D.PHARM • SECOND YEAR

फार्माकोलॉजी

अध्याय 4

केंद्रीय तंत्रिका तंत्र पर कार्य करने वाली औषधियाँ

हिंदी अध्याय नोट्स



DIPLOMA IN PHARMACY

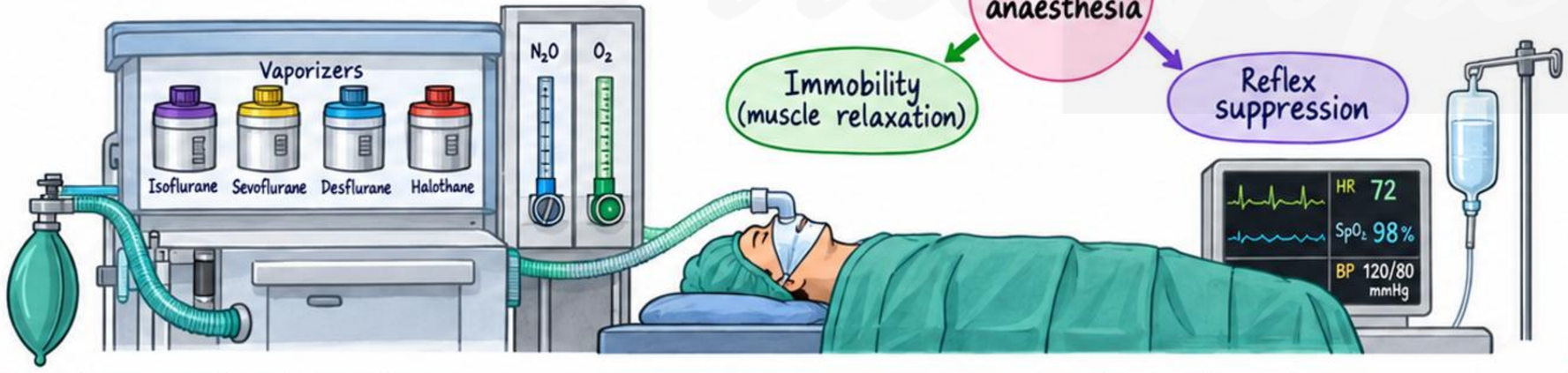
GENERAL ANAESTHETICS: DEFINITION AND CLASSIFICATION

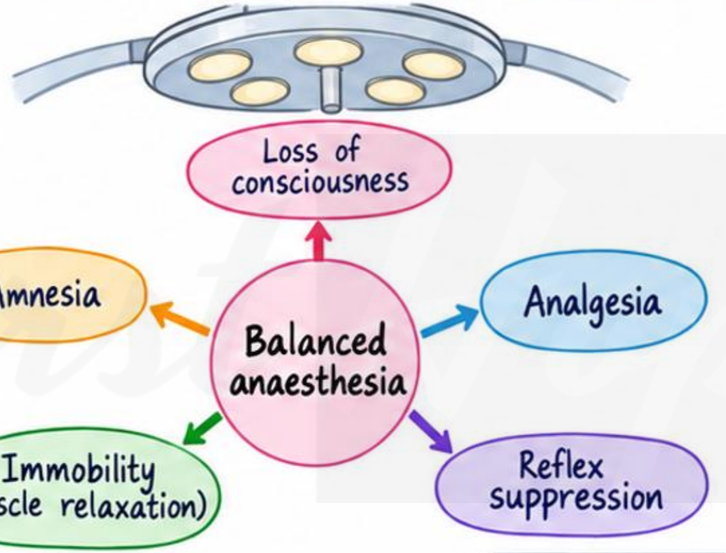
Definition : General anaesthesia painless surgery के लिए controlled और reversible state है। इसके aims हैं loss of consciousness, amnesia, analgesia, immobility या muscle relaxation और harmful reflexes का suppression। एक agent सभी components नहीं देता, इसलिए drugs का combination अक्सर use होता हैं।

Main CNS sites : Cortical networks और reticular activating system depress होते हैं।

A. INHALATIONAL ANAESTHETICS

- Volatile liquids: halothane, isoflurane, sevoflurane, desflurane।
- Gases: nitrous oxide, xenon।
- Main role: maintenance; कुछ agents induction भी कर सकते हैं।





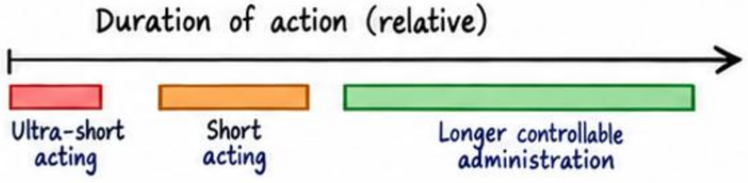
B. INTRAVENOUS ANAESTHETICS

- Induction agents: propofol, thiopentone, etomidate, ketamine।
- Adjunct agents: midazolam, fentanyl।
- Main role: rapid induction, short procedures या balanced anaesthesia।



Based on onset and duration :

- ultra-short acting: thiopentone, propofol — rapid induction
- short acting: etomidate — short procedures या induction
- longer controllable administration: inhalational agents — maintenance



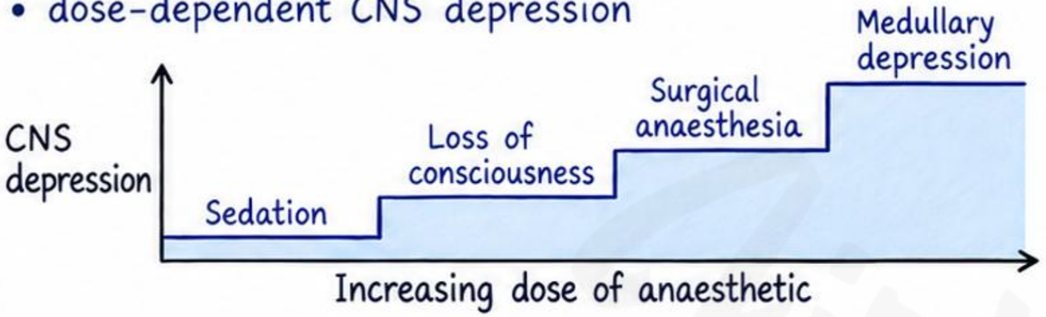
Memory line :
IV agents usually anaesthesia start करते हैं; inhalational agents commonly maintain करते हैं।

GENERAL ANAESTHETICS : ACTIONS, DOSES AND MAC

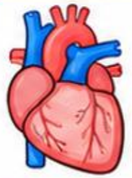
PHARMACOLOGICAL ACTIONS

CNS

- loss of consciousness, sedation और amnesia
- protective reflexes का suppression
- dose-dependent CNS depression



CARDIOVASCULAR SYSTEM



Vasodilation और myocardial depression से hypotension हो सकता हैं। Effect agent और patient पर depend करता है।

RESPIRATORY SYSTEM



अधिकतर agents breathing depress कर सकते हैं; rapid IV dose से apnoea हो सकता है। Ketamine spontaneous respiration को better preserve करता है, फिर भी airway complications possible है।

OTHER EFFECTS

- neuromuscular blockers muscle relaxation बढ़ा सकते हैं
- postoperative nausea और vomiting हो सकते हैं

IV INDUCTION DOSE EXAMPLES

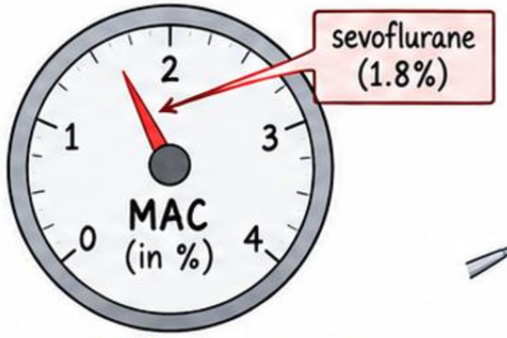
Drug	Dose (IV)
propofol	1.5–2.5 mg/kg IV
thiopentone	3–5 mg/kg IV
ketamine	1–2 mg/kg IV

Doses individualized होती हैं और trained professionals monitoring के साथ देते हैं।

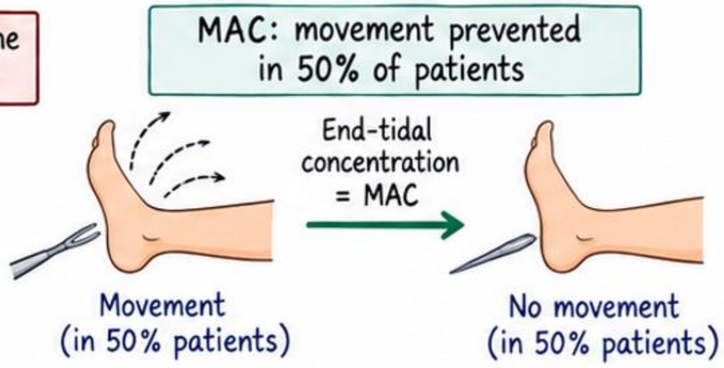
MAC: MINIMUM ALVEOLAR CONCENTRATION

MAC वह end-tidal inhaled concentration है जो surgical stimulus पर 50% patients में movement रोकती है। Lower MAC का अर्थ greater potency है।

- sevoflurane: लगभग 1.8%
- isoflurane: लगभग 1.2%
- nitrous oxide: लगभग 105%; इसलिए normal atmospheric pressure पर अकेले full surgical anaesthesia नहीं दे सकता और दूसरे agents के साथ use होता है।



Lower MAC = greater potency



GENERAL ANAESTHETICS: USES AND SAFETY

Pre-operative assessment → **Induction** (rapid loss of consciousness) → **Maintenance** (with volatile anaesthetics, nitrous oxide or IV agents) → **Emergence** (stop agents, allow recovery of consciousness) → **Recovery** (post-anaesthesia care and monitoring)

e.g. propofol / ketamine / thiopentone / methohexital

Indications

- general anaesthesia की induction और maintenance
- short surgical या dental procedures: propofol या ketamine
- electroconvulsive therapy, ECT: propofol या methohexital
- refractory status epilepticus: specialist care में thiopentone
- analgesia या procedural sedation: nitrous oxide या ketamine

Important cautions



hepatic disease: halothane avoid या carefully assess करें



cardiovascular instability: propofol hypotension बढ़ा सकता है



raised intracranial pressure: specialist assessment और controlled ventilation चाहिए; ketamine automatic absolute contraindication नहीं है



acute porphyria: thiopentone जैसे barbiturates avoid करें



pregnancy: individual risk-benefit और obstetric-anaesthetic care



known malignant-hyperthermia susceptibility: triggering volatile anaesthetics और succinylcholine avoid करें

Adverse effects

Postoperative nausea या vomiting, respiratory depression, hypotension, कुछ agents से arrhythmias और delayed recovery। Halothane arrhythmia और rare severe hepatic injury कर सकता है।

Malignant hyperthermia

Triggers:
susceptible person में volatile anaesthetics plus या minus succinylcholine।

Warning signs:
rapidly rising carbon dioxide, tachycardia, muscle rigidity और बाद में hyperthermia।

Emergency sequence:

trigger stop → 100% oxygen → IV dantrolene → active cooling और acidosis, potassium तथा organ complications का supportive correction।

Safety rule

General anaesthesia में airway equipment, oxygen, circulation support और continuous monitoring जरूरी हैं।



SEDATIVES AND HYPNOTICS: CLASSIFICATION

Definition: Sedatives lower dose पर anxiety घटाकर calming करती हैं।
Hypnotics higher dose पर sleep induce और maintain करती हैं।
Dose के अनुसार same drug दोनों effects दे सकती हैं।

Based on duration:

- **short acting:** triazolam, zolpidem — sleep induction
- **intermediate acting:** lorazepam, temazepam — sleep maintenance
- **long acting:** diazepam, clonazepam — anxiety या seizures; next-day effects अधिक

Sleep depth:

Wakefulness (normal alertness) → Mild sedation (reduced anxiety) → Moderate sedation (calm and relaxed) → Deep sedation → Hypnosis (sleep)

Based on drug class:

1. **BENZODIAZEPINES, BZDs**
   Diazepam, lorazepam, triazolam।
   GABA-A receptor action enhance करती हैं।
2. **NON-BZD Z-DRUGS**
   Zolpidem, zaleplon, eszopiclone।
   Preferential sleep-promoting GABA-A effects; usually short acting।
3. **BARBITURATES**
   Phenobarbital, secobarbital।
   Respiratory-depression और overdose risk अधिक; अब limited uses।
4. **MELATONIN RECEPTOR AGONIST**
   Ramelteon।
   Sleep-wake cycle regulate करने में help करता है।
5. **SEDATING ANTIHISTAMINES**
   Hydroxyzine, diphenhydramine।
   H1 blockade से drowsiness; anticholinergic effects हो सकते हैं।
6. **OLDER AGENT**
   Safer options के कारण chloral hydrate largely obsolete हैं।

Key point: Choice treatment reason, onset, duration, age, comorbidities और dependence risk पर depend करती है।

First Hope

FREE PREVIEW

Click here to visit our website

PHARMACY PREMIUM NOTES

Complete subject and semesters are available on FirstHope app only.

Scan or click here

Click here to get the app >

Available on Google Play

JOIN THE FIRSTHOPE COMMUNITY

Join our Telegram channel

Click here to join Telegram >

Scan or click here

@FirstHopeNotes

Instagram

@firsthope.official

Click here to follow >

YouTube channel

FirstHope-Pharmacy / Live streams

Click here to watch >

WhatsApp channel

Follow FirstHope on WhatsApp

Click here to join >

FirstHope website

firsthope.co.in

Click here to visit >

B.Pharm / D.Pharm / M.Pharm / Pharm.D

Preview notes. Complete subjects and semesters in the FirstHope app.