VOMITING

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Vomiting is a common symptom. It is a complex reflex behavioural response involving forceful expulsion of the stomach contents through oral cavity.

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THE EMETIC REFLEX

This reflex consists of an afferent limb, central integration and control, and an efferent limb.

The afferent limb:
- GI tract mechanoreceptors that are activated by changes in tension or distension of bowel wall.
- GI tract chemoreceptors that respond to wide range of chemical irritants including radiation and chemotherapeutic agents.
- Chemoreceptor trigger zone found at the floor of the fourth ventricle that responds to neuroactive agents (dopamine, enkephalin, acetylcholine, substance P).
- Vestibular system that is responsible for motion induced vomiting. Vomiting results from sensory mismatch involving the visual, vestibular and proprioceptive systems.
- Higher cortical centers that can initiate emetic reflex in instances of conditioned vomiting.

The efferent limb:
- GI motor activity during vomiting is mediated via vagus nerve.

CAUSES OF VOMITING

1. Gastrointestinal / hepatic causes
   - Acute gastroenteritis
   - Helicobacter pylori / peptic ulcer disease
   - Gastroesophageal reflux disease
   - Appendicitis
   - Anatomical obstruction: Pyloric stenosis
     Duodenal atresia/stenosis
   - Malrotation
   - Volvulus
   - Obstructed inguinal hernia
   - Intussusception
   - Hepatitis
   - Cholecystitis
   - Pancreatitis
2. Genitourinary causes
   - Pyelonephritis
   - Uremia
   - Pelviureteric junction obstruction

3. Neurological causes
   - Increased intracranial pressure, eg intracranial haemorrhage, tumour.
   - Meningitis/encephalitis
   - Migraine

4. Metabolic causes
   - Diabetic ketoacidosis
   - Addison’s disease
   - Reye’s syndrome
   - Inborn error of metabolism: OTC deficiency
     MCAD deficiency
     MELAS syndrome
   - Acute intermittent porphyria

5. Extraintestinal causes
   - Otitis media
   - Sinusitis
   - Pharyngitis

6. Other causes
   - Food poisoning
   - Psychogenic
   - Bulimia nervosa
   - Munchausen by proxy
   - Cyclical Vomiting Syndrome

**CLINICAL CLUES TO DIAGNOSIS**

1. Duration of symptoms
   Acute onset of vomiting usually suggests infective origin, head trauma, acute gastrointestinal obstruction. Chronic vomiting may suggest partial mechanical obstruction, progressive intracranial pathology, motility disturbance, metabolic or endocrine aetiology.
2. Timing of vomiting in relation to meals
Vomiting soon after meal is common in infants with hypertrophic pyloric stenosis. In older patients, it may suggest psychogenic vomiting. Delayed vomiting (after more than 1 hour) is seen in motility disorder. Early morning vomiting may be seen in patients with raised intracranial pressure and those with problems of postnasal drip.

3. Relief of pain by vomiting usually suggests peptic ulcer disease. However, pain may be exaggerated by food in children.

4. Characteristic of vomiting
Projectile vomiting suggests gastrointestinal obstruction. In the absence of nausea or retching, it may be associated with raised intracranial pressure. Effortless vomiting usually suggests gartoesophageal reflux.

5. Vomitus
Presence of old food suggests gastric outlet or high small bowel obstruction. Undigested food may suggest possibility that vomitus is from oesophagus and this feature may indicate achalasia. Bilious vomitus suggests postampullary obstruction. Coffee ground vomitus indicates presence of upper GI bleeding or Mallory Weiss syndrome.

6. Odor of vomitus
Feculent odor suggests intestinal obstruction, peritonitis with ileus or stasis with bacterial overgrowth.

7. Malodorous breath is associated with chronic sinusitis, Helicobacter pylori gastritis, giardiasis, and small bowel bacterial overgrowth.

8. Visible peristalsis in infants or succussion splash in children are indications of a gastric outlet obstruction.

9. Vomiting seen in children with muscular hypotonia or hypertonia suggests either gastroesophageal reflux disease with cerebral palsy or oropharyngeal discoordination and aspiration.

10. History of trauma may suggest increased intracranial pressure from head injury.

11. Repetitive, stereotypic, intense bouts of vomiting occurs in cyclical vomiting syndrome or abdominal migraine.

12. Abdominal mass can be seen in congenital or acquired, neoplastic or non-neoplastic condition. Pregnancy should be excluded in a teenager female.
DIAGNOSTIC EVALUATION

1. Clinical evaluation:
   - Assess the degree or severity of dehydration by assessing the severity and duration of vomiting and clinical signs of dehydration.
   - Assess nutritional status if vomiting is of prolonged duration.
   - Discover additional clues to the diagnosis, for example, fever, weight loss, jaundice and associated gastrointestinal symptoms.
   - Abdominal examination to look for tenderness, organomegaly, masses, succussion splash, presence of bowel sounds, previous surgical scars, hernia etc.
   - Look for signs of severe infection, eg: tense anterior fontanelle, meningism for meningitis, presence of neurological signs and assess the child’s conscious status if history suggestive of head injury.
   - Examine for extraintestinal cause of vomiting such as Kussmaul’s breathing in diabetic ketoacidosis, inflamed tympanic membrane in otitis media and positive renal punch in pyelonephritis.

2. Investigations
   - Laboratory tests to assess degree of metabolic disturbance as a result of vomiting, presence of underlying metabolic conditions.
   - Stool examination and culture in acute gastroenteritis.
   - Urine examination if there are urinary symptoms. These symptoms may not be obvious in young infants and it is important to perform urinary examination to exclude an urinary tract infection.
   - Abdominal radiograph when there are signs of intestinal obstruction.
   - Endoscopic examination if symptoms suggest peptic ulcer disease.
   - pH study to exclude gastroesophageal reflux and to assess the severity of gastroesophageal reflux.
   - Surgical referral when physical examination reveals acute abdominal signs.
   - Imaging of brain to exclude intracranial pathology.

TREATMENT

- Treat underlying cause if known, eg., specific treatment of gastroesophageal reflux, meningitis and urinary tract infection.
- Rehydration therapy
- H₂ antagonist for bleeding due to Mallory Weiss syndrome
- In the absence of a definitive diagnosis and when vomiting is recurrent, give a trial of antimigraine or intestinal prokinetic therapy.
Approach of Vomiting In Infancy

History / Physical Examination

Non bilious
- GER
- Pyloric stenosis
- Over feeding

Bilious
- Always suspect intestinal obstruction

Blood
- Uncommon
- Usually Mallory Weiss syndrome

Feeding technique
- Other examinations, eg: ultrasound

Appropriate investigation & treatment

Observe
- KIV for further investigations, eg, endoscopy