

## NAUSEA AND VOMITING

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### **What is nausea and vomiting?**

Nausea is the unpleasant urge to vomit. Vomiting is the forceful ejection of stomach contents through the mouth. This is generally a protective mechanism to remove harmful ingested substances, but can occur from many unrelated infectious and inflammatory conditions in the body. Muscles in the abdominal wall contract vigorously to create the pressure necessary for vomiting (retching). Retching, also called 'dry heaving' can also occur without vomiting, or can precede or follow vomiting. Similarly, nausea can occur without vomiting or may precede vomiting.

Vomiting must be differentiated from regurgitation, which is the effortless movement of swallowed food contents or stomach acid from the stomach back into the mouth. Regurgitation is not associated with nausea or retching. When regurgitated material tastes sour and bitter, it may be a manifestation of reflux disease, but when it tastes the same as ingested food, it indicates a problem with food movement from the swallowing tube into the stomach. Rumination is another symptom that may resemble vomiting. Rumination consists of regurgitation of ingested food followed by rechewing and reswallowing, and is a learned behavior that may be considered pleasurable by the patient.

### **How can nausea and vomiting affect you?**

Nausea and vomiting are distressing symptoms that can make it difficult to go to work or perform normal activities. Nausea and vomiting after surgery, associated with pregnancy and acute infectious illnesses lead to significant loss of worker productivity and medical expenses. In the United States, it is estimated that the cost of acute stomach infections (often resulting in acute nausea and vomiting) exceeds \$1 billion dollars per year in medical expenses alone; the cost of absence from work and lost productivity may be even higher. Some patients feel that nausea and vomiting after surgery is worse than pain after surgery. Nausea and vomiting occurring after a surgical procedure can result in longer hospital stays and higher costs of hospitalization. As many as 8 out of 10 pregnant women develop nausea and vomiting in the early stages of their pregnancy, resulting in time away from work or home. Nausea and vomiting due to cancer chemotherapy can reduce the patient's ability to complete household tasks, enjoy meals, spend time with others and perform their usual activities.



## **Common causes of nausea and vomiting**

Common causes of nausea and vomiting include the following:

- a. Medicines. Nausea and vomiting can result from almost any medication. Certain medicines such as chemotherapy for cancer and anesthetic agents are particularly known for causing nausea and vomiting.
- b. Infections of the gastrointestinal tract. These may be caused by viruses or bacteria and includes gall bladder infections (cholecystitis), appendicitis, viral hepatitis and diverticulitis.
- c. Infections outside the gastrointestinal tract such as pneumonia, bladder and kidney infections, meningitis and ear infections.
- d. Bacterial toxins in food (food poisoning)
- e. Pregnancy
- f. Motion sickness
- g. Alcohol intoxication
- h. Inflammation of the abdominal organs such as pancreatitis, Crohn's disease or ulcerative colitis.
- i. Intestinal blockage. This can occur due to stomach or intestinal ulcers, cancers and tumors or inflammatory diseases like Crohn's disease.
- j. Slow intestinal movement or transit such as gastroparesis (delayed emptying of stomach), ileus or pseudoobstruction. Slow transit can be due to many causes.
- k. Migraine headaches
- l. Other brain and nervous system disorders including tumors of the brain, seizures, head trauma and multiple sclerosis.
- m. Hormonal disorders including diabetes, overactive thyroid (hyperthyroid) and underactive adrenal glands (Addison's disease).
- n. Kidney failure
- o. Radiation therapy
- p. Psychiatric disorders such as anxiety, depression, anorexia nervosa and bulimia.
- q. Cyclic vomiting syndrome
- r. Physical or emotional pain
- s. Heart attack can sometimes manifest as nausea and vomiting

## **Symptoms of nausea and vomiting**

Nausea is often referred to as a "queasy sensation" or a feeling of being "sick to the stomach." Nausea may occur with or without vomiting and vomiting can occur without nausea. These symptoms may be accompanied by a sensation of flushing, sweating, salivation, lightheadedness and upper abdominal discomfort. Important associated symptoms include: anorexia, a decreased interest in eating; sitophobia, a fear of eating due to unpleasant symptoms; and early satiety, feeling full early after eating only a small amount of food. Associated symptoms and circumstances prior to the onset of nausea



and vomiting can help your doctor determine the cause. The cause of acute nausea and vomiting can very often be diagnosed by doctors just by listening to the patient's history and performing a physical examination. However, chronic nausea and vomiting, which by definition is when symptoms have lasted longer than 1 month, is more challenging to diagnose and treat.

### **Evaluation of nausea and vomiting**

The cause of an acute episode of nausea and vomiting is typically determined through detailed history and physical examination. Only if the cause remains unclear should further diagnostic tests be performed; sometimes tests are performed to determine if there are harmful consequences from nausea and vomiting. If nausea and vomiting are the result of a minor illness or short-term problem, there may be little cause for concern. However, your doctor will determine if hospital admission is needed or if further testing can be performed as an outpatient and if medication may be beneficial. Hospital admission is more common for elderly and the very young, as they can become dehydrated quickly. If diarrhea, dehydration, or both are present, intravenous fluids may be needed, necessitating a visit to the doctor's office, the emergency room or even admission to the hospital. Finally, even if nausea and vomiting are not particularly severe, hospital admission may be needed for tests and further treatment if symptoms do not improve after several days.

A three step approach is recommended for the evaluation of nausea and vomiting. The first step is to evaluate and treat harmful consequences of nausea and vomiting such as dehydration or alteration in chemical levels in the blood (electrolyte imbalance). Next, the cause of nausea and vomiting is investigated and treated. Finally, if no cause can be determined, therapy to improve symptoms is initiated.

### **Potential harmful consequences of nausea and vomiting**

Dehydration and/or imbalance of the body's electrolytes and minerals circulating in the blood can be problematic when vomiting is severe or prolonged. This is one of the most important acute consequences of nausea and vomiting. Evaluation consists of measuring vital signs (pulse, blood pressure, temperature), physical examination to look for signs of dehydration, checking levels of chemicals in the blood, evaluating kidney and liver function with blood tests and performing limited tests such as an EKG. Treatment consists of intravenous fluids, sometimes with added chemicals (Ringer's lactate, fluids with added potassium or magnesium).

When symptoms are prolonged, weight loss or malnutrition may occur. Supplementation of nutrition to prevent or to reverse weight loss can include feeding into the intestines (enteral nutrition) or sometimes directly into a large vein (parenteral nutrition).

Forceful retching or vomiting can lead to tears of the intestinal junction, where the esophagus joins with the stomach. When these tears are limited to the inner lining, they



are called Mallory-Weiss tears. Mallory-Weiss tears may cause intestinal bleeding. Passing of bright red or dark blood in the vomitus or from the rectum could be due to Mallory-Weiss tears. Rarely, tears can be through the entire wall of the esophagus resulting in perforation and the escape of stomach contents outside the gut, Boerhaave's syndrome. This is a serious condition and can lead to abscess formation or fluid collection, typically around the bottom of the left lung. Violent retching can occasionally cause painful bruises or tears in the abdominal wall muscles.

### **Identifying causes of nausea and vomiting**

After a detailed history and thorough physical examination, your doctor will often be able to determine the cause of nausea and vomiting. Knowing what preceded the onset of nausea and vomiting and the following associated symptoms are important clues to uncovering the diagnosis:

- a. Sudden onset of symptoms with fevers, body aches, runny nose, cough and diarrhea may indicate possible infection, usually a virus, but sometimes bacterial infection.
- b. If symptoms began after anesthesia or following chemotherapy, medication is a likely cause. Similarly, nausea and vomiting may occur after use of recreational drugs (marijuana, cocaine) or alcohol.
- c. Early morning vomiting often occurs during pregnancy but may also be seen in subjects with kidney failure.
- d. Vomiting several hours after a meal may suggest blockage in the stomach or intestines.
- e. Abdominal pain followed by vomiting may suggest inflammation in the abdomen such as pancreatitis or intestinal obstruction.
- f. Explosive projectile vomiting can be associated with increased pressure inside the brain such as meningitis or tumors.
- g. Vomiting immediately after a meal could indicate blockage in the stomach but can be associated with psychiatric disorders such as anorexia or bulimia.
- h. Chronic nausea and vomiting may be caused by hormonal disorders (diabetes, pregnancy) or functional disorders, symptoms in the absence of specific abnormalities that can be identified on testing.
- i. Cyclic vomiting syndrome is characterized by intense vomiting lasting a few hours or a few days with long periods without symptoms.
- j. Loss of weight, malnutrition and dehydration may result from long standing nausea and vomiting, as it may be associated with reduced or poor oral intake of nutrients.

If the diagnosis still remains unclear after a history and physical, the following tests may be used to provide your doctor with more information:

- Blood tests (blood count, measurement of chemical levels in the blood, liver and pancreatic enzymes)



- X rays of the gastrointestinal tract, abdomen, or brain. These can include plain x rays, barium x rays or specialized scans such as CT scans or MRI scans.
- Endoscopy, the use of a long flexible tube with a video camera that allows direct visualization of the swallowing tube, stomach and first part of the small intestine, is performed to look for abnormalities in the lining of these structures that might be causing the nausea and vomiting.
- Tests to assess the movement of food through the stomach and intestines, gastrointestinal motility testing.

If the cause of nausea and vomiting is not clear after a thorough search and if the symptoms are not controlled with standard therapy, psychological tests and evaluation or psychiatric consultation may prove helpful. Psychogenic vomiting and eating disorders such as anorexia nervosa or bulimia are recognized causes of these symptoms.

### **Treatment for nausea and vomiting**

The treatment of nausea and vomiting may depend on the cause. However, the following general measures are appropriate for any patient with significant nausea and vomiting.

- Correction of Fluid and Electrolyte Imbalance:** Loss of body fluids results in dehydration and alteration in levels of minerals in the blood. Fluid replacement is usually performed with intravenous saline solution containing potassium. Potassium and sometimes magnesium levels may be low in the blood and may need to be added to the intravenous fluid.
- Nutritional Support.** Initially, patients should not eat solid food or may need to stop consuming food and drink. When feeding resumes, clear liquids are given first and diet advances as tolerated. When obstruction or chronic symptoms makes feeding by mouth impossible, alternate access for nutrition and fluid support are used. A nasogastric tube can be placed through the nose into the small intestine and feeding solutions may be administered directly into the intestines (enteral feeding or tube feeding). Alternatively, a feeding tube can be directly placed through the abdominal wall into the stomach (percutaneous endoscopic gastrostomy or PEG tube) or intestines (percutaneous endoscopic jejunostomy or PEJ tube). Another option is to place a venous catheter into an arm vein or other vein and infuse a prepared solution containing essential nutrients and vitamins directly into the blood stream, total parenteral nutrition or hyperalimentation.
- Therapy for Symptom Relief.** Patients with upper abdominal discomfort resulting from fluid in the stomach or intestines (usually in the presence of a blockage) improve if a tube is placed through the nose into the stomach to suction out stomach contents. Medications for nausea and vomiting may be given to prevent symptoms (e.g., before chemotherapy or immediately after surgery) or to suppress symptoms after they have begun. Several types of medications are available and include phenothiazines (such as Compazine and Phenergan), 5-HT<sub>3</sub> antagonists (such as Zofran), dopamine receptor antagonists (such as Reglan), antihistamines (Antivert, Dramamine, Benadryl) and anticholinergics



- (Scopolamine). Other agents that may be used for chronic nausea and vomiting, especially when a cause is not evident in the stomach or intestines, include benzodiazepines (Ativan) and tricyclic antidepressants (Elavil, Pamelor). Medicine to reduce acid production may also be necessary in patients with prolonged vomiting. These agents are administered to protect the esophagus from acidic content of the vomitus.
- d. **Other agents:** Several alternative approaches are available for nausea and vomiting. The best-studied alternative therapy is perhaps the use of acupressure for pregnancy related nausea and vomiting. Wristbands with acupressure buttons are commercially available, inexpensive, safe and have been shown to provide relief of mild nausea and vomiting. Ginger and vitamin B6 supplements have also been used successfully as symptom suppressants in pregnancy. Electrical stimulation, usually at the wrist, has also been used to prevent postoperative nausea and vomiting with some success. Hypnosis has been used with some success to address the fear of vomiting in patients with psychogenic nausea and vomiting, chemotherapy and pregnancy-related nausea and vomiting. Therapy focuses on hypnotic suggestions for relaxation and symptom reduction as well as distraction through guided imagery.
  - e. **Gastric stimulation:** An implanted device with attached electrodes into the gastric wall can be an option for patients with refractory nausea and vomiting. This is utilized in patients with prolonged and persistent nausea and vomiting, usually in the setting of decreased ability of the stomach muscles to push food into the intestines, especially when medical treatment with multiple different medication regimens has failed in controlling symptoms. Gastric stimulation involves a surgical procedure to implant an electronic device into the abdomen, with wires (electrodes) that are attached to the stomach wall. While stomach emptying is typically not improved with this device, nausea and vomiting may improve in about half the patients where this device is implanted.

### **Can nausea and vomiting be prevented or successfully cured?**

Episodic nausea and vomiting with a known cause such as motion sickness, chemotherapy, or surgical anesthesia can be prevented with medicines taken just before the causative event or medication. Symptoms due to medications and toxins improve when the drug or toxin is stopped. Morning sickness of pregnancy will usually resolve as the pregnancy progresses or with delivery. Nausea and vomiting due to chronic disorders such as functional problems, psychiatric disorders, endocrine disorders or cancer may be difficult to treat and may need chronic medications to control the symptoms. If nausea and vomiting are related to an infectious or inflammatory condition, symptoms will generally resolve completely with treatment of the primary condition.

