Drugs acting on the digestive system: Emetics

Dr Mutie D. M.

Definitions

- By now it is expected that you have gone through the video on physiology of vomiting.
- What is Emesis: Act of forceful expulsion of gastric contents through the mouth, sometimes the nose
- It is often preceded by nausea
- Is vomiting useful in any way? **Write down your answers**.
- We will first go through drugs that are used to induce emesis.

Learning outcomes

By the end of this session, you should be able to:

- Classify emetics and give at least two examples
- Describe their mechanism of action
- List indications for emetics
- List adverse effects and contraindications
- Write appropriate prescription for an emetic

Emetics

- Let us now explore drugs used to induce emesis.
- They are Required when an undesirable substance has been ingested
- **Classification** : it is based on point of action.

1. Stimulants of CTZ: eg Apomorphine
2. Irritants of gastric mucosa
   a. mustard
   b. sodium chloride
3. Both CTZ stimulant and irritant effect: ipecacuanha, digitalis
4. Olanzapine

Apomorphine

- This is a dopamine agonist, used in management of parkinsonism.
- Produce vomiting in 5-10 minutes after administration
- Route- subcutaneous/IM, Dose- 2 to 4mg
- Metabolised in the liver.
- Apormorphine is a CNS depressant so **in which situation would it be contraindicated?**
- Vomiting is accompanied by sedation
- Large doses can cause restlessness, tremors

Ipecacuanha

- This drug is commonly available as syrup, and is also known as ipecac syrup. **From which plant is it derived?**
- Dose- 15 to 20ml (adults) once which may be repeated once with 15ml if vomiting doesn’t occur within 20 minutes.
- Induces vomiting within 15 minutes
- It is considered safer than apomorphine
- If vomiting is not induced, there may be significant systemic absorption

Ipecacuanha cont.

- Side effects include prolonged vomiting, aspiration, CNS depression,

Mustard and sodium chloride

- Mustard is a household remedy to induce vomiting
- Dose- 1teaspoonful with water
- It is considered safe
- Sodium chloride
- A high concentration of Sodium chloride is usually used.
- It withdraws fluid from the cells lining the stomach, causes irritation and reflex emesis

Uses/indications of emetic drugs

- Acute cases of poisoning except
  - in corrosive substances poisoning
  - if patient is not fully conscious
- Alcoholic intoxication
- Removal of foreign bodies from the oesophagus
- Certain cases of paroxysmal tachycardia

Contraindications to emetic drugs

- Poisoning from the following substances:
  - Corrosive(acid/alkali) poisoning
  - Kerosene (petroleum) poisoning
  - Unconscious patients
  - Morphine (and CNS stimulants) poisoning

- Medical conditions:
  - Hernias
  - Aneurysm
  - Severe heart diseases
  - Peptic ulcer
  - Pulmonary TB
  - Prolapse of rectum or uterus
  - Threatened abortion
  - Weak / debilitated persons

Summary

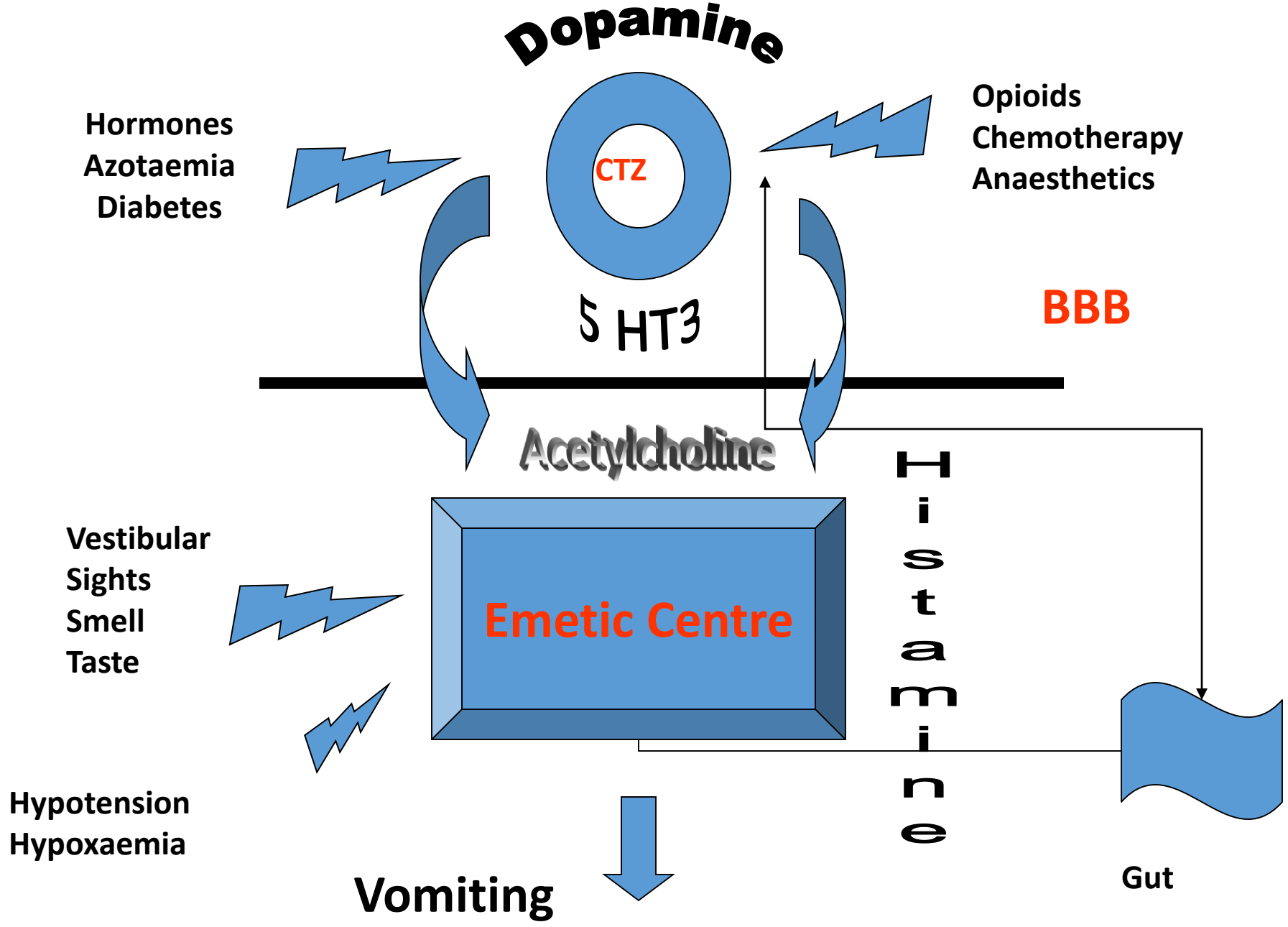
- This marks the end of the session on emetic drugs. We set out to:
  - Classify emetics and give at least two examples
  - Describe their mechanism of action
  - List indications for emetics
  - List adverse effects and contraindications
- Take a minute or two to go over these outcomes and identify any area where you still need help.

Drugs acting on the digestive system: Anti-emetics

Dr Mutie D. M.

Introduction

- We will now go through drugs that are used to prevent and/or stop emesis. By the end of this session, you should be able to:
  1. Classify antiemetics and give at least two examples
  2. Describe their mechanism of action
  3. List indications for antiemetics
  4. List adverse effects and contraindications
- Before we move on, remind yourself the neurotransmitters that are involved in the vomiting process. They form the background to antiemetic mechanism of action


Dopamine
CTZ
Hormones
Azotaemia
Diabetes
Opioids
Chemotherapy
Anaesthetics
5 HT3
BBB
Acetylcholine
Histamine
Vestibular
Sights
Smell
Taste
Emetic Centre
Hypotension
Hypoxaemia
Vomiting
Gut

Pause

- Vomiting may also occur in absence of an infection or direct stimulus like smell. **Name any of these situations**, also referred to as Irrational reflexes
- We pause here to remind us that many drugs can cause emesis as a side effect. **List** some of the ones you have come across in your earlier sessions.
- Remember there are drugs that cause serious vomiting; patients on these drugs often require antiemetics. This is the content of this session
- Some of the drugs we are going to discuss are used for prophylaxis while others are more useful in treatment.

Classification of antiemetics

1. Dopamine antagonists
2. Serotonin $5HT_3$ antagonists
3. Anticholinergics
4. Antihistamines
5. Neurokinin antagonists
6. Others

1. Anti-dopaminergic agents

- Examples include Chlorpromazine and Droperidol identify three more examples
- **MoA**: antagonism of dopamine, D_2 receptors
- PO,IV, IM; liver metabolism, renal excretion
- **Use**: used to treat and prevent nausea and vomiting Post operative vomiting, radiation vomiting, drug induced (cancer), emergency anaesthesia

1. Anti-dopaminergic agents cont.

- **List the side effects of these agents**

2. Serotonin $5HT_3$ antagonists

- They tend to end with ‘setron’ Examples: Ondansetron, Granisetron.
- These block serotonergic receptors at vomiting centre, CTZ, vagal stimulation may also occur
- Available as per oral preparations, as well as IV especially prior to chemotherapy sessions
- Metabolised in the liver and excretion is renal and hepatic
- Uses: Post operative, chemotherapy, post radiation vomiting. They are not useful in motion sickness. **Why is this?**
- Side effects include headache and dizziness, constipation and diarrhoea

3. Anticholinergics

- **What drugs are found in this class and used as antiemetics?**
- **MoA**: antimuscarinic action in gut and centrally
- Preparations: PO, IM, patch
- **Use**: motion sickness-single dose for short journeys; vertigo and nausea post middle ear surgery
- **SE**: drowsiness, dry mouth, urinary retention

4. Antihistamines

- Example: Promethazine, cyclizine , Meclizine
- H1 receptor antagonists are particularly effective at treating nausea and vomiting whose cause is motion sickness or vertigo.
- They are also useful in post operative and drug-induced nausea and vomiting
- SE: Sedation; anticholinergic effects – dry throat, dry mouth, constipation; headache,
- Note that promethazine is an antipsychotic with antihistamine activities

4. Antihistamines cont.

- Contraindications
- benign prostatic hypertrophy
- With other sedating drugs
- Patients using antipsychotic drugs

5. Neurokinin antagonists

- eg: Aprepitant, rolapitant
- Centrally acting, block the NK_1 receptors
- **Use**: in combination with 5-HT3-receptor blockers and corticosteroids for the prevention of acute and delayed nausea and vomiting (especially during cancer therapy)
- Side effect: Fatigue / weakness, Neutropenia, Constipation, Itch, Dizziness, Headache, Liver enzyme elevation

6. Others

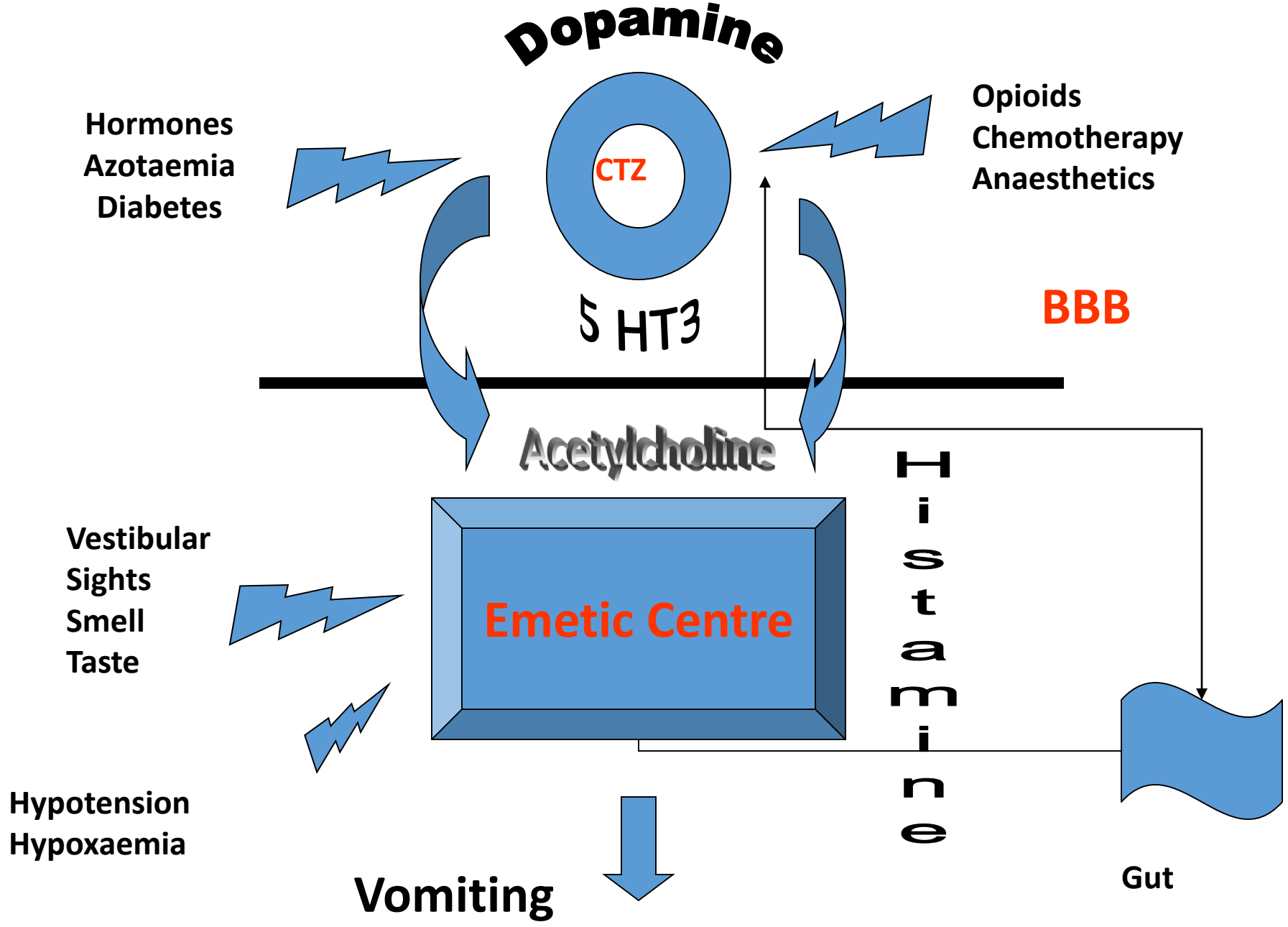
- The drugs in this category are mainly used in other conditions but have antiemetic properties that are clinically useful.

A. Glucocorticoids: dexamethasone, methylprednisolone
   - Use: cytotoxics, together with 5HT3 antagonists

b. Benzodiazepines: eg diazepam. These are especially useful in nausea and vomiting caused by the patient's belief that they may be sick
   - Also used before cytotoxics

Anti-emetic agents: Choice

- Postoperative
- Chemotherapy
- Travel sickness
- Parkinson’s disease (especially apomorphine)
- Pregnancy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General notes

- Symptomatic relief could delay diagnosis of a critical illness
- Antiemetic drugs are generally more effective in prophylaxis than treatment
- Cause should be diagnosed and managed accordingly
- Choice of drug depends on aetiology
- Nausea and vomiting in pregnancy: rarely use drugs coz of possible dangers

Conclusion

- That is the end of this session. Test yourself to see if you can:

1. Classify antiemetics and give at least four examples
2. Describe their mechanism of action
3. List indications for antiemetics
4. List adverse effects and contraindications

- To aid your revision, do the assignment in the main page on the portal