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# A Case Report on Antibiotic Associated Clostridium Difficile Infection

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**Abstract:** ***Clostridium difficile (C. difficile) stands out as a significant culprit behind diarrhea, often spread through the fecal - oral route. Specifically, the strain known as C. difficile type BI/NAP1/027 is notably responsible for severe C. difficile infections (CDI). It leads the pack in causing antibiotic - associated diarrhea, alongside other pathogens such as Clostridium perfringens, Staphylococcus aureus, and Klebsiella oxytoca. In the past, antibiotics like clindamycin, cephalosporins, penicillins, and fluoroquinolones have been linked to CDI outbreaks. We report a case of Clostridium difficile - associated diarrhea.***

**Keywords:** Clostridium difficile infections

## 1. Introduction

Clostridium difficile, also known as C. difficile, is a common type of bacteria that forms spores and is gram - positive. It can lead to various gastrointestinal problems, with symptoms ranging from mild diarrhea to severe colitis and, in some cases, fatal outcomes. [1] The rise in C. difficile infection rates is attributed to heightened antibiotic utilization. Additionally, factors such as gastric acid suppression, advanced age, severe illness, enteral feeding, obesity, chemotherapy, gastroenteral surgery, and hematopoietic stem cell transplant are recognized as predisposing elements for C. difficile infection. Moreover, the upward trajectory in organ transplants has further fueled the increase in C. difficile incidence. [2]

C. difficile bacteria enter the body via oral ingestion and initiate reproduction in the small intestine. Upon reaching the colon, they release toxins capable of harming tissues. These toxins result in cell destruction and the onset of watery diarrhea. When bacteria reintroduce themselves into an individual's digestive system, they reactivate and provoke infection. Given C. difficile's ability to survive outside the body, it can spread readily. Poor hand hygiene and inadequate cleaning facilitate the bacteria's transmission [3].

While no specific antibiotics can be entirely exempted, those frequently associated with C. difficile infection include clindamycin, cephalosporins (especially second - and third - generation), quinolones, co - amoxiclav, and aminopenicillins. Broad - spectrum antibiotics, in comparison to narrow - spectrum ones, are more prone to significantly altering gut flora. This alteration potentially creates an environment conducive for the establishment of other bacteria like C. difficile [4]. C. difficile - induced diarrhea should be considered in any patient experiencing diarrhea within two months of antibiotic use or 72 hours of hospital admission. Diagnosis often involves stool testing for the glutamate dehydrogenase (GDH) antigen. The enzyme - linked immunosorbent assay for this antigen is both sensitive and rapid. However, a positive result only confirms the presence of the organism and not necessarily its toxigenic capability. Alternatively, a nucleic acid amplification test (NAAT), utilizing polymerase chain reaction to detect the toxin gene, is highly sensitive for toxigenic strains. Nonetheless, it cannot determine whether these strains are actively producing toxin. [5].

The American College of Gastroenterology suggests oral vancomycin or oral fidaxomicin as the preferred treatment for a primary episode of nonsevere C. difficile - induced diarrhea. Specifically, Fidaxomicin at a dosage of 200 mg orally every 12 hours for 10 days is recommended by the Infectious Diseases Society of America (IDSA) and the Society for Healthcare Epidemiology of America (SHEA) as the first - line therapy for C. difficile infection. Fidaxomicin has been shown to reduce the risk of recurrence more effectively than vancomycin. In cases where fidaxomicin is not feasible, vancomycin at a dosage of 125 mg orally four times daily for 10 days is considered an alternative. It's worth noting that metronidazole is no longer recommended as first - line therapy for C. difficile - induced diarrhea; however, it can be used orally if vancomycin or fidaxomicin is unavailable. If potentially causative antibiotics are being administered, it's advisable to discontinue their use promptly or switch patients to an antibiotic regimen less likely to induce C. difficile - associated diarrhea. [6].

## 2. Case Report

A 91 - year - old gentleman presented to the ER with complaints of decreased food intake and altered behavior for 5 days. The patient also complained of loose stools - 5 episodes/day, foul smelling, not associated with abdominal pain. The patient also complained of headaches for 1 day. He had a known case of Acute Kidney Injury (AKI), Type II DM, Systemic Hypertension and Dyslipidemia Medication history of the patient shows that the patient was taking Inj Ceftazidime /Avibactam on a previous hospital stay which was 2 weeks back in view of urosepsis. Blood and urine cultures were sent and showed multidrug - resistant Klebsiella pneumoniae - carbapenems resistant, hence he was started on Ceftazidime Avibactam. Routine investigations were done and showed normal inflammatory markers (CRP - 2.3) with

normal total counts. Hb was 9.4. Hypokalemia was present (K - 3.09), and creatinine was elevated. Urine showed numerous pus cells and the presence of bacteria. The stool was sent for GDH EIA and showed Clostridium difficile GDH antigen positive (5.34)). Renal dose adjustment was done. His hypokalemia was corrected. A stool culture was sent and showed clostridium difficile and showed Clostridium difficile GDH antigen positive (5.34)), so the antibiotic Ceftazidime Avibactam was stopped and was started on C. Vancomycin. Serial RFT and serum electrolytes monitoring were done. His fever spikes reduced and he improved symptomatically, hence discharged the patient.

## 3. Discussion

Antibiotic - associated diarrhea (AAD) occurs when loose, watery bowel movements are experienced three or more times daily following the administration of medications aimed at treating bacterial infections, namely antibiotics. In healthy individuals, the intestines harbor a diverse array of bacterial species. While many of these are benign or even beneficial to bodily functions, a select few possess the capacity to cause trouble. Ordinarily, the "harmful" bacteria are vastly outnumbered, thus maintaining a natural equilibrium within the gut. However, this equilibrium can be significantly disrupted when an individual initiates antibiotic therapy. This is due to the antibiotics' ability to eliminate large quantities of the gut's indigenous bacteria, thereby disturbing the intricate balance among the different species.

Clostridium difficile infection (CDI), a specific type of antibiotic - associated diarrhea (AAD), can lead to more severe gastrointestinal illness. Clostridium difficile, now also known as Clostridioides difficile, is a type of Gram - positive, spore - forming anaerobic bacterium. The spores of C. difficile are capable of enduring for extended periods on non - living surfaces, resisting heat, acidity, and antibiotics. This resilience contributes significantly to the challenges posed by this bacterium within the healthcare environment.

In our case report, the patient was taking the antibiotic, Ceftazidime avibactam for urosepsis. Ceftazidime avibactam is an antibiotic that is responsible for causing AAD. Here the patient was admitted with complaints of loose stools for 5 days. During hospitalization, vitals were monitored which are stable. Blood counts were normal and he had deranged creatinine and potassium levels. A stool was sent for GDH EIA in view of diarrhea and it showed Clostridium difficile infection (CDI) which is a particular form of Antibiotic - associated diarrhea (AAD). Antibiotic Ceftazidime avibactam was stopped and Tab Vancomycin 250 mg BD started to control CDI.

Many studies have been conducted to study the prevalence of antibiotic - associated Clostridium defficile infection. Our case report is similar to Xiaoqun MM *et al*, which showed cephalosporins induced clostridium defficile infection finally treated with Vancomycin. The case presented here concerned the impact of antibiotics on C. difficile - associated diarrhea (CDAD), indicating the importance of appropriate prescribing of high - risk antibiotics.

## 4. Conclusion

In conclusion, Cephalosporins, piperacillin - tazobactam, and carbapenems are frequently implicated in causing Antibiotic - associated diarrhea (AAD) due to Clostridioides difficile (CD). To mitigate the occurrence of CDI, it is advisable to opt for antibiotics with lower AAD risk from susceptibility tests and to refrain from using β - lactam and β - lactamase inhibitors (BL - BLIs) as empirical therapy. Implementing effective infection control measures can curb the emergence of multidrug - resistant (MDR) CD strains. Understanding the epidemiological patterns of CDI in countries like India is crucial for devising preventive and control strategies against CDI.

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**Conflict of Interest**
The authors declare that the case report was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

**Abbreviations**
- **CDI:** Clostridium Difficile Infections
- **AKI:** Acute Kidney Injury
- **NAAT:** Nucleic Acid Amplification Test
- **GDH:** Glutamate dehydrogenase
- **EIA:** Enzyme Immuno Assay
- **AAD:** Antibiotic - Associated Diarrhea
- **CDAD:** Clostridium Difficile Associated Diarrhea

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