

THEME

Nausea and vomiting



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Nausea and vomiting in adults

A diagnostic approach

BACKGROUND

Most people experience nausea and vomiting at some stage, but when these symptoms recur frequently they can significantly reduce quality of life. In most cases, a thorough history, examination and simple investigations can yield a diagnosis. Chronic nausea is a more challenging problem with its many potential causes and with a significant number of patients remaining undiagnosed despite extensive investigation.

OBJECTIVE

This article discusses the assessment and management of acute and chronic nausea and vomiting in adults.

DISCUSSION

Gastrointestinal infections and food poisoning are the most common causes of acute nausea and vomiting. Medication side effects and pregnancy should always be suspected. Hospitalisation may be required for severe metabolic abnormalities, dehydration or surgical causes. There are many potential causes of chronic nausea and vomiting and a comprehensive history and examination is required. Symptoms are poor predictors of functional versus pathological illness. Type and extent of investigation must be tailored to the individual patient.

Only one-quarter of people affected by acute nausea and vomiting visit their general practitioner. Of these, two-thirds cite the severity of their symptoms as the reason, while the remainder fear serious disease and seek reassurance from their doctor.¹ The economic burden for the community is also significant with a British study demonstrating a loss of 8.5 million working days per year.²

Vomiting is controlled by the brainstem that coordinates a series of actions involving the gut and skeletal muscle, resulting in the forceful ejection of the contents of the upper gut. Essentially, vomiting is a reflex designed to expel potentially harmful substances from the body.

It is important to distinguish between the various symptoms that may be described as 'vomiting'. Nausea is the unpleasant sensation of being about to vomit and is often associated with mouth watering. Vomiting is the forceful expulsion of gastric contents via the mouth. Retching is contraction of the abdominal muscles without the expulsion of gastric contents. In contrast, regurgitation is the effortless appearance of gastric contents into the

mouth, usually without nausea, and may be a symptom of gastro-oesophageal reflux disease or rumination syndrome.

The causes and plan for investigation of nausea and vomiting can be conveniently divided into whether the symptoms are acute or chronic. Chronic symptoms are defined as those lasting 1 month or more.

Acute nausea and vomiting

Aetiology

The most common cause of acute nausea/vomiting (*Table 1*) is viral gastroenteritis or bacterial food poisoning. Gastrointestinal infections are more common in autumn and winter and in children and young adults. Viruses include rotavirus, adenovirus and norovirus (especially during epidemics). Preformed bacterial toxins ingested in food may cause vomiting alone, and are often due to ingestion of poorly cooked and inappropriately stored food contaminated with *Staphylococcus aureus* or *Bacillus cereus*.

An infective cause is supported by the presence of diarrhoea, mild abdominal pain, fever, malaise, a potential cause/contact (eg. travel, sick family member, 'dodgy' meal) and an absence of significant abdominal tenderness.

Toxin mediated vomiting develops 1–6 hours after ingestion of the offending food. Other infections such as otitis media, urinary tract infections (UTI), meningitis and hepatitis can also result in vomiting as part of the overall clinical picture, but rarely present with nausea and vomiting alone except in elderly or institutionalised individuals.

Medication side effects usually present acutely soon after commencing the drug, but may be delayed or go unrecognised and present subacutely. A full medication history including vitamins, herbs and over-the-counter drugs should be sought, as well as an alcohol and drug history. Recent changes in medication are particularly relevant. Any recently commenced drug should be considered as a potential cause of nausea/vomiting, however, some are particularly prone to cause this side effect (*Table 2*).

Mechanical gastrointestinal obstruction causes vomiting often without nausea as a prominent symptom, at least initially. The nature of the vomitus may give a clue to the level of the obstruction; undigested food and saliva in acute oesophageal obstruction, partially digested food in gastric outlet obstruction, and bile or faeculent vomiting with more distal obstructions. Small bowel obstruction is usually acute, persistent and associated with colicky pain; but may occasionally be intermittent or subacute.

Vertigo, neurological symptoms, neck stiffness or headache hint at a neurological cause and should prompt appropriate investigation. Pregnancy should not be forgotten in women of childbearing age, particularly those with early morning nausea.

Initial assessment

In the acute setting, history, examination and simple investigations can often yield a diagnosis. The illness is commonly self limiting. The diagnostic approach focuses on identifying the cause (or at least excluding significant underlying diseases) with a view to expectant management or directing specific treatment.

Complications of nausea and vomiting should be identified and acute emergencies should be excluded. Most cases are not severe enough to require hospitalisation, however intravenous (IV) therapy may be required for:

- severe dehydration (inability to tolerate oral fluids)
- significant metabolic abnormalities related to vomiting (including hypokalaemia, metabolic alkalosis or uraemia)
- surgical emergencies (eg. mechanical obstruction, perforation or peritonitis)
- other medical or social factors increasing the likelihood of complications (eg. underlying renal, cardiac or hepatic impairment).

Table 1. Causes of acute nausea and vomiting

Common

- Gastroenteritis
- Nongastrointestinal infections (eg. UTI in elderly/institutionalised patients)
- Medications

Not to be missed

- Surgical causes
 - cholecystitis
 - appendicitis
 - small bowel obstruction
- Diabetic ketoacidosis
- Addisonian crisis
- Raised intracranial pressure (usually with other neurological features)
- Hepatitis
- Ingestion of irritants/allergens

Examination

Dehydration is assessed clinically by examining for dry mucous membranes, reduced skin turgor, tachycardia and postural hypotension.

The abdomen should be examined for tenderness (particularly localised tenderness), distension or a succussion splash – a splashing sound heard with a stethoscope when the abdomen is shaken in intestinal or pyloric obstruction. Particular attention should be paid to areas where hernias are common. Bowel sounds may be tinkling in mechanical obstruction or absent in an ileus. The presence of abdominal signs should prompt a surgical opinion.

Investigations

In many cases nil investigations may be appropriate. Basic biochemistry may include (as appropriate):

- electrolytes and renal function
- full blood count
- pancreatic and liver enzymes
- glucose.

If small bowel obstruction is suspected, erect and supine abdominal radiographs should be considered. However, it should be remembered that these are neither sensitive nor specific.² They can be normal in patients with partial/subacute obstruction and acute gastroenteritis may cause a degree of small bowel dilation and some fluid levels.

Management

Once surgical and major medical causes have been excluded, rehydration with oral fluids is preferred with oral or intramuscular antiemetic therapy. Patients may be discharged with instructions to return if symptoms

deteriorate or do not improve. If outpatient management is not tolerated, admission for IV fluids and parenteral antiemetic treatment (IV or IM) is required. Antiemetic choices include: metaclopramide (oral or parenteral [should be used with caution in young females due to the risk of an oculogyric crisis]); prochlorperazine (oral, suppository or parenteral); or ondansetron (oral or parenteral). Usually no specific follow up is required for a self limiting episode of nausea/vomiting unless there are public health issues.

Chronic nausea and vomiting

Aetiology

Table 3 outlines the many potential causes of chronic nausea and vomiting. Many gastrointestinal diseases present with nausea, often with associated symptoms. Postprandial nausea and vomiting suggest upper gastrointestinal causes including gastro-oesophageal reflux disease, functional dyspepsia, gastroparesis or gastrointestinal obstruction. Vomiting in gastric outlet obstruction commonly occurs about an hour after eating (although timing can be variable). Coeliac disease, peptic ulcer, upper gastrointestinal malignancy, hepatitis or pancreatic carcinoma may present with nausea or vomiting as part of the symptom complex, or occasionally as the major symptom. Uncomplicated *Helicobacter pylori* infection is not a cause of chronic nausea.³

Gastroparesis

Gastroparesis is a poorly understood condition in which gastric emptying is delayed, presumably due to disordered gastric or duodenal motility. The stomach is unable to clear food and secretions leading to gastric distension, discomfort, nausea and vomiting. The relationship between the severity of gastroparesis and symptoms is relatively poor for reasons that are unclear, and it should be

remembered that nausea itself can delay gastric emptying. Gastroparesis may occur following gastric surgery (an increasingly rare cause) or be due to diseases such as longstanding diabetes or scleroderma. In younger patients gastroparesis is commonly idiopathic, often presumed to be due to 'a virus' as it may follow an acute episode suggestive of infection.

Underlying medical conditions

Neurological conditions include increased intracranial pressure, migraines, seizures and labyrinthine disorders. Vertigo, neurological symptoms, neck stiffness or headache hint at a neurological cause. Endocrine causes include hypercalcaemia, hypothyroidism and Addison disease. Severe cardiac failure can cause nausea due to liver and gut congestion. Fever, night sweats and weight loss may occur with malignancy.

Functional nausea and vomiting

Unexplained nausea and vomiting may be functional in origin. This is covered in detail in the article 'Functional nausea and vomiting' by Nicholas Talley in this issue.

Assessment and diagnosis

A comprehensive history and examination is required.

History

The history can be suggestive of the aetiology, but it is important to note that symptoms can be poor predictors of pathological versus functional illness as even significant weight loss may occur in functional illness.⁴ Epidemiologically, the best predictors of significant pathology are male gender and increasing age.⁴ Exhaustion, number of doctor visits, time off work, associated 'functional' symptoms such as headaches and chronic pain, ingestion of psychotropic drugs, and negative *H. pylori* status are all predictors of functional disease.⁴

Patients might volunteer an initiating event. A relationship to changes in medication should be sought with any drug considered a potential cause, including over the counter, natural medications, vitamins or herbs, and health or nutritional supplements. Common medication causes include opiates, NSAIDs, dopaminergic agents (eg. levodopa), digoxin, antibiotics (eg. doxycycline and sulphonamides) oral hypoglycaemics and gastrointestinal drugs (eg. sulfasalazine), but any drug should be considered as a potential cause (Table 2). Chronic heavy alcohol or marijuana use should be specifically enquired for. Nausea due to chronic marijuana use is characteristically improved by a hot shower.⁵

Early morning vomiting is associated with pregnancy, uraemia, alcohol use and raised intracranial pressure.

Table 2. Common medications causing nausea and vomiting

- Cancer chemotherapy
- Nonsteroidal anti-inflammatory drugs (NSAIDs)
- Digoxin (nausea can occur at therapeutic levels)
- Antiarrhythmics
- Oral antidiabetics (especially metformin)
- Antibiotics (especially erythromycin, bactrim)
- Sulfasalazine
- Nicotine patches
- Narcotics
- Antiparkinsonian drugs
- Anticonvulsants (including at therapeutic doses)
- High dose vitamins

Neurogenic vomiting is often projectile and positional, while functional disorders often result in continuous symptoms.

Examination

Examination focuses on the general medical and gastrointestinal conditions listed in *Table 3*, along with a nutritional and neurological assessment. It is rare in adults for intracranial pathology to present with vomiting alone.¹ If other symptoms are absent, neurological causes should only be considered if severe and prolonged vomiting is otherwise unexplained.

Investigations

Following a comprehensive clinical assessment and initial investigations the aetiology of a patient's symptoms

Table 3. Causes of chronic nausea and vomiting

Drug induced

- Prescribed medications
- Alcohol
- Illicit drugs
 - marijuana
 - opiates

Gastrointestinal conditions

- Gastro-oesophageal reflux disease
- Functional dyspepsia
- Gastroparesis
- Peptic ulcer disease
- Gastric/small bowel, Crohn disease
- Intermittent internal herniation

General medical conditions

- Uraemia
- Hyper-/hypothyroidism
- Hypercalcaemia
- Addison disease
- Cardiac failure

Occult malignancy

- Pancreas
- Lung
- Endocrine
- Gastrointestinal

Neurological

- Raised intracranial pressure
- Migraine
- Labyrinthine disorders

Psychiatric/functional/idiopathic

- Depression/psychosis
- Anxiety
- Functional nausea
- Cyclic vomiting syndrome

may be found or strongly suspected and the appropriate therapy commenced. Withdrawal or substitution of a suspect medication or treatment of depression/anxiety should be trialed early as if this results in improvement, no further investigation may be required. If no cause is found on initial evaluation, a decision will need to be made as to how far it is appropriate to investigate and this will depend on the clinical circumstances. In the interim, a therapeutic trial with an antiemetic may be considered if there are no alarming symptoms, although the cost effectiveness of this technique has not been evaluated. Dietary modification may also be beneficial, with frequent small meals, reduction of fat content and avoidance of spicy foods or other foods noted to cause symptoms.

Investigation needs to be tailored to the clinical situation, focusing on the potential causes and the metabolic/nutritional consequences and may include the investigations listed in *Table 4*.

Upper gastrointestinal endoscopy is the most sensitive and specific test for mucosal lesions and a duodenal biopsy should be taken to assess for Coeliac disease, infection or eosinophilic enteritis. Gastroparesis is suggested by retained food at the time of the endoscopy. Further investigation may involve computerised tomography (CT) of the abdomen looking for obstruction, masses pancreatic or hepatobiliary pathology. A small bowel series is rarely helpful, but may be of value if done during acute symptoms to diagnose internal herniation (CT with oral contrast is probably superior in these circumstances).

Referral to a gastroenterologist or neurologist for further investigation may be required, including barium follow through, gastric emptying study (to formally evaluate gastroparesis – during euglycaemia in diabetics as a high blood glucose may delay gastric emptying) and magnetic resonance imaging (MRI) of the brain if there is a concern about intracranial pathology.

Psychological or psychiatric evaluation may be helpful if the symptoms are still unexplained, but will need to be carefully explained and negotiated with the patient. Some patients with chronic nausea and vomiting have seen many doctors and are very sensitive to their symptoms being trivialised or to being told 'it is all in your head'.

It is often helpful to explain to patients in whom a psychiatric or functional cause is suspected that the gut contains a complete nervous system and that this communicates extensively with the 'big brain'. It is then relatively easy to introduce the concept that communications can 'go wrong' and that this might be a cause of the symptoms. Every day language is full of expressions indicating the close relationship between the

Table 4. Investigations to consider in chronic nausea and/or vomiting**Pathology testing**

- Full blood count
- Inflammatory markers
- Urea and electrolytes
- Calcium/phosphate
- Liver function tests, including albumin
- Nutrition screen, iron
- Thyroid function tests
- Drug levels, especially for medications such as digoxin or anticonvulsants
- Fasting cortisol +/- synacthen test for Addison disease
- Tissue transglutaminase and total IgA

Imaging studies

- Upper GI endoscopy
- CT abdomen

brain and gut at the time of emotion or stress: 'You make me sick!' 'I've had it up to here!' 'You give me the shits!' 'I've had a gutful!' 'He was gutted.' 'These examples can be used to demonstrate to patients that emotion and stress can be associated with gastrointestinal sensations.

Management

Antiemetic therapy in patients with chronic nausea and vomiting where a specific cause has not been identified can be extremely challenging, particularly where symptoms are severe. Intermittent use of Ondansetron wafers (for rapid absorption not dependent on gastric emptying), although expensive, may be useful as rescue therapy where symptoms are intermittent. A trial of maxalon, Stemetil, or domperidone is useful. These therapies are available for prolonged use in this setting on the Pharmaceutical Benefits Scheme (Authority required). However, there is an increased risk of extrapyramidal side effects in this setting. Chronic nausea and vomiting may respond to a low dose of a tricyclic (eg. amitrytline 30 mg at night, commencing at 10 mg and built up slowly).

Summary of important points

- Most cases of acute nausea and vomiting are self limited and the aims of assessment are to reduce complications and screen for important treatable causes (especially surgical). In many cases, a diagnosis can be made following a thorough history, examination and/or simple investigations.
- Gastrointestinal infections and food poisoning make up the majority of acute presentations.
- Medication side effects should always be suspected with recent commencement or change in dose of medication.

- Pregnancy should be considered in women of childbearing age.
- Hospitalisation may be required for severe metabolic abnormalities, dehydration or suspected surgical causes.
- In chronic nausea and vomiting, with many potential causes, a comprehensive history and examination is required.
- Symptoms are poor predictors of functional versus pathological illness.
- The type and extent of investigation is heavily influenced by the clinical circumstances and presentation and must be tailored to the individual.
- A therapeutic trial of antiemetic or dietary modification can be undertaken while investigation and further referral is made.

Conflict of interest: none declared.

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