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Cecostomy tube lavage for treatment of fulminant clostridium difficile colitis in a recent transplanted patient

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Abstract

Fulminant Clostridium Difficile Colitis (FCDC) is a highly lethal disease with mortality rates ranging between 12% - 80%. In patients status-post allograft solid organ transplant this rate is increased. Treatment, however, is the same as the general population; emergent exploratory laparotomy and subtotal colectomy. However, this procedure done in an emergent setting carries a mortality rate up to 34% as well as significant patient morbidity. To our knowledge, only a few studies have examined a less aggressive treatment. The technique involves creating a divergent ileostomy to deliver antibiotics directly into the colon. This patient, a 68 year-old male who underwent renal transplant 7 days earlier, developed abdominal distension and paralytic ileus with eventual diarrhea. C. difficile was confirmed by microbiological studies. Despite treatment with oral vancomycin and intravenous metronidazole, this patient developed sepsis and required laparotomy. The index case was complicated by cardiac arrest and aborted. Because of the poor clinical course, he underwent placement of cecostomy tube followed by antibiotic irrigation. Full recovery was achieved and complete anatomy of the colon was preserved. In patients with FCDC, less aggressive surgical options should be investigated, as they could have benefits on the subsequent quality of life of the patient.

Case description

The patient was a 68-year old male with end stage renal disease who underwent allograft kidney transplant. He was given 2,000 mg cefazolin intravenously for antimicrobial prophylaxis prior to the procedure. Immunosuppression with myfortic, tacrolimus, alemtuzumab and steroid taper was continued postoperatively. On postoperative day # four he developed paralytic ileus which progressed to several episodes of watery diarrhea and epigastric pain. Using polymerase chain reaction (PCR) for toxins A/B genes, acute C. difficile infection was confirmed. He was started on intravenous metronidazole and oral vancomycin via nasogastric tube. His clinical status continued to deteriorate evidenced by worsening abdominal pain, distension, tachycardia and a white blood cell count of 2.3 Thou/mm3. The diagnosis of FCDC was made. He was admitted to the Intensive Care Unit and an emergent consultation to General Surgery was made. Upon examination he was found to have signs of peritonitis and septic shock. He underwent emergency exploratory laparotomy. His colon appeared diffusely dusky and edematous. During the exploration the patient experienced cardiac arrest with pulseless electrical activity (PEA). He was resuscitated with return of spontaneous circulation. The procedure was aborted, and his abdomen remained open. A temporary abdominal closure system was placed [figure 1]. Abdominal plain filmed obtained on post-operative day #4. C. difficile studies returned positive, 2 days later. Because of his rapid clinical decline, no other images were pursued prior to operation.

His recovery continued in the surgical ICU where he remained intubated and on vasopressors, maximum does of Norepinephrine was 0.04 mcg/kg/min. Immunosuppression in the form of myfortic and tacrolimus was held. Approximately twelve hours following the first case, he underwent reopening of the laparotomy where the colon was found to be diffusely edematous and ecchymotic. The cecum was identified and a 3-0 purse-string suture was placed in the cecum. A cecotomy was then made and a twenty -French gastrostomy tube was

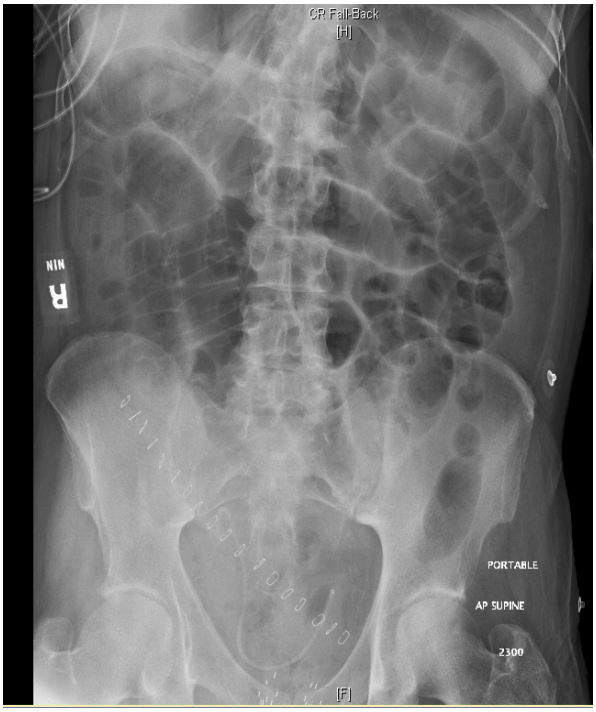

Figure 1. A temporary abdominal closure system

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placed into the cecum and the balloon was inflated. The cecostomy tube was brought out through the midline around the section sponge, then a temporary abdominal closure system was placed in the abdomen around the cecostomy tube.

The patient was started on 250 mg vancomycin HCL in 100mL normal saline via cecostomy tube as well as 500 mg rectal vancomycin enema, both administered every six hours. Intravenous metronidazole was also continued 500 mg every six hours. The proposed treatment plan consisted of fourteen days. The clinical course was favorable and it was possible to discontinue the vasoactive drugs twenty four hours after cecostomy tube placement. He returned to the operating room the following day for formalization of the cecostomy tube and closure of the abdomen. Initially, his immediate postoperative course was encouraging.

One week later, however, he developed fever, leukocytosis and tachypnea with respiratory failure resulting in re-intubation. Broad spectrum antibiotics were initiated after cultures were obtained. Immunosuppression in the form of intravenous methylprednisone 10 mg/daily was discontinued. Computerized tomography (CT) scan of the abdomen showed proximal dilatation of the small bowel suggestive of ileus pattern. The colon was normal in caliber with no signs of bowel leak and cecostomy appeared intact. Given his sudden clinical deterioration and apparent sepsis, oral fidaxomicin through the nasogastric tube was added at 200 mg twice a day. A bedside flexible sigmoidoscopy was performed, which revealed normal colonic mucosa throughout the sigmoid with a single area of pseudo membranes in the proximal rectum but no further evidence of continued colitis. Sepsis workup revealed sputum and BAL cultures which grew Aspergillus fumigatus and Serratia marcescens. Antimicrobials were adjusted accordingly.

During the course of persistent respiratory failure requiring mechanical ventilation, his serum creatinine level continued to increase as oliguria worsened. On postoperative day number eighteen, Continuous Veno-Venous Hemofiltration (CVVH) was initiated. His vitals had stabilized by POD number twenty. Metronidazole and fidaxomicin were discontinued totaling fourteen and five days of treatment respectively. Vancomycin flushes were also discontinued after fourteen days and the cecostomy tube was clamped. He was successfully extubated. Repeat testing for polymerase chain reaction (PCR) for toxins A/B genes was performed due to continued liquid stools. Repeat testing proved negative.

He continued to require hemodialysis and the integrity of his renal graft became questionable. Three weeks after starting dialysis renal biopsy was performed, with pathology confirming acute allograft rejection. He subsequently underwent transplant nephrectomy with a satisfactory postoperative course. Enteric feeds were weaned as he was tolerating oral intake. He was discharged to an acute care facility on hospital day #sixty-two. His cecostomy tube was removed in clinic six weeks after hospital discharge.

Discussion

Clostridium difficile infection after solid organ transplant occurs in 5.6% and 9.5% of all solid organ transplant recipients and in 2.6% and 7.3% of kidney allograft recipients [1]. These infection rates are five times that of the general inpatient population [2] Fulminant colitis is a complication that develops in 1% to 8% of patients with C. difficile infection and is associated with morality rates in the range of 30% to 80%. Fulminant colitis has been reported to be as high as 13% of transplanted patients with C. difficile infections [3,4]. The standard treatment for FCDC is subtotal colectomy. Emergent subtotal colectomy has a high mortality rate; however, this particular patient had multiple factors that added to an even higher potential rate of mortality and morbidity. Age, end stage renal disease with recent renal transplant, immunocompromised status, and decline into cardiac arrest during exploratory laparotomy, all designated a low survival rate for this patient. [5-9] Consequently, the decision was made to use a less aggressive approach involving placement of a cecostomy tube with antibiotic irrigation.

Enterostomy followed with antibiotic irrigation in not a novel idea in the management in FCDC. In order to avoid the high mortality rate associated with colectomy, other studies have described alternative, less invasive approaches. In 2011, Neal et.al reported their experience using laparoscopic techniques to create ileal diversion and intraoperative colonic lavage. Forty-two patients, nineteen patients (45%) received immunosuppressive drugs, were treated using their strategy. Postoperatively, the patients received antegrade vancomycin flushes via a malecot catheter left in the efferent limb of the ileostomy. In addition, patients were continued on intravenous metronidazole (500 mg q8 hours) for 10 days. When compared to the historical population, they found reduced mortality (19% vs. 50%; odds ratio, 0.24; $P = 0.006$). Preservation of the colon was achieved in 39 of 42 patients (93%) [10].

On the other hand, Fashandi and colleagues, in a retrospective review of all patients who underwent surgical treatment of FCDC, found less convincing evidence to support less invasive surgical management. In a much smaller cohort of patients utilizing Neal's protocol, 30% of loop ileostomy/lavage patients died within 30 days versus 23% in the total colectomy group. However, the two surgical groups in the study had similar 1- year mortality rates (40 vs. 46%, p 1⁄4 1.00). No patient in the loop ileostomy group required a subsequent colectomy, representing a 100% colon salvage rate. Furthermore, 83% of these patients had restoration of normal intestinal continuity with ileostomy reversal in the follow-up period, which reflected results of the Neal study [11]. Ferrada et.al, in 2017, found results that were congruent with Neal's findings. After adjusting for pre-procedure confounders they found mortality was significantly lower in the loop ileostomy group (17.2% vs. 39.7%; p = 0.002). [12] A case report by Castillo et.al described a pediatric transplant patient, who underwent ileostomy and terminal cecostomy followed by intracolic administration of vancomycin via the cecostomy then rectally for 1 month. Obliteration of C. difficile was achieved and the cecostomy was closed at one month. Intestinal reconstruction was performed 2 months later. There was no rejection of the transplanted heart. [13]

In accordance with clinical guidelines for management of C. difficile infection, our patient received treatment with vancomycin enemas, because ileus was present and intravenous metronidazole owing to the severity of the case. Following placement of the cecostomy tube; metronidazole and vancomycin were administered for 14 days. Fidoxomycin was given for 5 days because there was uncertainty in successful treatment of C. difficile infection in the setting of continued sepsis which was later attributed to pneumonia.

Conclusion

While surgical treatment of FCDC using intraluminal antibiotic irrigation has been described, the aborted subtotal colectomy with subsequent cecostomy tube placement and administration of antibiotics make this case unique. To the best of our knowledge, the outcomes of patients undergoing cecostomy for FCDC management have yet to be investigated. Recently reported less aggressive surgical

options consist of loop ileostomy and colonic lavage. This strategy ultimately requires reconstruction of the intestinal tract in a second operation. This procedure was chosen for our patient because of recent solid organ transplant, intraoperative cardiac arrest and multiple surgical interventions in the setting of multi-organ failure. Although the allograft was lost, the patient was able to make full recovery and the colon was preserved. The gastrointestinal continuity remained functional and intact. This case was acknowledged to serve as a stimulus to examine alternate, less drastic techniques to surgically treat fulminant Clostridium difficile colitis.

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