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Causes for anesthesia unfitness of surgical patients at Al-kindy Teaching Hospital

A research project submitted to Community & Family Medicine department, Al-Kindy college of medicine as a partial fulfillment of research module

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بسم الله الرحمن الرحيم

يرفع الله الذين آمنوا منكم والذين أوتوا العلم درجات

صدق الله العظيم

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Dedication

This project is dedicated to the professors in the Family and Community medicine department, to our supervisor in the surgery department Dr. Kareem Asi and our beloved parents who helped and guided us throughout the project and have never failed to give us the support that we need to successfully complete this project work. Allah bless them.

We would also like to dedicate this project to the patients who participated in this study and helped us in achieving the sample quota for this research.

Finally, we dedicate it to the souls of those who have gone in their surgical operation.

Abstract

Background :

Anesthetics are a diverse group of drugs that are used in the management of pain. The administration of anesthetics is necessary to provide inhibition of individual pain pathways (local anesthesia) or to render a patient unconscious so that surgical procedures can be carried out (general anesthesia).
Local anesthetics act by causing a reversible block to conduction along nerve fibers, They act on any part of the nervous system and on every type of nerve fiber, cause both sensory and motor blockades .The drugs used in local anesthesia vary widely in their potency, toxicity, and duration of action.
General anesthetics are agents that produce a drug-induced absence of perception. Depths of anesthesia that are required for the maintenance of surgical anesthesia can be achieved by a wide variety of drugs either alone or in combination. General anesthesia can be administered by a variety of routes, with inhalation and intravenous routes being the preferred methods. The variety of agents that can produce general anesthesia is very diverse; inhalation agents can be a simple as xenon and nitrous oxide, or the more complicated halogenated compounds. Intravenous anesthetics, as a group, include agents as diverse as the barbiturates, benzodiazepines, opioids, ketamine and alpha-2, adrenoceptor agonists

Objectives :

1- To determine the main causes of unfitness of surgical patients for GA in patients attending Al-Kindy teaching hospital from (2\10\2022) to(25\1\2023) for three months.
2- To determine the association between socio-demographics and unfitness for GA.

Methodology :

A Cross sectional study that was implemented at Al-kindy Teaching Hospital , from (2\10\2022) to (25\1\2023) for three months . The sample was collected from Al-Kindy Teaching Hospital.

Result :

A total of 1100 patient's file were collected, but only 150 files were with completed data Age : 9 years to 72 years, Both genders were included. All patients were unfit for GA; the included deferred (unfit for GA) patients were picked from Statistical Department of Al-Kindy Teaching Hospital. we found that most off cases were due to uncontrolled hypertension ***(24.7%)*** just second to the hypertension was unavailability of anesthetic drugs ***(14%)*** of the cases the third cause was pneumonia (chest infection) ***(12%)***

Conclusion:

As it was found in the results that most cases was delayed due to uncontrolled hypertension that gives us a hint to do more education in controlling hypertension also we need to develop our hospital abilities to provide anesthetic drugs in addition we need more education about infectious diseases . how to treat and control them.

Key words : ***Anesthesia , Hypertension ,Pneumonia*** .

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Abbreviation	Stands for
GA.	General anesthesia
DM.	Diabetes mallets5
HTN.	Hypertensive
TB.	Tuberculosis
No.	Number

Introduction

Anesthesia :

General anesthesia is a medically-induced loss of consciousness with concurrent loss of protective reflexes due to anesthetic agents. Various medications may be prescribed to induce unconsciousness, amnesia, analgesia, skeletal muscle relaxation, and the loss of autonomic system reflexes. [1] Anesthetic techniques can be classified into : GA , Regional anesthesia (caudal ,spinal ,epidural , Beir's block & peripheral nerve block) and Local anesthesia.[2]. Choosing a suitable anesthetic technique can have benefits for patients. For some patients, physicians need to determine whether GA or Neuraxial Anesthesia is more suitable for a particular surgical procedure. [3] GA has been reported to be risk of : MI ,stroke & death. [3]

Cardiovascular disease (CVD) :

Is the single largest cause of death in the developed countries and is one of the leading causes of disease burden in developing countries as well. According to the definition of the World Health Organization, CVD is a group of disorders of the heart and blood vessels including coronary heart disease, cerebrovascular disease, peripheral arterial disease, rheumatic heart disease, congenital heart disease, deep vein thrombosis, and pulmonary embolism.[4] Risk factors for CVD have been divided into invariable and variable risk factors. Invariable risk factors include age, sex, and genetic status. However, known variable risk factors include improper lifestyle habits, such as smoking tobacco and poor exercise and eating habits.[5] Other risk factors associated with CVD include the presence of underlying diseases such as arterial hypertension, diabetes mellitus, dyslipidemia, cholesterol, and obesity. In addition, myocardial injury after non cardiac surgery (MINS) might be important factor in cardiovascular events during perioperative complications .Hip fracture was found to be one of the risk factors for MINS during the pre-operative period.[5]

Anesthesia and surgery have a wide range of effects on the cardiovascular system. Even in healthy patients having minor operations, anesthetic agents can cause significant cardiac depression and hemodynamic instability. Virtually all anesthetic agents have intrinsic myocardial depressant properties, although some may mask this with sympathetic stimulation. The vasodilatory effects of the volatile agents can result in serious hypotension when combined with this negative inotropy. In the patient with pre-existing cardiac disease, these cardiovascular anesthetic effects become much more serious. These patients will not tolerate wide swings of hemodynamic variables, and the cardio depressant effects of anesthetics are more pronounced in them. The stress of anesthesia and surgery frequently unmasks previously undiagnosed heart disease. Surgery itself provides many insults to the cardiovascular system, and these may be additive with the effects of anesthesia. These include loss of blood and other volume shifts, release of various substances into the circulation, hypothermia, sudden changes in cardiac preload and afterload, myocardial ischemia, and effects of drugs or blood products given for surgical reasons. The symptoms and signs of these surgical stresses to the cardiovascular system are often masked by anesthesia.[6]

Hypertension :

Hypertensive patients (systolic >140mmHg, diastolic >90mmHg). The link between elevated arterial pressure and CVS disease is well established, with the greatest risk associated with the highest arterial pressures. [7]

Traditionally, many patients have had anesthesia and surgery deferred to allow hypertension to be treated. evidence that moderately elevated BP is associated with increased perioperative risk is limited, although increased CVS lability under anesthesia frequently occurs. However, the association of hypertension with end-organ damage (IHD, heart failure, renal failure) contributes significantly to the likelihood of perioperative CVS complications. [8]

Preoperative evaluation

- Is hypertension primary or secondary? Consider the rare possibility of pheochromocytoma, hyperaldosteronism, renal parenchymal hypertension, and renovascular hypertension. These will have individual anaesthetic implications. [9]

- Is there evidence of end-organ involvement? The presence of coronary or cerebrovascular disease, impairment of renal function, signs of left ventricular hypertrophy, and heart failure puts patients in a high-risk category. [10]

Also hypertension associated with Increased complications including myocardial infarction, myocardial ischemia, dysrhythmias, cerebrovascular events, and renal failure have been reported if the preoperative diastolic blood pressure is 110 mmHg or higher. [11]

Heart failure means that the heart is unable to pump blood around the body properly. It usually happens because the heart has become too weak or stiff. [12]

It's sometimes called congestive heart failure, although this name is not widely used now.

Heart failure does not mean your heart has stopped working. It means it needs some support to help it work better.[12]

It can occur at any age, but is most common in older people.[12]

Heart failure is a long-term condition that tends to get gradually worse over time.[13]

It cannot usually be cured, but the symptoms can often be controlled for many years. [13]

Angina :

Angina is chest pain or discomfort caused when your heart muscle doesn't get enough oxygen-rich blood. It may feel like pressure or squeezing in your chest. The discomfort also can occur in your shoulders, arms, neck, jaw, abdomen or back. Angina pain may even feel like indigestion. In addition, some people don't feel any pain but have other symptoms like shortness of breath or fatigue. If these symptoms are due to a lack of oxygen to the heart muscle, it's called an anginal equivalent. [14]

Arrhythmia :

Or known as irregular heartbeat, is a problem with the rate or rhythm of your heartbeat. Your heart may beat too quickly, too slowly, or with an irregular rhythm. [15]

It is normal for your heart rate to speed up during physical activity and to slow down while resting or sleeping. It is also normal to feel as if your heart skips a beat occasionally. But a frequent irregular rhythm may mean that your heart is not pumping enough blood to your body.

Regularity :

Irregular rhythm suggests ectopic beats (atrial or ventricular), AF, atrial flutter with variable block, or 2nd-degree heart block with variable block. [16]

Perioperative arrhythmias

Perioperative cardiac arrhythmias are common and may be life-threatening

Whenever possible, they should be controlled preoperatively, as surgery and anesthesia can cause marked deterioration. Management is easier if the underlying problem has been recognized, investigated, and treated pre- operatively. Never give an IV drug for any rhythm disturbance, unless you are in a position to cardiovert immediately. [17]

Practical diagnosis of arrhythmias

Ideally undertaken with a paper printout of the ecg and preferably in a 12-lead format. In theatre, this is often impractical—use the different leads available on the monitor to improve interpretation

Ventricular rate

Calculate the approximate ventricular rate (divide 300 by the number of large squares between each QRS complex). [18]

Tachyarrhythmia: rate >100bpm; Brady arrhythmia: rate <60bpm

Pneumonia :

Is a form of acute respiratory infection that affects the lungs. The lungs are made up of small sacs called alveoli, which fill with air when a healthy person breathes. When an individual has pneumonia, the alveoli are filled with pus and fluid, which makes breathing painful and limits oxygen intake. [19]

Causes **:**

- Pneumonia is caused by several infectious agents, including viruses, bacteria and fungi ,The most common are the following :

- Streptococcus pneumonia is the most common cause of bacterial pneumonia in children.

- Haemophilus influenza type b (Hib) is the second most common cause of bacterial pneumonia .

- Respiratory syncytial virus is the most common viral cause of pneumonia. [20]

Tuberculosis (TB) :

is a contagious infection that usually attacks your lungs. It can also spread to other parts of your body, like your brain and spine. A type of bacteria called Mycobacterium tuberculosis causes it. [21]

Patients who have respiratory tract infections producing fever and cough with or without chest signs on auscultation should not undergo elective surgery under GA due to the increased risk of post-operative pulmonary complications. [22]

Adult patients with simple coryza are not at significantly increased risk of developing post-operative pulmonary problems, unless they have pre-existing respiratory disease or are having major abdominal or thoracic surgery. [23]

Laryngospasm may be more likely in patients with a recent history of upper respiratory tract symptoms who are asymptomatic at the time of surgery. [24]

Compared with asymptomatic children, children with symptoms of acute or recent upper respiratory tract infection (URTI) are more likely to suffer from transient post-operative hypoxemia (SpO2 <93%). this is most marked when intubation is necessary. [25]

Diabetes :

is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. Insulin is a hormone that regulates blood glucose. Hyperglycemia, also called raised blood glucose or raised blood sugar, is a common effect of uncontrolled diabetes and over time leads to serious damage to many of the body's systems, especially the nerves and blood vessels. [26]

The World Health Organization (WHO) in 2007 report shows that at least 171 million people of the world are suffering from diabetes. [27] According to Ministry of Health (MOH) in Iraq the prevalence of diabetes in Iraq increased from 5% in 1978 to 13,9% in 2015. [28]

During the operation of diabetic patients, anesthesia and surgery can aggravate their condition. Patients with poorly blood glucose controlled may have serious complications such as ketoacidosis, circulatory failure, postoperative infectious complications and even death. The perioperative mortality of patients with diabetes or preoperative hyperglycemia is higher than that of patients without diabetes or hyperglycemia (1,3-7). Decreasing glucose variability during admission for surgery is essential for patients with type 2 diabetes to reducing re-admission rates and length of stay. Glaciated hemoglobin (HBA1c) may also identify patients at higher risk of postoperative complications and the possibility of re-admission. [29]

Liver Disease :

The term "liver disease" applies to many conditions that stop the liver from working or prevent it from functioning well

There are many kinds of liver diseases **:**

-Non-alcoholic fatty liver disease is the most common liver disorder globally. The prevalence is 25% worldwide but is widely distributed across different populations and regions. The highest rates are reported in the Middle East (32%) .[30]

-Diseases caused by viruses, such as hepatitis A, hepatitis B, and hepatitis C.

-Diseases caused by drugs, poisons, or too much alcohol. Examples include fatty liver disease and cirrhosis.

-Liver cancer.

-Inherited diseases, such as hemochromatosis and Wilson disease. [31]

patients with well-compensated or occult cirrhosis, general anesthesia and surgery can cause complications, which can result in significant morbidity and mortality.

Most surgical procedures result in small elevations in serum liver biochemical test levels, whether performed under general, spinal, or epidural anesthesia. In patients without underlying liver disease, minor postoperative increases in serum aminotransferase, alkaline phosphatase, or bilirubin levels are not clinically important. Surgery, on the other hand, can hasten hepatic decompensation in patients with underlying liver disease, especially those with compromised hepatic synthetic function. The intensity of the operation is related to the operational risk.

In patients with elevated liver enzyme levels, anesthesia and surgery may deteriorate liver function; thus, choosing anesthetics with less hepatotoxicity may be critical in these patients. Preoperative evaluation is critical for elective procedures to ensure a proper risk benefit calculation for elective surgery and to direct optimization.[32-35]

Renal failure :

A condition in which the kidneys stop working and are not able to remove waste and extra water from the blood or keep body chemicals in balance. Acute or severe renal failure happens suddenly (for example, after an injury) and may be treated and cured. Chronic renal failure develops over many years, may be caused by conditions like high blood pressure or diabetes, and cannot be cured. Chronic renal failure may lead to total and long-lasting renal failure, called end-stage renal disease (ESRD). A person in ESRD needs dialysis (the process of cleaning the blood by passing it through a membrane or filter) or a kidney transplant. Also called kidney failure. [36] [37]

Decreased renal function can prolong anesthetic drug effects by decreased elimination of these drugs. Anesthesia can deteriorate renal function and decreased renal function can interfere with drug elimination leading to their prolonged effect. The anesthesiologist must understand all the physiological aspects of the patient, renal protection, and the relationships between anesthetic drugs and renal function. [38]

Anemia :

Is a condition in which the number of red blood cells or the hemoglobin concentration within them is lower than normal. Haemoglobin is needed to carry oxygen and if you have too few or abnormal red blood cells, or not enough haemoglobin, there will be a decreased capacity of the blood to carry oxygen to the body's tissues. This results in symptoms such as fatigue, weakness, dizziness and shortness of breath, among others. The optimal haemoglobin concentration needed to meet physiologic needs varies by age, sex, elevation of residence, smoking habits and pregnancy status. The most common causes of anaemia include nutritional deficiencies, particularly iron deficiency, though deficiencies in folate, vitamins B12 and A are also important causes; haemoglobinopathies; and infectious diseases, such as malaria, tuberculosis, HIV and parasitic infections.[39]

Anemia is a common blood disorder of perioperative patients. The primary physiologic consequence of severe anemia to the surgical patient is inadequate tissue oxygen delivery, which may lead to tissue hypoxia, biochemical imbalances, organ dysfunction, and ultimately organ damage. Mismanagement of the anemic surgical patient can adversely affect perioperative outcomes. [40]

Objectives :

1-To determine the main causes of unfitness of surgical patients for GA in patients attending Al-Kindy Teaching Hospital for three months .

2- To determine the association between socio-demographics and unfitness for GA.

Methodology :

Study design : retrospective study.

Setting & duration : Al-Kindy teaching hospital . data were collected from (2\10\2022) to (25\1\2023)

Sample & sampling technique : convenient sample technique.

The study participant were patients who were deferred from surgery (data were collected from statistic department by convenience sample from discharge patients files). The data were collected and classified according to the : Age ,Gender ,Residence ,Smoking Status & Drinking Alcohol. .

Inclusion criteria :

All patients files that were discharged because of unfitness for GA at the time from (2\10\2022) to (25\1\2023).

Exclusion criteria : Files with incomplete data

Ethical issues : Ethical approval was obtained from relevant health facility and community & family medicine , along with the approval of the researchers medical college. The researchers guaranteed that information were not to be used for any other purpose rather than for research work .

Statistical analysis :

- Data were presented in simple measures of :frequencies & percentages.

- *Chi-square test* was used to analyze data along with *fisher's exact test* to analyze the association for cells with small expected count *(less than 5)* .

- p-value was considered to be significant when it was *equal or less than (0.05)* .

Results :

A total of 1100 patients files were collected, but only 150 files were with completed data; the included deferred (unfit for GA) patients were picked from Statistical Department of Al-Kindy Teaching Hospital. It was found that most off cases was due to uncontrolled hypertension ***(24.7%)*** just second to the hypertension were unavailability of anesthetic drugs ***(14%)*** of the cases the third cause was pneumonia (chest infection) ***(12%).***

Table (1) : Illustrates the demographic distribution of the sample.

Demographic data		No.	%
Age (yrs.)	< 18 years	28	18.7
	18-40 years	64	42.7
	41-64 years	47	31.3
	≥65 years	11	7.3
Gender	Female	84	56.0
	Male	66	44.0
Residence	Rural	48	32.0
	Urban	102	68.0
Smoking status	No	104	69.3
	Yes	46	30.7
Drinking Alcohol	No	140	93.3
	Yes	10	6.7

Table (2) : Distribution of patients causes unfitness for GA data.

Causes of unfitness for anesthesia	No.	%
Anemia	8	5.3
Angina	1	0.7
Arrhythmia	4	2.7
Chest Infection (pneumonia)	18	12.0
Diabetes	13	8.7
Heart Failure	5	3.3
Hypertension	37	24.7
Liver Diseases	9	6.0
Non fasting patient	13	8.7
Patient refuse to do the surgery	2	1.3
Renal failure	2	1.3
TB	2	1.3
Unavailability of anesthetic drugs	21	14.0
Unavailability of IV fluids or maintaining drugs	2	1.3
Unavailable Operating Room	13	8.7
Total	150	100.0

Table (3) : the relation between causes of unfitness for general anesthesia with smoking, No.=150 .

Causes of unfitness for GA	Smoking			
	No		Yes	
	No.	%	No.	%
Anemia	6	5.8	2	4.3
Angina	1	1.0	0	0.0
Arrhythmia	3	2.9	1	2.2
Chest Infection (pneumonia)	14	13.5	4	8.7
Diabetes	11	10.6	2	4.3
Heart Failure	3	2.9	2	4.3
Hypertension	20	19.2	17	37.0
Liver Diseases	3	2.9	6	13.0
Non fasting patient	12	11.5	1	2.2
Patient refuse to do the surgery	2	1.9	0	0.0
Renal Failure	2	1.9	0	0.0
TB	0	0.0	2	4.3
Unavailability of anesthetic drugs	15	14.4	6	13.0
Unavailability of IV fluids or maintaining drugs	2	1.9	0	0.0
Unavailable Operating Room	10	9.6	3	6.5

-Smoker patients were non-significantly un-fit for GA, due to HTN, *(P-value=0.057).*

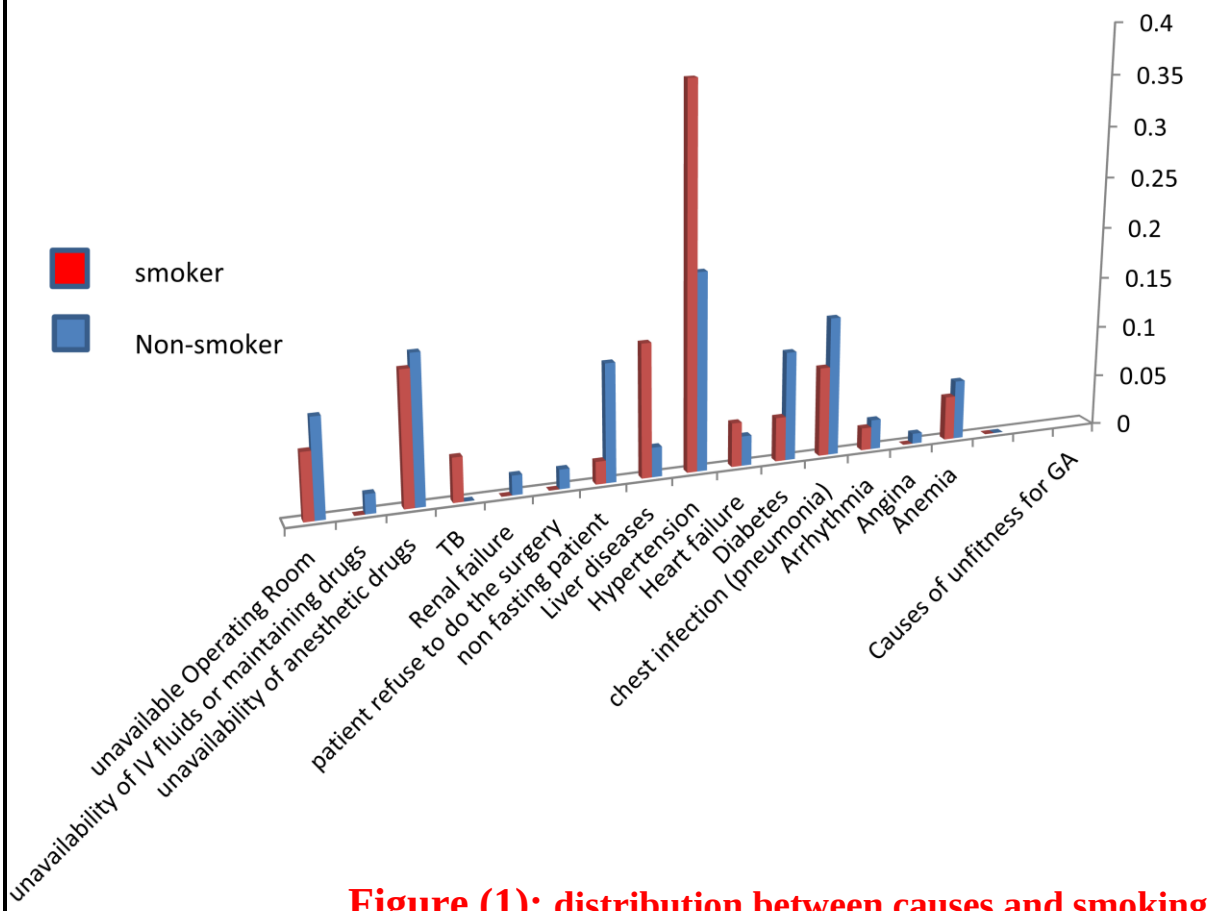

Figure (1): distribution between causes and smoking.

Table (4) : The relation between the main causes of unfitness for anesthesia and age

Causes of unfitness for GA	Age (Yrs.)			
	<18 NO.	18-40 NO.	41-64 NO.	≥ 65 NO.
Anemia	1	7	0	0
Angina	0	1	0	0
Arrhythmia	2	2	0	0
Chest Infection (pneumonia)	2	12	4	0
Diabetes	0	5	8	0
Heart failure	0	0	0	5
Hypertension	0	13	18	6
Liver Diseases	0	5	4	0
Non fasting patient	11	0	2	0
Patient refuse to do the surgery	0	0	2	0
Renal failure	0	1	1	0
TB	0	2	0	0
Unavailability of anesthetic drugs	7	10	4	0
Unavailability of IV fluids or maintaining drugs	2	0	0	0
Unavailable Operating Room	3	6	4	0

Fisher exact test was used to analyze the association for cells with small expected count *(less than 5)*

Patients who aged 41-64 years old and having HTN; significantly were unfit for GA than other patients, ***(p-value was 0.0001).***

Chi-square value was (165.969[a])

Discussion :

In ***(Table 1)*** it was found that the largest group of age was (18-40) with a percent of *(42.7%)* and the second largest one was the age group of (41-60) with a percent of *(31.3%)* .

Regarding smoking we found that *(30.7%)* were smokers compared to *(69.3%)* who were not

About alcohol drinking *(93.3%)* were nondrinkers and only *(6.7%)* were drinkers

(Table 2) of this research found that the top three main causes of unfitness for general anesthesia were as follow :

hypertension with largest percent with *(24.7%)* (37 out of 150 patients) ,

unavailability of anesthetic drugs with a percent of *(14%)* (21 out of 150 patients),

chest infection with a percent of *(12%)* (18 out of 150 patients)

(Table 3) of this research the relation between smokers and the top three causes were as follow :

(37%) of smoker patients were hypertensive ,

(13%) unavailability of anesthetic drugs cause were smoker ,

(8.7%) of chest infection patients were smokers .

In ***(Table 4)*** the relation between age groups and causes were as follow :

The highest number of patients in the age group(41-64 years) (18 out of 150 patients) was deferred from surgery due to hypertension

The highest number of patients in the age group (18-40 years) (13 out of 150 patients) was deferred from surgery due to hypertension

The second highest number in the age group (18-40 years) (12 out of 150 patients) was deferred from surgery due to chest infection.

A study was performed in Jordan regarding the reasons for cancellation of elective surgical operations over a period of 12 months (10485) case was scheduled to an operation (10103) operation was performed successfully and (382) surgery was cancelled the reasons was categorized as follow :

- Patient related reason including : fail to attending , patient request and patients not fasting.

- Administrative related reasons.

- Medical related reasons including : chest infection, high blood pressure , acute illness , change in treatment plan , abnormal laboratory results .[41]

The percentage of cancelled surgeries was as follow :

Patient non fasting was *(2.6 %)* compared to *(8.7%)* in this study , regarding medical reasons specifically hypertension percentage was 11% compared to *(24.7%)* in this study, in chest infection percentage was *(12.8%)* compared to *(12%)* in this study .

Limitation of the study :

Few limitations were identified in this study :

First of all, the sample size was small and can not be generalized to all hospitals ,another limitation is the incomplete data of patients files that made analysis difficult.

Also taking both genders could affect the results regarding smoking or alcohol drinking. Some female patients were not willing to provide honest answers regarding their smoking habits due to social norms and expectations.

Conclusion :

Based on the analysis of the data, it was determined that uncontrolled hypertension was the leading cause of medical cases encountered, accounting for (24.7%) of all cases. Furthermore, the unavailability of anesthetic drugs accounting for (14%) of all cases. Another significant finding was the prevalence of pneumonia or chest infection, which was identified as the third most common cause of medical cases, accounting for (12%) of all cases.

Recommendations :

The study recommend to increase the awareness of the complications of uncontrolled hypertension ,diabetes and chest infection that could happen during or after surgery and to provide education to the patients, also we need to improve health facilities to promote anesthetic drugs and maintain patient safety. In addition;;n, increase society knowledge about the importance of appropriate fasting . This includes educating patients about the risks of eating or drinking prior to surgery, as well as providing guidance on how to prepare for the procedure.

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