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LONG TERM POST OPERATIONAL EFFECT OF ANESTHISIA ON HUMAN BODY ''TRUTH & MYTH''.

Vrushali Nandkishor Malikar[1],Prof. Akash Dhoke[2], Dr. Manisha D. Kitukale[3]

vrushalimalikar@gmail.com[1],
Student, Department of Pharmaceutics[1]
Assistant Professor, Department of Pharmaceutics[2]
Principal, P. Wadhwani College of Pharmacy, Yavatmal, India[3]
Pataldhawal Wadhwani College Of Pharmacy, Yavatmal,Maharashtra,India[1,2,3]

ABSTRACT -

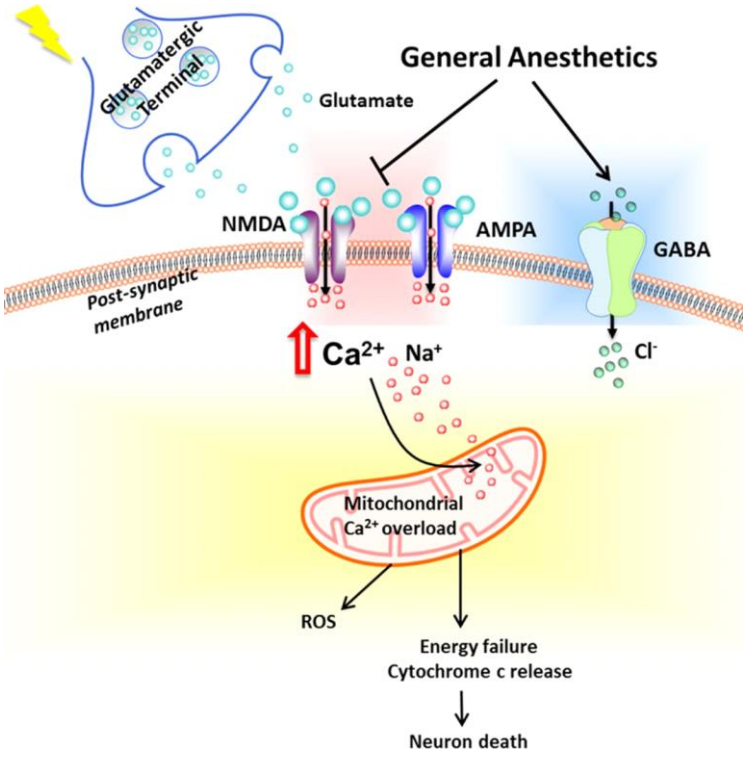
This paper discusses the long-term effects of anesthesia on the human body, investigating the scientific evidence and misconceptions surrounding post-operative complications. The review covers various anesthetic drugs, their interaction with body systems, and examines the myths regarding cognitive, physical, and emotional side effects.

This paper explores the long-term effects of anesthesia on the human body, differentiating scientifically supported truths from commonly held myths. Through an extensive literature survey and analysis of experimental data, the post-operative consequences of anesthesia are assessed, focusing on cognitive, physical, and psychological effects. This paper aims to clarify the impact of anesthesia and provide a clearer understanding of its long-term implications.

INTRODUCTION :

Anesthesia is a critical component of modern medical procedures, enabling pain-free surgeries. While the short-term effects of anesthesia are well understood, there is ongoing debate regarding its long-term post-operative effects. This paper aims to clarify which post-anesthesia effects are supported by clinical research and which are myths, offering a clearer understanding of anesthesia's impact.
The lingering effects of anesthesia on the brain and body , especially in elderly and vulnerable populations,remain controversial.
This paper seeks to clarify which post-anesthesia effects are supported by clinical research and which are myths, offering a clearer understanding of anesthesia's impact.

MECHANISM ACTION OF GLUTAMATE



Inhibitory Enhancement :
general anesthetics enhance the activity of ihibitory neurotransmitters like GABA binds to GABA receptor leading to an influx of chloride ions and hyperpolarization of the neuron.this makes it harder for the neuron to fire reducing overall brain activity.
Excitatory suppression:
anesthetics also supreess excitatory neurotransmission by blocking receptors like NMDA(N-methyl-D-aspartate) and AMPA (alpha amino -3hydroxy-5-methyl-isoxazolepropionic acid).this reduce the influx of sodium and calcium ions ,further ihibiting neuronal firing
Mitochondrial impact :
anesthetics can also affect mitochondria leading to calcium overload and increased production of reactive oxygen species (ROS) this can distrub energy production and contribute to neuronal death.
Multiple targets :
Different anesthetics might have varying affinities for specific receptaors and ion channels ,leading to a complex interplay of effect.
overall,general anesthetics work by depressig the activity of the central nervous system ,leading to unconsciousness,analgesia and immobility.

MECHANISM ACTION OF PROPOFOL

propofol

| |

Activation of GABA receptor

| |

Increase transmembrance conductance

| |

Hyperpolarization of post synaptic membrane

| |

Functional inhibition of post synaptic membrane

Inhibits the responce to painful stimuli by interacting with beta3 subunit of GABA receptor
Sedative effects of propofol mediated by the same GABA receptor on the beta2 subunit

TRUTH OF ANESTHESIA :

1. Nausea and Vomiting
This very common side effect can occur within the first few hours or days after surgery and can be triggered by a number of factors, such as the medication, motion, and the type of surgery.
2. Sore Throat
The tube that is placed in your throat to help you breathe while you're unconscious can leave you with a sore throat after it's removed.
3. Postoperative Delirium
Confusion when regaining consciousness after surgery is common, but for some people — particularly older patients — the confusion can come and go for about a week. You may feel disoriented and have problems remembering or focusing. This can worsen if you are staying in the hospital for a few days after the procedure, especially in intensive care, because you are in an unfamiliar place. Having a loved one with you helps, along with doing some other simple things: wearing your glasses or hearing aids as soon as you can after the procedure and making sure you have family photos, familiar objects, and a clock and calendar in your room.
4. Muscle Aches
The medications used to relax your muscles so a breathing tube can be inserted can cause soreness.
5. Itching
This is a common side effect of narcotics, one type of pain medication sometimes used with general anesthesia.
6. Chills and Shivering (Hypothermia)
This occurs in up to half of patients as they regain consciousness after surgery, and it might be related to body temperature.

RARE COMPLICATIONS OF GENERAL ANESTHESIA :

Postoperative Delirium or Cognitive Dysfunction

In some cases, confusion and memory loss can last longer than a few hours or days. A condition called postoperative cognitive dysfunction can result in long-term memory and learning problems in certain patients. It's more common in older people and those who have conditions such as heart disease, Parkinson's disease, or Alzheimer's disease.

Malignant Hyperthermia

Some people inherit this serious, potentially deadly reaction to anesthesia that can occur during surgery, causing a quick fever and muscle contractions.

Monitored Anesthesia Care or IV Sedation

For some procedures, you may receive medication that makes you sleepy and keeps you from feeling pain. There are different levels of sedation.

Local Anesthesia

This is the type of anesthesia least likely to cause side effects, and any side effects that do occur are usually minor.

MYTHS OF ANESTHESIA

1. Anesthesia Will Wear Off Too Soon

One of the more common fears is that the anesthesia will stop working at some point during the procedure, and you'll start feeling pain. But the way anesthesia works is that it is constantly applied, via inhalation or intravenously. You'll be awakened when the anesthesiologist shuts off the flow of drugs at the end of the surgery.

There are rare cases – called anesthesia awareness – in which patients can recall their surroundings or feelings of pressure or pain during the procedure.

2. You Might Die During Surgery

Every surgery carries some element of risk. But in most cases, this is related to a patient's overall health, rather than the anesthesia. Patients in a fragile state – consider the case of someone undergoing trauma surgery following a major accident – face much greater risks than those created by anesthesia.

General anesthesia does affect your vital signs. So, if you are in poor condition, your body may not be able to handle wide swings in your vital signs. But it is extremely rare for the anesthesia to be the cause of death or other serious complication. Back in the 1960s and 1970s, it was more common for deaths to be related to anesthesia. As many as one in 10,000 patients died. Today, that number is closer to one in 200,000 patients.

There are many underlying health conditions that can increase your risk, including:

- Smoking
- Obesity
- High blood pressure
- Diabetes
- Stroke
- History of heavy alcohol use
- Heart disease
- Poor lung function

3. You Might Reveal Something Personal

Another fear is that you'll start blabbing personal secrets to your doctors and nurses. The reality is that patients don't tend to say much that's all that exciting after the drugs hit. It's far more likely you'll feel confused or start laughing rather than reveal earth-shattering secrets.

4. Local Anesthesia Isn't as Risky

There is always some risk, however small. But there's no reason to think general anesthesia is any more dangerous than local anesthesia. The key is making sure the anesthesia application matches the patient and the procedure.

Trouble can occur, for example, if local anesthesia is used for a surgery better suited for general anesthesia. This sometimes happens when a patient insists on local anesthesia. This could turn into a dangerous situation if the patient is getting an inadequate level of anesthesia for the procedure.

There also are situations where patients are too fragile for general anesthesia. In those cases, doctors will try to minimize the anesthesia.

5. Tolerating Pain Will Help You Heal Faster

The idea that pain is a necessary part of healing pops up from time to time in various medical situations. But research shows that patients experience multiple benefits from the pain reduction provided by anesthesia.

Nerve blocks that reduce surgical pain can significantly reduce the need for potentially addictive narcotics. With less pain, patients can start rehab faster. And if they feel comfortable, they're more likely to follow their surgeon's instructions.

6. Redheads Require More Anesthesia

Over the years, there has been considerable debate among researchers about whether or not redheads need more anesthesia. The notion has not been proven to be true, though it is rooted in findings that suggests people with red hair may experience pain differently.

Far more important, however, are a range of factors unique to each patient. These include body weight, ideal body weight, the surgery, expected duration and complexity of the procedure.

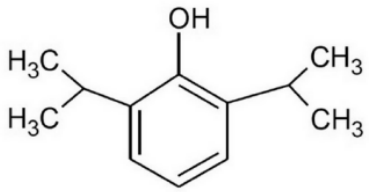
7. The Anesthesiologist Doesn't Stay in the Room

Rest assured that a member of the anesthesia care team will be at your side 100% of the time. This could be the physician or an advanced practice provider.

LITERATURE SURVEY :

A number of studies have investigated the long-term impacts of anesthesia on the human body. Early research focused primarily on the cognitive effects, particularly in older adults, where instances of post-operative cognitive dysfunction (POCD) were reported. Recent studies have expanded to include physical side effects, such as impacts on the cardiovascular system, and emotional disturbances like anxiety and depression post-surgery.
Some research suggests that the type of anesthetic administered, patient age, and pre-existing conditions may influence the severity of these effects. However, conflicting findings make it difficult to generalize these results. This section discusses the current state of knowledge, including key studies and findings.

DRUG PROFILE

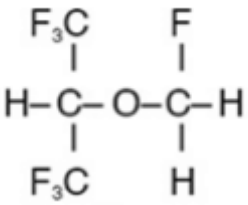


C12H18O Empirical formula of propofol is C 12 H 18 O, with two isopropyl groups positioned on each side of a hydroxyl group in the ortho position on a phenol ring. The molecule is highly lipophilic, and miscibility can only be achieved in lipophilic substances or organic solvents.

Clinical data

Drug class	GABA receptor agonist; sedative; hypnotic
ATC code	N01AX10 (WHO)
Legal status	
Legal status	AU : S4 (Prescription only) BR : Class C1 (Other controlled substances) CA : ℞-only UK : POM (Prescription only) US : ℞-only In general: ℞ (Prescription only)

CHEMICAL FORMULA OF SEVOFLURANE



The IUPAC name for sevoflurane is 2,2,2-trifluoro-1-[trifluoromethyl]ethyl fluoromethyl ether:

Chemical Formula	$C_4H_3F_7O$
Molecular Weight	200.0548 g/mol
IUPAC Standard InChI	InChI=1S/C4H3F7O/c5-1-12-2(3(6,7)8)4(9,10)11/h2H,1H2
IUPAC Standard InChIKey	DFEYYRMXOJXZRJ-UHFFFAOYSA-N
CAS Registry Number	28523-86-6

Sevoflurane is a volatile, non-flammable inhalation anesthetic that's commonly used in children because of its sweet odor and rapid induction and recovery of anesthesia.

AIM AND OBJECTIVE :

- The primary aim of this paper is to investigate the long-term post-operative effects of anesthesia on the human body, specifically addressing the myths and facts related to cognitive, physical, and emotional consequences. The objective is to conduct a comprehensive review of the literature, examine the drug profiles of commonly used anesthetics, and provide a clear analysis of the potential side effects based on scientific evidence.
- The primary goal of general anesthesia is to render a patient unconscious and unable to feel painful stimuli while controlling autonomic reflexes.there are five main classes of anesthestic agents: intravenenous (IV) anesthetics,inhalational anesthetics,IV sedatives,synthetic opioids,and neuromuscular blocking drugs.
- Anesthesia is a medical intervention that prevent patient from feeling pain during procedures like surgery ,certain screening and diagnostics tests,tissue sample removal (eg.skin biopsies),and dental work.

PLAN OF WORK :

The plan for this research includes the following steps:

1. Conduct a thorough literature survey on the effects of anesthesia.
2. Analyze the drug profiles of the most commonly used anesthetics.
3. Study the reported long-term physical, cognitive, and emotional effects of anesthesia.
4. Compare reported effects with scientific evidence to separate truth from myth.
5. Summarize the findings and propose recommendations for future research and clinical practice.

EXPERIMENTAL WORK :

This review is based on an extensive survey of clinical and experimental studies available in peer-reviewed journals. The selected studies focus on various aspects of anesthesia, including its short-term and long-term effects, pharmacokinetics, and patient outcomes.

In addition to clinical studies, this work also examines animal models and case studies that explore the impact of anesthetic agents on the nervous system, cardiovascular function, and recovery time. While this paper does not include primary experimental data, it integrates findings from multiple sources to present a cohesive analysis.

RESULT AND DISCUSSION :

The reviewed studies indicate that while short-term effects of anesthesia, such as grogginess and temporary cognitive dysfunction, are well-documented, the long-term impacts remain a topic of debate. Some studies, particularly in older adults, suggest a link between anesthesia and prolonged cognitive decline, while others find no significant correlation.

Additionally, emotional disturbances like anxiety and depression have been reported in some cases, but it remains unclear whether these effects are directly attributable to anesthesia or other factors related to surgery and recovery. The cardiovascular and respiratory systems are also areas of concern, especially in patients with pre-existing conditions.

SUMMARY AND CONCLUSION :

This paper has reviewed the current understanding of the long-term effects of anesthesia. The evidence suggests that while there are certain risks associated with anesthetic agents, the most severe long-term effects are relatively rare and often related to individual patient factors. The myths surrounding anesthesia and its long-term consequences are largely unfounded, though more research is needed to fully understand its effects on vulnerable populations.

FUTURE SCOPE :

Future research should focus on identifying patient-specific risk factors that may contribute to adverse long-term outcomes following anesthesia. Further clinical trials are needed to investigate the interaction between anesthetic agents and other medications, particularly in elderly patients or those with pre-existing conditions.

Technological advancements in anesthesia delivery systems and the development of safer anesthetic agents may reduce the potential for long-term side effects, but continued vigilance is necessary.

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