TABLE 54-1 CAUSES OF NAUSEA AND VOMITING

Intraperitoneal	Extraperitoneal	Medications/ Metabolic Disorders
Obstructing disorders	Cardiopulmonary disease	Drugs
Pyloric obstruction	Cardiomyopathy	Cancer chemotherapy
Small-bowel obstruction	Myocardial infarction	Antibiotics
Colonic obstruction	Labyrinthine disease	Cardiac antiarrhythmics
Superior mesenteric artery syndrome	Motion sickness	Digoxin
Enteric infections	Labyrinthitis	Oral hypoglycemics
Viral	Malignancy	Oral contraceptives
Bacterial	Intracerebral disorders	Endocrine/metabolic disease
Inflammatory diseases	Malignancy	Pregnancy
Cholecystitis	Hemorrhage	Uremia
Pancreatitis	Abscess	Ketoacidosis
Appendicitis	Hydrocephalus	Thyroid and parathyroid disease
Hepatitis	Psychiatric illness	Adrenal insufficiency
Altered sensorimotor function	Anorexia and bulimia nervosa	Toxins
Gastroparesis	Depression	Liver failure
Intestinal pseudoobstruction	Postoperative vomiting	Ethanol
Gastroesophageal reflux		
Chronic idiopathic nausea		
Functional vomiting		
Cyclic vomiting syndrome		
Cannabinoid hyperemesis syndrome		
Rumination syndrome		
Biliary colic		
Abdominal irradiation		

occur as a paraneoplastic consequence of malignancy (e.g., small-cell lung carcinoma). Patients with gastroesophageal reflux may report nausea and vomiting, as do some with irritable bowel syndrome (IBS) or chronic constipation.

Other functional gastroduodenal disorders without organic abnormalities have been characterized in adults. *Chronic idiopathic nausea* is defined as nausea without vomiting occurring several times a week. *Functional vomiting* is defined as one or more vomiting episodes weekly in the absence of an eating disorder or psychiatric disease. *Cyclic vomiting syndrome* presents with periodic discrete episodes of relentless nausea and vomiting in children and adults and shows an association with migraine headaches, suggesting that some cases may be migraine variants. Some adult cases have been described in association with rapid gastric emptying. A related condition, *cannabinoid hyperemesis syndrome*, presents with cyclical vomiting with intervening well periods in individuals (mostly men) who use large quantities of cannabis over many years and resolves with its discontinuation. Pathologic behaviors such as taking prolonged hot baths or showers are associated with the syndrome. *Rumination syndrome*, characterized by repetitive regurgitation of recently ingested food, is often misdiagnosed as refractory vomiting.

Extraperitoneal Disorders Myocardial infarction and congestive heart failure may cause nausea and vomiting. Postoperative emesis occurs after 25% of surgeries, most commonly laparotomy and orthopedic surgery. Increased intracranial pressure from tumors, bleeding, abscess, or blockage of cerebrospinal fluid outflow produces vomiting with or without nausea. Patients with psychiatric illnesses including anorexia nervosa, bulimia nervosa, anxiety, and depression often report significant nausea that may be associated with delayed gastric emptying.

Medications and Metabolic Disorders Drugs evoke vomiting by action on the stomach (analgesics, erythromycin) or area postrema (opiates, anti-parkinsonian drugs). Other emetogenic agents include antibiotics, cardiac antiarrhythmics, antihypertensives, oral hypoglycemics, antidepressants (selective serotonin and serotonin norepinephrine reuptake inhibitors), smoking cessation drugs (varenicline, nicotine), and contraceptives. Cancer chemotherapy causes vomiting that is acute (within hours of administration), delayed (after 1 or more days), or anticipatory. Acute emesis from highly emetogenic agents (e.g., cisplatin) is mediated by 5-HT_3 pathways, whereas delayed emesis is less dependent on 5-HT_3 mechanisms. Anticipatory nausea may respond to anxiolytic therapy rather than antiemetics.

Metabolic disorders elicit nausea and vomiting. Pregnancy is the most prevalent endocrinologic cause, and nausea affects 70% of women in the first trimester. Hyperemesis gravidarum is a severe form of nausea of pregnancy that produces significant fluid loss and electrolyte disturbances. Uremia, ketoacidosis, adrenal insufficiency, and parathyroid and thyroid disease are other metabolic etiologies.

Circulating toxins evoke emesis via effects on the area postrema. Endogenous toxins are generated in fulminant liver failure, whereas exogenous enterotoxins may be produced by enteric bacterial infection. Ethanol intoxication is a common toxic etiology of nausea and vomiting.

APPROACH TO THE PATIENT: Nausea and Vomiting

HISTORY AND PHYSICAL EXAMINATION

The history helps define the etiology of nausea and vomiting. Drugs, toxins, and infections often cause acute symptoms, whereas established illnesses evoke chronic complaints. Gastroparesis and pyloric obstruction elicit vomiting within an hour of eating. Emesis from intestinal blockage occurs later. Vomiting occurring within minutes of meal consumption prompts consideration of rumination syndrome. With severe gastric emptying delays, the vomitus may contain food residue ingested hours or days before. Hematemesis raises suspicion of an ulcer, malignancy, or Mallory-Weiss tear. Feculent emesis is noted with distal intestinal or colonic obstruction. Bilious vomiting excludes gastric obstruction, whereas emesis of undigested food is consistent with a Zenker's diverticulum or achalasia. Vomiting can relieve abdominal pain from a bowel obstruction, but has no effect in pancreatitis or cholecystitis. Profound weight loss raises concern about malignancy or obstruction. Fevers suggest inflammation. An intracranial source is considered if there are headaches or visual field changes. Vertigo or tinnitus indicates labyrinthine disease.

The physical examination complements the history. Orthostatic hypotension and reduced skin turgor indicate intravascular fluid loss. Pulmonary abnormalities raise concern for aspiration of vomitus. Abdominal auscultation may reveal absent bowel sounds with ileus. High-pitched rushes suggest bowel obstruction, whereas a succussion splash upon abrupt lateral movement of the patient is found with gastroparesis or pyloric obstruction. Tenderness or involuntary guarding raises suspicion of inflammation, whereas fecal blood suggests mucosal injury from ulcer, ischemia, or tumor. Neurologic disease presents with papilledema, visual field loss, or focal neural abnormalities. Neoplasm is suggested by palpation of masses or adenopathy.

DIAGNOSTIC TESTING

For intractable symptoms or an elusive diagnosis, selected screening tests can direct clinical care. Electrolyte replacement is indicated for hypokalemia or metabolic alkalosis. Iron-deficiency anemia mandates a search for mucosal injury. Pancreaticobiliary disease is indicated by abnormal pancreatic or liver biochemistries, whereas endocrinologic, rheumatologic, or paraneoplastic etiologies are suggested by hormone or serologic abnormalities. If bowel obstruction is suspected, supine and upright abdominal radiographs may show intestinal air-fluid levels with reduced colonic air. Ileus is characterized by diffusely dilated air-filled bowel loops.