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Salmonella typhimurium as a Rare Cause of Small Bowel Obstruction

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Abstract

Small bowel obstruction (SBO) is an extremely common condition for hospitalization throughout the world. Although most causes of are due to post-operative adhesions, there are much less common causes which remain important to consider as differentials due to diagnostic and treatment implications. To the best of our knowledge, we are presenting the first case of SBO caused by *Salmonella typhimurium* induced terminal ileitis. We discuss how certain characteristics on CT imaging along with culture data led to our diagnosis and successful treatment.

Keywords: Small bowel obstruction, Terminal ileitis, Salmonella

1. Introduction

Small bowel obstruction (SBO) is a common disorder requiring inpatient hospitalization throughout the world.¹ Most cases of partial or complete SBO are due to post-operative adhesions, underlying tumors, or hernias.^{2,3} SBO however is an extremely unusual manifestation of an acute bacterial infection. We present a case of SBO caused by *Salmonella typhimurium*, a clinical manifestation of *S. typhimurium* that, to date, has never been reported. In our case, we discuss how CT findings including terminal ileum thickening along with stool cultures led to diagnosis and successful conservative treatment with SBO resolution.

2. Case description

A 72-year-old male with a past medical history including atrial fibrillation and bronchogenic cancer pending surgical resection, presented to our hospital with complaints of progressively worsening generalized weakness and fatigue for the past 3 days. He also reported abdominal distention and ongoing non-bloody diarrhea with a decrease in oral intake for 3 weeks. Upon presentation, he was

afebrile with a blood pressure of 81/52 mmHg, heart rate of 117 beats per minute, and a respiratory rate of 32 breaths per minute. Physical exam was significant for abdominal distention and bilateral lower quadrant tenderness, along with rebound tenderness. Laboratory values were remarkable for WBC of $4 \times 10^9/L$, with 43% band forms on differential. Chemistry panel revealed sodium 125 mmol/L, potassium 2.9 mmol/L, Chloride 92 mmol/L, CO₂ 14 mmol/L, BUN 42 mg/L, Creatinine 3.3 mg/L. Lactic acid was elevated to 7.3 mmol/L. *Clostridium difficile* toxin A/B PCR was negative. CT abdomen performed was remarkable for distention of the small bowel with a notable transition point and focal thickening at the terminal ileum. The terminal ileum was noted to gradually merge into the rest of the small bowel without any associated kink or twist (Fig. 1). No significant adenopathy was noted. Patient was started on empiric antibiotics with meropenem, and admitted to ICU for sepsis likely secondary to small bowel obstruction. He was resuscitated intravenous fluids with improvement in his vitals and lactic acid. Patient was evaluated by the surgical team given the SBO. Given clinical improvement with medical management, conservative treatment was continued with bowel rest and

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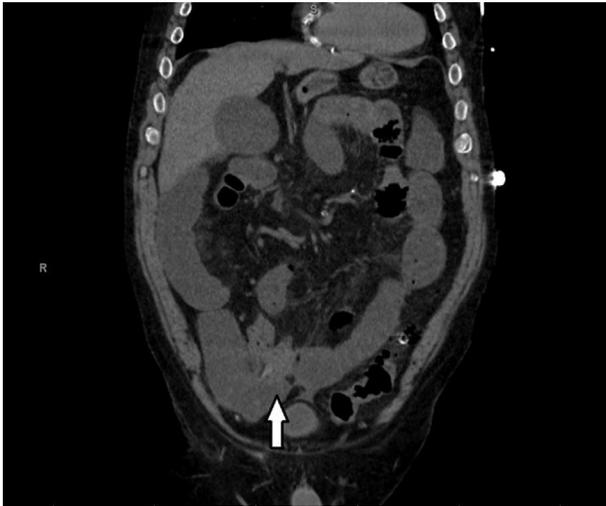


Fig. 1. CT scan (coronal view) of the abdomen demonstrating terminal ileum thickening with upstream small bowel dilatation.

nasogastric tube (NG) placement. Serial repeat abdominal X-rays on hospital days 3 and 4 were performed to evaluate for resolution of the obstruction, however showed persistently dilated small bowel loops (Fig. 2). Stool cultures returned positive on hospital day #4 for *S. typhimurium*, and antibiotics were tailored to ciprofloxacin. He had significant clinical improvement within 48 h after antibiotic initiation. Repeat abdominal X-ray on hospital day 7 showed complete resolution of the small bowel obstruction. Patient also began to



Fig. 2. Abdominal X-ray showing persistent small bowel dilatation.

tolerate an oral diet, and was discharged home on hospital day 9.

3. Discussion

Small bowel obstruction is a common disorder seen in hospitals throughout the world, and accounts for about 300,000 inpatient admissions every year in the United States.¹ There are many treatment approaches depending on clinical severity of disease, and range from conservative (bowel rest, NG tube insertion, and IV fluid rehydration) to emergent surgery for patients with complications including strangulation or peritonitis.² In regards to etiologies, acute mechanical SBO is most commonly caused by post-operative adhesions, underlying tumors, or hernias.^{3,4} Less commonly, patients can have disorders that preferentially affect intrinsic regions of the small bowel, such as the ileum. Terminal ileitis, which is frequently caused by Crohn's disease, is also known to occur in a wide variety of other disorders including infectious etiologies, spondyloarthropathies, vascular causes (vasculitides or ischemia), small-bowel tumors, or infiltrative (sarcoidosis, amyloidosis, etc). The most common infections associated with ileal inflammation include *Yersenia*, *Salmonella*, *C. difficile*, *Mycobacterium*, Actinomycosis, Anisakiasis, Cytomegalovirus, and *Histoplasma capsulatum*.⁵ The clinical course of infection-related ileitis usually follows an acute and self-limited course of abdominal pain involving the right lower quadrant, and may also include diarrhea.⁶ Differentiating between the various etiologies of ileitis relies on a detailed history and physical, while incorporating the clinical presentation, and as in our case, maintaining a clinical suspicion for an underlying treatable infectious etiology. In regards to *Salmonella*-associated ileitis, similar to the other infectious etiologies, the course of gastroenteritis follows initial infection and progresses to fluid secretion and inflammatory neutrophil migration into the mucosa of the intestine, and infection can preferentially involve areas such as the terminal ileum.⁷ Progression to small bowel obstruction as a complication of terminal ileitis caused by *Salmonella* as in our patient, however, has not been reported yet in the literature. *Salmonella* is currently one of the most common bacterial etiologies of foodborne illness worldwide.⁸ The acute infection, however, can be extremely difficult to diagnose if not suspected. Definitive diagnosis of *Salmonella* enteritis is culture. In patients with *Salmonella*-associated acute terminal ileitis, CT findings can be very helpful in the diagnosis, which can show slight circumferential and homogenous thickening of the terminal ileum, commonly involving a

10–15 cm segment.⁹ Therefore, in patients with a vague clinical presentation, CT can play an important role in the initial evaluation, and can help facilitate timely initiation of treatment. As in our case, timely diagnosis and treatment can also lead to successful conservative management of the small bowel obstruction, and potentially avoid more aggressive interventions such as surgery.

Informed Consent was obtained from the patient prior to the manuscript submission for publication of the case details and any accompanying images. Therefore, IRB approval was not obtained for this study.

Conflict of interest

The authors have no conflicts of interest to declare.

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