

CLOSTRIDIUM DIFFICILE INFECTION (C. DIFF)

Introduction

It is well known that exposure to antibiotics can cause diarrhea. Sometimes, the antibiotic itself can have a side-effect of diarrhea. When one stops the antibiotic, the diarrhea typically resolves. Occasionally, antibiotics can increase a person's risk for developing a particular type of infection called Clostridium difficile (C. diff). It is named because it was a difficult organism to isolate back when it was first identified in 1935. Regardless, it is now considered the most common infection that a person can acquire while in the hospital. It has deservedly earned a bad reputation as having a major impact on a hospitalized person's overall health. People outside of the hospital, however, can also develop the infection. We have good therapy for this infection and, most of the time, it can be treated.

Causes

The culprit bacteria is called Clostridium difficile, but it is more commonly called C. diff. It is found throughout our environment but is most often concentrated in healthcare centers such as hospitals and nursing homes. It is also found in daycare centers. It is commonly transmitted from what is called the "hand-mouth" route. The bacteria is ingested after being picked up from contaminated surfaces. Hand washing is the best method to minimize and avoid its transmission.

C. diff colitis develops when a person is put on an antibiotic for an infection such as pneumonia, a bladder infection, or skin infection. Antibiotics can change the normal bacteria that live in the colon and enable the C. diff bacteria to overgrow.

The C. diff bacteria produce two toxins. These are labeled toxin A and toxin B. Both of these toxins bind to the cells that line the intestine to cause inflammation and diarrhea.

There are a number of tests that check for an infection. The most common ones check for the presence with either toxin A, toxin B, or both. These tests are accurate when done properly.

When the infection occurs, it will most often begin within 5-10 days after starting the antibiotics. It can, however, occur earlier, as soon as one day after beginning an antibiotic, or up to 10 days after finishing an antibiotic. Diarrhea is the most common symptom, although it is not always present.

Of some concern is the fact that there is a more virulent strain that is emerging. It produces more toxin A and B and, as a result, is considered 10-20 times more toxic than the traditional organism.

People who develop C. diff can go through several stages of infection, particularly if it is unrecognized early on. These can evolve from a simple infection associated with diarrhea and a slight fever to a condition we call pseudomembranous colitis, which is a more serious stage of the disease. In this case, the colon develops a thick, white coating called a pseudomembrane. Finally, very severe cases can develop into what is called a toxic megacolon. This is also known as “fulminant colitis”. These more serious stages are more common in older people who are hospitalized. The potential for complications increases as the severity of the infection increases.

Diagnosis

The diagnosis for the infection is made by collecting stool, diluting it, and checking it for toxin A or B. Occasionally, a colonoscopy is performed. A colonoscopy is a procedure where a scope is inserted through the rectum and into the large intestine while the patient is asleep. This may help confirm the diagnosis but also judge the severity. The changes of pseudomembranous colitis mentioned above can often be seen at colonoscopy.

Treatment

The traditional treatment for the infection is to use either one of two antibiotics, Metronidazole (Flagyl) or Vancomycin (Vancocin), which are given by mouth. The minimum treatment is 10-14 days. More serious infections sometimes require longer treatment. Both of these antibiotics are effective, but Metronidazole is often used as a first choice because it is less expensive.

Other treatment options include other antibiotics or resins. A newer antibiotic called Rifaximin (Xifaxan) has shown some effectiveness. Another medicine called Cholestyramine (Questran) has also been used. Cholestyramine is a resin that will bind the toxin. It is not effective as primary therapy but is sometimes used in addition to antibiotics. One needs to be careful with Cholestyramine, however, because it can also bind medications, including Vancomycin.

Probiotics are also often used together with antibiotics. Specifically, *Saccharomyces boulardii* has been shown to help control the infection and reduce the chances of relapse. Prebiotics, which are plant products that promote the growth of more favorable bacteria, have also shown some promise.

Approximately 10-15 per cent of people will have a relapse after initial treatment. Most often, relapses are treated with a longer duration of either Vancomycin or Metronidazole. Chronic or repeated relapses can be effectively treated with a longer course of Vancomycin over six weeks. This therapy is often given in a decreasing dose, including alternate-day therapies, in an effort to capture the organism in its toxin and non-toxin producing forms. Vancomycin is also often preferred during pregnancy as there are some concerns with Flagyl crossing the placenta.

The most important factor, however, is strict hand washing after using the bathroom and coming in contact with a person who is potentially infected. This is particularly important in hospital settings, and all healthcare providers should wash their hands between patient contacts. Alcohol-based hand sanitizers are not effective, as they do not kill the bacteria.

Summary

Clostridium difficile, or C. diff, is an infection that can develop after a person is on antibiotics. It appears to be increasing in incidence. There is great concern of rising incidence of a more toxic form. We have good therapy that usually consists of Metronidazole or Vancomycin. Antibiotic resistance has not yet been reported. Treatment is typically between 10-14 days. Relapse occurs in 10-15 per cent of patients, who are then typically treated with a longer course of therapy. Probiotics and prebiotics look promising, particularly as a preventative measure.

This information is not intended as medical advice and should not be used for diagnosis. The information in these brochures should not be considered a replacement for consultation with a health-care professional. If you have questions or concerns about the information found in these brochures, please contact your health-care provider. We encourage you to use the information and questions in these brochures with your health-care provider(s) as a way of creating a dialogue and partnership about your condition and your treatment.