Antiemetic drugs

Nausea and vomiting may be manifestations of many conditions. A useful mnemonic for remembering causes of nausea and vomiting is VOMIT.

Vestibular
Obstruction (opiates)
Mind (dysmotility)
Infection (irritation of gut)
Toxins (taste and other senses)
Control of vomiting

1. Vomiting center

Respond to inputs from

- Vestibular system.
- Periphery (Pharynx, GIT).
- Higher brain stem and cortical structures.
- CTZ stimulation
- Muscarinic, histaminergic, serotonergic receptors.
Chemoreceptor trigger zone (CTZ)

- CTZ includes nucleus ambiguous, nucleus of solitary tract and nucleus of the vague.
- CTZ is physiologically outside BBB (chemical stimuli in blood, CSF).
- D2, 5HT3 receptors.
Receptors Associated with Nausea and Vomiting

(Dopamine, Serotonin)

(Intrinsic: Substance P, Acetylcholine, Histamine)

(Vestibular Apparatus)

(GI Tract)

(Acetylcholine, Histamine, Serotonin, Substance P & mechanoreceptors)

CTZ

CNS
1. CTZ stimulation:

- Drugs: morphine, apomorphine, digitalis, L-dopa, bromocryptine, estrogen, emetine.
- Chemicals
- Radiation
- Uremia
2. The periphery via sensory nerves
   GIT irritation, myocardial infarction, renal or biliary stones.

3. Disturbance of vestibular system

4. Higher cortical centers stimulation:
   emotional factors, nauseating smells or sights.
Classification of Antiemetic Drugs

1. **Muscarninic receptor antagonists**
   - Hyoscine (transdermal patches)
   - Motion sickness
   - Not in chemotherapy-induced vomiting

2. **H1-receptor antagonists**:
   - promethazine, diphenhydramine, meclizine, dimenhydrinate.
   - Motion sickness
3. **Dopamine antagonists:**

**Prokinetics:**
- Metoclopramide, domperidone.
- Effective against vomiting due to gastroenteritis, medications, surgery and toxins, uremia.

**Neuroleptics:** chlorpromazine

**Side effects** dystonic reactions, sedation, and postural hypotension
4. **5-HT3 antagonists:**

Ondansetron, granisetron

- Long duration of action.
- Half life 4-9 h

Taken once daily

Very effective in vomiting due to chemotherapy, postoperative vomiting and after radiotherapy.
5. **Cannabinoids**: Nabilone, dronabinol
   - Sedation, hallucination and dysphoria.
   - Used as appetite stimulant
   - May cause euphoria

6. **Glucocorticoids**
   - Dexamethasone and methylprednisolone
   - Highly effective in acute emesis
   - Mechanism not known.
   - Hyperglycemia, insomnia.

7. **Vitamin B6** Pyridoxine
Therapeutic Choice of Antiemetics

Motion sickness
Hyoscine: For short Journey.
Diphenhydramine: For Long Journey.

Vomiting with pregnancy
avoid all drugs in the first trimester
Pyridoxine (B6)
Promethazine (late pregnancy).
Drug-induced vomiting (CTZ)  
domperidone & metoclopramide

Vomiting due to cytotoxic drugs.
Ondansetron - Dopamine antagonists.
Dexamethazone - Nabilone.

Post operative vomiting
Dopamine antagonists.