CASE REPORT

Clostridium difficile enteritis: diffuse small bowel radiological changes in a patient with abdominal sepsis

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SUMMARY

While imaging appearances of pseudomembranous colitis are commonly recognised, radiological manifestations of *Clostridium difficile*-associated enteritis are poorly understood which, combined with the rarity of this infection involving small bowel, makes establishing the correct diagnosis challenging. Therefore, in order to encourage awareness of readers, we present a case of *C. difficile* enteritis that manifested as abdominal sepsis complicating the postoperative period in a middle-aged woman with fistulating Crohn's disease and defunctioning ileostomy. Radiological appearances are described based on three consecutive CT studies performed 5 days prior to onset of symptoms, during the peak of enteritis, corresponding with the patient's clinical deterioration, and also 35 days later following treatment and resolution.

BACKGROUND

Clostridium difficile enteritis is a rare but potentially life-threatening condition, and the outcomes are poorer when the diagnosis is delayed. A literature review performed by a group of authors in 2013 identified 83 documented cases of *C. difficile* enteritis with a mortality rate of 23%.¹ With the vast majority of cases reported in the last decade, the incidence of *C. difficile* enteritis appears to be rising, particularly in patients with inflammatory bowel disease undergoing bowel surgery.^{2 3} A number of other predisposing factors have also been described.

CT is increasingly used in this group of patients, and therefore, the familiarity of the radiologist with this condition should facilitate timely diagnosis. However, to the best of our knowledge, the published data on the imaging manifestations of *C. difficile* enteritis are limited, with only a single radiological paper describing four cases available.⁴ Therefore, we present a case of *C. difficile* enteritis in a predisposed, postoperative patient with a background of Crohn's disease, managed with multiple antibiotics. The patient had three consecutive CT studies performed prior to onset of symptoms, during the peak of abdominal sepsis and 35 days later following treatment. This allows documentation of the transition of the small bowel wall from normal to abnormal state followed by radiological, clinical and microbiological resolution. The colon remained normal.

CASE PRESENTATION

A 51-year-old Caucasian woman presented to our institution with signs of small bowel obstruction (SBO). She had a history of distal colonic Crohn's disease with a colovaginal fistula, which was managed with a defunctioning loop ileostomy and combination therapy of infliximab and azathioprine. Her admission CT revealed uncomplicated adhesive SBO caused by a band adhesion proximal to the ileostomy, but at this time, there was no evidence of any significant bowel wall thickening (figure 1).

The patient was admitted and underwent laparoscopic adhesiolysis; however, she became septic postoperatively. She was transferred to the intensive care unit, and despite multiantibiotic therapy (amikacin, vancomycin and piperacillin-tazobactam), she deteriorated and had increasing stoma output.

INVESTIGATIONS

A second CT was performed, 5 days after the initial CT, which showed a striking interval change in the small bowel appearance: although not dilated, there was extensive diffuse transmural oedema, with a hyperenhancing 'shaggy' mucosal surface, and a moderate amount of free intra-abdominal fluid (figure 2). The colon was normal.

Figure 1 Initial CT abdomen and pelvis performed on admission. Intravenous contrast-enhanced axial CT image at the level of stoma (S) shows dilated small bowel loops with thin wall (arrowheads). The colon (arrow) is empty and has normal appearances. A small amount of free fluid (asterisk) is present.

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Figure 2 Second CT abdomen and pelvis performed 5 days later. Intravenous contrast-enhanced axial CT images at the level of stoma (S) (A) and pelvis (B) demonstrate extensive thickening of the small bowel with submucosal oedema and increased enhancement of mucosal surface (arrowheads) which shows shaggy outline. By contrast, the colon (arrows) has normal appearances. Ascites (asterisks) is present.

The small bowel appearances were remarkably similar to those seen in the colon with pseudomembranous colitis, and therefore, the suspicion for *C. difficile* enteritis was raised. Subsequent stool testing for the *C. difficile* toxin gene and glutamate dehydrogenase were both positive. Stoma ileoscopy showed evidence of inflammation and pseudomembranes. As a result, treatment for *C. difficile* was initiated (oral vancomycin and intravenous metronidazole).

DIFFERENTIAL DIAGNOSIS

Given the CT appearances, positive stool microbiology and stoma ileoscopy findings, the suspicion for *C. difficile* enteritis was high. A Crohn's disease flare, while possible, was deemed unlikely, as the CT features did not support this. Gastrointestinal lymphoma was also a consideration but also not high in the differential given the imaging appearances and acute symptom onset.

TREATMENT

As a result, treatment for *C. difficile* was initiated (oral vancomycin and intravenous metronidazole).

OUTCOME AND FOLLOW-UP

The patient made a good clinical recovery, continuing with oral metronidazole after stepdown from intensive care. Following negative *C. difficile* DNA stool testing, she was discharged home. A subsequent outpatient ileoscopy showed resolution of the inflammation and pseudomembranes. The patient did, however, represent a month later because of recurrent ileostomy obstruction, which necessitated a third CT study. The third CT (figure 3), performed 35 days after the second one, showed recurrent adhesive SBO at near stoma level, but also coincidentally, yet helpfully, confirmed resolution of the small bowel thickening. This time, the patient's stoma was effectively manually examined and catheterised with resultant satisfactory bowel decompression. Subsequently, the patient had successful elective refashioning of her ileostomy. She is currently doing well at 6-month follow-up.

DISCUSSION

C. difficile colitis is relatively common, and its imaging appearances have been well documented. However, *C. difficile* enteritis is rare, and there has been little discussion of suggestive imaging findings in the literature. Despite this, it is an important diagnosis

to consider due to its associated high mortality rate, cited as between 23% and 69%.^{1 5} Once diagnosed, the infection can be treated by metronidazole, vancomycin or a combination of both.

A number of predisposing factors have been suggested based on previously reported cases. Antibiotic use, immunosuppression, previous bowel surgery, in particular previous colectomy or ileostomy, inflammatory bowel disease and alteration in gastric acid metabolism due to gastric acid suppressants have all been cited as risk factors.^{1 4 6 7}

It has been postulated that colectomy alters the small bowel flora, creating an environment more similar to the colon, thus predisposing to *C. difficile* enteritis.⁶ Defunctioning the colon, as in this patient, may create a similar enteric environment. *C. difficile* colitis is mediated by the exotoxins type A and B produced by the bacterium, without invading the colonic mucosa. It has been suggested that the clinical presentation is more fulminant in *C. difficile* enteritis due to increased small intestinal permeability.⁸

In this case, the predisposing factors of antibiotic use, Crohn's disease, previous ileostomy and recent surgery did exist to support the diagnosis.

The imaging at the peak of this patient's illness demonstrated small bowel mural thickening, mucosal hyperenhancement and submucosal oedema, which had developed rapidly over a 5-day period. The differentials for this imaging

Figure 3 Third CT abdomen and pelvis performed 35 days after the second one. Intravenous contrast-enhanced axial CT image at the level of stoma (S) shows dilated small bowel loops with thin wall (arrowheads). The colon (arrow) is empty and has normal appearances. A small amount of free fluid (asterisk) is present.

appearance would include infectious, inflammatory, ischaemic and vasculitic aetiologies. In this case, the patient clinically, radiologically and microbiologically responded to *C. difficile* treatment, rendering other differentials less likely. In addition, the distribution of a panenteritis is unlikely to be ischaemic in aetiology, as this did not conform to a vascular territory.

Few studies documenting imaging findings exist in cases of *C. difficile* enteritis, and none have demonstrated it diffusely affecting the small bowel mucosa such as in this case. In this patient, the small bowel features closely mimic the colonic imaging findings seen with pseudomembranous colitis. The CT demonstrated bowel wall thickening, indistinct bowel wall with inflammatory fat stranding and abdominal free fluid, all of which would be hallmarks of *C. difficile* colitis if the colon was affected.

A previous study showed that the caecum is commonly affected in *C. difficile* enteritis, whereas in this case, the small bowel only was diffusely affected, likely due to the discontinuity of bowel.⁴ Previous studies have also described intramural or intraperitoneal gas as a hallmark of *C. difficile* enteritis.^{9 10} This was not seen in this case, however may be a late sign.

Learning points

- ▶ This case demonstrates small bowel thickening, mucosal hyperenhancement and submucosal oedema that developed in an acute case of *Clostridium difficile* enteritis
- ▶ Appearances strikingly similar to the more easily recognised colonic appearances in *C. difficile* or pseudomembranous colitis.
- ▶ This is an important learning case for the radiologist, emergency physician and gastroenterologist, in order to emphasise early CT and recognition of the imaging findings in a disease conferring high mortality.
- ▶ The interval development of these changes since the CT performed only 5 days prior highlights the rapidity of the disease process and the importance of repeat CT scanning if the patient has risk factors and deteriorates clinically.

This case demonstrates a clear development of these changes in bowel appearances over a 5-day period, with interval surgery, concurrent treatment with multiple antibiotics, in concordance with the patient's deteriorating clinical status and inflammatory markers. Normal mucosal appearances were demonstrated before and after, hence indicating the relatively rapid onset of bowel changes demonstrated here. This suggests value in repeat CT scanning in patients with predisposing factors, and having a high index of suspicion, even if normal small bowel appearances are initially seen.

Contributors All authors contributed to this case report. JS wrote the case history, selected the images and wrote the manuscript. TC selected the images and edited the manuscript. RW provided case history and edited the manuscript. SK supervised the work, selected the patient's images and edited and reviewed the manuscript.

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REFERENCES

- 1 Dineen SP, Bailey SH, Pham TH, *et al.* Clostridium difficile enteritis: A report of two cases and systematic literature review. *World J Gastrointest Surg* 2013;5:37–42.
- 2 Lundeen SJ, Otterson MF, Binion DG, *et al.* Clostridium difficile enteritis: an early postoperative complication in inflammatory bowel disease patients after colectomy. *J Gastrointest Surg* 2007;11:138–42.
- 3 Issa M, Ananthakrishnan AN, Binion DG. Clostridium difficile and inflammatory bowel disease. *Inflamm Bowel Dis* 2008;14:1432–42.
- 4 Wee B, Poels JA, McCafferty IJ, *et al.* A description of CT features of Clostridium difficile infection of the small bowel in four patients and a review of literature. *Br J Radiol* 2009;82:890–5.
- 5 Boland E, Thompson JS. Fulminant Clostridium difficile enteritis after proctocolectomy and ileal pouch-anal anastomosis. *Gastroenterol Res Pract* 2008;2008:1–5.
- 6 Tsutaoka B, Hansen J, Johnson D, *et al.* Antibiotic-associated pseudomembranous enteritis due to Clostridium difficile. *Clin Infect Dis* 1994;18:982–4.
- 7 Lavallée C, Laufer B, Pépin J, *et al.* Fatal Clostridium difficile enteritis caused by the BI/NAP1/027 strain: a case series of ileal C. difficile infections. *Clin Microbiol Infect* 2009;15:1093–9.
- 8 Yee HF, Brown RS, Ostroff JW. Fatal Clostridium difficile enteritis after total abdominal colectomy. *J Clin Gastroenterol* 1996;22:45–7.
- 9 Kuntz DP, Shortleeve MJ, Kantrowitz PA, *et al.* A cause of intramural gas. *Dig Dis Sci* 1993;38:1942–4.
- 10 Tjandra JJ, Street A, Thomas RJ, *et al.* Fatal Clostridium difficile infection of the small bowel after complex colorectal surgery. *ANZ J Surg* 2001;71:500–3.

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