

Introduction to Anaesthesia

“Understanding the Concept”

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Vocabulary "Jargon" in Anesthesia:

Consciousness:

- *Can perhaps be described as :*

"Our continuing stream of Awareness of either our surroundings or our sequential thoughts"

Anaesthesia (*American, Anesthesia*):



*Anaesthesia: Loss of feeling or Sensation

**Latin terminology:* An ===> No,
aesthesia → Sensation

ANESTHESIA

- Partial or complete loss of sensation
 - with or with out loss of consciousness
 - as result of disease, injury, or administration of an anesthetic agent, usually by injection or inhalation
- * Can be effected:
- locally :(***local anesthesia***),
 - to regions of the body :(***Regional Anesthesia***),
 - or Generally :(***general Anesthesia***)
- *Sensation of stimuli can be blocked with the patient either conscious (***Local and Regional Anesthesia***) or unconscious (***General Anesthesia***).

Hypnosis

"The state of being asleep and consequently unaware of the surrounding"

To the anesthetist it technically implies:

- There is deprivation of critical faculties induced by "hypnotism".
- * It is pharmacologically induced to a level at which the patient cannot be roused to consciousness by physical stimuli, but can still react unconsciously by withdrawal or autonomic reflexes if not deep enough to block nociception, or not given sufficient analgesia as well.

Narcosis

- * A state of stupor produced by drugs (i.e. it is pharmacologically induced).
- It is more accurate than Hypnosis.
- It is confusingly used for Morphine-like drugs of addiction
 - i.e. They take them for their euphoric action and not to get stuporous.

Sedation

- Sedation : May be used vaguely to imply anything from allaying anxiety to inducing near natural sleep with drugs, by depressing the highest critical cerebral centers of the brain.

Pain vs. Nociception

- The word "Painful Stimulus" should be restricted to conscious patients who are aware of the pain.
- Under General Anesthesia, the word **"Nociceptive stimulus"** is better used.
- A Nociceptive stimulus will cause pain in the conscious patient and reflex response (*e.g. Tachycardia*) in the unconscious one.

Analgesia

- “The state of freedom from pain”
- Can be effected locally, and the patient is still conscious
“e.g. by use of local Anesthetics”.
- Can be generalized and patient still coconscious
 - Systemic Analgesic Drugs.
 - “stage-one general Anesthesia“ (see below)
- Can be part of deep general Anesthesia.

****So, Anesthesia and analgesia are not interchangeable words!**

Anxiolysis

- A reduction in anxiety (Fear, apprehension, and stress due to awareness of an impending unpleasant experience).
- Sedation will lead to Anxiolysis, but Anxiolysis can be effected by certain non-sedative drugs (e.g. Tranquilizers).

Tranquillizers and antidepressants

- **Tranquillizers:** Drugs which acts at a lower level of the central nervous system than the cerebral cortex to produce a calming effect. (*Major: Neuroleptic or Antipsychotics*) & (*Minor: anxiolytics*)
- **Antidepressants:** drugs that alter the mood and mental reactions of patients.

Important Notes !!

- *** All hypnotic sedatives, tranquilizers and antidepressants in large doses will cause loss of consciousness, respiratory depression and abolition of the protective reflexes.
- The difference between drugs commonly used for sedation and those used for intravenous induction of general anesthesia is the therapeutic margin.

Muscle Relaxation

“ Rendering the muscles less tense by decreasing their tone, or even paralyzing them ”.

- Can be obtained in different ways:
 - **By Central depression of the nervous system.**
 - **By local anesthesia of peripheral nerves.**
 - **By blocking the neuromuscular junction.**

*** Any drug which causes a muscle to relax could be called a Muscle Relaxant, but in anaesthesia practice this term is almost exclusively reserved for the group of intravenously administered drugs which block the chemical transmission of a nerve impulse at the Neuromuscular Junction leading to muscle paralysis.*

General Anesthesia

General Anesthesia clinically implies that

the patient has been rendered reversibly unconscious by DRUGS

for the execution of a painful operative or diagnostic test.

Subdivisions of General Anesthesia

Are based on the route by which the drug is introduced into the body and thence via the blood stream to the brain:

- *Intravenous*
- *Inhalational*
- *Intramuscular*
- *Rectal*

Modern “Balanced” General Anesthesia

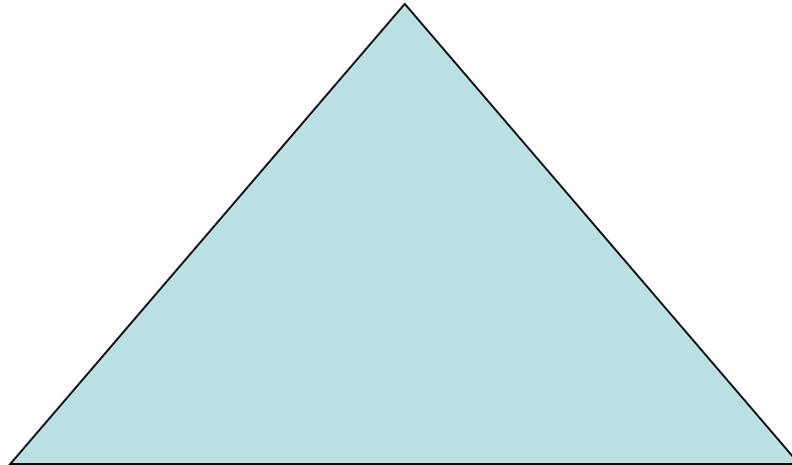
- An altered physiologic state, characterized by Reversible loss of Consciousness, analgesia of the entire body, amnesia, and some degree of Muscle Relaxation.
- This is brought about by different groups of drugs that has different specific actions:
 - Hypnotic drugs for effecting Loss of Consciousness.
 - Analgesic Drugs for effecting analgesia.
 - Muscle relaxant Drugs for effecting muscle paralysis.

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This is in comparison with “Old Anesthesia” where all of the above actions were effected by a single agent (e.g. Ether) at high concentrations with higher incidence of side effects.

Triad of General anaesthesia

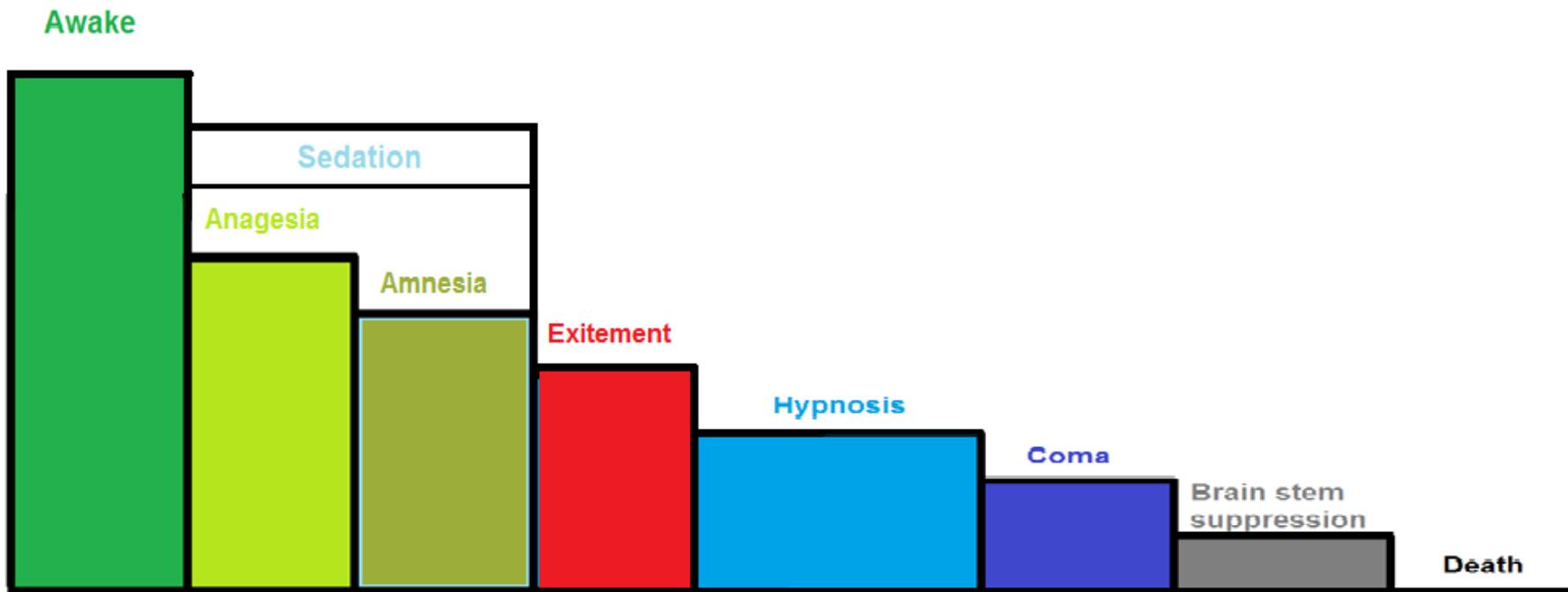
Hypnosis



Analgesia

Muscle relaxation

- **General Anesthesia** is not a single, all-or-none state of altered Consciousness; rather,
 - It is a continuum of alteration of Consciousness, brought about by increasing plasma and CNS levels of the anesthetic agent.
 - This continuum can be classified into stages characterized by cumulative development of different clinical states of consciousness.



Stages of anesthesia

STAGE 1: (Stage of conscious sedation):

- Low anesthetic Concentrations in CNS → Decrease activity of neurons in cells of Substantia Gelatinosa in Spinal Cord → interruption of the function of Spinothalamic tract → some degree of Analgesia.
- Clinically: The patient initially experiences analgesia without amnesia. However, later in stage 1 both analgesia and amnesia ensue.

Stages of anesthesia

2- Stage of Excitement:

- At Higher brain concentrations of anesthetic drug:
 - complex neuronal actions take place, including blockade of many small inhibitory neurons such as Golgi type II cells, together with a paradoxical facilitation of excitatory neurotransmitters.
- Clinically:

During this stage the patient appears to be delirious and excited but definitely is amnesic.

Also:

- **Respiration is irregular in rate and volume.**
- **Retching and vomiting may occur.**
- **Incontinence and struggling sometimes occur.**
- **Regular breathing marks the end of this stage.**

Stages of anesthesia

3- *Stage of Surgical Anesthesia:*

- With increasing Anesthetic concentration, there will be a progressive depression of pathways in the reticular activating system, together with suppression of spinal reflex activity that contributes to muscle relaxation.
- Clinically:
It begins with the recurrence of regular breathing and extends to complete cessation of spontaneous respiration.

** Four planes of stage III have been defined, representing increasing depth of anesthesia:

Plane 1: From the return of regular respirations to the cessation of REM.

Plane 2 :The Surgical Plane: from the cessation of REM to the onset of paresis of the intercostal muscles.

Plane 3 :From the onset to the complete paralysis of the intercostal muscles.

Plane 4: From the paralysis of the intercostal muscles to the paralysis of the diaphragm - at the end of this plane the patient will be apneic.

Stages of anesthesia

4- Stage of Medullary depression:

- At high CNS drug concentrations, the activity of neurons in the respiratory and vaso-motor centers in the brain stem - which are relatively insensitive to anesthetic drugs – is depressed, leading to Cardio-Respiratory Collapse.
- ** Full Respiratory and Circulatory support are a must, Otherwise, Coma and Death will ensue.**

Stages of anesthesia

- The stages of General Anesthesia used to be clinically distinct in old anesthesia because of slow onset time of older drugs (Ether, etc...).
- In Modern Anesthesia, the distinctive signs of each of the 4 stages are obscured due to:
 - Use of drugs with rapid onset of action.
 - Use of means of mechanical ventilation.
 - Pre or intra-operative use of drugs that influence the signs of anesthesia.

Scope of Anesthesia

- Work In Every Area Of Medicine
 - OR, PACU, ICU, OB, Peds, Pain Clinic
- Work With The Most Diverse Patient Population
 - Premature Infants To Geriatrics
- Provide Medical Care & Critical Care
 - Prior To, During, And After Surgical Procedures
- Work With Advanced Technology

You Might Like Anesthesia If...

- You Enjoy Performing Procedures
- You Are Interested In Critical Care
- You Enjoyed:
 - Pharm, Physio, Cardiology, Pulmonology
- You Like All Areas Of Medicine
 - You Can Specialize Though
- You Like To See Immediate Results

Role of the Anesthetist

- Anesthetist is the perioperative physician.
- Provides medical care to each patient:
 - Pre-operative evaluation.
 - Patient counseling and informed consent
 - Consultation with surgical team
 - Providing pain control
 - Supporting life functions during surgery.
 - Supervising immediate post-operative care

Scope of anesthesia

- I. Anesthesia for surgical procedures in the operating theatres.

- I. Anesthesia and sedation in remote areas
 - ✓ *Day case surgery*
 - ✓ *Radiology*
 - ✓ *Endoscopy*
 - ✓ *Dental*
 - ✓ *Shockwave Lithotripsy*
 - ✓ *Cardioversion*
 - ✓ *Electroconvulsive therapy*

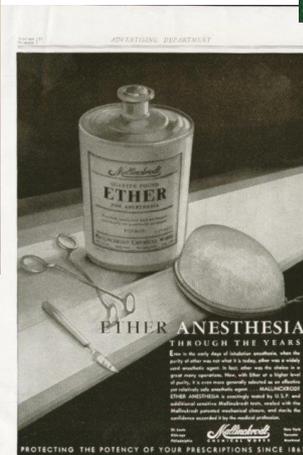
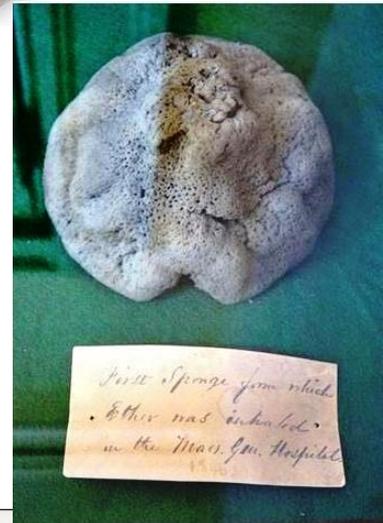
- II. Cardiopulmonary resuscitation
 - I. Labour analgesia

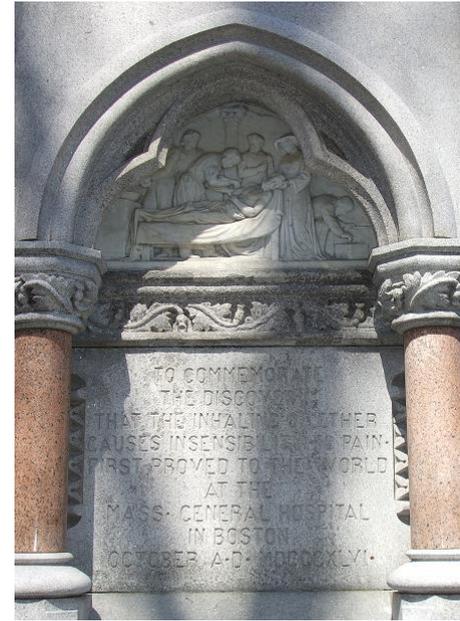
 - I. Pain management: Acute and chronic

Brief History

- Pre-1800: Surgery Without Anesthesia
- 1846: First Ether Anesthetic
- 1847: Chloroform was introduced by James Simpson.
- 1884: Cocaine For Local Anesthesia
- 1910s-1930s: Endotracheal Intubation.
- 1921: Epidural Anesthesia Described
- 1943: Curare Clinical Trial Success (Montreal)
- Mid 1950s: halothane
- 1960: Short Acting Opioids
- 1982: Transesophageal Echo
- 1983: Laryngeal Mask Airway

Ether Day – October 16th, 1846





Before anaesthesia:...

..... Surgery was a terrifying last resort in a final attempt to save life.

Dr D J Wilkinson, past Honorary Treasurer and Archivist, Association of Anaesthetists of Great Britain and Ireland

Liston, an eminent surgeon, was once operating for a bladder stone.

The panic stricken patient finally broke loose from the brawny assistants, ran out of the room, down the hall and locked himself in the lavatory.

Liston, hot on his heels and a determined man, broke down the door and carried the screaming patient back to complete the operative procedure.

(Rapier HR. Man against Pain London 1947;49).

Anaesthesia is now very safe,
with mortality of less than 1 in
250,000 directly related to
anaesthesia.

===== *cf.* =====

The global mortality rate due to
traffic accidents
was 19 per 100 000 population
(1:5263)

Thank You