## ENTERIC INFECTIONS AND FOOD POISONING

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# Introduction

• Diarrhea is the most common manifestation of these infections.

- However, because it is usually self-limiting within hours or days, most of those afflicted with gastrointestinal infections do not seek medical care.
- Nonetheless, gastrointestinal infection remains one of the three most common syndromes seen by physicians who practice general medicine.
- Worldwide, diarrheal disease remains one of the most important causes of morbidity and mortality among infants and children.

### **Clinical Features**

#### • <u>Watery Diarrhea</u>

- 1. Nausea, vomiting, fever, and abdominal pain may also be present, but the dominant feature is intestinal fluid loss.
- 2. Diarrhea is produced by pathogenic mechanisms that attack the proximal small intestine, the portion of the bowel in which more than 90% of physiologic net fluid absorption occurs.
- 3. The purest form of watery diarrhea is that produced by enterotoxin-secreting bacteria such as Vibrio cholerae, and enterotoxigenic Escherichia coli (ETEC), which cause fluid loss without cellular injury.
- 4. Other common pathogens that damage the epithelium, such as rotaviruses and calcivirus also cause fluid loss, but are more likely to cause fever and vomiting as well

#### **Clinical Features**

#### • **Dysentery**

- 1. Dysentery begins with the rapid onset of frequent intestinal evacuations, but the stools are of smaller volume than in watery diarrhea and contain blood and pus.
- 2. Fever, abdominal pain, cramps, and tenesmus are common complaints. Vomiting occurs less often. The focus of pathology is the colon.
- 3. Organisms causing dysentery can produce inflammatory and/or destructive changes in the colonic mucosa either by direct invasion or by production of cytotoxins. This damage produces the pus and blood seen in the stools, but does not result in substantial fluid loss because the absorptive and secretory capacity of the colon is much less than that of the small bowel.

### **Clinical Features**

#### • Enteric Fever

- 1. Enteric fever is a systemic infection, the origin and focus of which are the gastrointestinal tract.
- 2. The most prominent features are fever and abdominal pain, which develop gradually over a few days in contrast to the abrupt onset of the other syndromes. Diarrhea is usually present but may be mild and not appear until later in the course of the illness.
- 3. The pathogenesis of enteric fever is more complex than that of watery diarrhea or dysentery. It generally involves penetration by the organism of the cells of the distal small bowel with subsequent spread outside the bowel to the biliary tract, liver, mesentery, or reticuloendothelial organs.
- 4. Bacteremia is common, occasionally causing metastatic infection in other organs. Typhoid fever caused by *Salmonella enterica* serovar Typhi is the only infection for which these events have been well studied.

### Food Poisoning

- The term "food poisoning," however, is usually reserved for instances in which a single meal can be incriminated as the source. This situation typically arises when multiple cases of the same gastrointestinal syndrome develop at the same time among persons whose only common experience is a meal shared at a social event or restaurant. The probable etiologic agent can usually be assessed from knowledge of the incubation period, the food vehicle, and the clinical findings.
- Some are not infections but intoxications, caused by ingestion of a toxin produced by bacteria in the food before it was eaten. Intoxications have shorter incubation periods than infections and may involve extraintestinal symptoms (eg, the neurologic damage in botulism).

#### Hospital-Associated Diarrhea

- The hospital environment should not allow spread of the usual causes of endemic intestinal infection.
- Two special causes of hospital-associated diarrhea are caused by enteropathogenic *E coli* (EPEC) in infants and *Clostridium difficile* in patients treated with antimicrobial agents. Fortunately, EPEC outbreaks have become rare. *C difficile* accounts for more than 90% of cases of a syndrome that ranges from mild diarrhea to fulminant pseudomembranous colitis during or after treatment with antibiotics.
- The responsible toxigenic C difficile may be resident in the patient's intestinal flora before administration of antimicrobics or be acquired by spread from other patients in the hospital. Rotaviruses can also cause hospital outbreaks in infants

#### <u>Microscopic Examination</u>

- 1. The presence of polymorphonuclear leukocytes or blood in the stool correlates with organisms that produce disease by invasion, but false-negative results are common.
- 2. The observation and morphologic characterization of amebas and flagellates on wet or stained preparations are the primary means by which amebic (Entamoeba histolytica) and flagellate (Giardia lamblia) infections are diagnosed.
- 3. The viruses of diarrhea cannot be grown in cell culture but can be detected by electron microscopy or for Rotavirus by antigen detection.

#### • <u>Culture</u>

- 1. Isolation of the etiologic agent is the primary means by which bacterial enteric infection is diagnosed. In enteric fever, the organism is typically present in the blood in the early stages of disease. Blood cultures are, however, usually negative in watery diarrhea and dysenteric infections, and stool culture must be relied on for diagnosis.
- 2. Selective media are used for the various enteric pathogens. Media routinely used may vary among clinical laboratories but should include those appropriate for Salmonella, Shigella, and Campylobacter jejuni.
- 3. Diarrhea caused by *E* coli is a special problem, because the methods that define the enterotoxigenic, invasive, or other pathogenic mechanisms are not yet practical for clinical laboratories.

#### <u>Toxin Assay</u>

The B cytotoxins of C difficile can be detected by its cytopathic effect in a cell culture system. In most clinical cases, enough toxin is present for direct detection in a stool specimen. This assay is currently available only in reference laboratories. Methods that detect the C difficile A and B toxins by latex agglutination and immunoassays are now in common use.

#### Antigen and Antibody Detection

- 1. At present, antibody detection is useful in the diagnosis of amebic dysentery caused by *E histolytica* and of typhoid fever. Both are considered ancillary to the primary diagnostic tests, which involve specific detection of the organism by microscopic and cultural methods.
- 2. Reagents are commercially available for the detection of rotavirus antigen in stool by latex agglutination or enzyme immunoassay. These methods have a sensitivity roughly comparable to that of electron microscopy.
- 3. Serologic methods have been described for many other causes of gastrointestinal infection, but are not generally used because of lack of sensitivity, specificity, or availability of reagents.

### General Principles of Management

- In most gastrointestinal infections, the primary goal of treatment is relief of symptoms, with particular attention to maintaining fluid and electrolyte balance.
- The effects of common antidiarrheal medications such as subsalicylatecontaining compounds (Pepto-Bismol) or antispasmodics (Ioperamide) are variable, depending on the cause.
- Antimicrobial agents are usually not indicated for self-limited watery diarrhea, but are required for more severe dysenteric infections. Some enteric infections, such as typhoid fever, are always treated with antimicrobics.