1 HOUR SAN CE CBDM Approved

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Another Bad Bug

Clostridium Perfringens

I had the distinct pleasure not too long ago to be the recipient of a case of food poisoning. I always joke that every food handler and food regulator should experience food poisoning at least once in their lives to appreciate the significance of it.

Not that I wish food poisoning on anyone, but we would all have a better connection with the public health aspects of our jobs if we experienced it just once. Nonetheless, after 24 hours in the restroom and a long epidemiology survey by the local regulatory jurisdiction, without a formal conclusion, I had contracted *Clostridium perfringens.*

A spore-forming gram-positive bacterium, *C. perfringens* is found in many environmental sources, such as soil, decaying animals, feces, as well as in the intestines of humans and animals. It is commonly found in raw meat and poultry. This bug finds its preference for growth to be in very little to no oxygen, and under those conditions can multiply very rapidly. It is an anaerobic pathogen. Some strains of perfringens produce a toxin in the intestine that causes illness. A more serious but rare illness is also caused by ingesting food contaminated with Type C strains of *C. perfringens*. This illness is known as enteritis necroticans or pig-bel disease, which is often fatal, but very rare in the US.

Within 6-24 hours after ingested, *C. perfringens* will cause watery diarrhea and abdominal cramps. The good news is the illness typically resolves itself within 24 hours. Usually fever and vomiting do not occur. This foodborne pathogen is not spread from one person to another. It is caused by eating food contaminated with large numbers of *C. perfringens* bacteria that have produced enough toxin in the intestine to cause illness. However, someone with dirty hands can introduce the bacteria into food. Like most illnesses, those in a highly susceptible population are most likely to contract the illness and have extreme symptoms that could last 1-2 weeks, in which case complications are more likely to occur. In severe cases, rehydration or intravenous fluids may be necessary.

Antibiotics are not typically issued for this illness. Like many sporeformers, the spores of perfringens can survive high temperatures. During cooling and holding of food at temperatures between 54°F and 140°F the spores will germinate and then the bacteria will grow. The bacteria will grow very rapidly between

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Types of Foodborne Illness:

- **A foodborne infection** is a disease that results from eating food containing living harmful microorganisms (germs). These kinds of germs colonize the intestinal lining and invade the body, causing foodborne illness symptoms.
- **A foodborne intoxication** is a disease that results from eating food contaminated with poisons or toxins from bacteria, molds, or chemicals. These toxins are usually odorless, tasteless and colorless, and they can cause disease even after the disease germs in the food have been killed.
- **A toxin-mediated infection** is a disease that results from eating food containing live germs. These kinds of germs would colonize the stomach or intestine, making toxin as they live and grow. The toxin produced inside the body causes the foodborne illness symptoms.

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How to Prevent *C. Perfringens* Infections:

1. Keep raw meat, poultry, and fish separate from other food items to prevent cross contamination.
2. Always wash your hands before and after handling foods.
3. Store foods at the proper temperature, below 41°F.
4. Cook foods thoroughly to the recommended temperatures to destroy vegetative cells.
5. Serve foods safely. Keep at a temperature that is either warmer than 140°F or cooler than 41°F; these temperatures prevent the growth of *C. perfringens* vegetative cells and spores that might have survived the initial cooking process. Meat dishes should be served hot right after cooking.
6. Leftover foods should be refrigerated at 41°F or below as soon as possible and within two hours of preparation. It is okay to put hot foods directly into the refrigerator.
7. Large pots of food like soup or stew or large cuts of meats like roasts or whole poultry should be divided into small quantities for refrigeration.
8. Leftovers should be reheated to at least 165°F before serving.
9. Foods that contain dangerous bacteria may not taste, smell, or look different. Any food that has been left out too long may be dangerous to eat, even if it looks okay.

109°F and 117°F. If food is served without heating to destroy the vegetative cells, the live bacteria will be eaten. Once inside the intestine, the bacteria produce a toxin. It is this toxin that causes the subsequent illness. It is a toxin-mediated infection.

With regards to *Clostridium perfringens* (toxin-mediated infection), the spores—found in soil, dust and feces—are carried on raw food products. They turn vegetative and grow after being 1) heat-shocked, 2) put into a situation without oxygen [anaerobic], and 3) given more than 4 hours' time in the temperature danger zone. The food with the bacteria is consumed, produce toxins inside the body, and cramps and watery diarrhea ensue. According to the CDC, there are few cases where the toxin is formed in the food before being consumed.

What foods are most likely associated with this nasty bug?

Gravy, beef, poultry, and pre-cooked foods can be culprits. In these foods, *C. perfringens* can find areas of low to no oxygen in which to thrive. Lack of temperature control of the food will then allow the bacteria to grow to large numbers. In my case, the general conclusion was most likely chicken in gravy that was on a buffet that was serving thousands of conference attendees. Implicated most often are facilities such as schools, hospitals, nursing homes, prisons, and other similar businesses (banquets and events) making large volumes of foods that are typically prepared several hours before serving, during which time the food may be temperature abused.

Clostridium perfringens is one of the most common causes of foodborne illness in the United States according to the CDC, with approximately 10,000 cases occurring annually in the US. With many illnesses going unreported, it is estimated to cause nearly 1 million cases of foodborne illness each year.

Next time you find yourself in similar digestive distress, like I did, consider that you may have gotten a dose of this bad bug.

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