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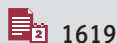
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# Eosinophilic Gastroenteritis Causing Small Bowel Diverticulosis and Volvulus: A Case Report

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Study Design A  
Data Collection B  
Statistical Analysis C  
Data Interpretation D  
Manuscript Preparation E  
Literature Search F  
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**Corresponding Author:** Rebecca Barr, e-mail: [Rebarr001@gmail.com](mailto:Rebarr001@gmail.com)**Financial support:** None declared**Conflict of interest:** None declared**Patient:** Female, 83-year-old  
**Final Diagnosis:** Eosinophilic gastroenteritis • jejunal diverticulosis  
**Symptoms:** Abdominal pain • obstruction  
**Medication:** —  
**Clinical Procedure:** —  
**Specialty:** Surgery**Objective:** Rare coexistence of disease or pathology**Background:** Eosinophilic gastroenteritis is a broad classification of disease characterized by eosinophilic infiltration of the gastrointestinal tract in the absence of a stimulatory cause. Given the ability of eosinophilic gastroenteritis to affect the entire gastrointestinal tract, it can present in a variety of ways, from chronic intermittent pain to mechanical obstruction. We present a rare case in which eosinophilic gastroenteritis of the jejunum led to small bowel diverticulosis and volvulus, requiring surgery.**Case Report:** An 83-year-old woman with a history of chronic abdominal pain, nausea, and early satiety presented to our clinic after a thorough gastrointestinal workup and radiologic diagnosis of partial midgut volvulus. She underwent an exploratory laparotomy and was found to have normal rotational anatomy with prominent small bowel diverticulosis. A section of 70 cm of proximal jejunum was resected, encompassing all visible diverticula, and a primary anastomosis was performed. The patient recovered without complication. She was seen at follow-up with complete resolution of her presenting symptoms.**Conclusions:** We propose that this patient's pathology was caused by chronic intermittent obstructions related to eosinophilic gastroenteritis, leading to repeated periods of increased intraluminal pressure and severe small bowel diverticulosis. This case highlights the importance of maintaining an index of suspicion for small bowel diverticulosis in the setting of chronic eosinophilic gastroenteritis.**Keywords:** Diverticulosis, Small Intestinal • Eosinophilic Enteropathy • Intestinal Volvulus • Volvulus of MidgutFull-text PDF: <https://www.amjcaserep.com/abstract/index/idArt/933180>

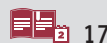
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## Background

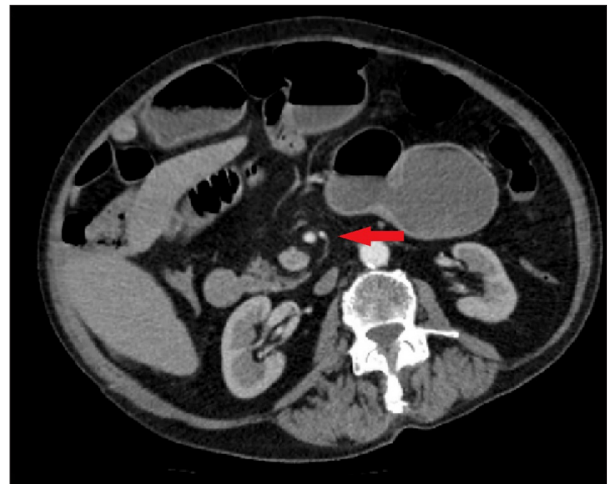
Eosinophilic gastroenteritis is a wide-ranging category of disease characterized by selective eosinophilic infiltration of the gastrointestinal tract in the absence of a stimulatory cause. Due to its rarity and heterogeneity, its exact prevalence and risk factors are hard to classify. A current literature review shows that eosinophilic gastroenteritis can affect any age group, from infancy to elderly, with a slight male predominance of 1.2: 1 [1]. While the pathophysiology remains unclear, eosinophilic gastroenteritis is characterized by chronic intermittent periods of inflammation with eosinophilic infiltration of the gastrointestinal wall. Given the scope of gastrointestinal tract involvement with eosinophilic gastroenteritis, it can present differently based on the area that is affected, from nausea and chronic abdominal pain to mechanical obstruction [1].

In addition, small bowel diverticulosis is uncommon, occurring in less than 0.5% of the population [2-4]. The main complication of eosinophilic gastroenteritis is diverticulitis, which generally presents acutely, making the elective presentation of this patient even rarer. We present a case in which eosinophilic gastroenteritis of the jejunum led to small bowel diverticulosis and volvulus, requiring surgery. While there are documented cases of eosinophilic esophagitis causing esophageal diverticulosis, to the best of our knowledge, this is the first reported case of jejunal diverticulosis related to eosinophilic gastroenteritis.

## Case Report

An 83-year-old woman was referred to our general surgery clinic for chronic abdominal pain, nausea, early satiety, and weight loss, which had occurred over the past 4 years. Her past medical history was significant for type 2 diabetes, atrial fibrillation, hypothyroidism, and eosinophilic gastritis, which was previously treated with corticosteroids. Her only surgical history was a tonsillectomy performed in 1941. On examination, she had a soft, mildly tender abdomen without hernia defects, organomegaly, or masses.

Over the past 4 years, she had multiple admissions at various hospitals for partial small bowel obstruction, despite not having had previous abdominal surgery. During this time, she underwent several computed tomography (CT) scans, upper gastrointestinal contrast studies, and magnetic resonance enterography studies. Abnormal findings included a dilated proximal small bowel to 5 cm, multiple small bowel diverticula, closed-loop bowel obstruction, pneumatosis, scattered foci of free air, what appeared to be numerous end-to-side small bowel anastomoses (which were, in retrospect, large adjacent diverticula), “swirl sign”, as well as partial midgut volvulus, concerning for malrotation (**Figure 1**).



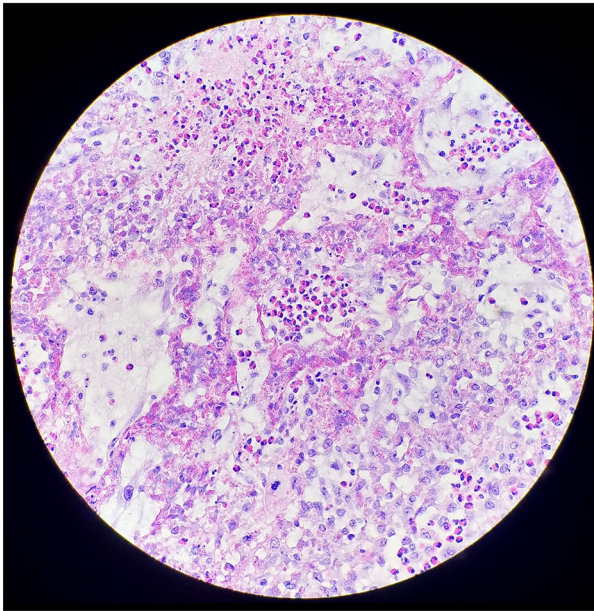
**Figure 1.** Computed tomography showing multiple dilated loops of small bowel and a “swirl sign” (arrow) that was concerning for midgut volvulus.



**Figure 2.** Gross specimen with near-continuous involvement of the small bowel by consecutive gastrointestinal diverticula/pseudodiverticula (up to 6.2 cm) arising from the mesenteric border.

Four months prior to her referral to our clinic, she underwent a diagnostic laparoscopy at an outside hospital for increased abdominal pain with pneumatosis intestinalis and a few small foci of extraluminal air, which were seen on a CT scan of the abdomen and pelvis. At that time, she was found to have no signs of bowel ischemia, and the procedure was ended without further intervention.

The authors scheduled the patient for exploratory laparotomy because of her intractable symptoms. During surgery, she



**Figure 3.** Microscopically, the diverticula show a lack of muscularis propria. There is not prominent crypt loss or crypt destruction; however, there are eosinophils infiltrating the epithelium, deep mucosa, submucosa, and muscularis propria, as described in cases of eosinophilic gastroenteritis.

was found to have normal rotational anatomy with prominent small bowel diverticulosis, largely confined to the proximal jejunum (Figure 2). A section of 70 cm of small bowel was resected and a primary stapled anastomosis was performed. The patient recovered without complication and was discharged on postoperative day 6, after the return of bowel function. Pathology showed diffuse diverticulosis with prominent transmural eosinophilic infiltrates destroying the bowel wall (Figure 3). Of note, at the time of surgery, her hematic biometry showed eosinophilia of 30%. She was seen in the clinic at her 2-week follow-up appointment and in the Emergency Department 4 weeks later with an unrelated minor complaint. At both visits, the patient reported complete resolution of her presenting symptoms.

## Discussion

Small bowel diverticulosis is rare in the general population, with a reported prevalence of 0.03% to 0.5% [2-4]. Although most commonly found in the duodenum, jejunal diverticula accounts for 18% to 25% of all small bowel diverticula [5]. The diverticula themselves can be true (congenital) or false (pulsion); however, in the jejunum, false diverticula are more common. False diverticula are thought to develop from dysmotility due to disorganized migrating motor complexes leading to prolonged spastic contractions and resultant increased

intraluminal pressure in areas of inherent weakness near the penetrating mesenteric vessel branches. This kind of dysmotility can be seen with visceral neuropathies and myopathies as well as with connective tissue disorders, such as Ehlers-Danlos and systemic lupus erythematosus [6-8].

Most small bowel diverticula are asymptomatic, with an estimated 4% to 10% of patients presenting with chronic nausea, bloating, flatulence, and diarrhea [4,9]. While diverticulitis is the most common complication reported for jejunal diverticulosis, other complications include hemorrhage, perforation, obstruction, and volvulus [2,4,10,11]. Asymptomatic small bowel diverticulosis can be observed; however, once it is symptomatic, operative treatment is usually required. In a series of 18 patients with complicated jejunal diverticulosis, 7 patients presented with free perforation, 6 had diverticulitis, and 5 had gastrointestinal bleeding. Of those patients, 14 required surgery while 4 were managed with nonoperative treatment [12].

Small bowel volvulus occurs when a segment of bowel twists around its mesenteric axis. It is most common in children and is usually due to inadequate fixation of the small bowel and colon (malrotation), leaving the child susceptible to midgut volvulus [13]. Small bowel volvulus, including midgut volvulus due to malrotation, is also seen in adults. Aside from malrotation, other etiologies of volvulus include tumors, inflammatory or congenital adhesions, and Meckle's diverticulum. If untreated, small bowel volvulus can lead to obstruction, ischemia, strangulation, and perforation [14]. Moreover, jejunal diverticula are also known to cause volvulus. In a case series of 19 patients with small bowel volvulus from China, 6 were found to be secondary to jejunal diverticula [15]. In addition, volvulus generally presents emergently. In a review of small bowel volvulus cases in the United States, Coe et al reported that 78.9% of cases presented emergently, while 9.5% presented electively. Although our patient did present several times to the Emergency Department with acute symptoms, the curative procedure was performed electively, making our patient an exception to the norm. Overall, 65.2% of patients with volvulus presenting emergently required operative management, compared with 34.8% who did not. As a result, mortality was higher among patients treated without surgery (11.7% vs 5.9%,  $P < 0.001$ ) [14]. The conclusion of the authors was that while nonoperative management is possible in selected cases of complicated jejunal diverticulosis, most patients require surgery [12].

Eosinophilic gastroenteritis is a broad classification of disease characterized by selective eosinophilic infiltration of the gastrointestinal tract in the absence of a stimulatory cause. Our patient had previously been diagnosed with eosinophilic gastritis, but, in retrospect, the addition of her small bowel involvement was more indicative of eosinophilic gastroenteritis.



While the pathophysiology is not well understood, there is evidence that a hypersensitivity reaction may be involved [16]. Current literature review shows that eosinophilic gastroenteritis can affect any age group and any portion of the gastrointestinal tract, although the stomach and duodenum are most common [1,16]. Given its scope of involvement, eosinophilic gastroenteritis can present differently based on the area of the gastrointestinal tract that is affected. Clinical manifestations are variable and nonspecific, most frequently consisting of abdominal pain, nausea, and vomiting. Reported complications include pancreatitis, which is due to obstruction of the pancreatic duct, and mechanical small bowel obstruction, due to stricture or edema. Eosinophilic gastroenteritis is treated effectively with corticosteroids, only rarely requiring surgery for complications. Its course can be acute, chronic, with a relapsing and remitting pattern, or continuous [16]. Diverticulosis of the esophagus due to eosinophilic esophagitis has been reported [17]; however, to the best of our knowledge, ours is the first report of jejunal diverticulosis associated with eosinophilic gastroenteritis.

This case highlights the importance of maintaining an index of suspicion for complicated jejunal diverticulosis in patients with known eosinophilic gastroenteritis. Previous literature lacks a theorized mechanism of how eosinophilic gastroenteritis could cause jejunal diverticulosis. We propose that eosinophilic gastroenteritis caused a chronic partial small bowel obstruction in this patient in the proximal jejunum. This chronic small bowel obstruction caused high intraluminal pressure, leading to pulsion diverticula. These, in turn, acted as mobile masses which predisposed the bowel to torsion. The resulting intermittent volvulus worsened the obstruction, causing increased proximal pressure and further expansion of the diverticula. To further aggravate the problem, inflammation and scarring from repeated episodes of diverticulitis exacerbated this process. It will always be unclear if the full thickness eosinophilic infiltration of the bowel wall directly contributed to

the creation of our patient's diverticulosis or if this was secondary to obstruction. Directly or indirectly, it is highly likely that the conditions were related.

In this case, although initial management without therapeutic surgery was successful in treating the emergent abdominal pain, the patient remained symptomatic between episodes, and a definitive resection was necessary. This raises the question of whether surgery should have been performed sooner. Considering the progression of this case and of cases presented in the literature, we recommend that asymptomatic jejunal diverticulosis can be observed, but that symptomatic localized small bowel diverticulosis is best treated with resection of the entire involved portion of the small bowel with primary anastomosis. This treatment should be considered at the onset of symptoms. In the present case, we believe that definitive surgery performed earlier could have alleviated the patient's symptoms in a timelier fashion.

## Conclusions

We present a case of eosinophilic gastroenteritis leading to symptomatic jejunal diverticulosis, which ultimately required surgery. Small bowel diverticulosis is rare and not known to be commonly associated with eosinophilic gastroenteritis, making diagnosis challenging. This case highlights the importance of maintaining vigilance when approaching abdominal pain associated with chronic gastrointestinal disease, such as eosinophilic gastroenteritis, as the sequelae can require operative management.

## 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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