8.1.4

Infectious Enterocolitis

Infectious enterocolitis is inflammation of the linings of the digestive tract due to an infection. Infectious enterocolitis can be caused by 3 classes of microbial agents: viruses, bacteria, and protozoa (eukaryotic pathogens). These agents mostly spread by the fecal/oral route. We will discuss viruses and bacteria here, but it may be helpful for you to realize that *Giardia* is an example of a protozoan that causes infectious enterocolitis.

The common viruses that cause **viral enterocolitis** are as follows:

- **Norovirus** is responsible for the majority of cases of non bacterial foodborne gastroenteritis in all age groups. It causes a lot of foodborne illness on cruise ships.
- **Enteric adenoviruses** primarily affect infants.
- **Rotavirus** infections are most severe in children younger than 5. Children younger than three months and breastfeeding children are relatively protected against this virus because of transplacental antibodies and antibodies received through the breast milk. Common symptoms that accompany a rotavirus infection are fever and vomiting followed by onset of watery stool that leads to the rapid development of dehydration. The two vaccines given to infants and children to prevent a rotavirus infection are **RotaTeq** (a live attenuated oral vaccine with 5 strains given in three doses), and **Rotarix** (a monovalent, live attenuated oral vaccine given in two doses). The risk is small, but the rotavirus vaccines may increase the risk of a condition called intussusception, which is when a section of the small intestine telescopes inside another portion.

Bacteria have three mechanisms by which they cause **bacterial enterocolitis:**

1. The first pathogenic mechanism for development of bacterial enterocolitis is NOT an infection. It involves the ingestion of preformed toxins present in contaminated food (otherwise known as “food poisoning”). It is not considered an infection because there are no active bacteria invading the body. The toxins will cause rapid onset of symptoms within 2-12 hours of nausea, vomiting, and diarrhea. *Clostridium botulinum* is a bacterial species that can make a toxin called botulinum toxin. This toxin is produced under anaerobic conditions (such as in improperly canned food) and when ingested it can cross the mucosal barrier, enter the blood, and affect the nervous system. This toxin can prevent the release of acetylcholine in the neuromuscular junction and induce dangerous and deadly paralysis.
2. The second pathogenic mechanism of bacteria is infection by toxigenic organisms that proliferate in the gut lumen and produce enterotoxins. An example of this is *Clostridium difficile*, which can colonize the intestine when the normal microflora is disrupted (such as with the use of large doses of antibiotics). *C. difficile* produces an enterotoxin that causes diarrhea and inflammation. We will discuss it more in the next section.
3. The third mechanism is infection by invasive organisms that proliferate in the lumen and have the means of adhering to enterocytes so they can invade them with the toxins they produce. While it is similar to the second pathogenic mechanism because it involves the colonization of the gut by bacteria, it is different because the bacteria have a means of attachment. These bacteria adhere to mucosal epithelial cells through fimbriae and pili that are unique to the species. An example is *Escherichia coli* (particularly the species 0157:H7). This bacteria can adhere to enterocytes and while attached they can produce enterotoxins that destroy the enterocytes. *E. coli 0157:H7* is explained later in this chapter.

The three main complications related to bacterial enterocolitis are dehydration, perforation, and sepsis. Although all types of infectious enterocolitis are no fun, bacterial infections tend to produce more severe results than the viral invasions.