

Diagnosis and Management of Foodborne Illnesses

A Primer for Physicians
and Other Health Care Professionals

Enterotoxigenic *Escherichia coli* Infection Patient Scenario

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This learning scenario can be used to reinforce medical management information pertaining to foodborne illnesses, such as that provided from the other booklets of this primer. This case study provides questions that need to be considered when dealing with a potential case of foodborne illness. Answers are provided immediately following the questions to enhance the learning process.

Similar learning scenarios are also available for other foodborne pathogens.

Enterotoxigenic *Escherichia coli* Infection, a Patient Scenario

Stephanie is a 35-year-old who presents to your office with a 4-day history of abdominal cramps, headache, and 8-10 episodes/day of watery diarrhea. She has had a few episodes of vomiting but denies fever or bloody diarrhea. She has no complaints of dysuria or back pain. She was previously healthy.

Physical examination reveals she is afebrile with a blood pressure of 120/80 mm Hg and normal capillary refill. She has a soft and diffusely tender abdomen with hyperactive bowel sounds but no rebound or guarding. She has no costovertebral angle (CVA) tenderness and stool examination is negative for occult blood.

What is the possible differential diagnosis for her chief complaint?

Infectious gastroenteritis

Irritable bowel syndrome

Carbohydrate malabsorption (lactose intolerance)

Endocrinopathies – hyperthyroidism, adrenal insufficiency

Carcinoid tumor

What additional information would assist with the diagnosis?

Has she ever had similar symptoms before?

Is there a family history of malabsorption syndromes or endocrinopathies?

Does she have other signs or symptoms such as weight loss, bloating, history of milk intolerance, flushing, tachycardia, or weight loss?

What is her occupation?

Has she traveled to a foreign country within the last month?

Do other household members or close acquaintances have gastrointestinal tract symptoms or diarrhea?

Stephanie reports she rarely has diarrhea, usually less than one episode a year. She denies a family history of malabsorptive or endocrine disorders, and has had none of the other symptoms listed above. She is an art therapist for a local children's mental health clinic, and is not aware that any of her patients have had gastrointestinal tract symptoms or diarrhea. Other household members are well; however, several of her extended family members and friends who attended her younger sibling's high school

graduation picnic last weekend also have diarrhea. In fact, her aunt (the hostess of the party) called the local health department because she was concerned that the illnesses might be associated with food that was served at the event from a local restaurant (Restaurant A). Stephanie is uncertain what her aunt learned from the health department.

How does this information assist with the diagnosis?

This information suggests that Stephanie's case of diarrhea may be part of a larger outbreak. The most appropriate next step in her management is to contact the local health department and ask if it is aware of an outbreak of foodborne disease, or if it has had reports of diarrheal illness from other patrons or partygoers who consumed food from Restaurant A. The health department also may provide information about the etiologic agent or suspected etiologic agent, and provide recommendations for treatment.

You call the health department and learn that there is an outbreak of foodborne illness associated with consumption of food from Restaurant A. Similar to Stephanie, most patients have had abdominal cramps and watery diarrhea, few have had fever, and no one has reported bloody diarrhea. The median incubation period is 42 hours and the diarrhea lasts 3 to 7 days. At this time, neither the vehicle of transmission nor the etiologic agent has been identified. The health department officials request that you obtain a stool culture and report the results back to them.

What are the possible etiologic agents of this outbreak of foodborne illness?

Based on its investigation, the health department suspects the vehicle for this outbreak was a food item consumed at Restaurant A, 42 hours before the illness. If this is so, the most likely etiologic agent is a bacterial pathogen as suggested by the moderate incubation period, the lack of vomiting, and the significant duration of illness. Foodborne illness caused by the most common enteric viral pathogens typically has a shorter incubation period, more vomiting, less diarrhea, and a shorter duration of symptoms. By contrast, parasitic infections usually have a longer incubation period (1 to 2 weeks) and a longer duration of illness (>2 to 3 weeks).

The bacterial enteric pathogens that should be considered as possible sources of the outbreak are *Campylobacter* and *Salmonella*, the two most common causes of bacterial foodborne diseases in the United States. Typically these infections are characterized by fever in addition to abdominal cramps and diarrhea, and bloody stools are possible but not common. *E. coli* O157:H7 infection should also be considered, although bloody stools frequently are reported with this infection. *Vibrios* and enterotoxigenic *E. coli* rarely are diagnosed causes of foodborne illness in the United States but should remain in the differential diagnosis given the profuse watery diarrhea that characterizes this outbreak.

A stool culture for bacterial enteropathogens including *Salmonella*, *Shigella*, *Campylobacter*, *Yersinia*, and *E. coli* O157:H7 is negative. You report this information to the health department and learn that the routine stool cultures from other patients in the outbreak are also negative. The state public health laboratory examined stools for common viral enteric pathogens; those preliminary studies are negative.

What other pathogen(s) should be considered?

How are they identified?

The most likely etiologic agent of this outbreak is enterotoxigenic *E. coli* (ETEC). ETEC is a common cause of traveler's diarrhea and is an increasingly recognized cause of foodborne illness in the United States. This bacterium elaborates one or more enterotoxins that cause intestinal secretion and diarrhea. The incubation period, symptoms, and duration of diarrhea described for persons involved in this outbreak are characteristic of ETEC infection.

Furthermore, clinical laboratories and most state and territorial public health laboratories do not have the capacity to test for ETEC in stool; the identification process requires a complex procedure with expensive reagents. Therefore, if the characteristics of a diarrheal illness are suggestive of a bacterial etiology but routine stool cultures are negative for common bacterial and viral enteropathogens, ETEC should be strongly suspected as the etiologic agent. Local health departments can arrange to have stools tested for ETEC at the state public health laboratory or at the Centers for Disease Control and Prevention.

What should the patient know about ETEC infections? What is the next step in management?

ETEC is the most common cause of “traveler’s diarrhea” and is becoming a more frequently recognized cause of foodborne illness in the United States. The illness is self-limited; the diarrhea usually lasts fewer than 5 days.

Because the duration of illness is short, ETEC infections generally do not require antibiotic therapy. Treatment is mainly supportive including oral or intravenous fluids for rehydration. Occasionally antibiotics, such as ciprofloxacin for adults and trimethoprim/sulfamethoxazole for children, are given if the patient has an underlying illness or if the diarrhea is severe. ETEC infection may cause dehydration but there are generally no serious complications or long-term sequelae from this infection.

Patients should be reminded to wash their hands with warm running water and soap after using the bathroom and before and after eating to avoid transmitting the infection to others. They should tell friends who might have attended other parties at which food from Restaurant A was served to call the local health department to report cases of illness.

How can ETEC infections be prevented?

Human and animal wastes are the ultimate source of ETEC contamination. Travelers in developing countries should avoid foods that could be contaminated with bacteria. They should eat thoroughly cooked foods prepared in facilities that practice proper food handling techniques. They should avoid unpasteurized juices and milk, and drink bottled beverages, or water that has been boiled or adequately chlorinated. They should avoid raw foods (eg, salads, peeled fruit or vegetables, raw seafood, undercooked meat or poultry) and foods from street vendors.

In the United States, proper food preparation and handling practices will reduce the risk of ETEC infections. This should include careful handwashing with warm water and soap after using the bathroom and before and after preparing or consuming food.

Stephanie's watery diarrhea resolved after 5 days. She was mildly dehydrated and missed 3 days of work, but recovered completely with no long-term complications.