

GENERAL ANAESTHETICS



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Contents

- Introduction
- Stages & Phases of anaesthesia
- Classification
- Pharmacokinetics
- Pharmacodynamics
- Techniques of anaesthesia
- Complications & Contraindications
- Drug Interactions
- Pre-anaesthetics
- Bibliography

Introduction

❑ Reversible, Drug-induced loss of sensations and consciousness to stimuli.

- Depresses the Nervous System

❑ Anaesthetic state

- Changes in behaviour or perception.

→ Amnesia , immobility and muscle relaxation , abolition of somatic and autonomic reflexes, analgesia, hypnosis.



Essential Components Of Anaesthesia

- Hypnosis – Loss of consciousness
- Reversible loss of sensations
- Amnesia – Loss of memory
- Analgesia – Loss of perception of pain
- Immobility – Loss of motor reflexes
- Skeletal muscle relaxation
- Quick acting and rapid eliminated
- No toxic effects – Large margin of safety

Properties of ideal anaesthetics

For Patient

- Pleasant, non irritating, no after effects, fast recovery

For Surgeon

- **Provide** - Adequate analgesia, Immobility, muscle relaxation and non inflammable

For Anaesthetist

- Easy administration, cheap, stable, safe, easy to store, long shelf-life

Stages

1.

• Stage of Analgesia

2.

• Stage of Delirium

3.

• Surgical Anaesthesia

4.

• Medullary Paralysis

I

Loss of pain
sensation



II

Combative
behavior



III

Surgical
anesthesia



IV

Medullary
paralysis
and death



Phases

1.

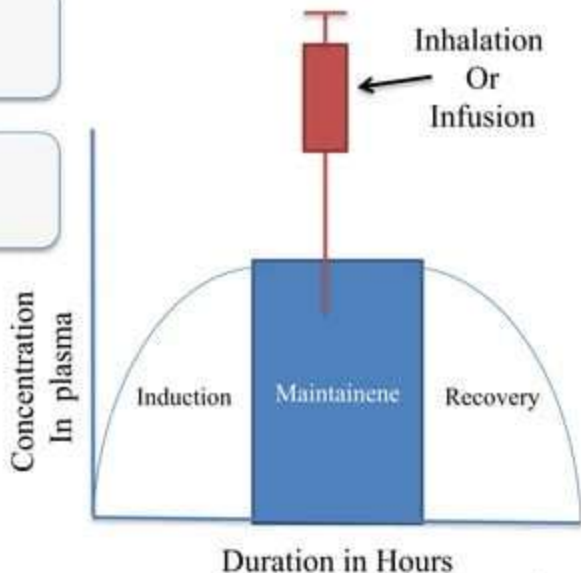
- Induction

2.

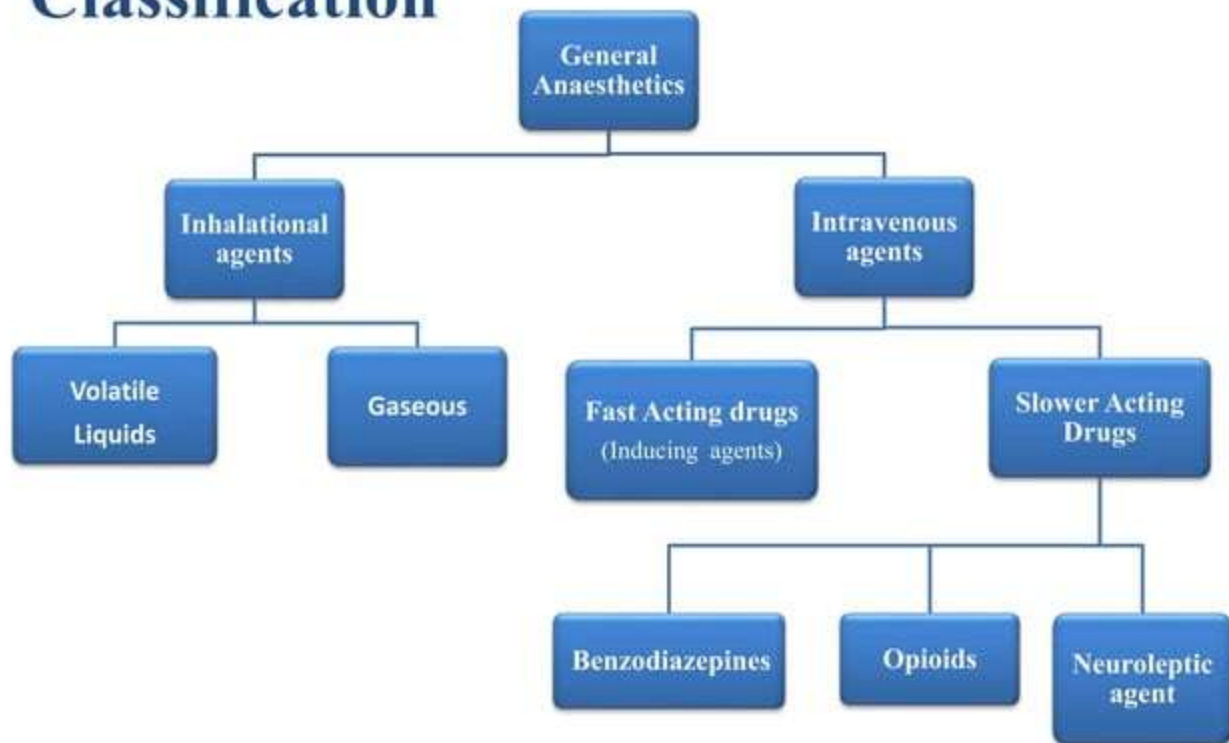
- Maintenance

3.

- Recovery



Classification



Drugs

Gases

- Nitrous oxide
- Entonox
- Xenon

Volatile Liquids

- Chloroform
- Ether
- Halothane
- Enflurane
- Isoflurane
- Desflurane
- Sevoflurane
- Methoxyflurane

Inducing agents

- Thiopentone
- Methohexitone
- Propofol
- Etomidate
- Ketamine
(Dissociative)

Benzodiazepines

- Diazepam
- Lorazepam
- Midazolam

Opioids

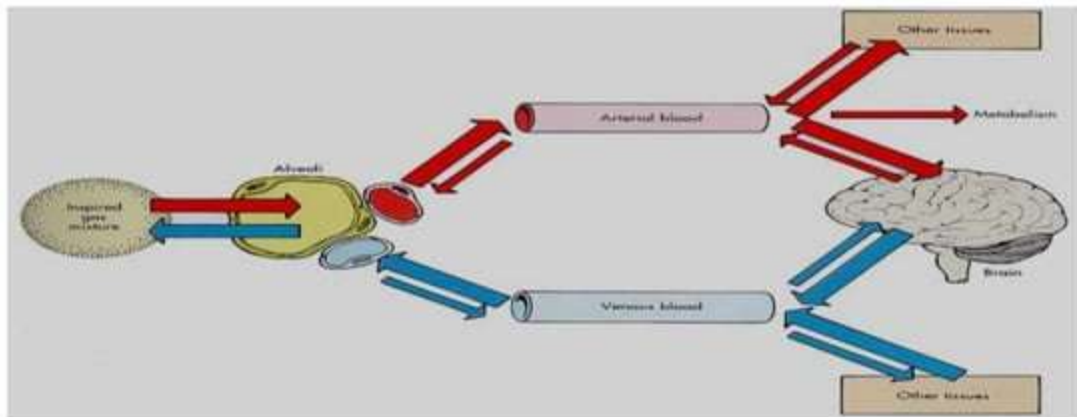
- Fentanyl
- Remifentanyl
- Sufentanil
- Alfentanil

Neuroleptic agent

- Droperidol

Pharmacokinetics

- Depth of anaesthesia depends on Potency of the agent (MAC) and Partial Pressure (PP) attained in the brain.
- Induction and recovery depends on rate of change of PP in brain.



Factors affecting PP of anaesthetics in Brain

1. PP of anaesthetic in the inspired gas
2. Pulmonary ventilation
3. Alveolar exchange
4. Solubility of anaesthetic in blood –
Blood: gas partition coefficient
5. Solubility in tissues
6. Cerebral blood flow

Elimination

- Mostly through lungs in unchanged form.
- Channel of absorption \longleftrightarrow channel of elimination.
- Enter and persists in adipose tissue for long periods – high lipid solubility and low blood flow.
- They are not metabolized except Halothane.
- Second gas effect
- Diffusion hypoxia

Properties of Inhaled Anaesthetics

Minimal Alveolar Concentration (MAC)



- Smaller the MAC value more potent is the anaesthetic and vice versa.

Arteriovenous concentration Gradient(ACG)



- Smaller the ACG value faster will be the onset of action and vice versa.

Blood – Gas partition coefficient



- Smaller the B/G partition coefficient value faster will be the onset of action and vice versa.

- Rank order of MAC values(%) of different inhalational anaesthetics –

Methoxyflurane	(0.16%)
Halothane	(0.75%)
Isoflurane	(1.2%)
Enflurane	(1.7%)
Sevoflurane	(1.9%)
Desflurane	(6%)
Nitrous oxide	(>100%)

High



Low

Potency

Points to Remember..

Blood solubility – Rate of Induction

Lipid solubility – Potency

A/V Gradient – Rate of Induction

Partial Pressure – Potency

B/G partition coefficient – Rate of Induction

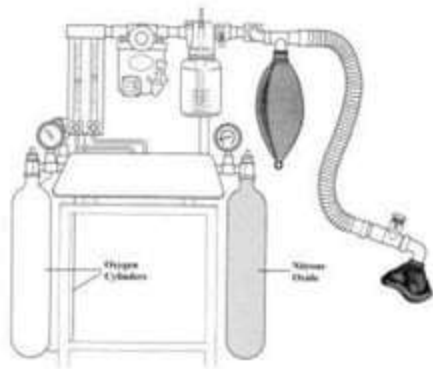
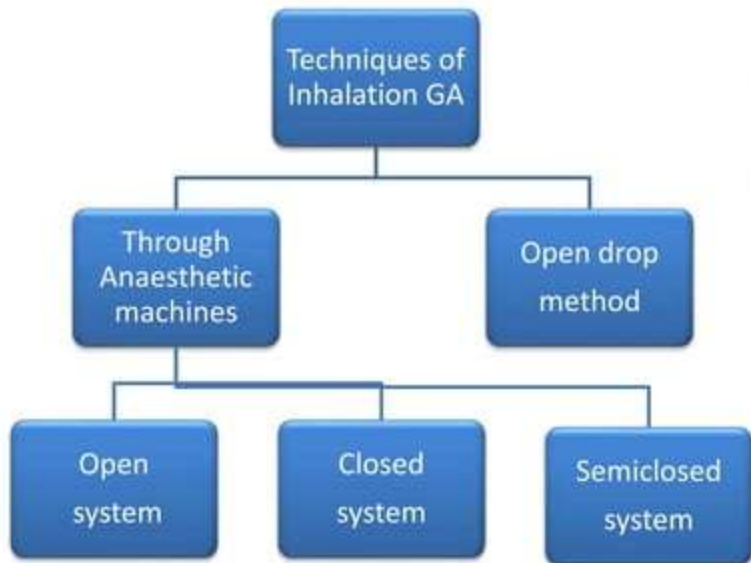
Pharmacodynamics

No specific receptor has been identified as the locus of general anesthetic action. They -

- Increases the activity of GABA receptors.
- Increases the activity of the glycine receptors.
- Blocks postsynaptic nicotinic currents.
- Inhibit the activity of Glutamate receptors.

Note: The mechanism by which the anesthetics perform these modulatory roles is not understood.

Techniques



Complications

During anaesthesia:

- Respiratory depression
- Cardiac arrhythmias
- Fall in BP & Aspiration
- Laryngospasm and asphyxia
- Delirium and convulsion
- Fire and explosion

After anaesthesia:

- Nausea and vomiting
- Persisting sedation
- Pneumonia
- Organ damage – liver, kidney
- Nerve palsies
- Cognitive defects

Contraindications

M



Medical Problems
Like Diabetes, Asthma,
High Blood Pressure

A



Alcohol
Intake

S



Smoking

Drug Interactions

1. Patients on antihypertensives given general anaesthetics—BP may fall markedly.
2. Neuroleptics, opioids, clonidine and monoamine oxidase inhibitors potentiate anaesthetics.
3. Halothane sensitizes the heart to Adrenaline.
4. Insulin need of a diabetic is increased during GA: switch over to plain insulin even if the patient is on oral hypoglycaemics.

Pre- anaesthetics medication

Defination: It is the term applied to the use of drugs prior to the administration of an anaesthetic agent to make anaesthesia safer and more agreeable to the patient.

- Analgesia

- Relief of anxiety

- Amnesia for pre and post operative events

Aim

- Decrease secretions

- Antiemetic effects

- Decrease acidity and volume of gastric juice

Drugs

- Sedative- antianxiety drugs** – Diazepam, Lorazepam
- Opoids** – Morphine, Pethidine
- Anticholinergics** – Atropine, Hyoscine, Glycopyrrolate
- Neuroleptics** – Chlorpromazine, Haloperidol
- H₂- blockers / Proton pump inhibitors** – Ranitidine, Famotidine, Omeprazole, Pantoprazole
- Antiemetics** – Metoclopramide, Domperidone, Ondansetron

Open For Discussion.....



PresenterMedia



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Thank You