

# Introduction to anesthesia

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# Anesthesia

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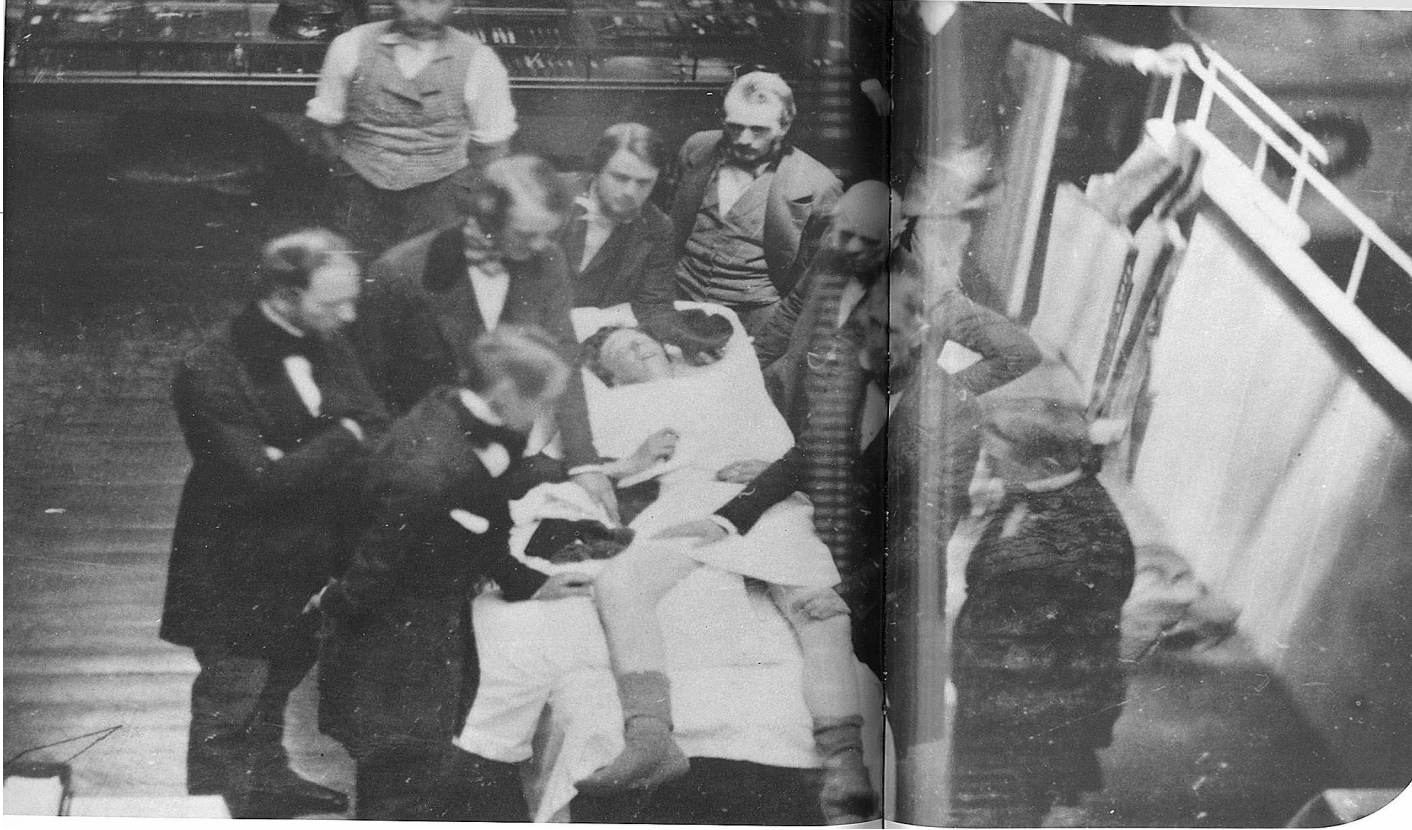
- From Greek *anaesthesia* means "no sensation"
- Listed in Bailey's English Dictionary 1721.
- When the effect of **ether** was discovered "**anesthesia**" was used as the name for the new phenomenon.

# Basic Principles of Anesthesia

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- **Anesthesia** defined as the abolition of sensation
- **Analgesia** defined as the abolition of pain
- ***“Triad of General Anesthesia”***
  - need for unconsciousness
  - need for analgesia
  - need for muscle relaxation

# History of Anesthesia



General anesthesia by **William T. G. Morton** on October 16, **1846** in the Ether Dome at Massachusetts General Hospital, Boston.

# History of Anesthesia

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- Ether synthesized in 1540 by Cordus
- Ether used as an anesthetic in 1842 by Dr. Crawford W. Long
- Ether publicized as an anesthetic in 1846 by Dr. William Morton
- Chloroform used as an anesthetic in 1853 by Dr. John Snow

# History of Anesthesia

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- Endotracheal tube discovered in 1878
- Local anesthesia with cocaine in 1885
- Thiopental first used in 1934
- Curare first used in 1942 - opened the “Age of Anesthesia”

# Types of Anesthesia:

**1-General Anesthesia** - is a medically induced coma with loss of protective reflexes, resulting from the administration of one or more general anaesthetic agents. General anesthesia acts primarily on the brain and central nervous system to make the patient unconscious and unaware. It is administered via the patient's circulatory system by a combination of inhaled gas and injected drugs. After the initial injection, anesthesia is maintained with inhaled gas anesthetics and additional drugs through an intravenous line (IV).

**General anaesthesia has many purposes, including:**

Analgesia (loss of response to pain)

Amnesia (loss of memory)

Immobility (loss of motor reflexes)

Hypnosis (unconsciousness)

Paralysis (skeletal muscle relaxation )



# 2-iv/ monitored anesthesia

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sedation is often used for minimally invasive procedure like colonoscopies the level of sedation range from minimal –drowsy but able to talk-to deep





# 3-Local Anesthesia

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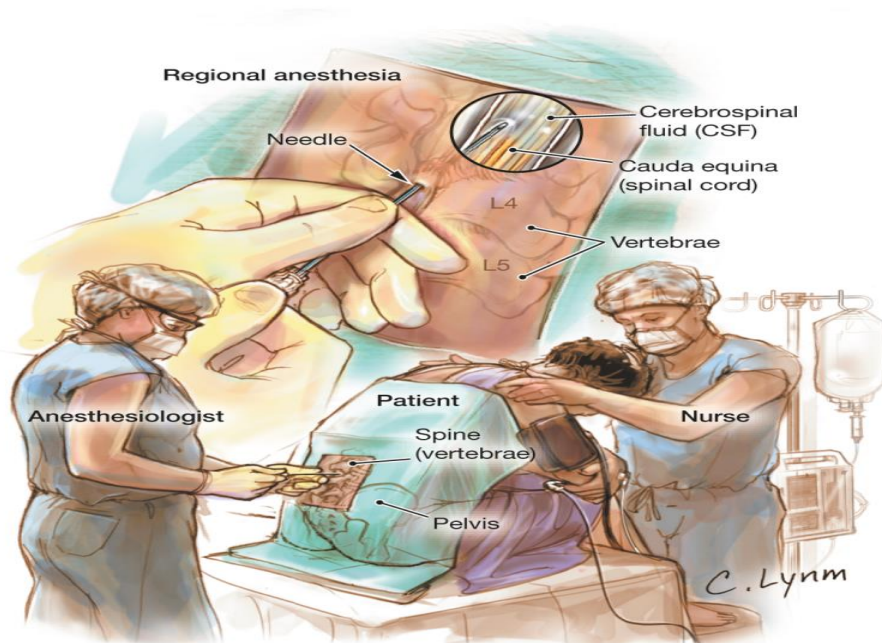
- is any technique to induce the absence of sensation in a specific part of the body. A patient remains conscious during a local anesthesia. For minor surgery, a local anesthetic can be administered via injection to the site. However, when a large area needs to be numbed, or if a local anesthetic injection will not penetrate deep enough, physicians may resort to regional anesthetics.



# 4-Regional anesthesia

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is the use of local **anesthetics** to **block** sensations of pain from a large area of the body, such as an arm or leg or the abdomen. **Regional anesthesia** allows a procedure to be done on a region of the body without your being unconscious. You will likely receive medicine to help you relax or sleep during surgery. Major types of regional anesthesia include:

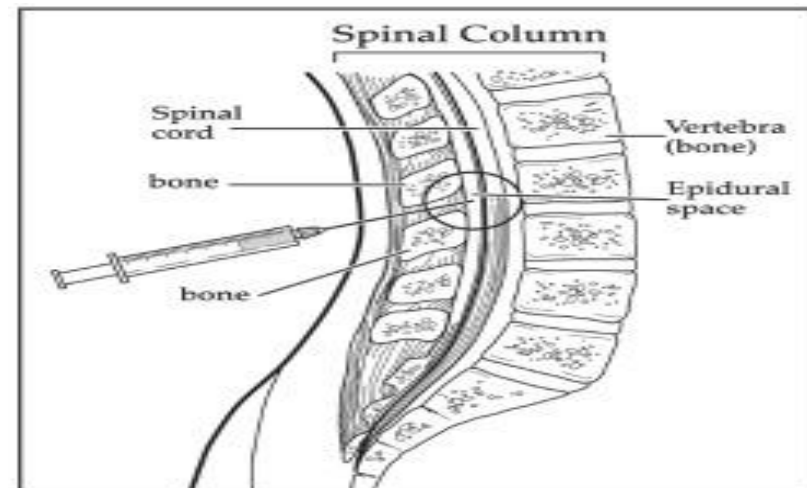


# A-Spinal

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- Spinal anaesthesia, also called spinal block, subarachnoid block, intradural block and intrathecal block, is a form of neuraxial regional anaesthesia involving the injection of a local anaesthetic or opioid into the subarachnoid space,

often used for lower abdominal, pelvic, rectal, or lower extremity surgery. This type of anesthetic involves injecting a single dose of the anesthetic agent directly into the spinal cord in the lower back, causing numbness in the lower body.



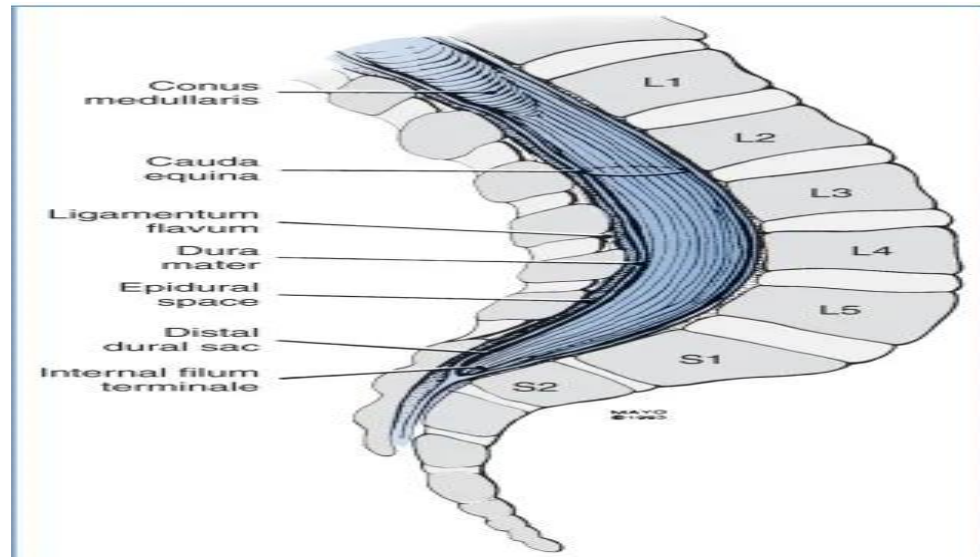
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**You received the injection in your spine.  
Complete recovery may take four to  
eight hours.**

# B-Epidural and caudal anesthesia

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- this anesthetic is similar to a spinal anesthetic and also is commonly used for surgery of the lower limbs and during labor and childbirth. This type of anesthesia involves continually infusing drugs through a thin catheter that has been placed into the space that surrounds the spinal cord in the lower back, causing numbness in the lower body.



# 5-Nerve blocks

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- A local anesthetic is injected near a specific nerve or group of nerves to block pain from the area of the body supplied by the nerve. Nerve blocks are most commonly used for procedures on the hands, arms, feet, legs, or face. Example - a Brachial Plexus block may be used by your anesthesiologist to provide anesthesia to your entire arm and shoulder.

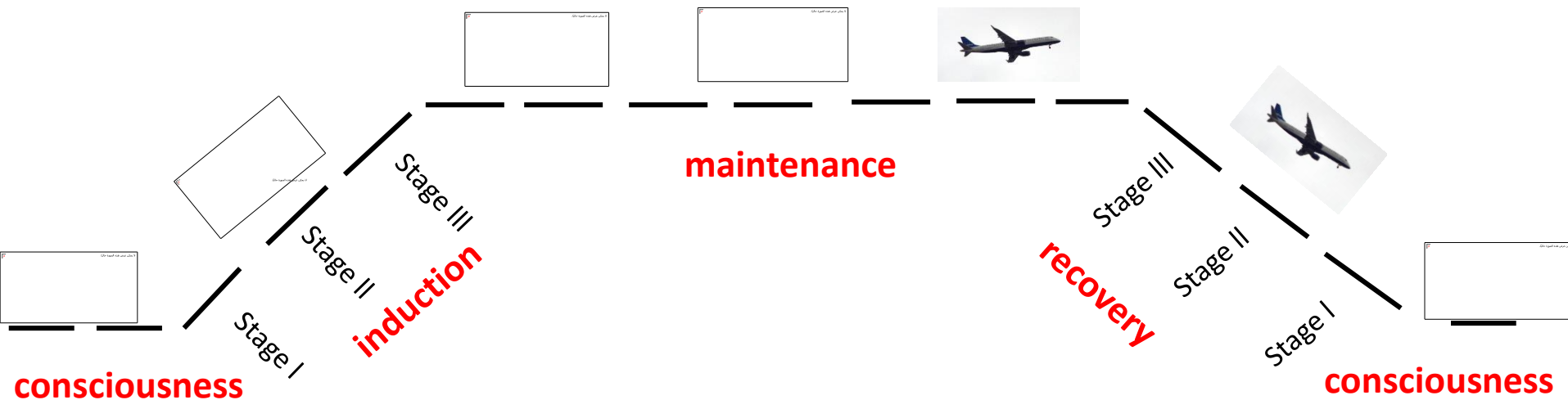


# Anesthesia events practically

**1- induction:** it is the period of time which begins with the administration of an anesthetic up to the development of surgical anesthesia.

**2- maintenance:** sustaining the state of anesthesia. Done by inhalational, N2O, M.R

**3- recovery:** anesthetics stopped at the end of surgical procedure and consciousness regains.(reversal)





# Stages of GA



## Stage I: Stage of Analgesia

- Starts from beginning of anaesthetic inhalation and lasts upto the loss of consciousness
- Pain is progressively abolished during this stage
- Patient remains conscious, can hear and see, and feels a dream like state
- Reflexes and respiration remain normal
- It is difficult to maintain - use is limited to short procedures only

## **Stage II: stage of delirium and excitement**

- from loss of consciousness to bringing of regular respiration
- Excitement ,patient may shout ,struggle, and hold his breath.
- Muscle tone increase ,jaw is tightly closed
- Breathing is jerky ,vomiting ,involuntary micturition or defecation may occur .
- Heart rate and Blood Pressure may rise and pupils dilate due to sympathetic stimulation .
- No stimulus or surgical procedure carried out during this stage .
- Breath holding is commonly seen ,Vomiting ,laryngospasm ,and uncontrolled movement .
- This stage is not found with modern anaesthesia , it is attributed to use of premedication, and rapid induction agents .



### **Stage III : Surgical anesthesia :**

Extends from onset of irregular respiration to cessation of spontaneous breathing. This has been divided into 4 planes-

- Plane 1: This plane ends when eyes become fixed.
- Plane 2: Loss of corneal and laryngeal reflexes.
- Plane 3: Pupil start dilating and light reflexes.
- Plane 4: Dilated pupil, decrease muscle tone ,BP falls.

### **Stage IV : Medullary paralysis :**

Respiratory and vasomotor control ceases.

## Stages of General Anesthesia

Stage I Amnesia	From induction to <b>loss of consciousness</b> , pain perception is maintained
Stage II Delirium	<b>Exaggerated responses to noxious stimulus</b> , dilated pupils, divergent gaze, irregular breathing
Stage III Surgical anesthesia	<b>Central gaze, constricted pupils</b> , regular respiration, no somatic or autonomic responses
Stage IV Overdosage	Depressed respiration, dilated fixed pupils, marked hypotension

## Pre-operative phase



## Intra-operative phase



## Post-operative phase



- Pre-operative evaluation
- Choice of anesthesia
- Pre-medication

- Preparation of patient
- Vascular access, monitoring
- G.A induction:(iv anesthetics, N2O,M.R, opioid)
- Maintenance: (inhalational with or without N2O, M.R)
- Recovery: (reversal)
  
- Regional anesthesia:(spinal, epidural)

- Post-operative pain control
- Monitoring

# Preoperative Evaluation

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## 1. History

- Current problem
- Other known problems
- Medical history (allergies, drug intolerance, present therapy, tobacco and alcohol intake)
- Previous anesthetics, surgeries, deliveries
- Family history
- Review of organ systems
- Last oral intake

## Preoperative Evaluation

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### 2. Physical Examination

- Vital signs
- Airway (Thyromental distance, ULBT, Malampati sign)
- Heart
- Lungs
- Extremities
- Neurological examination

## Preoperative Evaluation

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### 3. Routine Laboratory evaluation (healthy asymptomatic)

Hematocrit: All menstruating women, age >60 y, anticipated significant blood loss

S. glucose, creatinine: age >60 y

ECG: age >40 y

Chest radiograph: age >60 y

Pregnancy test: fertile women

## *American Society of Anesthesiology Risk Classification*

ASA Class	Description
1	Normal, healthy (0.06-0.08%)
2	Mild systemic disease (0.27-0.4%)
3	Severe systemic D, not incapacitating (1.8-4.3%)
4	Severe systemic D that is a constant threat to life (7.8-23%)
5	Moribund, not expected to live 24h (9.4-51%)
6	Care for organ donation

# Choice of anesthesia

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- The patient's understanding and wishes regarding the type of anesthesia that could be used
- The type and duration of the surgical procedure
- The patient's physiologic status and stability
- The presence and severity of coexisting disease
- The patient's mental and psychologic status
- The postoperative recovery from various kinds of anesthesia
- Options for management of postoperative pain
- Any particular requirements of the surgeon
- ***There is major and minor surgery but only major anesthesia***



## The Anesthetic Plan

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Premedication

Type of anesthesia

General (airway, induction, maintenance, relaxant)

Regional (technique, agents)

Intraoperative management

Monitoring, positioning, fluids, MABL, special techniques

Postoperative management

Pain control, ICU (ventilation, monitoring)

## Maintenance

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If spontaneous breathing is needed, minimal opioids with nitrous oxide and inhalation anesthetic

If muscle relaxation is needed, nitrous oxide-opioid-relaxant with minimal inhalation anesthetic and controlled ventilation (Balanced anesthesia)

TIVA: Continuous infusion of propofol-opioid + muscle relaxant (nothing through inhalation)

# recovery

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Goals: awake, responsive with full muscle strength so he can maintain patent airway, cannot aspirate and can be assessed neurologically

Technique: stop anesthetics near the end of surgery, reverse muscle relaxation with reversal (neostigmine (0.03-0.06 mg/kg) and atropine (0.2-0.4 mg/kg))