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RESEARCH ARTICLE

A CONCISE OVERVIEW OF ANESTHESIA

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Abstract

Anesthesia plays a vital role in modern surgical care by eliminating pain, consciousness, and movement during invasive procedures. This short communication provides a focused overview of anesthesia with special emphasis on general anesthesia, including its triad, commonly used drugs, phases, and stages. It also briefly introduces neuraxial and regional anesthesia techniques, which serve as alternatives or adjuncts to general anesthesia. A clear understanding of these concepts is essential for safe clinical practice and optimal patient outcomes in anesthesia management.

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Introduction:-

Anesthesia: A General Overview:-

Anesthesia is a medically induced and regulated condition of insensibility to pain that is frequently accompanied by loss of consciousness, muscle relaxation, and memory suppression. It allows healthcare personnel to perform surgical and diagnostic treatments on patients without giving them any distress or suffering. Anesthesia techniques are divided into four categories: general, regional, local, and sedation(1). The type and duration of surgery, the patient's health status, and the anticipated postoperative pain all influence the method of anesthesia used. Anesthesiology includes not only drug delivery, but also airway control, vital sign monitoring, fluid therapy, and resuscitation(2).

General Anesthesia:-

General anesthesia (GA) is a reversible drug-induced state that includes unconsciousness, memory loss, analgesia, and skeletal muscular relaxation. It is frequently used during major procedures when full loss of sensation and immobility is required. General anesthesia is obtained by combining intravenous and inhalational medications that work synergistically on the central nervous system. The procedure entails a careful balancing of numerous pharmacological substances to obtain the desired anesthetic effects while limiting negative outcomes(4). A foundational concept in general anesthesia is the anesthetic triad: hypnosis (loss of consciousness), analgesia (loss of pain sensation), and muscle relaxation (immobility)(4). This triad guides anesthetic drug selection and dosing strategies. Induction agents such as propofol, thiopental, etomidate, and ketamine are commonly used to initiate anesthesia. Among these, propofol is preferred for its rapid onset and antiemetic properties, while ketamine is useful in hemodynamically unstable patients due to its sympathomimetic effects. Opioids like fentanyl, morphine, and remifentanyl are essential for intraoperative pain control. Muscle relaxants such as rocuronium, vecuronium, and succinylcholine facilitate tracheal intubation and provide optimal surgical conditions. Inhalational agents like sevoflurane, isoflurane, and desflurane are used to maintain anesthesia and allow for easy depth titration(5,6).

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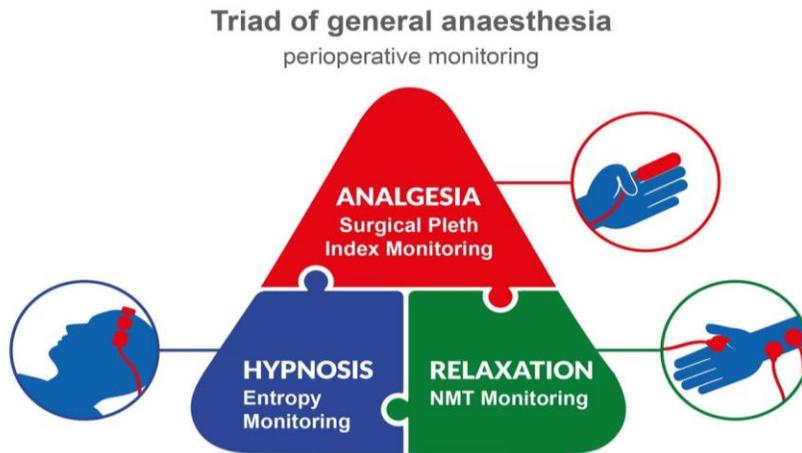


Figure 1: Triad of General Anesthesia

<https://www.anandic.com/en/products/produkt-detail/monitoring-adequacy-of-anesthesia/>

Phases and Stages of General Anesthesia:

General anesthesia comprises four clinical phases: preinduction, induction, maintenance, and emergence. The preinduction phase involves patient preparation, monitoring setup, and delivery of premedication. Fast-acting medications are used during induction to help the patient shift from consciousness to unconsciousness(7). In the maintenance phase, drugs are administered on a continuing basis to maintain an acceptable depth of anesthesia. Finally, the emergence phase describes the patient's gradual return to awareness and physiological stability following the withdrawal of anesthetic agents(8). Guedel's classification describes the stages of anesthesia according to clinical indicators. Stage I (analgesia) starts with drowsiness and ends with a loss of consciousness. Stage II (excitement) is distinguished by irregular respiration, involuntary movements, and elevated muscle tone, which raises the likelihood of problems such as laryngospasm. Stage III (surgical anesthesia) is the ideal state for surgery and is further classified into planes based on ocular and muscle symptoms. Stage IV (medullary depression) implies an overdose and is accompanied with respiratory and circulatory collapse, necessitating rapid treatment(9).

STAGE	Respiration		Ocular movem.	Pupil size	Reflexes	SK. mus. tone	B. P.	H. R.	USES
	Thor.	Abd.							
I ANALGESIA			NORMAL		EYE LID PHARYNGEAL CORNEAL LIGHT				Labour, Incisions & Minor ops.
II DELIRIUM			ROVING EYE BALLS			INVOLUNTARY MOVEMENT			NIL
III SURGICAL ANAESTHESIA	1		FIXED EYES						Most of the surgical operations
	2								
	3								
	4								
IV MEDULLARY PARALYSIS									Occasionally reached now Never attempted

Fig. 27.1: Stages of general anaesthesia

Figure 2: Guedel's classification

<https://www.pharmacy180.com/article/stages-of-anaesthesia-1125/>



Neuraxial and Regional Anesthesia Techniques:-

General anesthesia makes the entire body insensitive, whereas neuraxial and regional procedures provide site-specific anesthesia. Neuraxial anesthesia, which includes spinal and epidural anesthesia, is often used in obstetrics, orthopedics, and urology surgery. Spinal anesthesia involves injecting a single local anesthetic into the subarachnoid region, resulting in fast and intense sensory and motor blockage. Epidural anesthesia includes inserting a catheter into the epidural area, which allows for continuous medication delivery and adjustment over time (1,2).

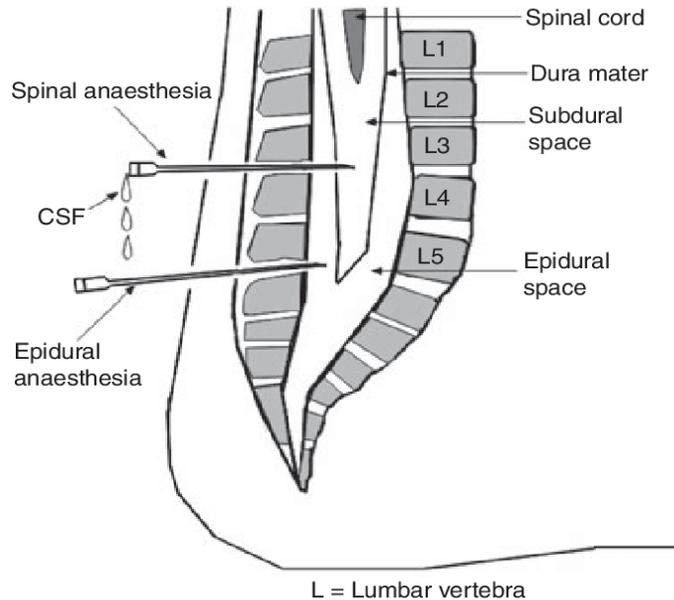


Figure 3: Spinal versus Epidural Anesthesia

Regional anaesthesia is the use of peripheral nerve blocks, such as brachial plexus blocks for upper limb operations or femoral and sciatic blocks for lower limb treatments. These approaches provide effective analgesia, maintain consciousness, and reduce the requirement for systemic opioids, lowering the risk of nausea, respiratory depression, and prolonged recovery. Regional anesthesia is increasingly being employed as a stand-alone treatment or in conjunction with general anesthetic (known as "combined anesthesia") to improve perioperative outcomes(10).

Conclusion:-

General anesthesia is an essential technique in perioperative treatment, allowing for safe and successful surgical operations. Understanding the fundamental triad, drug pharmacology, and progression through specified phases and stages is critical for safe therapeutic practice. Neuraxial and regional anesthetic treatments are useful alternatives or complements, providing localized pain relief and speedier recovery with fewer systemic problems.

A broad understanding of various anesthetic modalities enables anesthesia specialists to adjust their approach to each patient's needs, improving safety and surgical outcomes.

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