

# Postoperative Nausea & Vomiting (PONV)

## Why do we care about PONV?

- Up to 1/3 of patients without prophylaxis will experience PONV (up to 70-80% among high-risk patients).
- Causes patient discomfort
- Prolonged PACU stay
- A leading cause of unanticipated hospital admission
- Possible aspiration risk
- Patients report avoidance of PONV as a greater concern than postoperative pain (willing to pay \$56-100 out-of-pocket for effective PONV control).

## Major Risk Factors

### Patient-Related

- History of PONV or motion sickness
- Female > male
- Young > old
- Non-smoker

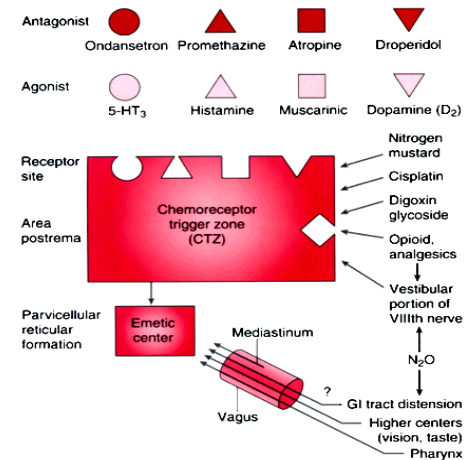
### Anesthetic-Related

- N<sub>2</sub>O, volatile anesthetics
- Drugs (narcotics, neostigmine)
- Aggressive hydration (gut edema)

### Surgery-Related

- Duration of surgery - every 30 minutes increases risk by 60% above baseline (e.g. 10% → 16% after 30 minutes)
- Type of surgery (laparoscopic, ENT, neuro, breast, plastics, strabismus)

## Chemoreceptor Trigger Zone



## Antiemetic Classes

### 5-HT<sub>3</sub> Antagonists (e.g. Ondansetron, Granisetron)

- Serotonin receptor antagonist
- More effective at preventing emesis than nausea
- All agents equally effective
- Zofran 4-8 mg IV or Kytril 0.1-1 mg IV before end of case

### Steroids

- Cheap and effective
- Can be given anytime, for prolonged PONV relief
- Avoid in diabetics
- Decadron 4-10 mg IV anytime during case

### Gastrokinetic (e.g. Metoclopramide)

- Dopamine antagonist; can cause extrapyramidal SEs
- Increases GI motility and LES tone
- Reglan 20 mg IV before end of case

## Antiemetic Classes

### Phenothiazines (e.g. Promethazine, Prochlorperazine)

- Dopamine antagonist
- Can cause sedation and extrapyramidal side effects
- Phenergan 12.5-25 mg at end of case.

### Anticholinergics (e.g. Scopolamine)

- Centrally acting
- Transdermal administration requires 2-4 hours for onset.
- Anticholinergic side effects ("mad as a hatter", "blind as a bat", "dry as a bone", "red as a beet").
- Scopolamine patch 1.5 mg TD q72hr

### Butyrophenones (e.g. Droperidol, Haloperidol)

- Central dopamine antagonist
- Cheap and effective, but a "black box" warning regarding QT prolongation has caused it to fall out of favor.
- Droperidol 0.625-1.25 mg IV at end of case.

## Other Antiemetic Agents

### Vasopressors

- Ephedrine 50 mg IM
  - Prevents gut hypoperfusion

### Induction agents

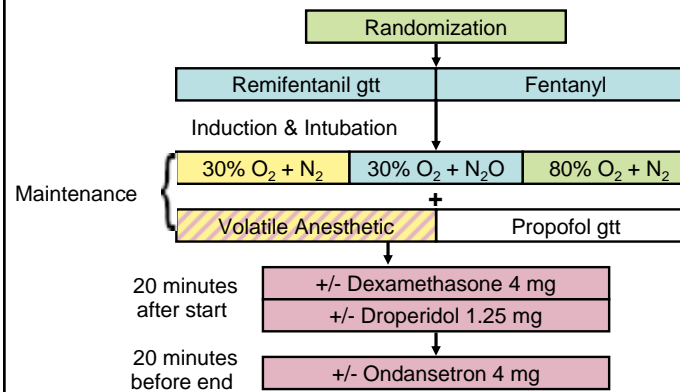
- Propofol 10-20 mg IV bolus

### Antihistamines (H<sub>2</sub>-blockers)

- Cimetidine 300 mg IV
- Ranitidine 50 mg IV

## IMPACT Trial: Study Design (Apfel et al., 2004)

5161 patients, 6 treatments ( $2^6 = 64$  treatment groups)

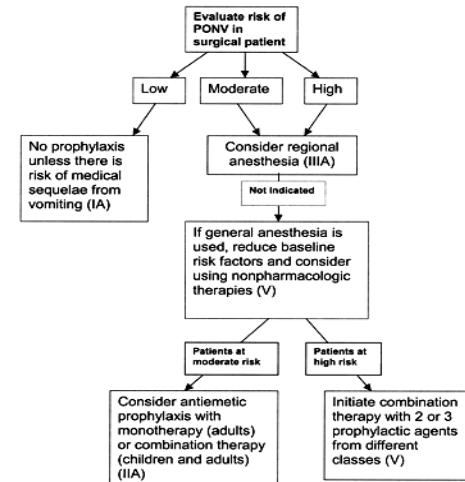


## IMPACT Trial: Results (Apfel et al., 2004)

Intervention	RR Reduction	P value
Dexamethasone (vs. none)	26.4%	<0.001
Ondansetron (vs. none)	26.0%	<0.001
Droperidol (vs. none)	24.5%	<0.001
Nitrogen carrier (vs. N <sub>2</sub> O)	12.1%	0.003
Propofol gtt (vs. volatiles)	18.9%	<0.001
Remifentanyl gtt (vs. fentanyl)	-5.2%	0.21

- Interventions acted independently of each other; relative risk reduction (RRR) of combined therapy can be estimated by multiplying individual RRRs.
- Average PONV = 34% (59% with volatile + N<sub>2</sub>O + remi + no antiemetics; 17% with propofol + N<sub>2</sub> + fentanyl + antiemetics x3).
- Use the safest and cheapest antiemetic first; use combined therapy only in moderate or high-risk patients.

## Algorithm for PONV Treatment



## Strategies to Reduce PONV

- Use regional anesthesia vs. GA
- Use propofol for induction and maintenance of anesthesia
- Use intraoperative supplemental O<sub>2</sub> (50-80%)
- Avoid N<sub>2</sub>O and/or volatile anesthetics
- Minimize opioids
- Minimize (<2.5 mg) or eliminate neostigmine
- Maintain euvolemia; avoid hypervolemia (gut edema)
- Use a combination of antiemetics in different classes

## References

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