INTRODUCTION TO ANESTHESIA

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Before 1846

Few drugs/plant product used to remove pain-

- Alcohol
- Opium
- Cocaine

- Other method /non-drugs method used to remove pain-
  - Cold
  - Concussion
  - Carotid compression
  - Hypnosis

- **Anesthesia:** is defined as the loss of physical sensation with or without loss of consciousness .

- **Anesthesiology** is branch of medicine that is focused on the relief of pain in the perioperative period (i.e. before, during or after a surgical procedure).

- A physician specialized in anesthesiology is called an **Anesthesiologist**

The three components :-

- 1- Analgesia
- 2-Hypnosis (amnesia)
- 3. Muscle relaxation.

Analgesic or painkiller :is any member of the group of drugs used to achieve analgesia, relief from pain (They are distinct from anesthetics Analgesia is pain relief without loss of consciousness and without total loss of feeling or movement Ex(**Opioids, NSAIDs, Ketamine ….)**

Amnesia: refers to the loss of memories, such as facts, information and experiences. Ex(**Propofol, Benzodiazepines…)**

Muscle relaxation: is a type of drug that causes muscle contraction to cease and decrease its tone. By block the nerve impulses to the muscles. They sometimes are also referred to as neuromuscular blocking agentsEx(**Succinylcholine, Atracurium …)**

Anxiolytics, or anti-anxiety drugs: are a category of drugs used to prevent anxiety and treat anxiety related to several anxiety disorders. Ex(**Benzodiazepines, Alpha-2 Agonists ..)**

General anesthesia

- ☼ **Definition:**
- is altered physiological state characterized by reversible **loss of consciousness** , **analgesia** of the entire body , **amnesia** , and some degree of **muscle relaxation** .

Types of Anaesthesia

General Anaesthesia

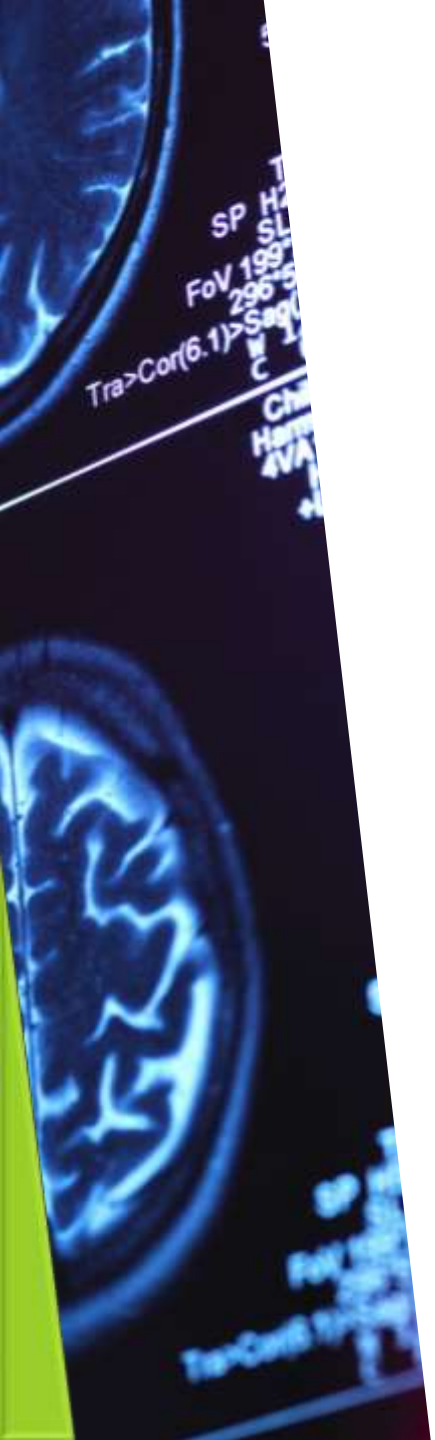
Regional Anaesthesia:

Spinal

Epidural

Peripheral nerve block

Local Anaesthesia:



Types of anesthesia :

1 General anesthesia a drug-induced reversible depression of the CNS resulting in the loss of response to & perception of all external stimuli.

2 Local anesthesia

A local anesthetic numbs a small part of the body where you are having the operation. It is used when nerves can be easily reached by drops, sprays, ointments or injections. You stay conscious, but free from pain. Common examples of surgery using local anesthetic are having teeth removed and some common operations on the eye.

3-Regional anesthesia

This is when a local anesthetic drug is injected near to the nerves that supply a larger or deeper area of the body. The area of the body affected becomes numb .example:

A-Spinal and epidural anesthesia:

Spinals and epidurals are the most common types of regional anesthetics. These injections can be used for operations on the lower body, such as caesarean section, bladder operations or replacing a hip. You stay conscious, but free from pain.

B-nerve block :injection placed near to a nerve or group of nerves, for example in the arm or leg , Nerve blocks are also useful for pain relief after the operation, as the area will stay numb for a number of hours(brachial plexus block)

- Balanced anesthesia :Modern anesthetic technique is known as balanced anesthesia, because it employs a "cocktail" of different drugs to achieve the goals of general anesthesia .
- Balanced anesthesia uses a combination of agents, to limit the dose and toxicity of each drug.
- The objectives of balanced anesthesia are to calm the patient, minimize pain, and reduce the potential for adverse effects associated with analgesic and anesthetic agents.

Regional Anesthesia	Local Anesthesia	General Anesthesia
this is when a local anesthetic drug is injected near to the nerves that supply a larger or deeper area of the body. The area of the body affected becomes numbness and paralyzed. ***Example :*** ***A)Spinal and Epidural*** ***B)Nerve Block***	technique depend on a group of drugs that produces transient loss of autonomic, sensory and motor function when the drugs are injected or applied to neural tissue.	an altered physiological state characterized by reversible loss of consciousness, analgesia of the entire body, amnesia and some degree of muscle relaxation.

Spinal and Epidural	Nerve Block
are the most common types of regional anesthetics. These injections can be used for operations on the lower body, such as caesarean section, bladder operations or replacing a hip.	injection of drugs near specific nerve during and after surgery . Such as in the arm or leg. (brachial plexus block)

Four main stages are recognized based upon

- Patient's body movements
  Respiratory rhythm,
  Oculomotor reflexes
  Muscle tone

stages of anesthesia based on Guedel's classification

Stage 1 Amnesia and analgesia stage From beginning of the anesthetic to the loss of consciousness During this stage, the patient progresses from analgesia without amnesia to analgesia with amnesia Patients can carry on a conversation at this time

Stage 2 stage of excitement or delirium): from loss of consciousness to onset of automatic breathing Eyelash reflex disappear but other reflexes remain intact During this stage, the patient's respiration and he art rate may become irregular In addition, there may be uncontrolled movements, vomiting, suspension of breathing, and pupillary dilation

Because the combination of spastic movements, vomiting, and irregular respiration may compromise the patient's airway, rapidly acting drugs are used to minimize time in this stage and reach Stage 3 as fast as possible.

- **Stage 3** Surgical Anesthesia: : from onset of automatic respiration to respiratory paralysis.

This is the targeted anesthetic level for procedures requiring general anesthesia.

Airway manipulation is safe at this level.

Ceased eye movement and respiratory depression are hallmarks of this stage .

Reaction to skin incision disappear

Plane I - from onset of automatic respiration to cessation of eyeball movements.

Eyelid reflex is lost, swallowing reflex disappears, marked eyeball movement may occur but conjunctival reflex is lost at the bottom of the plane

Plane II - from cessation of eyeball movements to beginning of paralysis of intercostal muscles.

Laryngeal reflex.‹corneal reflex disappears, secretion of tears increases (a useful sign of light anesthesia), respiration is automatic and regular, movement and deep breathing as a response to skin stimulation disappears.

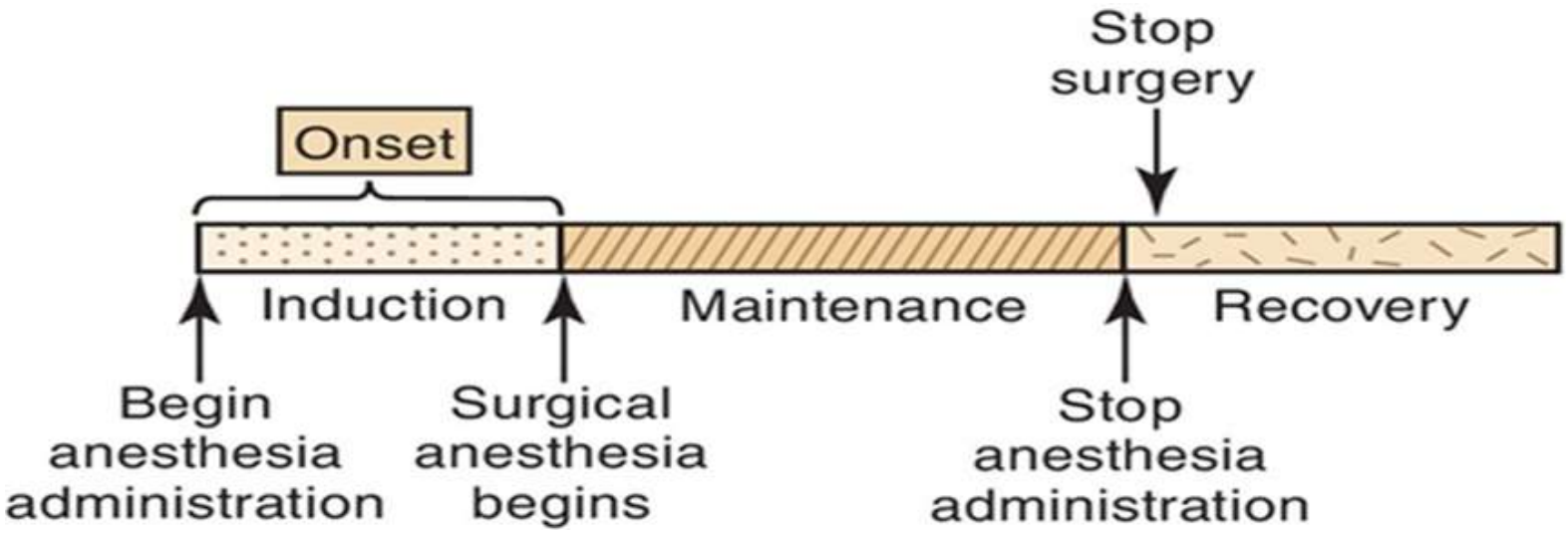
- Plane III - from beginning to completion of intercostal muscle paralysis. Diaphragmatic respiration persists but there is progressive intercostal paralysis, pupils dilated and light reflex is abolished.

- Plane IV - from complete intercostal paralysis to diaphragmatic paralysis (apnea).

- **Stage 4** - also known as overdose, occurs when too much anesthetic medication is given relative to the amount of surgical stimulation and the patient has *severe brainstem or medullary depression*, resulting in a cessation of respiration and potential cardiovascular collapse. This stage is lethal without cardiovascular and respiratory support.

Phases of Anesthesia

- **Induction:** putting the patient to sleep(initial entry to surgical anesthesia)
- **Maintenance:** keeping the patient asleep without awareness(Maintain depth of anesthesia, ventilation, fluid balance, hemodynamic control, homeostasis).
- **Emergence(recovery):** waking the patient up(resumption of normal CNS function •
- **Extubation ,** resumption of normal respiration)


Stop
surgery
Onset
Induction
Maintenance
Recovery
Begin
anesthesia
administration
Surgical
anesthesia
begins
Stop
anesthesia
administration

Balanced anesthesia

1 Hypnotics drugs : commonly known as sleeping pills, are a class of psychoactive drugs whose primary function is to induce sleep

Hypnotics I.V	Hypnotics Inhalational	Hypnotics I.M
Propofol	sevoflurane	Ketamine
barbiturate	isoflurane	
ketamine	halothene	
Etomidate	desflurane	
BNZ	eneflurane	

2 Analgesic drugs

- paracetamol and acetaminophen
- NSAID
- Opioid: morphine pethidine fentanyl
- Local anesthetic drug (blocks)
-

3 +/- Muscle relaxant drugs

- depolarizing muscle relaxant
- Non – depolarizing muscle relaxant

premedication: BNZ

+/- adjuvant drug :

- Antiemetic ,
- Anti acids ,
- Anticholinergic (atropine ,scopalomine)

Preoperative Evaluation of patients

TO provide better anesthesia service & prevent anesthesia complication BY history & physical examination related to anesthesia & any indicated laboratory tests & imaging

A. **History review**

1- Patient profile “”Age””

2-current problem and operation .
3- other known medical problems (DM & HTN) & smoking
4- medication history :
*allergies to drug
* drugs intolerance
* non-therapeutic drugs(alcohol , tobacco)
5- previous anesthetic operation(obstetric history & pain history & any complication .

6-Surgical history
7-family history , S.H, M.H

8- Review of organ system:
* general include activity level
* Resp. & CVS
*renal & electrolyte imbalance
*hematology & GI
*neurological ,endocrine , psychiatric
*musculoskeletal & dermatologically

9- last oral intake

Fasting need

- clear fluid 2-4 hr
- breast milk 4 hr
- infant formula 6 hr
- light meal 6 hr
- heavy meal > 8 hr ,
- elective surgery 12-24 hr

Smoking stop

- > 4-6 hr decrease carboxyHb
- > 12-24 hr decrease nicotin ((nicotin is sympathomimetic and ↑↑ coronary vasoconstriction))
- > 6-8 weeks normalize M.C.F
- > 2-3 month normalize pulmonary function
- > 6 month -1year return to non-smoker lung

B. physical examination :

1- vital sign and general examination
2- airway assessment (LEMON)

- ✓ L look
- ✓ E evaluate
- ✓ M mallampati
- ✓ O obstruction
- ✓ N neck mobility

3- heart (HR , B.P , S1 & S2 , PULSE)
4- lung (crackles , wheezing , Resp. rate , dyspnea)
5- neurological examination
6- extremities , edema , deformity

C. laboratory evaluation

Age	Sex	Investigation
<40	M	Nill
<40	F	Hb
Infant		Hb
40-60	M	ECG & blood suger & KFT
40-60	F	Hb & ECG & blood suger & KFT
>60	M&F	All
	M>40 F> 50	ECG

If patient know to have disease do investigation according to disease

ex. Thyroid pt do T3 ,T4 ,TSH

D.M Glucose level.

ASA classification

- The ASA physical status classification system is a system for assessing the fitness of patients before surgery. In 1963 the American Society of Anesthesiologists (ASA) adopted the five-category physical status classification system; a sixth category was later added. These are:

1. Healthy person.
2. Mild systemic disease.
3. Severe systemic disease.
4. Severe systemic disease that is a constant threat to life.
5. A moribund person who is not expected to survive without the operation.
6. A declared brain-dead person whose organs are being removed for donor purposes.

- If the surgery is an emergency, the physical status classification is followed by “E” (for emergency) for example “3E

Increase risk of morbidity & mortality in anesthesia:

- Age > 70
- Smoking
- MI < 6 months OR unstable angina within 3 m
- Pulmonary edema < 1 week
- Hb < 10 g/dl
- Urea > 20 mmol/L & dehydration
- Wt. loss > 10% in 1 month
- Severe medical illness ,also sepsis , emergency , major operation

Patients who are at increased risk of aspiration during surgery:

- Abdominal pathology, especially obstruction.
- Delayed gastric emptying (e.g. pain ,opioids).
- Incompetent lower esophageal sphincter
- Altered conscious level resulting in impaired laryngeal reflexes
- Pregnancy

RSI:
Rapid Sequence Induction

Rapid sequence induction (RSI) is an established method of inducing anesthesia in patients who are at risk of aspiration of gastric contents into the lungs. It involves loss of consciousness during cricoid pressure followed by intubation without face mask ventilation. The aim is to intubate the trachea as quickly and as safely as possible.

Need rapid induction and intubation :

1. Full stomach
2. Emergency
3. Bleeding
4. Obstetric delay stomach empty.

THANK YOU