General Anaesthetic

Content

General anesthetics

- Non-volatile anesthetics
- Pharmacological actions of thiopental
- Ketamine
- Neuroleptanalgesia

Intended Learning Outcomes

At the end of this lecture, student will be able to

- Give examples for non-volatile anaesthetics/intravenous anaesthetics
- Explain the pharmacological actions of thiopental
- List the uses of ketamine
- Describe neuroleptanalgesis

Intravenous anaesthetics

- These are inducing agents- because of rapidity of onset of action
- Maintained by inhalation agent
- Fast inducers- thiopental, methohexital, etomidate and propofol

Thiopentone sodium

- Ultra short acting barbiturates
- Induction very quick and pleasant- recovery also rapid
- Rapidly cross BBB and diffuse rapidly out of brain and redistributed
- Short acting
- Poor analgesic

Reduce cerebral metabolic rate of O2 consumption

Cerebral vasoconstriction

Reduce intracranial pressure and blood flow

Adverse effects

- **Laryngospasm**- prevent by atropine and succinylcholine

- **Postoperative Pain –** adequate analgesia should be provided
- pH is 11- local tissue damage(extravasate)

Uses

- Anticonvulsant in emergency treatment of intractable seizures
- Suitable drug for patients with cerebral oedema and brain tumor

ADME

- High lipid solubility
- Very short duration of action
- Rapidly metabolized by liver
- With successive doses body fat depots get saturated
- Slow release into plasma – prolonged recovery
- Readily cross placental barrier

Speed of induction?
- Rapid

Duration of action?
- Short (because of redistribution)

Metabolism
- Very slow

Cardiovascular effects?
- Depression due to decreased contractility and vasodilation

Respiratory effects?
- Depressant

Ketamine- Dissociative anaesthesia

- Characterised by a feeling of dissociation from surrounding. Profound analgesia, immobility and amnesia
- Primary site of action- cortex and limbic system (not RAS)
- Block the action of glutamate at NMDA receptor
- Dose: IM 5-10 mg/kg, IV 1-2 mg/kg
- 0.1 – 0.25 mg/kg IV complete analgesia
- Increases BP, HR, CO – Avoided in IHD patients
- Suitable for patients of hypovolemic shock

Disadvantages of Ketamine

- Causes Nystagmus, involuntary movements
- May cause delirium, hallucinations, colourful dreams
- Salivation may be troublesome

- Muscle relaxation – inadequate
- Increases i.o.t and intracranial pressure
- Drug of abuse
- Used for short lasting procedure:
    - Cardiac catheterization, bronchoscopy, dressing of burns, forceps delivery, teeth extraction, manual removal of placenta, dental work
- Not used in:
    - Heart disease, abdominal surgery, thyrotoxic patients, pregnant women at term, operation of eye, psychiatric disorders

Neuroleptanalgesia

- Combines the use of a neuroleptic drug with an opioid analgesic drug
- Differs from the classical general anesthesia
- Subject is conscious and able to cooperate during operative procedure
- Most favoured combination: Neuroleptic droperidol and analgesic drug fentanyl

Preanesthetic Medication

- To reduce anxiety and apprehension
- To obtain additive or synergistic effect – induction smooth and rapid
- To counteract certain adverse effects
- To relieve pre and post-operative pain
- To suppress respiratory secretion
- To reduce reflex excitability

1. Opioid analgesics

2. Sedative and tranqullisers: Bzds like diazepam/lorazepam: -smooth induction, loss of recall of perioperative events

3. Antimuscarinic drugs: Atropine/hyoscine and glycopyrrolate to reduce salivary and bronchial secretion

4. Antiemetics: Metoclopromide reduce post-operative vomiting, reduce chances of reflux and aspiration (by increase gastric emptying)

5. H2 Blockers/PPIs: reduce the risk of gastric regurgitation and aspirational pneumonia

Drugs Administered During Anesthesia

- Skeletal muscle relaxant
- Very short acting ganglionic blocker – to produce controlled hypotension
- Drugs to counter the anesthetic complication:

- Vasopressin – to correct hypotension
- Antiarrythmics
- Anticonvulsants

Summary

- Thiopental has high lipid solubility and thereby very short duration of action
- It is used in induction of anesthesia in short duration for fracture reduction, dilatation and curettage, laryngoscopy, bronchoscopy
- Ketamine is antagonist at NMDA receptor of cerebral cortex (limbic system)
- Following single dose produces dissociative anesthesia

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