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### Colstridium Difficile Colitis

Katie Bloomfield

Otterbein University, [katie.bloomfield@otterbein.edu](mailto:katie.bloomfield@otterbein.edu)

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# Colstridium Difficile Colitis

Katie Bloomfield, RN, MS

Otterbein University, Westerville, Ohio

## Introduction

Clostridium difficile infection (CDI) is usually caused by the administration of antibiotics that causes the disruption of normal flora in the gut allowing for colonization of C difficile in the intestines (Aziz, 2013). CDI can cause diarrhea and may progress into colitis, toxic mega colon, sepsis, or even death (Headley, 2012). CDI has become increasingly difficult and costly to treat due to new hypervirulent strains, causing an increase in morbidity and mortality. The average cost of treating C difficile is \$5042 to \$7179 per incident and national cost of \$897 million to \$1.3 billion a year (Walters & Zuckerbraun, 2014).

Healthcare acquired infections (HAI) have become a national focus. They are considered preventable and can be reduced with proper infection control practices, surveillance, and appropriate antibiotic use. In 2009, the U.S Department of Health and Human Services released a plan to reduce all HAIs, which causes increased length of stay, healthcare costs, and deaths. Most of the HAIs have dramatically declined, but unfortunately CDIs still remain high (Headley, 2012). Since 2013, acute care hospitals have been required to report CDIs to the Center for Medicaid and Medicare Services (CMS), which has resulted in an increase awareness of infection control practices and feedback on their current practice, providing opportunities for improvement. The purpose of this poster is to provide information on the pathophysiology of CDIs and practitioners' role in reducing the incidence of CDIs.

## Underlying Pathophysiology

Clostridium difficile is a gram-positive anaerobe that produces spores and toxins. CDI usually occurs after an individual's intestinal microbiota is interrupted, usually following antibiotic administration. The antibiotics destroy the normal microbiota, which normally functions to prevent infections and overgrowth, allowing the c. difficile bacteria to grow (Wu, et al. 2013). C. difficile spores are transmitted through the fecal-oral route. Upon entering the gut, the bacteria enter the mucosal layer of the epithelial layer and produce toxin A and toxin B, causing a severe inflammatory response. (Buonom & Petri, 2016).

Toxin A and toxin B "are able to glucosylate and inactivate Rho and Ras family small GTPases causing disruption of the actin cytoskeleton causing disruption of the actin cytoskeleton, cell rounding, inhibition of cell division and cell death" (Buonom & Petri, 2016). The inactivation of Rho and Ras causes degranulation by the cytoskeleton, resulting in cell shrinkage and apoptosis. (Walters & Zuckerbraun). This causes epithelial breakdown and loss of intestinal barrier, allowing for bacteria to enter the lamina propria, which causes inflammatory mediators and immune cells travel to the site. Neutrophils travel to the site and are found in the pseudomembranous lesions. Although neutrophils are the main cell to fight CDI, it is suspected they may also worsen colitis by causing damage to surrounding tissue (Buonom & Petri, 2016).

## Significance of Pathophysiology

The pathophysiology is significant because the toxins produced by C. Difficile causes severe inflammation in the bowel and can lead to pseudomembrane colitis. The severe cases of colitis increase the risk for further complications, like toxic mega colon, perforated bowel and peritonitis (Nazarko, 2015). These toxins can also cause a systemic effect that can lead to sepsis and death (Walters & Zuckerbraun, 2014).



Figure 1 Toxic megacolon xray

## Symptoms

- C. difficile colitis can have a wide range of symptoms that varies in the severity
- Symptoms can occur during antibiotic therapy or up to 10 weeks after completing antibiotic treatment.
- May be asymptomatic
- Abdominal pain and tenderness
- Watery diarrhea lasting greater than 48 hours
- Elevated white blood cell count
- Fever
- Dehydration
- Hypotension
- Tachycardia
- Loss of appetite
- Mental Status changes
- Lactic acidosis

## Implication for Nursing Care

- A patient with suspected or confirmed CDI should be immediately placed in a private room with enteric precautions to prevent the spread to others (Headley, 2012).
- Gloves and gown are absolutely necessary, even when in not direct contact with the individual.
- Alcohol based sanitizers do not remove spores completely, so hand washing with soap and water for 15 seconds must be done after removing gloves every time (Aziz, 2013).
- The infected room must be cleaned daily with a bleach solution because other cleaners are ineffective in killing the spores, which can live on surfaces for months (Headley, 2012).
- The care provider should teach the patient and family about infection control practices to reduce the risk of contracting CDI.
- The main goal is prevention and early identification of CDI.
- Antibiotic use disrupts the normal flora and sets up a perfect opportunity for CDI.
- The appropriate and discriminate use of antibiotics is paramount to prevention (Walters & Zuckerbarun, 2014).
- Vancomycin intravenous administration within the previous eight weeks increase the risk of CDI (Aldrete, et al., 2015).
- Patients at an increase risk should be identified and monitored closely for symptoms. Some risk factors include:
  - Age > 65 years old
  - Recent antibiotic use
  - Hospitalization
  - Comorbidities
  - Nasogastric tubes
  - Proton pump inhibitors (Narako, 2015)
- A stool specimen should be obtained and sent for a PCR test, if there are 2 or more loose stools in 24 hours.
- Monitor for further complications of CDI, like toxic megacolon, perforated bowel, peritonitis, or sepsis.

## Conclusion

Clostridium difficile infection have been increasing and is the most common health care acquired infections (Bunomo & Petri, 2016). C difficile colitis can lead to many complications that are very costly and lead to significant increase in length of stay. There are many opportunities in the acute care setting to reduce the rate of health care acquired CDI. As with many bacteria, C Difficile is becoming more resistant to treatment. The inappropriate and over use of antibiotics is a major reason why there has been an increase in the cases and resistance of c difficile to treatment. This should be addressed daily with each patient to determine if they are receiving the right antibiotics based off cultures and symptoms. The need for quick identification and diagnosis is key to prevent further complications and strict infection control practices to prevent the further spread.

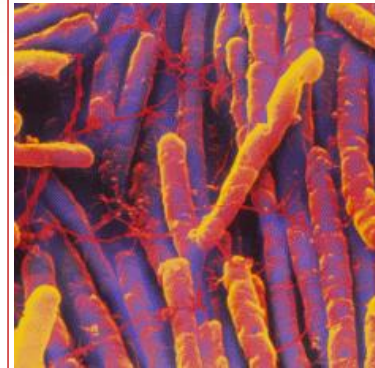


Figure 2 Colstridium difficile spores

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## Additional Sources

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