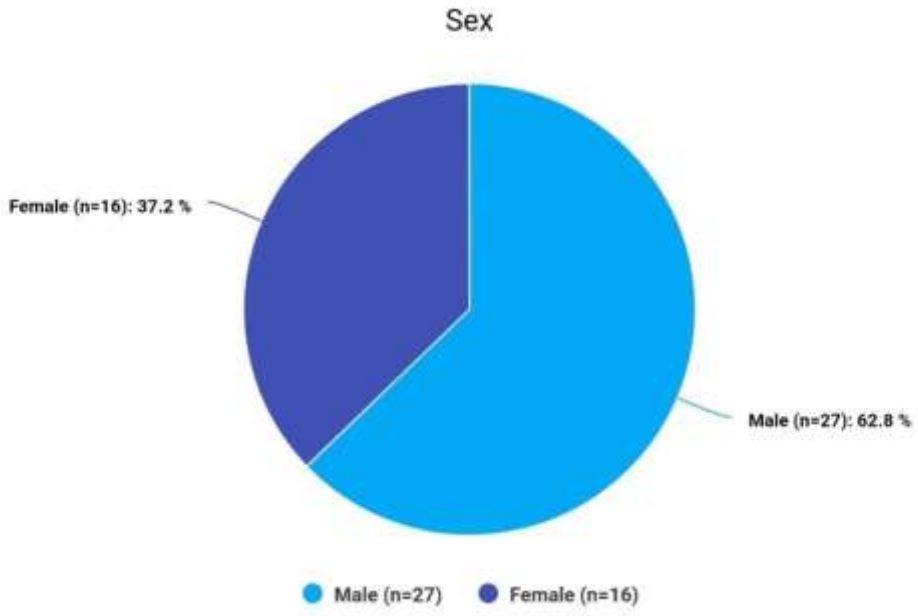

Table 2: Distribution of sample according to history.

From table 2: the result showed that the majority of sample in Pervious surgery with anesthesia was GA 53.5%, in pervious postoperative any complications after pervious surgery under anesthesia was yes 69.8%, and in side effect was 79.1%, and Family history of previous diseases and allergy and drugs history and medical illness was 0.
While in education level was secondary school 39.5%.

Socio-demographic data of patient		**N**	**%**
Pervious surgery with anesthesia	**GA**	**23**	**53.5**
	SA	**20**	**46.5**
Is the patient experienced pervious postoperative any complications after pervious surgery under anesthesia ?	**Yes**	**30**	**69.8**
Is the patient has any side effects?	**Yes**	**34**	**79.1**
Family history of previous diseases?	**Yes**	**0**	**0.0**
Is the patient has previous allergy?	**Yes**	**0**	**0.0**
Drugs History	**No**	**0**	**0.0**
Surgical History	**CS**	**3**	**7.0**
Medical illness	**Non**	**43**	**100.0**

Figure 4: Distribution of sample according to education level

From figure 4: the result showed that the majority of sample in education level was secondary school 39.5%

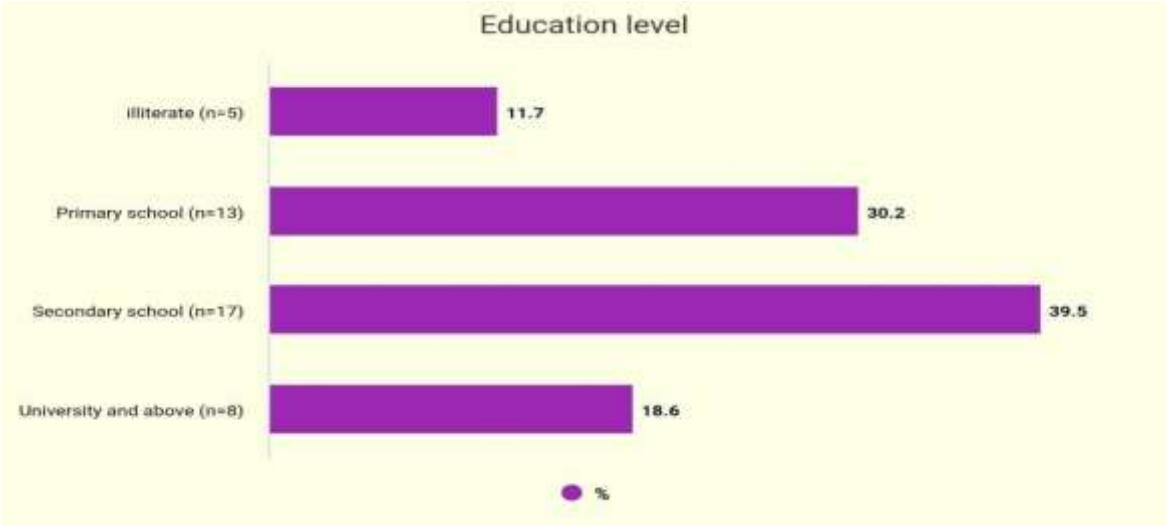

Table 3: Distribution of sample according to surgical data

From table 3: the result showed that the majority of sample in diagnosis was CS 27.9%, while type of surgery was CS 27.9%, and ASA was II 79.1

surgical data of patient		**N**	**%**
Diagnosis	**Recurring uterine**	**3**	**7.0**
	CS	**12**	**27.9**
	Tonsillitis	**9**	**20.9**
	Appendicitis	**6**	**14.0**
	Urine tumor	**3**	**7.0**
	Hernia	**3**	**7.0**
	Fracture	**3**	**7.0**
	Cholestasis	**3**	**7.0**
	Hemorrhoids	**1**	**2.3**
Type of surgery	**Hysterectomy**	**6**	**14.0**
	CS	**12**	**27.9**
	Tonsillectomy	**9**	**20.9**
	Appendectomy	**6**	**14.0**
	Hernia	**3**	**7.0**
	Fixed fracture	**3**	**7.0**
	Cholecystectomy	**3**	**7.0**
	Hemorhidectomy	**1**	**2.3**
ASA classification	**I**	**9**	**20.9**
	II	**34**	**79.1**

Figure 5: Distribution of sample according to ASA

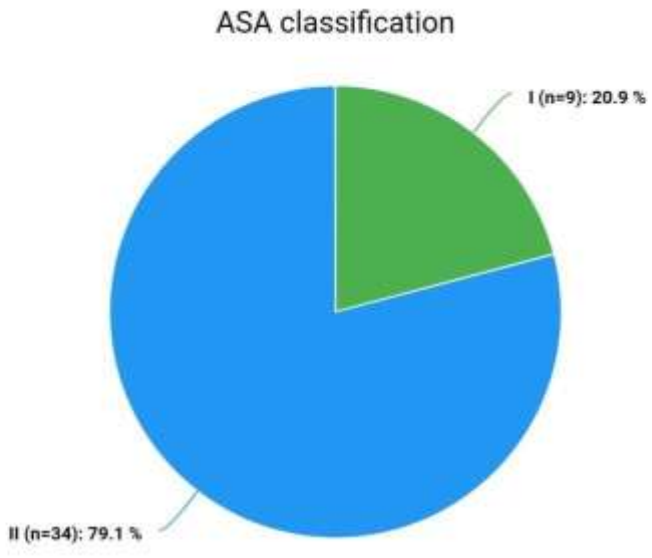

Table 4: Illustrate the preoperative vital signs data)BP and O2)

From table 4: the result showed that the majority of sample in preoperative vital signs data)BP and O2) was normal.

Time	**Blood pressure**	
	Systolic	**Diastolic**
Baseline	110.4±9.9	65.2±12.4
20 min before surgery	110.3±13.4	60.7±11.3
10 min before surgery	109.5±13.3	62.3±12.2
Oxygen saturation		
Baseline	99.2±0.8	
20 min before surgery	98.8±1	
10 min before surgery	99.2±1	

Table 5: Illustrate the preoperative vital signs data (pulse rate, respiration, and temperature .)

From table 5: the result showed that the majority of sample in preoperative vital signs data)pulse rate, respiration, and temperature) was normal.

Time	Normal		High		Low	
	N	%	N	%	N	%
Pulse rate						
Baseline	**40**	**93.0**	**2**	**4.7**	**1**	**2.3**
20 min before surgery	**41**	**95.3**	**1**	**2.3**	**1**	**2.3**
10 min before surgery	**43**	**100.0**	**0**	**0.0**	**0**	**0.0**
Respiration						
Baseline	**42**	**97.7**	**1**	**2.3**	**0**	**0.0**
20 min before surgery	**43**	**100.0**	**0**	**0.0**	**0**	**0.0**
10 min before surgery	**43**	**100.0**	**0**	**0.0**	**0**	**0.0**
Temperature						
Baseline	**41**	**95.3**	**0**	**0.0**	**1**	**2.3**
20 min before surgery	**43**	**100.0**	**0**	**0.0**	**0**	**0.0**
10 min before surgery	**42**	**97.7**	**0**	**0.0**	**0**	**0.0**

Table 6: Illustrate the intraoperative protocol

From table 6: the result showed that the most dugs used in GA was Propofol and dexamethasone, while spinal anesthesia was Marcaine.

Drugs	N	%	Dose
Propofol	**21**	**48.8**	**88.6±23.6**
Pethidine	**5**	**11.6**	**25±0**
Dexamethasone	**21**	**48.8**	**-**
ketamine	**17**	**39.5**	**73.5±25**
atracorium	**21**	**48.8**	**19±13.4**
Marcaine	**22**	**51.2**	**15±0**
Transsimic acid	**2**	**4.7**	**-**
Ephidrine	**22**	**51.2**	**26.5±13.3**
Metoclopramide	**22**	**51.2**	**7.9±4.1**
Tramadol	**8**	**18.7**	**-**
Paracetamol	**22**	**51.2**	**-**

Figure 6: Illustrate the intraoperative side effects

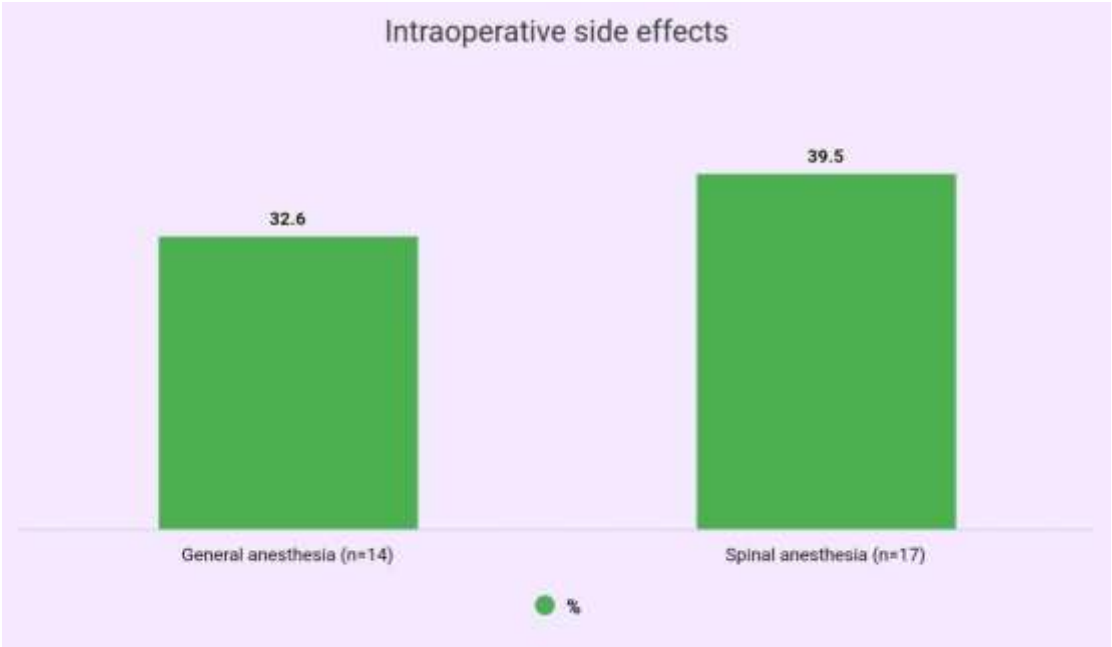

Table 7: Illustrate the intraoperative side effects

From table 7: the result showed that the side effect on general anesthesia was 32.6%, while spinal anesthesia was 39.5%.

Intraoperative side effects	Yes		No		P value
	N	%	N	%	
General anesthesia	14	32.6	7	16.3	0.095
Spinal anesthesia	17	39.5	5	11.6	

Table 8: Illustrate the intraoperative Possible causes of side effects

From table 8: the result showed that the most caused of side effects was surgical stimulation and drugs.

Possible causes of side effects	Yes		No	
	N	%	N	%
Laryngoscope	1	2.3	42	97.7
Endotracheal intubation	1	2.3	42	97.7
Surgical stimulation	5	11.6	38	88.4
Tracheal extubation	3	7.0	40	93.0
hypoxemia	2	4.7	41	95.3
hypervolemia	1	2.3	42	97.7
hypothermia	1	2.3	42	97.7
Poor analgeaia	3	7.0	40	93.0
Symp block	1	2.3	42	97.7
hypotension	4	9.3	39	90.7
drugs	5	11.6	38	88.4
disconnect tube	3	7.0	40	93.0
anxiety	1	2.3	42	97.7

Table 9: Illustrate the intraoperative side effects under general and spinal anesthesia

From table 9: the result showed that the most side effects association to general anesthesia was bradycardia, bleeding, shivering. And spinal anesthesia was hypotension, headache, and there is relation between hypotension and headache with protocol of anesthesia so the spinal anesthesia higher than general anesthesia, while there is relation between bleeding with protocol of anesthesia so the general anesthesia higher than spinal anesthesia.

Name of side effects	General anesthesia		Spinal anesthesia		P vqule
	N	%	N	%	
hypertension	1	2.3	1	2.3	1
Symp_block	0	0.0	1	2.3	0.127
hypotension	2	4.7	6	14.0	0.024
bradycardia	3	7.0	2	4.7	0.488
hypoxia and asperation	2	4.7	2	4.7	0.1
bleeding	2	4.7	0	0.0	0.028
shivering	3	7.0	2	4.7	0. 48
Neroginic shock	1	2.3	0	0.0	0.127
Headache	0	0.0	3	7.0	0.007

Table 10: Illustrate the intraoperative side effects and their complication and management

From table 10: the result showed that the complication associated with side effect so bleeding associated hypertension, admission ICU associated with cardiac arrest, headache associated with sympathetic block. Shivering associated to hypotension and bradycardia. Hypertension associated to tachycardia, hypoxia and Hypotension, laryngospasm, bronchospasm, dyspnea associated with hypoxia.

The management of hypertension used beta blocker, cardiac arrest used CPR and adrenaline, and change to GA, sympathetic block used Stop of solution and give fentanyl, hypotension used Fluid, Ephedrine, blood. and bradycardia used

Ephedrine and atropine. while Tachycardia used ↓fluid, ↑ inhalation gas. hypoxia used O2, change ETT aminophylline. aspiration used Chang ETT. and bleeding used Tranexamic acid. shivering used Pethidine. Neurogenic shock used Dopamine.

Headache used Analgesia and rest

Name of side effect	Complication during and post-operative	management
hypertension	**Bleeding**	**Beta blocker**
Cardiac arrest	**Admission ICU**	**CPR and adrenaline, and change to GA**
sympathetic block	**headache**	**Stop of solution and give fentanyl.**
hypotension	**shivering**	**Fluid, Ephedrine, blood**
bradycardia	**shivering**	**Ephedrine and atropine,**
Tachycardia	**hypertension**	**↓fluid, ↑ inhalation gas**
hypoxia	**Hypotension, laryngospasm, bronchospasm, dyspnea**	**O2, change ETT aminophylline**
aspiration		**Chang ETT**
bleeding		**Tranexamic acid**
shivering	-	**Pethedine**
Neurogenic shock		**Dopamine**
Headache		**Analgesia and rest**

Table 11: Illustrate the intraoperative fluid

From table 11: the result showed that the intraoperative fluid was N/S and RL, and Blood.

Intraoperative fluid	N	%	Mean±SD
N/S	**49**	**90.7**	**1700±300**
Blood	**2**	**4.7**	**500±0**
RL	**4**	**9.3**	**500±0**

Table 12: Illustrate the postoperative time of complication

From table 12: the result showed that the most time of post operation complication was immediate postoperative period 64.5%.

Time of Postoperative complication	N	%
Immediate postoperative period	**20**	**64.5**
early postoperative period	**11**	**35.5**

Table 13: Illustrate the postoperative vital signs data) BP and O2)

From table 13: the result showed that the majority of sample in postoperative vital signs data) BP and O2) was normal.

Time	Blood pressure	
	Systolic	Diastolic
5 min after surgery	**115.4±8.1**	**60.1±11.6**
10 min after surgery	**110.3±12.4**	**60.3±10.2**
20 min after surgery	**106.5±13.3**	**59.3±12.2**
Oxygen saturation		
5 min after surgery	**99.2±0.8**	
10 min after surgery	**99.9±0.1**	
20 min after surgery	**99.2±0.8**	

Table 14: Illustrate the postoperative vital signs data (pulse rate, respiration, and temperature)

From table 14: the result showed that the majority of sample in postoperative vital signs data) pulse rate, respiration, and temperature) was normal.

Time	Normal		High		Low	
	N	%	N	%	N	%
Pulse rate						
5 min after surgery	38	88.4	2	4.7	3	7.0
10 min after surgery	40	93.0	1	2.3	2	4.7
20 min after surgery	43	100.0	0	0.0	0	0.0
Respiration						
5 min after surgery	42	97.7	0	0.0	1	2.3
10 min after surgery	41	95.3	1	2.3	1	2.3
20 min after surgery	43	100.0	0	0.0	0	0.0
Temperature						
5 min after surgery	39	90.7	1	2.3	2	4.7
10 min after surgery	43	100.0	0	0.0	0	0.0
20 min after surgery	43	100.0	0	0.0	0	0.0
Pain	preoperative		Intraoperative		postoperative	
	0	0.0	0	0.0	43	100.0

Discussion

In our study we found that the sample had previous complication was more than half 69.8%, and previous side effects was more than half 79.1%, Similar to study of (John T, et al, 2017) and (Gholamreza M, et al, 2019), who say that the sample had previous complication was more than half 61.3% and 64.5%; respectively, and previous side effects was more than half 74.1% and 77.4%; respectively. And differed to study of (Xi Chen, et al, 2022), who say that the sample had previous complication was less than half 41.2%, and previous side effects was less than half 49.1%. In our study we found that the most preoperative vital signs was normal, similar to study of (Gholamreza M, et al, 2019) and (Sahar I, et al, 2022), their result showed that the most preoperative vital signs was normal. in our study we found that the most drugs used on general anesthesia was Propofol, similar to study of (Khosrou N, et al, 2012), and deferent to study of (Xi Chen, et al, 2022), the most drugs used on general anesthesia was thiopental. While spinal anesthesia the most drugs used was Marcaine, similar to study of (Khosrou N, et al, 2012). and differed to study of (John T, et al, 2017), who used lidocaine. Our result showed that the side effect associated with general anesthesia was less than half 32.6%, similar to (John T, et al, 2017) and (Khosrou N, et al, 2012), and differed to study of (Gholamreza M, et al, 2019), who say that the more than half of side effect associated with general anesthesia, While side effect associated with spinal anesthesia was less than half 39.5%, similar to (John T, et al, 2017) and (Khosrou N, et al, 2012), and differed to study of (Gholamreza M, et al, 2019), who say that the more than half of side effect associated with spinal anesthesia. and the most side effect associated with general anesthesia was bradycardia, bleeding and shivering, Similar to study of (Sahar I, et al, 2022) and (Xi Chen, et al, 2022), and differed to study of (John T, et al, 2017), who say the most

side effect associated with general anesthesia was hypertension and hypothermia. and most side effect associated with spinal anesthesia was hypotension and headache, similar to (Khosrou N, et al, 2012) and (John T, et al, 2017), and differed to result of (Sahar I, et al, 2022) the most side effect associated with spinal anesthesia was shivering. The most caused of side effects was surgery stimulation and drugs, similar to result of (Xi Chen, et al, 2022). and most complication was bleeding and shivering and bradycardia, similar to (John T, et al, 2017), and not similar to (Gholamreza M, et al, 2019), the most complication was nausea and vomiting. The most postoperative vital signs was normal similar to study of (Sahar I, et al, 2022).

Conclusions and Recommendation

5.1 Conclusions

In our study we found that the sample had previous complication and side effect was more than half, and we most preoperative vital signs was normal, and the most drugs used on general anesthesia was Propofol, While spinal anesthesia the most drugs used was Marcaine, and the side effect associated with general anesthesia was less than half, While side effect associated with spinal anesthesia was less than half. and the most side effect associated with general anesthesia was bradycardia, bleeding and shivering, and most side effect associated with spinal anesthesia was hypotension and headache, The most caused of side effects was surgery stimulation and drugs, and most complication was bleeding and shivering and bradycardia, The most postoperative vital signs was normal.

5.2 Recommendations

1. Providing all requirements and supplies for anesthesia techniques
2. Providing all medications to treat complications and side effects

3. Conduct a pre-operative assessment for each patient and know the patient's medical history
4. Monitor the patient continuously during the surgical procedure
5. Ensure that the patient's health condition is stable after completing the operation
6. Give clear instructions to the patient about post-operative care
7. Ensure that the patient is prepared psychologically and physically before surgery.
8. Inform the patient of any potential risks and explain the steps that was be taken for prevention
9. Apply standard safety protocols at all stages of the surgical procedure
10. Verify the safety and cleanliness of all devices and equipment used .

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QUESTIONNAIRE

Common Side Effects and Complications of Anesthesia in Public Hospitals in Sana'a

I. Demographic Data:

A- Personal data: -

1- Age: a- 20-39 y ( ) b- 40-59 y ( ) c- 60-79 y ( ) d-80 and more( ).

2- Sex: a- Male ( ) b- Female ( )

3- Patient weight? ……..

4- Patient height? ……..

5- Patient BMI ? ……..

B- History data: -

6- pervious surgery with anesthesia : a- GA ( ) b- SA ( ) c- NO ( ).

7- Is the patient experienced pervious postoperative any complications after pervious surgery under anesthesia ?

a- Yes ( ) b- No ( )

8- Is the patient has any side effects?

a-Yes ( ) b- No ( )

9- Family history of previous diseases:

a- Yes ( ) b- No ( )

10-Is the patient has previous allergy?

a- Yes ( ) b- No ( )

11-Drugs History:

a- Steroids ( ) b- Antihypertension ( ) c- Other ( ) :…….

12-Surgical History: ……..……

13-Medical illness:

a- HTN ( )
b- Ischemic Heart Disease ( )
c- Renal Disease ( )
d- Liver Disease ( )
e- Nothing ( )
f- Other Specify:……..

C-Educational level : -

a- Illiterate ( )
b- Literate ( )
c- Primary School ( )
d- Secondary School ( )
e- University and above ( )

D-Surgical data: -

1- Diagnosis: ……..…….……..
2- Type of Surgery: …….……..…….
3- ASA classification ( )

II. preoperative vital signs data : -

1- BP:

Time	Systolic	Diastolic
Baseline		
20 min before surgery		
10 min before surgery		

2- Pulse rate:

Time	Normal heart rate	Tachycardia	Bradycardia
Baseline			
20 min before surgery			
10 min before surgery			

3- Oxygen saturation:

Time	Pao2
Baseline	
20 min before surgery	
10 in before surgery	

4- Respiration :

Time	Breathing rate	Tachypnea	Bradypnea
Baseline			
20 min before surgery			
10 in before surgery			

5- Temperature :

Time	Normal	Hyperthermia	Hypothermia
Baseline			
20 min before surgery			
10 min before surgery			

III. intraoperative protocol

1- anesthetic drugs:

Name	Dosage

2- Type of anesthesia :

a- GA ( ) b- SA ( )

3- Intraoperative Side effects:

a) Yes ( ) b) No ( )

4- If yes. the possible causes of Side effects are:

a- Laryngoscopy ( ).
b- Endotracheal intubation ( ).
c- Surgical stimulation ( ).
d- Tracheal extubation ( ).
e- Hypoxemia ( ).
f- Hypervolemia ( ).
g- Hypothermia ( ).
h- Other Specify …….……

5- side effects under general and spinal anesthesia:

- Type of anesthesia : a- GA ( ) b- SA ( )
- Name of side effects:

a. ……..

b. ……..

c. ……

d. ……

e. ……

f. ……

g. ……

6- intraoperative side effects and their complication and management:

Name of side effect	**Complication during intraoperative**	**management**

7- Intraoperative IV fluid administration

Fluids name	Amount

IV- Post-Operative Data

1) Postoperative complications

a. Yes ( ). b. No ( ).

2) If yes the possible causes of complications are:

a. Bladder Distension ( ). b. Shivering ( ). c. Hypothermia ( ).

d. Reversal of Anesthetic Agents ( ). e. Hypoxemia ( ).

f. Pain and Anxiety ( ). g. Volume Overload ( ).

h. Other Specify …….…….

3) Time of postoperative complications:

a. Immediate Postoperative Period ( ).

b.Early Postoperative Period ( ).

Late Postoperative Period (24–48 h) ( ).

4) Vital signs:

a) BP

Time	Systolic	Diastolic
5 min after surgery		
10 min after surgery		
20 min after surgery		

b) Pulse rate:

c) Time	Heart rate	Tachycardia	Bradycardia
5 min after surgery			
10 min after surgery			
20 min after surgery			

c) Oxygen saturation:

Time	Pao2
5 min after surgery	
10 min after surgery	
20 min after surgery	

d) Respiration :

Time	Breathing rate	Tachypnea	Bradypnea
5 min after surgery			
10 min after surgery			
20 min after surgery			

e) Temperature :

Time	Normal	Hyperthermia	Hypothermia
5 min after surgery			
10 min after surgery			
20 min after surgery			

f) Pain:

Pain	Preoperative	Intraoperative	Postoperative

NOTES:

……
……
…….

Supervisor signature

الاثار الجانبية والمضاعفات الشائعة للتخدير في المستشفيات العامة بصنعاء.

الخلاصة

الخلفية: يمكن أن تحمل العمليات الجراحية الاختيارية التي يتم إجراؤها تحت التخدير العام أو النخاعي آثارًا جانبية ومضاعفات مختلفة. قد تشمل الآثار الجانبية الشائعة الغثيان والقيء والتهاب الحلق والرعشة والنعاس. يمكن أن تشمل المضاعفات الأكثر خطورة، على الرغم من ندرتها، اكتئاب الجهاز التنفسي وعدم انتظام ضربات القلب وتلف الأعصاب. تعد مراقبة المريض بعناية وإدارة التخدير المناسب أمرًا بالغ الأهمية لتقليل هذه المخاطر. يجب إبلاغ المرضى بالآثار الجانبية والمضاعفات المحتملة قبل إجراء العملية من أجل تحديد توقعات واقعية.

الهدف: تحديد الآثار الجانبية والمضاعفات الشائعة في الجراحة الاختيارية تحت التخدير العام والنخاعي في المستشفيات العامة.

المنهجية: أجريت دراسة وصفية مقطعية على المستشفيات العامة في صنعاء 2025- 2024م، وتم جمع البيانات من خلال استبيان مغلق، وتم تحليل البيانات باستخدام برنامج (SPSS الإصدار 24).

النتائج: كانت العينة 43، وكان متوسط ± الانحراف المعياري للعمر 27.4±14.8، بينما كان الوزن 56.7±15.8، والطول 1.6±0.2، ومؤشر كتلة الجسم 24.1±7.3، وكانت غالبية العينة من حيث الجنس من الذكور 62.8٪، وكانت غالبية العينة في الجراحة السابقة مع التخدير GA 53.5٪، وكانت المضاعفات السابقة أكثر من النصف 69.8٪، وكانت الآثار الجانبية السابقة أكثر من النصف 79.1٪، وكانت معظم العلامات الحيوية قبل الجراحة طبيعية، والتخدير العام كانت أكثر الأدوية المستخدمة هي البروبوفول ، والتخدير الشوكي كان ماركاين، وكان التأثير الجانبي المرتبط بالتخدير العام أقل من النصف 32.6٪، وكان التأثير الجانبي المرتبط بالتخدير الشوكي أقل من النصف 39.5٪، وكان معظم التأثير الجانبي المرتبط بالتخدير العام بطء نبضات القلب والنزيف والرعشة، وكان معظم التأثير الجانبي المرتبط بالتخدير الشوكي انخفاض ضغط الدم والصداع، وكان معظم كانت المضاعفات هي النزيف والرعشة وبطء نبضات القلب ، وكانت معظم العلامات الحيوية بعد العملية الجراحية طبيعية.

الاستنتاج: في دراستنا وجدنا أن العينة كانت تعاني من مضاعفات وآثار جانبية سابقة أكثر من النصف، وكانت معظم العلامات الحيوية قبل الجراحة طبيعية، وأكثر الأدوية المستخدمة في التخدير العام هي البروبوفول ، أما التخدير النخاعي فكان أكثر الأدوية المستخدمة هو ماركايين، وكان التأثير الجانبي المرتبط بالتخدير العام أقل من النصف، بينما كان التأثير الجانبي المرتبط بالتخدير النخاعي أقل من النصف. وكان أكثر الآثار الجانبية المرتبطة بالتخدير العام بطء نبضات القلب والنزيف والرعشة، وكان أكثر الآثار الجانبية المرتبطة بالتخدير النخاعي انخفاض ضغط الدم والصداع، وكان أكثر الآثار الجانبية المسببة هو التحفيز الجراحي والأدوية، وكان أكثر المضاعفات النزيف والرعشة وبطء نبضات القلب ، وكانت أكثر العلامات الحيوية بعد الجراحة طبيعية.

الجمهورية اليمنية
وزارة التربية والتعليم والبحث العلمي
جامعة 21 سبتمبر للعلوم الطبية والتطبيقية
عماده البيئة وخدمة المجتمع
تخصص فني تخدير وعناية مركزة

الاثار الجانبية والمضاعفات الشائعة للتخدير في المستشفيات العامة بصنعاء.

بحث تخرج لقسم لتخدير بعمادة البيئة وخدمة المجتمع جامعة 21 سبتمبر للعلوم للعلوم الطبية والتطبيقية كاكمال جزئي للحصول على درجة الدبلوم

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2024 - 2025