

## Case Report

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# Appendicitis in the Setting of an Active Crohn's Disease Flare

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## Abstract

Appendicitis is a common disease that affects 7-8% of the population. Crohn's Disease (CD) is characterized by inflammatory flares in the gastrointestinal tract. Treatment of appendicitis in the setting of a CD flare poses a significant challenge. Herein we describe the treatment and outcomes for an 86-year-old patient with refractory CD who presented with perforated appendicitis concurrent with a Crohn's flare. Through initial conservative management with antibiotics and drain placement followed by outpatient nutritional optimization, the patient was able to tolerate an interval right hemicolectomy with ileocolic anastomosis to successfully treat both the perforated appendicitis and stricturing CD.

**Keywords:** Appendicitis; Crohn's Disease

## Introduction

Appendicitis occurs in 100 patients per 100,000 persons annually in North America [1,2]. Treatment algorithms exist based on length of symptoms and presence complicating factors, such as abscess or perforation [3]. Literature exists to compare clinical, radiographic, and pathologic differences between Crohn's Disease (CD) flare and appendicitis, as the treatment regimens are vastly different for each [4-6]. Crohn's flares benefit from immunosuppression, often with steroids. Appendicitis is treated with immediate surgery or antibiotics. However, current literature does not address the treatment for appendicitis in the setting of a Crohn's flare.

The following is a description of an 86-year-old female with CD complicated by chronic stricture refractory to biologic medication presenting with perforated appendicitis.

## Case description

An 86-year-old female with a history of hypothyroidism, supraventricular tachycardia requiring ablation one year prior, osteoporosis, and CD presented to the emergency department with five days of bilateral lower quadrant pain associated with nausea. Her CD history is not entirely known or documented; she reports a diagnosis in her mid-40's, however, she was not placed on a maintenance medical regimen until one year prior to this presentation,

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at which time she was started on biologic therapy (vedolizumab) after appropriate workup. She is known to have stricturing CD of the terminal ileum seen on colonoscopy and CT enterography.

On presentation to the emergency department, a CT scan of her abdomen and pelvis demonstrated active short segment small bowel inflammation, in addition to a dilated appendix and associated appendicolith. Her labs were significant for a leukocytosis of 10.12 K/uL and hypoalbuminemia of 1.7 g/dL. She was immediately started on intravenous antibiotics of metronidazole and ceftriaxone. Per gastroenterology recommendations, the patient was also given one dose of solumedrol. After 24 hours of treatment with antibiotics and the one dose of steroids, the patient reported improvement in abdominal pain, though her diarrhea continued. A repeat CT abdomen/pelvis on hospital day 2 was performed to assess for causes of an increase in white blood cell count. This CT demonstrated a perforated appendix with an associated fluid collection in addition to inflammation of the ileum and ascending colon. This second CT scan confirmed the presumed diagnosis of acute appendicitis in the setting of a Crohn's flare. Interventional radiology successfully placed a drain in the fluid collection and cultures from the abscess grew pan-sensitive *Escherichia coli* and *Bacteroides fragilis*. Her initial hospitalization was complicated by an ileus that required nasogastric tube decompression. In a multidisciplinary inflammatory bowel disease meeting, it was determined that the best plan for this patient was an elective interval right hemicolectomy with ileal resection to treat the perforated appendicitis and strictured CD. To minimize surgical risks and need for an ostomy, she was placed on Total Parenteral Nutrition (TPN) at the end of her hospitalization and continued to receive TPN as an outpatient. Due to the intra-abdominal infection and lack of appropriate response to her previous biologic, the decision was made to continue without maintenance CD immunosuppressive medication until after the surgery.

Upon discharge, she continued to have difficulty with oral intake due to abdominal discomfort and nausea. After two months of TPN, her albumin increased to 2.8 g/dL, at which time she was taken to the operating room for a laparoscopic right hemicolectomy with ileal resection. In the operating room, the ileum, cecum, appendix, and ascending colon were found to be densely fibrotic and inflamed (Figure 1). No fistula or abscess were encountered. Indocyanine green dye was used to identify well vascularized large and small bowel to determine resection locations. An ileocolic anastomosis was created. The small bowel was reexamined from the anastomosis to the ligament of Treitz with no further disease appreciated. The pathology report describes Crohn's ileitis with stricturing and ulceration affecting the distal 2/3 of the 54cm of ileum specimen. The appendix demonstrated inflammation with no granuloma, viral inclusions, or dysplasia. The right colon demonstrated no inflammation.

The patient did well postoperatively, though her hospitalization was complicated by a postoperative ileus that resolved with conservative management. She was discharged home on postoperative day 5.

The patient's abdominal symptoms improved following surgical resection. She no longer required TPN following surgery and improved her albumin to 3.5 g/dL through improved oral in-

take in two months following surgery. Three months postoperatively she continued to thrive without requiring immunosuppressive medication.

## Discussion

This patient presented a challenging dilemma. Her imaging and disease course confirmed her overlapping diagnoses of acute appendicitis and a Crohn's disease flare, both of which can have significant consequences with high morbidity if not treated [7,8]. Unfortunately, the immunosuppressive treatment for Crohn's flares could have catastrophic consequences in a patient with an active infection. We report here the conservative antibiotic treatment of acute perforated appendicitis in the setting of an active Crohn's flare followed by the delayed surgical treatment of both the perforated appendix and terminal ileal Crohn's disease in a patient with multiple comorbidities.

Perforated appendicitis can result in serious infectious complications for patients [9]. This is particularly relevant in the patient described here, who has been treated with chronic immunosuppression for her Crohn's disease. There are multiple options for treating perforated appendicitis, including interval appendectomy and "wait-and-see" methods. In a systematic review, patients with perforated appendicitis who were treated with a "wait-and-see" method had a recurrence rate of approximately 12.4% [8]. Due to the confusing picture of appendicitis in Crohn's patients, risking a similar episode in the future was an undesirable option. Furthermore, in a consensus meeting to develop guidelines for management and treatment of acute appendicitis, the European Association of Endoscopic Surgery recommends interval appendectomy after conservative treatment for perforated appendicitis [3].

One consideration that was discussed during the patient's initial presentation was the potential for appendiceal CD contributing to or causing this presentation, as seen in less than 1% of cases of appendicitis [6]. However, given the associated fluid collection and evidence of perforation, the underlying etiology did not change the initial management and source control.

When considering her Crohn's disease, even isolated from the perforated appendicitis, it was determined that her stricturing ileal disease warranted surgical intervention. Fortunately, while treatment of her initial presentation of appendicitis and Crohn's flare was unclear, the surgical treatment of her diseases overlapped nicely, with her appendix falling within the specimen to be removed for her ileal Crohn's disease.

## Conclusion

This case report details the pathway that resulted in a safe treatment of a patient with active CD and acute perforated appendicitis. Through multidisciplinary discussion and cooperation, she was able to have an interval operation to prevent future episodes of appendicitis and maintain control of her stricturing Crohn's disease without requiring an emergent operation or ostomy creation.

## Figures



**Figure 1:** Operative specimen demonstrating significant fibrosis and inflammation

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