

WEEK THREE- Pharmacology of anti-emetics

Nausea

- Subjective experience
- Usually but not always associated with vomiting
- Related to specific nerve pathways
 - Associated with ↑ salivation & tachycardia
- Retching follows:
 - Chyme forced from duodenum & stomach but pharyngo-oesophageal sphincter remains closed so chyme returns to stomach & cycle repeats

Vomiting- emesis

- A protective innate
- Due to: micro-organisms on food, chemotherapy drugs, hormones of pregnancy
- Usually associated with nausea & retching
- The forceful expulsion of the contents of the stomach

Symptoms of nausea & vomiting

Parasympathetic impulses →

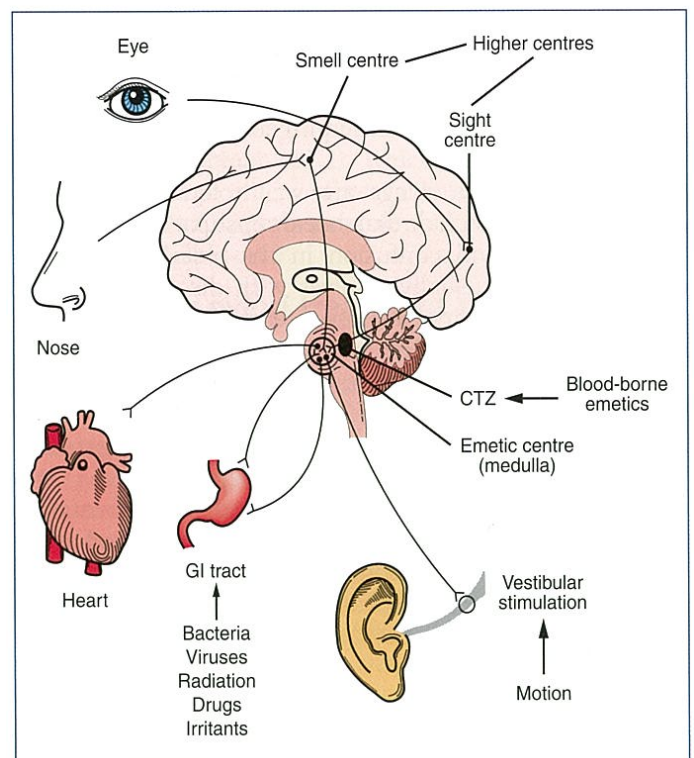
- ↑ salivation
- ↑ gastric motility
- Relaxation of oesophageal sphincters

Sympathetic impulses →

- Tachycardia
- Tachypnoea
- ↑ sweating

Brains regions for nausea & vomiting

- Medulla in the brainstem → emesis
- Chemoreceptor trigger zone (CTZ)
- The medulla receives input from:
 - The CTZ
 - The vestibular apparatus
 - Higher centres relaying sensory input
 - Organs incl. the heart & parts of the GIT
- The CTZ:
 - Sensory monitoring and relay centre inferior & posterior to the 4th ventricle (area postrema) outside the blood brain barrier so receives emetic information from the blood and the CSF e.g. toxins, drugs, neurotransmitters
 - CTZ doesn't cause vomiting
 - CTZ relays info by neurotransmitters (acetylcholine, serotonin, histamine, dopamine)
 - Anti-emetics block these neurotransmitters



Pharmacology of anaesthetic agents

General anaesthetic

- Produces a reversible state of unconsciousness with an absence of pain
 - main effects on the CNS
 - Ideal when person has loss of consciousness, amnesia & analgesia

Local anaesthetic

- Blocks the sensation of pain in a specific part of the body
 - consciousness not depressed

Stages of Anaesthesia



Stage 1: Analgesia

- Pain removed but consciousness retained
- Nitrous oxide used in childbirth, trauma & dentistry

Stage 2: Excitement

- More or less unconscious, may be fearful, violent – patient may experience **delirium**
- Must be as short as possible
- Sudden death can occur due to stimulation of vagus nerves

Stage 3: Surgical anaesthesia

- Progressive muscle relaxation (important to avoid reflexes when tissue cut) → respiratory paralysis. ET tube + ventilator
- Neuromuscular blocking agents block laryngeal (gag) reflex e.g. suxamethonium (blocks ACh receptors → paralysis)

Stage 4: Paralysis of the medulla

- Stage where respiratory & circulatory failure occurs – ‘an anaesthetic accident’

General anaesthetics (GA)

- Inhibits nerve impulses to the CNS
- E.g.
 - Fluorinated hydrocarbons – e.g. isoflurane, sevoflurane, methoxyflurane (Penthrox®)
 - Barbiturates – e.g. sodium thiopental
 - Non-barbiturates – e.g. propofol, ketamine & benzodiazepines – e.g. midazolam, diazepam, lorazepam
 - + opiates – e.g. morphine, fentanyl