Look What the Cat Dragged in! Recurrent Clostridioides difficile from a Household Cat

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Patient: Female, 31-year-old
Final Diagnosis: Recurrent Clostridioides difficile
Symptoms: Diarrhea
Clinical Procedure: —
Specialty: Gastroenterology and Hepatology • General and Internal Medicine

Objective: Unusual clinical course
Background: Clostridioides difficile (C. difficile) is a bacterium that is well known for causing serious diarrheal infections and can even lead to colon cancer if left untreated. Disruption of the normal healthy bacteria in the colon can lead to development of C. difficile colitis. Risk factors for C. difficile infections (CDI) include recent antibiotic exposure, hospital or nursing home stays, inflammatory bowel disease (IBD), or impaired immunity. There is an increasing incidence of community-associated CDI (CA-CDI) in individuals without the common risk factors, which has implicated natural reservoirs, zoonoses, originating from animals such as domestic cats and dogs, livestock, shellfish, and wild animals.

Case Report: A previously healthy 31-year-old woman with recurrent CA-CDI suspected to be acquired from a household cat represents a novel presentation. The patient had an initial case of severe diarrhea following recent antibiotic exposure, was briefly monitored in hospital, and was diagnosed with CDI. She was trialed on oral vancomycin, which resulted in temporary resolution of her symptoms. Her symptoms recurred, however, and did not improve despite treatment with multiple therapeutic options over a period of months. Ultimately, the patient was not able to achieve long-term resolution of her symptoms until her newly adopted pet cat was treated by a veterinarian.

Conclusions: In conclusion, this case report explores the epidemiologic risk factors of zoonotic CA-CDI and the importance of early identification, evaluation, and prevention of disease. This case demonstrates the significance of thorough history taking, contact (pet) tracing, and proper treatment of recurrent CA-CDI.

Keywords: Bacterial Zoonoses • Clostridium Infections • Diarrhea • Disease Reservoirs

Full-text PDF: https://www.amjcaserep.com/abstract/index/idArt/940923
Background

The increasing incidence of community-associated Clostridioides difficile infections (CA-CDI) has implicated natural reservoirs from animals such as domestic cats and dogs, livestock, shellfish, and wild animals [1]. Understanding the interactions between the human host, the host’s environment, and the infectious agent is the key to this case (Figure 1). Recurrent Clostridioides difficile infection (CDI) from a household cat represents a novel presentation of CA-CDI, which, by definition, refers to CDI in an individual with no overnight stay in an inpatient healthcare facility in the 12 weeks prior to symptom onset [2,3].

Case Report

A 31-year-old woman presented with a 1-week history of fever and diarrhea. She reported passing 4 loose, non-bloody bowel movements daily, associated with abdominal cramps, nausea, and vomiting. Medical history included endometriosis and recurrent urinary tract infections (UTIs). Her most recent UTI was treated with a 7-day course of ciprofloxacin, completed 3 days prior to admission. This was her only antibiotic exposure within the previous 3 months. She denied any previous hospitalizations, surgeries, prior CDI, other enteric infections, or family history of immune-mediated conditions or IBD. Pertinent negatives were dysuria, melena, or hematochezia. She did not smoke or drank alcohol socially, and had only 1 male sexual partner.

On physical examination, she was febrile (38.89°C), tachycardic (133 beats/min), and tachypneic (respiratory rate 22 breaths/min), but normotensive. There was minimal abdominal tenderness and no guarding. The white blood cell count was 13 950 cells/μL, lactic acid 2.8 mg/dL, and urinalysis revealed trace leukocyte esterase. The urine culture was negative, but she received 2 days of intravenous antibiotics for a suspected urinary tract infection (UTI). Computed tomography of her abdomen and pelvis with contrast suggested left pyelonephritis; the colon was normal. The stool polymerase chain reaction (PCR) was positive for C. difficile, and she was discharged home with oral vancomycin for 14 days. She reported resolution of her diarrhea after completion of the 14-day course.

As demonstrated in Figure 2, 2 months later, she presented to a primary care clinic with recurrence of her symptoms, including profuse watery diarrhea associated with abdominal pain, nausea, fever, and chills. Her stool PCR was again positive for C. difficile. She had not used any other antibiotics between the initial episode and recurrence of CDI. She was given a regimen of tapered and pulsed vancomycin. A month later, via video visit, she revealed that she continued to have profuse diarrhea, every 4 hours, and fidaxomicin was prescribed. It was during this visit that the patient asked if a stray cat she adopted approximately a month before the onset of her initial symptoms might have contributed to her condition. She had plans at this time to isolate herself from her cat and take her cat to the veterinarian for testing while completing her fidaxomicin course. Given chronic diarrhea, she was referred to gastroenterology for further evaluation. One month later, the cat stool antigen test was positive for C. difficile, and treatment was commenced by a veterinarian. The cat displayed no symptoms; however, the patient was also concerned about the cat’s health, given the proximity to her in her apartment and the temporal relationship of the symptom onset and her adoption of the pet. One month later, she saw her gastroenterology doctor who had previously found her stool to be positive (by PCR) for the C. difficile toxin gene. She began treatment with bezlotoxumab. The patient described that the symptoms were not resolved until both her and her cat were treated. The patient followed up in clinic 2 months later without any gastrointestinal complaints and confirmed resolution of symptoms.

Figure 1. This graphic depicts the epidemiological triangle of infectious disease. Focusing on the interaction between the host, the environment, and the pathogen can help us understand this rare case of community-acquired C. difficile.
Environmental factors play a significant role in the pathogenesis of recurrent community-acquired CDI. A study in Houston, Texas identified pathogenic *C. difficile* in household and public environments; recovering toxigenic *C. difficile* endospores in 32% of samples collected from various household items and community areas, compared with 16.5% positive isolates from hospitals [4,5]. The most common sources were parks (24.6% samples positive), followed by homes (17.1%), commercial stores (8.1%), and fast-food restaurants (6.5%).

There is a general lack of data on the prevalence of pathogens in household pets and on the incidence of human infections that can be attributed to pets [6]. However, it has been hypothesized before that a patient who experiences CDI could transmit *C. difficile* to a pet, and the pet could then act as a reservoir for recurrence of *C. difficile* in the original patient or colonization of those who did not carry the pathogen [7]. There is yet to be a study that demonstrates the direct transmission of *C. difficile* between household pets and their owners, but Loo et al found that 2/9 (22%) of cats and 2/5 (40%) of dogs belonging to owners that had experienced CDI carried identical strains of *C. difficile* [8]. Studies have shown isolates of pathogenic clones of *C. difficile* in cat feces; specifically, the RT 014 strain [1,4]. However, there is no evidence that this bacterium is pathogenic to cats. Furthermore, evidence from stool-sample isolation that humans and their pets had similar strains of *C. difficile* makes it possible that our patient’s recurrent CA-CDI was derived from this natural reservoir [1]. It is also worth noting that although the rates of recurrent CDI in cats are not well known, it is hypothetically possible that the cat mentioned in our case could become re-infected and cause a recurrent infection in the patient. Given these findings, both household and environmental reservoirs must be considered in the etiology of CA-CDI.

This study was limited by the fact that whole genome sequencing was not performed on stool isolates. As such, resolution of the patient’s stool microbiota was limited. Additionally, the patient was exposed to ciprofloxacin prior to her initial CDI which is a risk factor for CDI.

### Conclusions

In conclusion, given the temporal relationship between the patient’s symptom onset and the adoption of the cat, and given the resolution of the patient’s symptoms following treatment of the cat, it is possible that the patient acquired *C. difficile* from the cat. This case highlights the importance of comprehensive history taking and considers the zoonotic transmission of *C. difficile* as a novel etiology of CA-CDI.

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### Statement

This case report was presented at the American College of Gastroenterology 2022 Annual Scientific Meeting & Postgraduate Course on October 24, 2022, in Charlotte, North Carolina, and won outstanding poster presenter award.

### Declaration of Figures’ Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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**Discussion**

This graphic depicts the timeline of the patient’s treatment and symptoms, and the cat’s diagnosis and treatment.
References:


