Isolated *Clostridium difficile* Small Bowel Enteritis in the Absence of Predisposing Factors

Sebastian D. Schubl,¹ Loveita Raymond,² R. Jonathan Robitsek,¹ and Farshad Bagheri³

Abstract

Background: *Clostridium difficile* colitis is a growing problem as antibiotic use and resistance continues to plague healthcare, yet few articles documenting the occurrence and outcomes of *C. difficile* small bowel enteritis exist. We believe to have the first reported case of *C. difficile* enteritis originating in the small bowel, in absence of any previously reported risk factors for this rare infection with high mortality.

Case Presentation: A 71-year-old female presenting with bowel obstruction and strangulation was found to have *C. difficile* enteritis after bowel resection and discontinuity that was found repeatedly to be isolated to the small bowel despite an intact, healthy colon.

Conclusion: The possibility of small bowel *C. difficile* in surgically manipulated small bowel is real, even in the absence of long-term antibiotic use, inflammatory bowel disease, or immunodeficiency and with a normal colon in place. This is an entity not described previously and further expands the potential impact of this ubiquitous bacterium.

CLOSTRIDIUM DIFFICILE colonization in the large bowel is a common cause of colitis in hospitalized patients after antibiotic exposure. Yet, it rarely colonizes the small bowel and seldom causes active small bowel enteritis. The few reported cases of small bowel *C. difficile* enteritis are observed in patients that have well-documented histories of inflammatory bowel disease (IBD), prolonged antibiotic use, immunosuppressive therapy, or who have undergone a total or subtotal colectomy. In this article we present a case of *C. difficile* infection isolated to the small bowel in a patient with no prior history of the risk factors outlined previously.

Case Report

A 71-year-old African-American female with past medical history of hypertension, hyperlipidemia, and Alzheimer's disease diagnosed only 1 mo prior, presented to the emergency department (ED) with 3 d of decreased appetite, absent bowel movements, and lethargy. The patient had no similar episodes in the past. Her most recent hospitalization was over 20 y ago for a thigh abscess, and her surgical history was significant only for a cesarean section. She had not received

antibiotics of any kind for more than 6 mo prior to the date of admission. On presentation the patient was hypotensive, but afebrile with normal pulse rate. She had mild abdominal distention, rigidity, guarding, and tenderness to palpation. Nasogastric tube placement yielded 3,000 ml of feculent material. Initial labs were significant only for acute kidney failure and elevated serum lactate concentrations; the complete blood count (CBC) was within normal limits without leukocytosis. Unsurprisingly, a computed tomography (CT) scan of the abdomen and pelvis showed high-grade distal small bowel obstruction (SBO).

The patient was intubated for worsening mental status and admitted to the surgical intensive care unit (SICU) for resuscitation. Following admission she required increasing doses of vasopressor support and was started on broad-spectrum IV antibiotics: vancomycin, levofloxacin, and metronidazole. Within 12 h of admission, the patient underwent emergent exploratory laparotomy, which revealed multiple adhesions, with incarcerated and strangulated distal ileum requiring resection of a 30-cm segment. The bowel was left in discontinuity and the abdomen left open with negative pressure therapy. She underwent a second look 24 h later without need for further

¹Department of Surgery, ³Department of Internal Medicine, Jamaica Hospital Medical Center, Jamaica, New York.

²Ross University School of Medicine, Portsmouth, Dominica.

resection and on hospital day five she was taken for a small bowel anastomosis, creation of a diverting loop/functional end ileostomy, and gastrostomy tube placement.

On the morning of hospital day six, tube feeds were started and all antibiotics except IV metronidazole were discontinued. On the evening of hospital day six, a sample of liquid stool from the ileostomy bag tested positive for *C. difficile* toxin B via polymerase chain reaction (PCR) assay. Repeat ileostomy and rectal stool samples were sent the next day for confirmation of this unexpected finding and again, the ileostomy sample was positive for *C. difficile* while the rectal stool sample was negative. Metronidazole was continued and vancomycin was added via gastrostomy tube. On hospital day eight, both rectal and ileostomy samples resulted positive for toxin B, thus vancomycin enema was added to the regimen. By hospital day ten, testing of both small and large bowel samples were negative for *C. difficile*. Because of the high mortality rate in the few known cases of this infection she was treated with a 14-d course of metronidazole IV at 500 mg every 8 h and vancomycin via gastrostomy and per rectum, tapered over 4 wk. After completion of this regimen her ileostomy was taken down and she was discharged to a skilled nursing facility without any recurrence of her *C. difficile* infection.

Discussion

A thorough review of the current literature on small bowel *C. difficile* enteritis shows cases only occur in the presence of one or more of several precipitating factors. Just as with *C. difficile* colitis, antibiotic usage, age, and inpatient hospitalization are significant and nearly universally present risk factors [1–3]. Small bowel *C. difficile* has also been associated with IBD, immunosuppression, subtotal or total colectomy with ileoanal anastomosis, and prolonged bowel discontinuity, with IBD present in greater than 50% of cases. Our patient is unique in having none of these previously reported risk factors and from her primary care physician (PCP) we know she never exhibited signs or symptoms of IBD. Of the remaining reported cases of small bowel *C. difficile*, the majority of patients are considered to be in an immunosuppressed state from either radiation or chemical immunosuppressive agents [4,5], or they suffer from an underlying immune modifying disease such as AIDS, autoimmune vasculitis, or cancer [6,7]. None of these were evident in this case.

Our patient did receive antibiotic therapy for 5 d prior to diagnosis, but for days prior to this and throughout her course, her small bowel and colon were mechanically separated; first because of her adhesion related bowel obstruction, and then operatively as she was left in discontinuity and then protected with a functional end ileostomy at time of anastomosis. This effectively rules out that she had a colonic nidus of infection that simply spread back to her small bowel and thereby resulted in the positive PCR assay from the ileostomy. This is further supported by the negative samples sent from her rectum, though admittedly, there was minimal stool at this site for testing.

In the reported cases of post-operative *C. difficile*, patients underwent bowel manipulation usually involving partial or complete resections of the colon and subsequently were in states of prolonged or permanent bowel discontinuity [8–19].

The only two reported cases with small bowel enteritis after operations limited to the small bowel involved infections of dysfunctional pouches or limbs [20,21]. Much like in colitis, documented cases of small bowel enteritis with an ileostomy presented with high stomal effluence [15,22]. The early and pronounced ileostomy output was the key finding that raised our index of suspicion to test the patient for *C. difficile*.

All classes of antibiotics have reported potential to cause *C. difficile* colitis and the same is presumed for small bowel enteritis with this ubiquitous organism [15]. Our patient received 5 d of levofloxacin in conjunction with vancomycin and metronidazole, and therefore this should be considered the inciting agent for her infection. Her initial hemodynamic instability likely predated the infection as it resolved rapidly after removal of the necrotic bowel, therefore, this cannot be considered a fulminant enteritis. From the few reported cases available, mortality in small bowel *C. difficile* has been estimated to be as high as 83% [23], though our patient never manifested systemic symptoms of her infection and despite a protracted hospital course was able to have her ileostomy reversed and be discharged to a nursing home.

Among the limitations to this case report was the lack of electronic medical charting in the PCPs office going back more than 6 mo prior to admission and the inability to directly interview the patient at any time because of her delirium and dementia to confirm that she was truly antibiotic naive prior to admission. Also, the only testing that was performed to establish her infection was a toxin PCR, which though highly sensitive and specific, could have been confirmed with endoscopy.

Inflammation from *C. difficile* enteritis can result in adverse complications such as perforation [1,24] and compartment syndrome [25]. The high mortality rate of small bowel enteritis makes early detection and therapy with rapid eradication of the infection critical to survival [23]. The possibility of *C. difficile* enteritis exists, regardless of other factors, in patients with a high output ileostomy [15,22], radiological findings consistent with pseudomembranous enteritis [26], or small bowel obstruction without any other clear cause. Our index of suspicion was raised in this patient because of the pronounced early post-operative ileostomy output. This is the first report of isolated small bowel *C. difficile* enteritis in the absence of the few known risk factors, and underscores the need for vigilance in non-predisposed populations of patients for this deadly infection.

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Address correspondence to:
Sebastian D. Schubl, MD
Department of Surgery
Jamaica Hospital Medical Center
8900 Van Wyck Expressway
Jamaica, NY 11418

E-mail: sschubl@jhmc.org

Abbreviations Used

CT = computed tomography
CBC = complete blood count
ED = emergency department
IBD = inflammatory bowel disease
PCP = primary care physician
PCR = polymerase chain reaction
SBO = small bowel obstruction
SICU = surgical intensive care unit

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