

## Definition

Gastroenteritis (GE) is a non-specific term for a condition comprising a combination of nausea, vomiting, diarrhoea and abdominal pain. Usually taken to mean of infectious origin.

## Epidemiology

- GE is caused by a variety of viral, bacterial, and parasitic pathogens.
- Very common - Worldwide, there are more than 1 billion cases, UK about 1 in 5 people/yr.
- Up to 20% of presentation of children <5 are for GE.
- Virus infections cause 30-40% of GE in industrialized countries. Up to 70% in children.
- Epidemics in Aus usually from Rotavirus but Norovirus can cause "winter vomiting"

## Risk Factors

- Poor personal hygiene and lack of sanitation
- Immunocompromise & AIDS
- Achlorhydria e.g. from PPIs (especially for Salmonella and Campylobacter)
- Poor food handling - raw food (shellfish), inadequate cooking or refrigeration, reheating.
- Breast feeding affords some protection.

## Presentation

### History:

- Nausea, vomiting, diarrhoea and abdominal pain to varying degrees.
- Duration, frequency and contents of vomit/diarrhoea. Blood/mucus/bile.
- Bloody diarrhoea suggests invasive bacterial infection, e.g. E coli O157, Entamoeba histolytica, or Salmonella
- Pyrexia in adults may suggest invasive organism, but children nearly always febrile.
- Variable incubation periods from a couple of hrs (preformed bacterial toxins) to 5+ days (parasites such as Giardia).
- Recent travel abroad.
- Ill contacts or fellow diners.

### Examination:

- ?Dehydrated - wt loss, CRT, lethargy, sunken eyes/fontanelle, skin turgor, ↑HR, ↓urine
- Abdo - r/o appendicitis. Listen for bowel sounds.

## Differential Diagnosis

- Urinary tract infection.
- Constipation with overflow.
- Gastritis, e.g. from alcohol abuse.
- Acute appendicitis.
- Hyperemesis gravidarum or, in late pregnancy, fulminating pre-eclampsia.
- Irritable bowel syndrome, inflammatory bowel disease, antibiotic-related.
- Intestinal obstruction, intussusception, coeliac disease
- Laxative abuse. Other drug/poison related.
- Addison's disease, DKA.

## Common infectious causes

Campylobacter (commonest), Rotavirus (commonest in children), Non-typhoidal salmonellosis, Norovirus (increasingly important), Giardia, Cryptosporidium, E. coli O157:H7, Shigella sonnei.

## Investigations

Stool: Microscopy for ova or parasites, culture, antigen testing (Rotavirus)

FBC and U&E

Urine culture.

## Management

*Treat/prevent dehydration:* ORT, IVF if severe. Starvation for couple of days common. Breast feeding should continue and in children diet re-introduced when vomiting subsides.

*Prevent spread.* Hand washing.

*Prevent subsequent cases:* Public Health Notification - dysentery and food poisoning notification is a statutory duty. Food storage/handling/cooking advice

*Drugs:*

- ABx do not shorten most GE, but may prolong the carrier stage. Used in the severely ill, especially the immunocompromised.
- If GE severe and community-acquired, empirical **ciprofloxacin** used (**azithromycin or co-trimoxazole** in children). Giardiasis and amoebiasis can be treated with **metronidazole**.
- Cochrane review found little evidence of benefit from antiemetics in children.
- Sometimes anti-diarrhoea or anti-spasmodic drugs may be required/used in adults.

*Return to work/school:* generally advised once diarrhoea has settled. Food handlers may require 48hrs symptom-free and a negative stool culture.

## Complications

- Dehydration esp in infants & elderly. Electrolyte (esp. Na<sup>+</sup>) derangement
- Haemolytic uraemic syndrome more likely in children with E. coli O157:H7.
- Reactive features e.g. arthritis, carditis, urticaria, erythema nodosum, conjunctivitis, and Reiter's syndrome.
- Salmonella can invade bones, joints, meninges, or the gallbladder.
- Toxic megacolon is rare.
- Some viruses may cause Guillain-Barre syndrome as may Campylobacter.
- IBS may follow gastroenteritis.
- Poor absorption of drugs such as anticonvulsants or oral contraceptives.

## Prognosis

Usually there is uneventful recovery with just a period of starvation and fluids only. Risk is greatest at the extremes of life and with immune compromise. In developed countries most deaths are in the elderly pop.

## Causes of Gastroenteritis

Organism	Incubation Period	Vomiting	Diarrhea	Fever	Associated Foods	Diagnosis	Clinical Features and Treatment
Staphylococcus (preformed toxin)	1–8 hours	+++	±	±	Staphylococci grow in meats, dairy, and bakery products and produce enterotoxin.	Clinical. Food and stool can be tested for toxin.	Abrupt onset, intense nausea and vomiting for up to 24 hours, recovery in 24–48 hours. Supportive care.
<i>Bacillus cereus</i> (preformed toxin)	1–8 hours	+++	±	–	Reheated fried rice causes vomiting or diarrhea.	Clinical. Food and stool can be tested for toxin.	Acute onset, severe nausea and vomiting lasting 24 hours. Supportive care.
<i>B. cereus</i> (diarrheal toxin)	10–16 hours	±	+++	–	Toxin in meats, stews, and gravy.	Clinical. Food and stool can be tested for toxin.	Abdominal cramps, watery diarrhea, and nausea lasting 24–48 hours. Supportive care.
<i>Clostridium perfringens</i>	8–16 hours	±	+++	–	Clostridia grow in rewarmed meat and poultry dishes and produce an enterotoxin.	Stools can be tested for enterotoxin or cultured.	Abrupt onset of profuse diarrhea, abdominal cramps, nausea; vomiting occasionally. Recovery usual without treatment in 24–48 hours. Supportive care; antibiotics not needed.
<i>Clostridium botulinum</i>	12–72 hours	±	–	–	Clostridia grow in anaerobic acidic environment eg, canned foods, fermented fish, foods held warm for extended periods.	Stool, serum, and food can be tested for toxin. Stool and food can be cultured.	Diplopia, dysphagia, dysphonia, respiratory embarrassment. Treatment requires clear airway, ventilation, and intravenous polyvalent antitoxin (see text). Symptoms can last for days to months.
<i>Clostridium difficile</i>	Usually occurs after 7–10 days of antibiotics. Can occur after a single dose or several weeks after completion of antibiotics.	–	+++	++	Associated with antimicrobial drugs; clindamycin and cephalosporins most commonly implicated.	Stool tested for toxin.	Abrupt onset of diarrhea that may be bloody; fever. Oral metronidazole first-line therapy. If no response, oral vancomycin can be given.
Enterohemorrhagic <i>Escherichia coli</i> , including <i>E. coli</i> O157:H7 and other Shiga-toxin producing strains (STEC)	1–8 days	+	+++	–	Undercooked beef, especially hamburger; unpasteurized milk and juice; raw fruits and vegetables.	<i>E. coli</i> O157:H7 can be cultured on special medium. Other toxins can be detected in stool.	Usually abrupt onset of diarrhoea, often bloody; abdominal pain. In adults, it is usually self-limited to 5–10 days. In children, it is assoc with haemolytic-uraemic syndrome (HUS). Antibiotic therapy may increase risk of HUS.
Enterotoxigenic <i>E. coli</i> (ETEC)	1–3 days	±	+++	±	Water, food contaminated with faeces.	Stool culture. Special tests required to identify toxin-producing strains.	Watery diarrhea and abdominal cramps, usually lasting 3–7 days. In travelers, fluoroquinolones shorten disease.
<i>Vibrio parahaemolyticus</i>	2–48 hours	+	+	±	Undercooked or raw seafood.	Stool culture on special medium.	Abrupt onset of watery diarrhea, abdominal cramps, nausea and vomiting. Recovery is usually complete in 2–5 days.

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<i>Vibrio cholerae</i>	24–72 hours	+	+++	–	Contaminated water, fish, shellfish, street vendor food.	Stool culture on special medium.	Abrupt onset of liquid diarrhea in endemic area. Needs prompt intravenous or oral replacement of fluids and electrolytes. Tetracyclines shorten excretion of vibrios.
<i>Campylobacter jejuni</i>	2–5 days	±	+++	+	Raw or undercooked poultry, unpasteurized milk, water.	Stool culture on special medium.	Fever, diarrhea that can be bloody, cramps. Usually self-limited in 2–10 days. Early treatment (erythromycin) shortens course. May be associated with Guillain-Barré syndrome.
<i>Shigella</i> species (mild cases)	24–72 hours	±;	+	+	Food or water contaminated with human feces. Person to person spread.	Routine stool culture.	Abrupt onset of diarrhea, often with blood cramps, tenesmus, and lethargy. Therapy depends on sensitivity testing, but the fluoroquinolones are most active. Often mild and self-limited, resolving in 4–7 days.
<i>Salmonella</i> species	1–3 days	–	++	+	Eggs, poultry, unpasteurized milk, cheese, juices, raw fruits and vegetables.	Routine stool culture.	Gradual or abrupt onset of diarrhea and low-grade fever. No antimicrobials unless high risk (see text) or systemic dissemination is suspected, in which case give a fluoroquinolone. Prolonged carriage can occur.
<i>Yersinia enterocolitica</i>	24–48 hours	±	+	+	Undercooked pork, contaminated water, unpasteurized milk, tofu.	Stool culture on special medium.	Severe abdominal pain, (appendicitis-like symptoms) diarrhea, fever. Polyarthritits, erythema nodosum in children. If severe, give tetracycline or fluoroquinolone. Without treatment, self-limited in 1–3 weeks.
Rotavirus	1–3 days	++	+++	+	Fecally contaminated foods touched by infected food handlers.	Immunoassay on stool.	Acute onset, vomiting, watery diarrhea that lasts 4–8 days. Supportive care.
Noroviruses and other caliciviruses	12–48 hours	++	+++	+	Shell fish and fecally contaminated foods touched by infected food handlers.	Clinical diagnosis with negative stool cultures. PCR available on stool.	Nausea, vomiting (more common in children) diarrhea (more common in adults), fever, myalgias, abdominal cramps. Lasts 12–60 hours. Supportive care.