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# The Pharmacist's Role in Treating Nausea and Vomiting

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**N**ausea has been defined as stomach distress with distaste for food and an urge to vomit or physically expel the stomach, esophageal, and/or oropharyngeal contents.<sup>1,2</sup> Nausea and subsequent vomiting can have a significant impact on a person's life. It has been estimated that costs associated with acute gastrointestinal (GI) infections alone exceed \$3.4 billion annually and that billions of dollars per year are spent on non-prescription products to treat nausea and vomiting.<sup>2,3</sup> The brain and GI tract are both involved in the pathophysiology of nausea and vomiting.<sup>2,4</sup> Areas in the brain involved in nausea and vomiting include the chemoreceptor trigger zone, which can be stimulated directly by toxins and lead to symptoms; the vestibular apparatus which detects motion and body position and when altered, can lead to motion sickness and resulting symptoms; and the medulla oblongata in the brain stem which can be stimulated directly by sight, smell, toxins, or memory through the cholinergic system to elicit nausea.<sup>2,4</sup> Gastric distention and slowed gastric emptying can stimulate nausea in the GI tract.<sup>2</sup>

A patient presenting with nausea and/or vomiting can have a wide variety of underlying causes. Unfortunately, many of the causes of nausea and resulting vomiting can be serious. Generally, chronic nausea and vomiting requires referral to a health care

**Table 1**

## Examples of Patient Referral Required<sup>a</sup>

### Causes Requiring Referral

- Acute myocardial infarction
- Appendicitis
- Bowel obstruction
- Bulimia nervosa
- Closed head injury
- Congestive heart failure
- Diabetic ketoacidosis
- Gastroparesis
- Migraine
- Pancreatitis
- Peptic ulcer
- Pyelonephritis
- Seizure
- Stroke
- Urinary tract infection

### Patient Presentations Requiring Referral

- Child <1 year old
- Child not urinating
- Food poisoning
- Jaundice
- Lethargic, or crying child
- Neck stiffness
- Patient with diabetes and severely elevated blood sugar
- Poisoning suspected
- Pregnancy or lactation
- Repeated or recurrent vomiting
- Severe abdominal pain in the middle or right lower quadrant
- Signs of dehydration
- Vomiting of blood
- Weight loss, fever, abdominal pain

<sup>a</sup>List is *not* all-inclusive. Always perform a thorough medical and medication history. Adapted from references 2-4.

provider. For patients presenting with acute symptoms, it is important for the pharmacist to perform a thorough medical history. Table 1 provides several patient presentations and serious causes of nausea and vomiting that require referral to the emergency department or the primary care provider. A list of medications commonly associated with nausea and vomiting is given in Table 2. It is important for the pharmacist to review all OTC, herbal, and prescription medications to evaluate for medication-related causes and exclude this as a possible cause or contributor.

Nausea and vomiting that is occasional and self-limiting without an ominous patient presentation can be appropriate for self-treatment. Causes of nausea and vomiting appropriate for self-treatment include motion sickness, viral gastroenteritis, heartburn, and food or drink indiscretions. Several OTC therapies are available for the treatment of nausea and vomiting.

## OTC Therapy

### Antihistamines

Antihistamines, including meclizine, dimenhydrinate, diphenhydramine, and doxylamine, are useful for the prevention or treatment of nausea and/or vomiting associated with motion sickness. It is thought that antihistamines work by decreasing elevated histamine levels in several areas of the brain associated with motion sickness.<sup>2</sup> These agents are more effective at preventing than treating nausea/vomiting. Therefore, patients are encouraged to initiate these agents

**Table 2****Medications Associated with Nausea and Vomiting**

- Chemotherapeutic agents
- Nonsteroidal anti-inflammatory drugs
- Opioid pain relievers
- Antibiotics
- Excessive alcohol consumption
- Oral contraceptives
- Hormone replacement therapy
- Digitalis, theophylline, or anticonvulsant toxicity
- Medication withdrawal (eg, opioids, selective serotonin reuptake inhibitors, benzodiazepines)

Adapted from references 2-4.

30 to 60 minutes prior to any activity where motion sickness is anticipated. Patients taking these agents should be counseled to avoid concurrent alcohol, hypnotics, sedatives, and other central nervous system depressants, as additive drowsiness can occur. Dosing is drug-specific, with certain agents not recommended in children.

**Acid-reducing/neutralizing agents**

Agents that reduce or neutralize stomach acid can relieve nausea associated with heartburn or stomach upset from the consumption of excessive or disagreeable foods or beverages.<sup>2</sup> Antacids include calcium carbonate, aluminum hydroxide, magnesium hydroxide, and others. They neutralize existing stomach acid by increasing the pH of the stomach. OTC histamine 2 (H<sub>2</sub>) receptor antagonists, including famotidine, cimetidine, and ranitidine, inhibit gastric acid secretion in the stomach to provide relief of heartburn, dyspepsia, and indigestion.<sup>2</sup> Again, dosing is drug-specific, with certain agents not recommended in children.

**Ginger (*Zingiber officinale*)**

Ginger has been shown to be superior to dimenhydrinate for motion sickness and beneficial for nausea and vomiting in pregnancy.<sup>5</sup> The mechanism is

thought to be similar to that of prescription Zofran (ondansetron), which blocks 5-HT<sub>3</sub> (serotonin) receptors in the ileum.<sup>6</sup>

**Emetrol**

Emetrol has been available for 60 years.<sup>7</sup> According to an article from 1953, the preparation was introduced into therapeutics by J.E. Bradley for the treatment of epidemic vomiting in children.<sup>8</sup> It contains a solution of 1.87 g dextrose (glucose), 1.87 g levulose (fructose), and 21.5 mg phosphoric acid per 5 mL and is clinically referred to as "phosphorated carbohydrate solution."<sup>7</sup> The hyperosmolar solution with phosphoric acid that makes up Emetrol is thought to work by decreasing smooth muscle contraction and delaying gastric emptying time through a direct action on the GI wall.<sup>2,9</sup> It is considered an antiemetic and is indicated for the relief of nausea caused by upset stomach resulting from intestinal flu, stomach flu, and food or drink indiscretions.<sup>9</sup> The product has also been used off-label for motion sickness and nausea and vomiting associated with pregnancy.<sup>2,9</sup>

In 1954, a double-blind study was performed to evaluate the efficacy of Emetrol in 110 patients suffering from nausea and vomiting due to a variety of causes.<sup>10</sup> The main objective of the study was to determine the effect of Emetrol within 1 hour using 4 repeated doses of 2 tablespoons every 15 minutes. In the trial, 37 patients had "organic" causes of nausea and vomiting, which the authors described as stomach cancer, breast cancer, diabetes, heart block, and gallbladder disease, and 73 patients had "functional" causes of nausea and vomiting, which the authors described as pregnancy, anxiety, constipation in the aged, migraine, and motion sickness. The oral phosphorated carbohydrate solution provided some relief in 8.1% of "organic" cases and some form of relief in 52% of "functional" cases.

No side effects were noted. More recent literature to support the use of Emetrol is not available.

In adults, the usual dose for nausea is 15 to 30 mL. The dose may be repeated every 15 minutes until distress subsides, but should not be taken for more than 1 hour or 5 doses. In children aged 2 to 12 years, the usual dose is 5 to 10 mL, which can be repeated every 15 minutes until distress subsides. Similar to adults, children should not take it for more than 1 hour or 5 doses.<sup>9</sup> For maximum effectiveness, Emetrol should not be diluted, nor should fluids be taken before or immediately after consumption.<sup>7</sup> Emetrol is considered safe, but a few important contraindications do exist. Patients with diabetes should avoid this product, given its high sugar content. In addition, individuals with hereditary fructose intolerance should avoid Emetrol.<sup>7,9</sup>

**Role of the Pharmacist in Nausea/Vomiting**

Pharmacists are the front-line health care provider. In this role, a pharmacist must perform a thorough medical and medication history to identify underlying causes and to appropriately treat or refer patients with nausea and/or vomiting. When the pharmacist identifies self-treatment as appropriate, several OTC options are available, depending on the underlying cause. For patients with upset stomach from intestinal flu, stomach flu, and food or drink indiscretions and without contraindications, Emetrol, a hyperosmolar solution with phosphoric acid, is a safe and effective treatment for adults and children aged 2 years or older. If 5 doses or 1 hour of treatment does not resolve the stomach upset, or if the stomach upset recurs often, patients should be instructed to seek further medical advice with their primary care practitioner. ■

► For a list of references and a case presentation, go to [www.PharmacyTimes.com/P2PNauseaVomiting](http://www.PharmacyTimes.com/P2PNauseaVomiting).

***This handout for pharmacists will be available online at [www.PharmacyTimes.com](http://www.PharmacyTimes.com).***

### **Case: Example of Patient Requiring Referral**

Applying the information from Tables 1 and 2, consider the following case example. A 21-year-old patient had knee surgery 10 days ago and has been taking hydrocodone/acetaminophen and naproxen 500 mg twice daily for pain, along with aspirin 325 mg daily for postsurgery blood clot prevention. The patient states that he has not had a bowel movement in 1 week and now complains of sharp, intense epigastric pain and abdominal pain. A thorough medical history performed by the pharmacist yields no significant clinical information. Given the medication history and recent surgery, the patient is at risk for stomach ulcer from the aspirin and naproxen. The patient also may be at risk for bowel obstruction from the opioid pain reliever and should be referred back to the surgeon or his primary care provider.

