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A DETAILED REVIEW ON ANESTHESIA AND ITS CLASSIFICATION

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ABSTRACT:

Anesthesia is the use of medicine to prevent the feeling of pain or another sensation during surgery or other procedures that might be painful given as an injection or through inhaled gases or vapours, different types of anesthesia affect the nervous system in various ways by blocking nerve impulses and therefore, pain. In today hospitals and surgery centers, highly trained professionals use a wide variety of safe modern medication and extremely capable monitoring technology. An anesthesiologist is a doctor who specializes in giving and managing anesthetics – the medications that numb an area of the body the help you and stay asleep. Anesthesia uses drugs called anesthetics to keep you form feeling pain during medical procedures. Local and regional anesthesia numbs a specific area of your body. General anesthesia makes you temporarily unconscious (full asleep) so you can have more invasive surgeries.

KEY WORDS: Anesthesia, General, Local, Regional, sedation, therapeutic effects, uses.

INTRODUCTION:

Anesthesia usually involves a loss of memory and awareness, along with insensitivity to painful stimuli, during a surgical procedure. Many drugs aid anesthesiologists in the management and comfort of their patients during the perioperative period. [1]

The founder of Modern Anesthesia is discussed by William T.G. Morton [1819-1868]. A young Boston Dentist Dr. Morton had been in the search for a better agent than what had been used by many dentists: nitrous oxide Dr. Morton's tenacity driven by enthusiasm and discovery he and renowned surgeon at Massachusetts General Hospital by John Collins Warren [1778-1856] made history on October 16, 1846 with the first successful surgical procedure performed with anesthesia. [2] The first administration of ether anesthesia in India was on Monday, 22nd March, 1847 in the Medical College Hospitals, Calcutta under the supervision of Dr. O'Saughnessy, the surgeon. [2] Sushrutha thus can be qualified to be called the 'Father of Anesthesiology'. [2] Dr. Leslie Hall known as the

'Father of Veterinary Anesthesia'. One of the first accounts of an endotracheal tube being used for an airway comes from the pediatrician Joseph O'Dwyer [1841-1898]. He used the metal "O'dwyer" tubes in diphtheria cases and passed them into the trachea blindly adding a cuff to the tube is created to Arthur guedel [1883-1956] and Ralph M. Waters [1883-1979] in 1932. This addiction suddenly gave the practitioner the ability to provide a positive pressure ventilation. The anesthesiologist chevalier jackon [1865-1958] promoted his hand-held laryngoscope for the insertion of endotracheal tubes and its popularity quickly caught hold. Sir Robert Reynolds Macintosh's [1897-1989] break through technique of direct laryngoscopy come after been appointed Nuffield professor of anesthetics at the university of oxford in 1937. [2]

CLASSIFICATION:

There are four types of Anesthesia:

A]. General Anesthesia.

B]. Local Anesthesia.

C]. Regional Anesthesia.

D]. Sedation.

A] GENERAL ANESTHESIA:

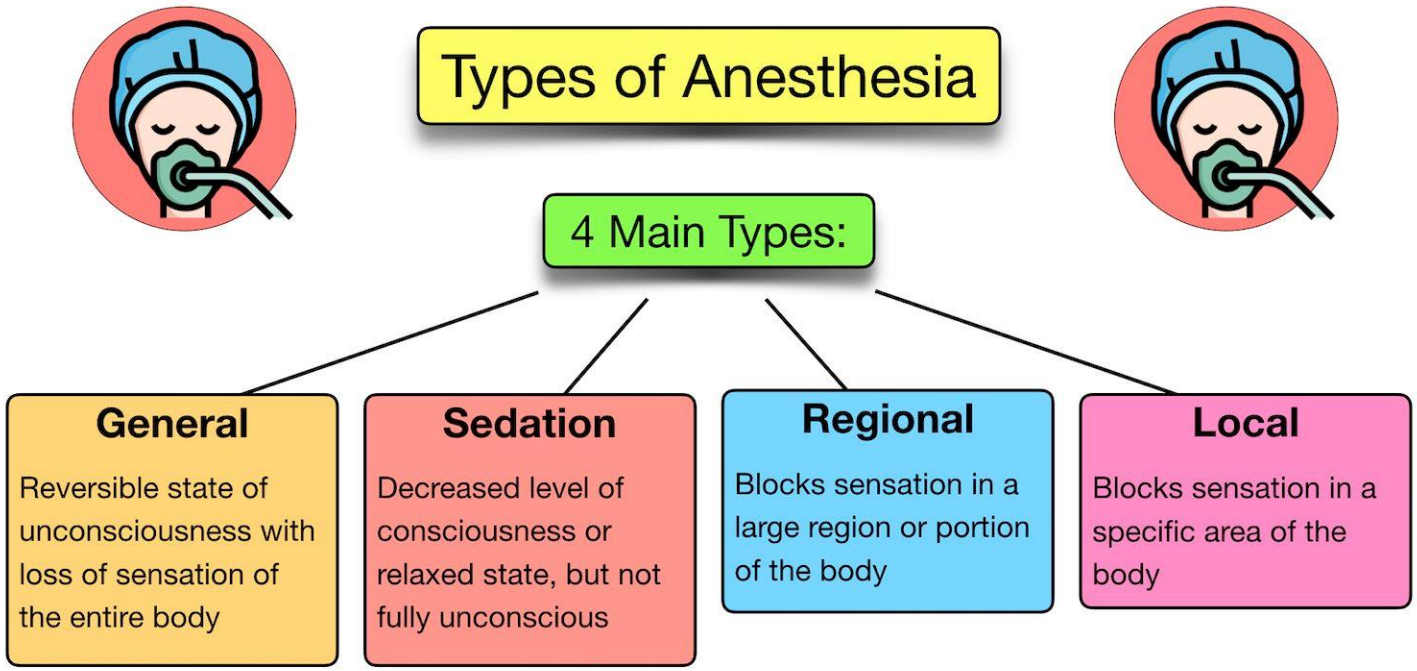

Fig. No 1 Types of anesthesia.

General anesthesia is a state of controlled unconsciousness. During a general anesthesia medicines are used to send you to sleep so you are unaware of surgery and do not move or feel pain while it's carried out. [1]

There are two types of general anesthesia:

1. Intravenous Agents.
2. Inhalation Agents.

1.Intravenous Agents:

Intravenous agents, such as, Propofol and Etomidate, act on the GABA receptor to induce rapid and reversible anesthesia. These drugs are commonly used for induction and maintenance of anesthesia in surgical procedures. Adverse effects include respiratory depression, hypotension and potential allergic reactions. [1]

2.Inhalation Agents:

Inhalation agents, such as, Sevoflurane and Isoflurane, exert their effects by enhancing GABAerigc neurotransmission in the brain. These drugs are administered via inhalation and are used for maintenance of anesthesia during surgery. Side effects may include Myocardial Depression, Respiratory Depression and Malignant Hyperthermia.

Overall understanding the pharmacology of intravenous and inhalation agents is crucial for anesthesiologists and healthcare providers to ensure safe and effective administration of general anesthesia in clinical practice. [1]

B] LOCAL ANESTHESIA:

Local anesthesia is a medication that causes absence of all sensation in a specific body part without loss of consciousness providing local anesthesia as opposed to general anesthetic which eliminates all sensation in the entire body and causes unconsciousness. [3]

There are two types of Local Anesthesia:

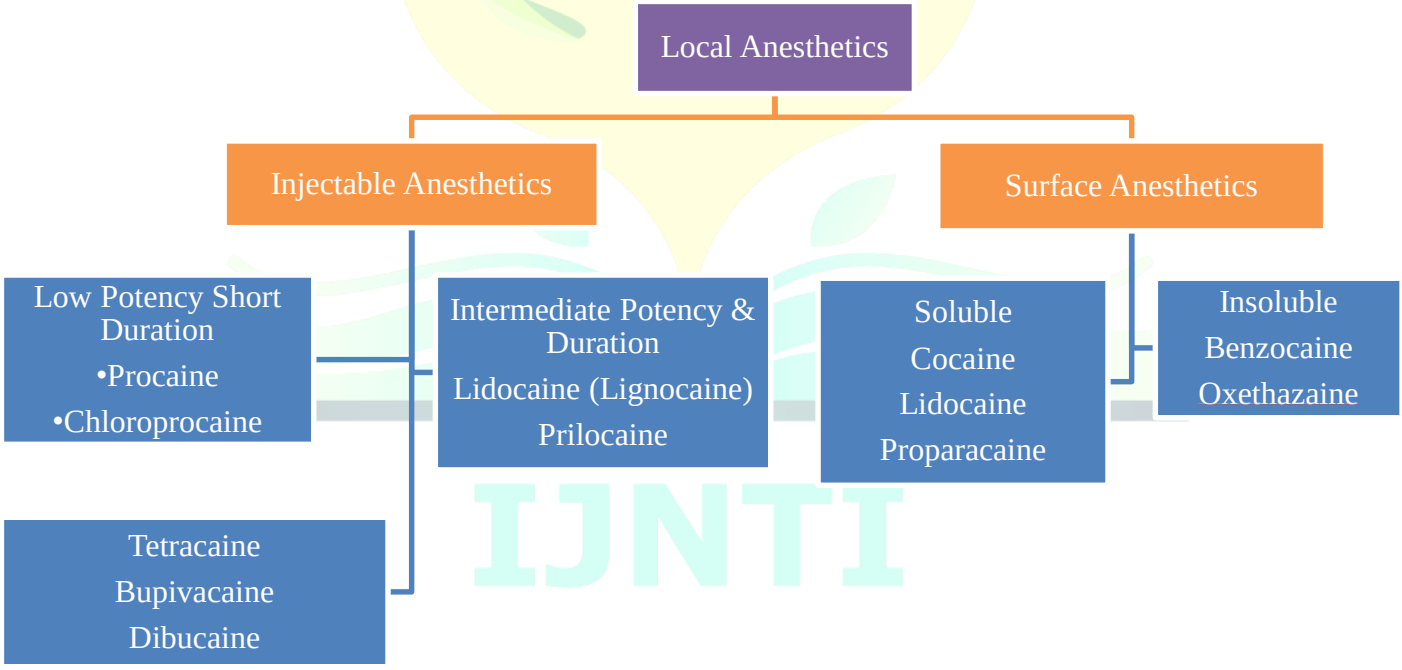

Fig no. 02 Local Anesthetics

Types of local anesthesia:

1.Inejctable anaesthesia

2.surface anesthesia

1.Inejctable Anesthesia:

Local anesthesia, also called local anesthetic, is usually a one-time injection of medicine that numbs a small area of the body. It is used for procedures such as performing a skin biopsy or breast biopsy, repairing a broken bone, or stitching a deep cut. [3]

2.Surface Anesthesia:

Topical anesthesia is defined as superficial loss of sensation in conjunctiva, mucous membranes, or skin, produced by direct application of local anesthetic solutions, ointments, gels or sprays. [3]

C] REGIONAL ANESTHESIA

Regional anesthesia consists of infiltrating a peripheral nerve with an anesthetic agent and blocking transmission to avoid or relieve pain. It differs from general anesthesia as it does not affect the patient's consciousness level to relieve pain. [4]

Types of regional anesthesia:

1.Epidural anesthesia

2.peripheral nerve blocks

3.Spinal anesthesia

1.Epidural Anesthesia: We typically use an epidural during labor and delivery of a child, as well as during and after other surgeries. We inject a medication that reduces sensation (local anesthetic) into your lower back. Then we insert a small tube (epidural catheter) to deliver a continuous infusion of medication. [4]

2.Peripheral Nerve Blocks: We may administer a peripheral nerve block for surgeries on your upper and lower extremities, trunk (abdomen and chest) and major joints (hip, knee, shoulder or ankle). We inject medication near a nerve, which blocks pain in the part of your body connected to that nerve. We provide a regional anesthetic for pain relief following rib fractures, hip fractures and acute burn injuries. [4]

3.Spinal Anesthesia: We use spinal anesthesia (spinal blocks) for surgery below your waist, including Cesarean sections, gynecologic surgery, orthopedic surgery, urologic surgery and vascular surgery. We inject medication into the fluid near your spinal cord, which numbs the bottom part of your body. [4]

D] SEDATION:

Today, physicians have many ways to make sure their patients are as comfortable as possible during surgery or procedures for diagnosing medical conditions. One common type of pain control is called sedation, which relaxes you and sometimes makes you fall asleep. Sedation, also known as monitored anesthesia care, conscious sedation, or twilight sedation, typically is used for minor surgeries or for shorter, less complex procedures, when an injection of local anesthetic isn't sufficient but deeper general anesthesia isn't necessary. These procedures might include some types of biopsies or involve the use of a scope to examine the throat or colon to find and treat medical conditions such as cancer.

An analgesic is a medication used to achieve analgesia, or pain relief, and is often combined with sedation. Procedures using sedation and analgesics may be performed in a hospital or in an outpatient setting, such as a same-day surgery center, your physician's office, or a dentist's office. [5]

Types of Sedation:

The main groups of sedatives include:

A. Benzodiazepines.
B. Barbiturates.
C. Hypnotics (nonbenzodiazepines).
D. Miscellaneous sedatives.

Benzodiazepines- Benzodiazepines are depressant drugs that slow down the messages that travel between your brain and your body. Healthcare providers mainly prescribe them for anxiety disorders, insomnia and seizures.

Examples of benzodiazepines include:

A. Alprazolam
B. Flurazepam
C. Triazolam

2.Barbiturates

Barbiturates are medications that cause you to relax or feel drowsy. They can also stop or prevent seizures. The most common uses are for anesthesia purposes and treating seizures and insomnia.

Examples of barbiturates include:

A. Methohexital
B. Pentobarbital
C. Phenobarbital

3.Hypnotics (nonbenzodiazepines)

These are medications that mimic hypnotic effects and work similarly to benzodiazepines, but they aren't the same. These drugs are most effective in treating insomnia and related sleep disorders. They include:

A. Eszopiclone
B. Zaleplon
C. Zolpidem

Providers sometimes call these "Z-drugs."

4.Miscellaneous sedatives

Other sedative medications that don't fit into the other categories include:

A. Ramelteon: This is a melatonin agonist medication that helps treat insomnia.
B. Suvorexant: This is an orexin antagonist medication that helps treat insomnia. Orexin is a neuropeptide that regulates arousal, wakefulness and appetite.

Opioids also have mild sedative effects. Providers may use them alongside benzodiazepines for added sedation.

MECHANISM OF ACTION:

A]. General Anesthesia:

1. Absorption: General anesthetics can be administered through various routes such as inhalation, intravenous injection, or oral administration. The route of administration affects how quickly and efficiently the drug is absorbed into the bloodstream. For example, inhalational anesthetics like sevoflurane or desflurane are absorbed through the lungs, while intravenous anesthetics like propofol or opioids are directly injected into the bloodstream for rapid absorption.

2. Distribution: Once absorbed into the bloodstream, general anesthetics are distributed throughout the body to reach their target sites such as the brain. The distribution of anesthetic drugs is influenced by factors like blood flow, protein binding, and lipid solubility. Lipid-soluble drugs tend to cross the blood-brain barrier more easily and exert their effects on the central nervous system.

3. Metabolism: Anesthetics undergo metabolism in the liver or other tissues to break them down into metabolites that are usually less active or more easily excreted from the body. The liver enzymes metabolize many anesthetic drugs, and the rate of metabolism can vary based on individual differences, genetic factors, and other medications being taken concurrently.

4. Excretion: After metabolism, the metabolites and any unchanged drug molecules are eliminated from the body through excretion processes like renal (via urine) or hepatic (via bile) excretion. The kidneys play a crucial role in eliminating water-soluble metabolites through urine, while drugs metabolized in the liver are often excreted in bile and eliminated through feces.

5. Factors affecting ADME: Several factors can influence the ADME of general anesthetics, including age, gender, genetics, organ function (e.g., liver and kidney), concurrent medications, and underlying health conditions. For example, elderly patients may have reduced hepatic and renal function, leading to slower metabolism and excretion of anesthetic drugs. Additionally, genetic variations in drug-metabolizing enzymes can affect the rate at which anesthetics are broken down in the body.

6. Drug interactions: General anesthesia is often administered as a combination of different drugs to achieve the desired effects such as unconsciousness, analgesia, and muscle relaxation. Drug interactions can affect the ADME of these agents by altering their absorption, distribution, metabolism, or excretion. Healthcare providers need to be aware of potential drug interactions to avoid adverse effects and ensure optimal anesthesia delivery.

7. Pharmacokinetic properties: An understanding of the pharmacokinetic properties of general anesthetics is essential for dosing and titration. Pharmacokinetic parameters such as half-life, clearance, volume of distribution, and plasma protein binding determine the drug's concentration in the body over time. These parameters influence the onset, duration, and intensity of anesthesia and help guide anesthesia management during surgery.

8. Individual variability: Individual patients may exhibit variability in their response to general anesthesia due to differences in ADME processes. Some patients may metabolize anesthetics more quickly or slowly than others, leading to variations in drug effectiveness and duration of action. Personalized medicine approaches aim to account for individual variability in ADME to optimize anesthesia outcomes and minimize risks for patients.

In conclusion, a thorough understanding of the ADME of general anesthesia is essential for safe and effective anesthesia delivery in clinical practice. Healthcare providers must consider factors such as absorption, distribution, metabolism, and excretion when selecting and administering anesthetic agents to ensure optimal patient outcomes during surgical procedures. Research into individual variability, drug interactions, and pharmacokinetic properties continues to advance our understanding of general anesthesia and improve anesthesia practice.

Induction and maintenance of general anesthesia, and the control of the various physiological side effects is typically achieved through a combinatorial drug approach. Individual general anesthetics vary with respect to their specific physiological and cognitive effects. While general anesthesia induction may be facilitated by one general anesthetic, others may be used in parallel or subsequently to achieve and maintain the desired anesthetic state. The drug approach utilized is dependent upon the procedure and the needs of the healthcare providers. [6]

It is postulated that general anaesthetics exert their action by the activation of inhibitory central nervous system (CNS) receptors, and the inactivation of CNS excitatory receptors. The relative roles of different receptors are still under debate, but evidence exists for particular targets being involved with certain anesthetics and drug effects. [6]

Below are several key targets of general anesthetics that likely mediate their effects:

$GABA_A$ receptor agonists

- $GABA_A$ receptors are chloride channels that hyperpolarize neurons and function as inhibitory CNS receptors. General anesthetics that agonize them are typically used to induce a state of sedation and/or unconsciousness. Such drugs include propofol, etomidate, isoflurane, benzodiazepines (midazolam, lorazepam, diazepam), and barbiturates (sodium thiopental, methohexital). [6]

NMDA receptor antagonists

- Ketamine, an NMDA receptor antagonist, is used primarily for its analgesic effects and in an off-label capacity for its anti-depressant effects. This drug, however, also alters arousal and is often used in parallel with other general anesthetics to help maintain a state of general anesthesia. Administration of ketamine alone leads to a dissociative state, in which a patient may experience auditory and visual hallucinations. Additionally, the perception of pain is dissociated from the perception of noxious stimuli. Ketamine appears to bind preferentially to the NMDA receptors on GABAergic interneurons, which may partially explain its effects. [6]

Two-pore potassium channels (K_{2P}s) activation

- Two-pore potassium channels (K_{2P}s) modulate the potassium conductance that contributes to the resting membrane potential in neurons. Opening of these channels therefore facilitates a hyperpolarizing current, which reduces neuronal excitability. K_{2P}s have been found to be affected by general anesthetics (esp. halogenated inhalation anesthetics) and are currently under investigation as potential targets. The K_{2P} channel family comprises six subfamilies, which includes 15 unique members. 13 of these channels (excluding TWIK-1 and TWIK-2 homomers) are affected by general anesthetics. While it has not been determined that general anesthetics bind directly to these channels, nor is it clear how these drugs affect K_{2P} conductance, electrophysiological studies have shown that certain general anesthetics result in K_{2P} channel activation. This drug-elicited channel activation has been shown to be dependent upon specific amino-acids within certain K_{2P} channels (i.e. TREK-1 and TASK channels). In the case of TREK-

1, activation was shown through an anesthetic perturbation to membrane lipid clusters and activation of phospholipase D2; direct binding of anesthetics to purified reconstituted TREK-1 had no effect on conductance. [6] The effects of certain general anesthetics are less pronounced in K_{2P} knock-out mice, as compared to their wild-type counterparts. Cumulatively, TASK-1, TASK-3, and TREK-1 are particularly well supported as playing a role in the induction of general anesthesia. [6]

B]. Local Anesthesia:

1. Absorption: Local anesthetics can be administered through various routes, such as topical application, injection, or in some cases, mucosal administration. The absorption of local anesthetics depends on factors like the site of administration, the vascularity of the tissue, the presence of epinephrine (which can reduce blood flow and delay absorption), and the lipid solubility of the drug.

2. Distribution: Once absorbed, local anesthetics undergo distribution throughout the body. Factors like protein binding, lipid solubility, and tissue perfusion influence the distribution of these drugs. Local anesthetics are known to cross the blood-brain barrier to some extent, but they primarily act locally at their target site.

3. Metabolism: Local anesthetics are metabolized in the liver through various enzymatic pathways. The primary metabolism of most local anesthetics involves hepatic cytochrome P450 enzymes, particularly the CYP1A2 and CYP3A4 isoforms. Metabolism of local anesthetics can lead to the formation of active or inactive metabolites, which can undergo further conjugation processes before being excreted from the body.

4. Excretion: After metabolism, local anesthetics and their metabolites are primarily excreted through the kidneys. They can be eliminated in urine either unchanged or as metabolites. The rate of excretion is influenced by factors such as renal function, pH of urine (which can affect the ionization of the drug), and the drug's molecular weight and lipophilicity.

In the case of local anesthetics, their pharmacokinetic properties can impact their onset, duration, and intensity of action. Factors that affect the ADME of local anesthetics include the specific drug being used, the administration route, the dose, and individual patient characteristics such as age, weight, liver function, and renal function.

It is important for healthcare providers to consider the ADME properties of local anesthetics when prescribing these drugs to ensure optimal therapeutic outcomes and minimize the risk of adverse effects. Monitoring of patients and adjusting dosages based on individual factors can help in achieving the desired analgesic effect while minimizing the potential for systemic toxicity.

Local anesthetics are drugs that reversibly block the conduction of impulses in the peripheral nerve system, inhibiting the excitation-conduction process [1,2]. Most synthetic compounds with local anaesthetic activity have a common basic structure (Fig. 1) in which an aromatic ring is connected to an amine group by an intermediary chain. The amine group can be protonated, and local anaesthetics present an equilibrium between the uncharged (A:), and the charged (AH ÷) forms:

AH+~--A: +H + (1) where the relative amount of each form depends on the dissociation constant (Ka) of the compound and the pH of the solution. The solution prepared for local anaesthesia from hydrochloride salts is commonly acidic, which increases the drug solubility since the charged form is predominant. After injection, the

buffering system in the tissue increases the pH of the solution and equilibrium is readily established in the extracellular fluid. It is proposed that both charged and uncharged forms of local anaesthetics are important for their action in excitable cells [3-8]. In the early 1970s, by studying the effect of pH with tertiary compounds, Narahashi et al. [5] concluded that local anaesthetics peneti'ate the nerve membrane in the uncharged form and block the action potential from inside the membrane in the charged form. This theory was confirmed with experiments in which quaternary analogs [6-8] of local anaesthetics were applied to either inside or outside the axon in single nerve preparation. These analogs are permanently [7]

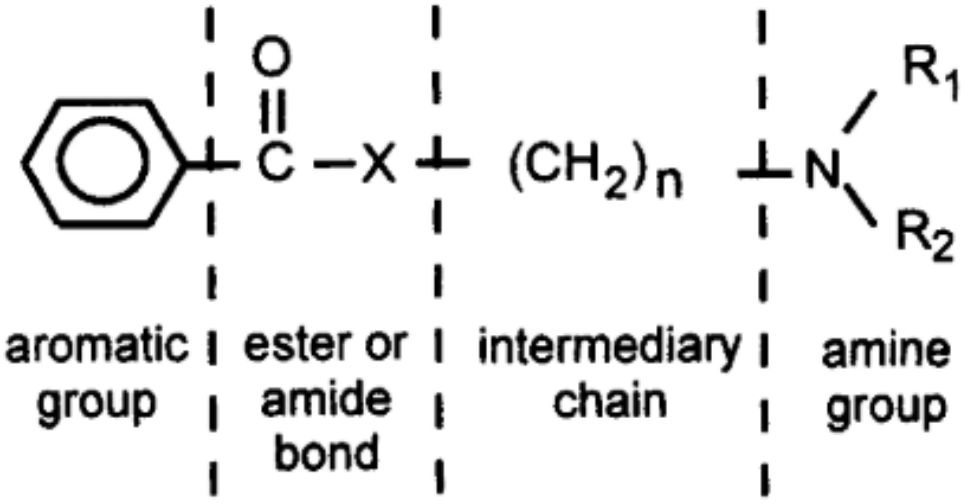

Fig no 03. Basic Strucure of local anesthetics

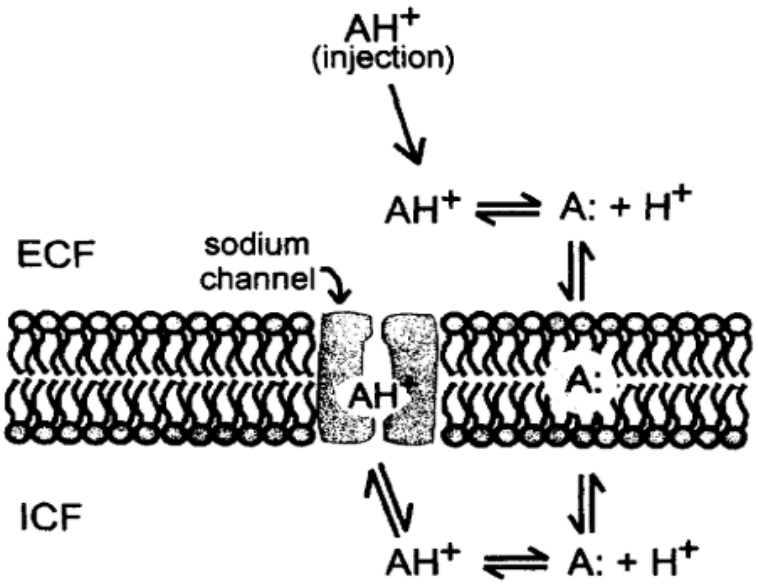

Fig no. 04 schematic representation of the mechanism of action of local anaesthetics

ionized and, consequently, they are not able to diffuse across the cell membrane, since the lipid bilayer represents a hydrophobic barrier for the charged compound. Thus, when applied outside the nerve cell, these quaternary analogs had no local anaesthetic activity, while when perfused inside the axon they were very active. Figure 2 summarizes this mechanism showing that the uncharged form is necessary to diffuse to the axoplasm where equilibrium (Eq. (1)) is reestablished, and the charged form binds to the sodium channel from the inside of the axon. [7]

C]. Regional Anesthesia:

It is considered that the anesthetic solution administered according to the regional intravenous anesthesia method will be non-uniformly dispersed due to the valvular system of the veins, the competence and disposition of which varies from one individual to the other. The anesthetic solution will progress to the level of venous capillaries, but will penetrate the tissues of the blood-deprived segment in variable concentrations. The anesthetic will pass from the venous network to the extravascular space in large amounts and this is facilitated by the vasodilatation, increased vascular permeability, and the increased number of functional capillaries. The anesthetic drug when present at the level of the cells will exert its action on the cellular membrane by a process which is facilitated by low pH and hypercapnia decreasing excitability and conduction in the nerves. The anesthetic solution will exert its action both at the level of the trunk and at the level of the peripheral nerve endings. However, the major effects occur at the periphery, while trunk blockade is secondary and mostly due to consecutive ischemic modifications. [8]

D]. Sedation Anesthesia:

1. Absorption: This refers to how the sedative drug gets into the bloodstream after administration. The route of administration (oral, intravenous, inhalation, etc.) affects the absorption rate and bioavailability of the drug.

2. Distribution: Once in the bloodstream, sedative drugs are distributed throughout the body to reach their target sites, such as the brain for sedation effects. Factors like protein binding and tissue permeability can influence drug distribution.

3. Metabolism: Sedative drugs are often metabolized in the liver through various enzymatic pathways. Metabolism can affect the duration of action, potency, and potential side effects of the drug.

4. Excretion: After metabolism, sedative drugs are eliminated from the body through processes like renal (kidney) excretion or biliary excretion. The rate of excretion determines the drug's half-life and how long it remains active in the body.

Understanding the ADME properties of sedative drugs helps pharmacologists and clinicians optimize dosing regimens, predict drug interactions, assess potential side effects, and ensure therapeutic efficacy while minimizing adverse outcomes.

Your ability to make decisions and judgements may be affected for up to 24 hours after your treatment, so you should not make any important decisions during that time. You should avoid posting on social media/public forums too. You should not return to work, look after dependants, drive, cook or operate any machinery for 24 hours as it may take this length of time for the drugs to leave your body. You should not take any alcohol or sleeping tablets for 24 hours after the procedure. Your doctor will give written instructions about further treatment to follow at home. The hospital will give you a contact telephone number to call if you feel unwell at home. If after the procedure you are concerned, feel unwell, or cannot find the hospital contact number, you can call your GP, ring 111 or go to your local accident and emergency department with a capable adult if necessary. [9]

Sedation and analgesics are usually provided through an IV placed in a vein. Depending on the procedure, the level of sedation may range from minimal (you'll feel drowsy but able to talk) to deep (you probably won't remember the procedure). Moderate or deep sedation may slow your breathing, and in some cases, you may be given oxygen. Analgesia may also contribute to drowsiness. But even with deep sedation, you won't be unconscious, as you would be with general anesthesia.

Even with deep sedation, you won't be unconscious, as you would be with general anesthesia.

Most patients wake up quickly once the procedure is over and the medications are stopped. Possible side effects include headache, nausea, and drowsiness, but you will likely experience fewer effects than you would from general anesthesia — and you'll probably recover faster and go home sooner.

Sometimes IV sedation and analgesics will be combined with other types of pain control — such as local anesthesia, which involves one or more injections to numb a small area of the body, or regional anesthesia, which numbs a larger part of the body, such as from the waist down. [9]

ADEVERSE EFFECT:

A]. General Anesthesia

This deals with the adverse reactions associated with general anaesthetic agents in current use. These reactions fall into 2 categories; those which are more common, predictable and often closely related, and those which are rare, unpredictable and carry a high mortality. Both inhalational and intravenous anaesthetic agents affect the central nervous and cardio-respiratory systems in a dose-related manner. Neuronal inhibition results in decreasing levels of consciousness and depression of the medullary vital centres which can lead to cardiorespiratory failure. Both groups of agents have some depressant effect on the myocardium and vascular smooth muscle leading to a fall in cardiac output and hypotension. Centrally-mediated respiratory depression is common to both groups and the inhalational agents have a direct 242mount on lung physiology. The most important idiosyncratic reactions to the volatile agents are malignant hyperpyrexia and 'halothane hepatitis'. Malignant hyperpyrexia has an incidence of 1:12,000 with a mortality of about 24%. It is triggered most often by halothane together with suxamethonium. Post halothane hepatic necrosis is rare. Evidence points to 2 distinct syndromes; direct toxicity from the products of reductive metabolism, and a more serious illness, immunologically mediated via haptens formed by liver proteins and the products of oxidative metabolism. Prolonged nitrous oxide exposure can cause bone marrow depression and life-threatening pressure effects by expansion of air-filled spaces within the body. The idiosyncratic reactions to the intravenous agents include anaphylactoid reactions (which are rare) and triggering of acute porphyria. Etomidate is immunologically 'clean', but it inhibits cortisol synthesis. [10]

B]. Local Anesthesia:

Local anaesthetics are responsible for 5 to 10% of all reported adverse reactions to anaesthetic drugs. Adverse effects may be classified as: (a) those associated directly with blocking ion channels in cell membranes, such as cardiovascular and CNS toxicity; (b) those due to other effects of drug or vehicle (mainly peripheral nerve complications); (c) allergic reactions (often a mistaken diagnosis); and (d) mechanical or other effects of technique, such as needle trauma or introduction of infection. Signs and symptoms of CNS toxicity include convulsions, followed by coma and respiratory depression. Convulsions are due to disinhibition of nervous conduction, probably by an action at the gamma-aminobutyric acid (GABA) receptor complex, while depressant effects, which predominate at higher doses, are due to blockade of sodium channels. CNS toxicity is potentiated by hypoxia and hypercapnia, so acute management must 242 mmune242z these Cardiovascular toxicities also involves sodium channel blockade, reducing contractility and interfering with conduction. Bupivacaine differs from lidocaine (lignocaine) in the sudden occurrence of dangerous ventricular arrhythmias including fibrillation at subconvulsant doses. Ropivacaine is a newer amide local anaesthetic with toxicity intermediate between these but potency similar to bupivacaine. Neurotoxic complications leading to prolonged deficit after intraspinal administration are uncommon. Causes are multifactorial, and include pH of and additives to preparations. Allergic

reactions account for only 1% of untoward reactions, but anaphylactoid collapse can be lifeth-reatening and requires rapid and effective management. [11]

C]. Regional Anesthesia:

Complications of regional anesthesia has been 243mmune243zed from very long time. Fortunately, serious complication is rare. Safe, effective practice of neuraxial anaesthesia requires a detailed knowledge of potential complications, their incidence and risk factors associated with their occurrence. The incidence of complication was higher for spinal than for epidural anaesthesia. These complications being rare, so existing studies are mainly retrospective, providing information about incidence and their associations but not necessarily demonstrate causality. [11]

There are many areas of controversies regarding the usage of regional anaesthesia i.e. in outpatient surgical procedures, epidural test dose, its safety in infected / febrile / 243mmune compromised patients, / in patients with neurological disorder and in patients receiving anti-coagulants. Recommendations proposed may be acceptable based on the judgment of the responsible anaesthesiologist. The consensus statements are designed to encourage safe and quality patient care but cannot guarantee a specific outcome. [11]

D]. Sedation:

a) Drowsiness impaired concentration , and mental and physical sluggishness.
b) The CNS depressant effects of barbiturates synergize with those of ethanol.
c) Hypnotic doses of barbiturates produce a drug “hangover” that may lead to impaired ability to function normally for many hours after waking.
d) Respiratory depression.
e) Tolerance.
f) Many drug intraction .
g) Driving /Psychomotor skills.
h) Ataxia occurs at high doses.

SIDE EFFECTS:

A]. General Anesthesia:

General anaesthetics have some common side effects. Your anaesthetist should discuss these with you before your surgery.

Most side effects happen immediately after your operation and do not last long. Possible side effects include:

1. Feeling sick or being sick (vomiting) – this usually happens immediately, although some people may continue to feel sick for up to a day
2. Shivering and feeling cold – this may last a few minutes or hours
3. Confusion and memory loss – this are more common in older people or those with existing memory problems; it’s usually temporary, but occasionally can be longer lasting
4. Bladder problems – you may have difficulty passing urine
5. Dizziness – you will be given fluids to treat this

6. Bruising and soreness – this may develop in the area where you were injected or had a drip fitted; it usually heals without treatment
7. Sore throat – during your operation, a tube may be inserted either into your mouth or down your throat to help you breathe; afterwards, this can cause a sore throat
8. Damage to the mouth or teeth – a small proportion of people may have small cuts to their lips or tongue from the tube, and some may have damage to their teeth; you should tell your anaesthetist about any dental work you have had done. [12]

B]. Local Anesthesia:

Local anesthetics are generally very safe and serious problems are rare.

You may have:

1. Some discomfort when the injection is given
2. A tingling sensation as the medicine wears off
3. Possibly some minor bruising, bleeding or soreness where the injection was given
4.

Some people experience temporary side effects from a local anaesthetic, such as:

1. Dizziness
2. Headaches
3. Blurred vision
4. Twitching muscles or shivering
5. Continuing numbness, weakness or pins and needles
6. Finding it hard to pee or leaking pee (epidural)

These problems will usually pass, but you should tell the healthcare professional in charge of your care if you experience any.

In very rare cases, you could have an allergic reaction to the local anaesthetic or develop serious problems, such as fits (seizures) or a cardiac arrest (when the heart stops pumping blood around the body). [12]

C]. Regional Anesthesia:

Our anesthesiologists and CRNAs are experts in taking precautions to ensure safety and comfort. However, as with any kind of surgical or medical treatment, regional anesthesia may result in side effects. Regional anesthesia complications are rare but may include:

1. Decreased blood pressure
2. Mild itching
3. Headache
4. Allergic reaction to the local anesthetic

In the unlikely event of a side effect, your care team will closely monitor you and respond with quick treatment. [13]

D]. Sedation:

1. Sleepiness.
2. Dizziness.
3. Difficulty focusing or thinking.
4. Blurred vision.
5. Impaired depth perception.
6. Slowed reaction times and reflexes.
7. Not feeling pain the way you usually do.

THERAPEUTIC USES:

A]. General Anesthesia:

A. Makes it possible to have procedures that would be too painful or stressful to have while awake. This is the main benefit.

B. Allows your health care provider to control your breathing and your blood pressure. This can prevent problems during the procedure.

C. Can be given quickly in an emergency.

D. Can be reversed quickly when a procedure is over.

E. Can be continued for a long period of time. [14]

B]. Local Anesthesia:

Healthcare professionals will consider several factors when determining whether to use local, regional, or general anesthesia. Local anesthesia is generally suitable in the following situations:

A. The procedure is minor and does not require general or regional anesthesia.

B. The procedure is quite quick, and the person will not need to stay overnight.

C. There is no need to relax the muscles or for the person to be unconscious. [14]

D. Examples of procedures involving local anesthesia include dental surgery, biopsies, and the removal of a verruca, mole, or cataract. [14]

C]. Regional Anesthesia:

A. Pain can be eliminated during and after surgery
B. Postoperatively, this pain control can be extended for many hours or days, with use of an epidural or continuous catheter that is placed next to a nerve with infusion of local anesthetic.
C. With opioids being avoided, it prevents their side effects such as nausea, vomiting, and drowsiness coming into play
D. The lack of pain and reduction of side effects from the opioids can result in a shorter stay in the recovery room and decreases the chance of an unplanned admission to the hospital. [14]

D]. Sedation:

Healthcare providers prescribe sedatives for several different conditions, some of which include:

1. Anxiety disorders.
2. Seizures.
3. Panic disorders.
4. Sleep disorders, like insomnia.
5. Bipolar disorder.
6. Spasticity.

Providers also use specific sedatives to help achieve sedation for certain procedures and minor surgeries. They also use them as part of general anesthesia. [14]

CONCLUSION:

Anesthesia is one of the greatest discoveries of modern medicine—it made operations painless for patients. New surgeries were possible that would have been too traumatic to perform on an awake person. Today, many people every day get anesthesia for various reasons—at the dentist, for an operation at the hospital or a diagnostic procedure. Chances are, if you have not already, you will get anesthesia at least once in your life. However, anesthesia can also be risky in the wrong hands, as it affects all body functions including essential ones, such as breathing. Therefore, it is important that a trained anesthetist with good equipment looks after you during anesthesia. Like flying an airplane, anesthesia can be dangerous and complicated, but is also very safe when done correctly.

General anesthesia is very safe. However, as you have learned, there are some risks and possible complications. Let your doctors know of any new symptoms that you may have after your surgery. Most of the complications can be prevented through good communication. Make sure to inform your doctors and anesthesia team of all your medical conditions, medications, allergies and previous anesthetics. There are both major and minor risks of anesthesia. Examples of major risks include death, heart attack and pulmonary embolism whereas minor risks can include postoperative nausea and vomiting and readmission to hospital. The likelihood of a complication occurring is proportional to the relative risk of a variety of factors related to the patient's health, the complexity of the surgery being performed and the type of anesthetic. Of these factors, the person's health prior to surgery (stratified by the ASA physical status classification system) has the greatest bearing on the probability of a complication occurring. Patients typically wake within minutes of an anesthetic being terminated and regain their senses within hours. One exception is a condition called long-term post-operative cognitive dysfunction, characterized by persistent confusion lasting weeks or months, which is more common in those undergoing cardiac surgery and in the elderly. Anesthesia, given to patients to inhibit pain, sedates the body and also regulates various bodily functions in surgery and benefits the operator as well as the patient.

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