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Diagnosis and Treatment Approach to Crohn's Disease in an Adolescent Complicated by Campylobacter jejuni Bacteraemia

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ABSTRACT

Background: *Crohn's disease in adolescents may present diagnostic and therapeutic challenges, particularly when small bowel involvement limits histological confirmation. Immunosuppressive treatment may also increase susceptibility to severe infections, including the uncommon complication of Campylobacter bacteremia.*

Case Presentation: *We report the case of a 13-year-old girl with Crohn's disease diagnosed based on clinical and magnetic resonance enterography findings despite initially inconclusive histology. While receiving infliximab and azathioprine, she was admitted with fever and diarrhea. A gastrointestinal multiplex PCR assay was positive for Campylobacter, and blood cultures subsequently isolated Campylobacter jejuni. She was successfully treated with ciprofloxacin. Six months later, persistent small bowel stenosis required surgical resection. Histopathological examination of the surgical specimen revealed chronic active jejunitis with morphological findings consistent with Crohn's disease. The patient subsequently achieved clinical stability on infliximab therapy.*

Conclusion: *This case highlights the diagnostic complexity of small bowel Crohn's disease in adolescents and the importance of imaging when histological confirmation is initially unavailable. It also emphasizes that C. jejuni bacteremia, although uncommon, should be considered in immunocompromised patients with Crohn's disease presenting with fever, with or without gastrointestinal symptoms. Early recognition and appropriate antimicrobial treatment are essential for a favorable outcome.*

Keywords

Crohn's disease, *Campylobacter jejuni,* Bacteremia, Adolescent, Immunosuppression, Small bowel stricture.

Introduction

Crohn's disease is a chronic inflammatory bowel disease caused by immune response in susceptible individuals, influenced by environmental factors. The disease can affect any part of the gastrointestinal tract with transmural inflammation [1]. The diagnosis involves clinical, endoscopy, radiological, magnetic resonance enterography and histological assessment [2]. The diagnosis and management of Crohn's disease in adolescents remain challenging. The complexity of the treatment includes immunosuppression and even surgery. Several complications, including infections, may arise during the diagnostic and therapeutic process [1,2].

Bacteria of the genus *Campylobacter* are Gram-negative, spiral-shaped bacilli that are slow-growing and have specific nutritional requirements. Microbiological techniques allow the isolation of Campylobacter species from clinical specimens, including stool, pus, and blood. In addition, the diagnosis can be established by nucleic acid detection methods, and stool antigen detection assays are also available [4-6]. Their pathogenesis involves multiple

mechanisms that can result in local, regional, or systemic invasion, as well as toxin production. Among *Campylobacter* species, *Campylobacter jejuni* is the most frequently isolated and is responsible for the majority of human infections, with an increasing incidence [4,5].

Campylobacter is a common cause of gastroenteritis in children and young adults and represents one of the main causes of foodborne infection [4-7]. However, systemic infection and bacteraemia are uncommon, accounting for less than 1% of all *Campylobacter* infections, and occur predominantly in elderly or immunocompromised patients and in those with underlying comorbidities [8,11].

Several studies have described the characteristics of patients with *Campylobacter* spp. bacteremia [9-12]. Bacteremia caused by *C. jejuni* is uncommon in children, and the few published cases have been reported mainly in patients with immunosuppression [13].

Patients with inflammatory bowel disease (IBD), particularly those with Crohn's disease, have been reported to be at increased risk of *Campylobacter* infection [8-10]. The diagnosis and management of Crohn's disease in adolescents require a multidisciplinary approach to achieve optimal disease control. The aim of this report is to describe the clinical presentation and diagnostic workup of an adolescent with Crohn's disease who presented with the rare infectious complication of *Campylobacter jejuni* bacteremia.

Case Report

A 13-year-old girl with a presumptive diagnosis of Crohn's disease, receiving treatment with infliximab and azathioprine, was admitted to the hospital because of febrile diarrhea.

One year before the current hospitalization, she had been diagnosed with probable Crohn's disease based on suggestive clinical features, including recurrent abdominal pain, vomiting, abdominal distension, and anemia. Histopathological examination of biopsy specimens obtained during upper gastrointestinal endoscopy and colonoscopy did not reveal findings characteristic of Crohn's disease. Subsequently, magnetic resonance enterography (MRE) demonstrated a small bowel stricture, a finding considered decisive for establishing the diagnosis of Crohn's disease. Treatment was initiated with corticosteroids, followed by maintenance therapy with infliximab and azathioprine, which she continues to receive.

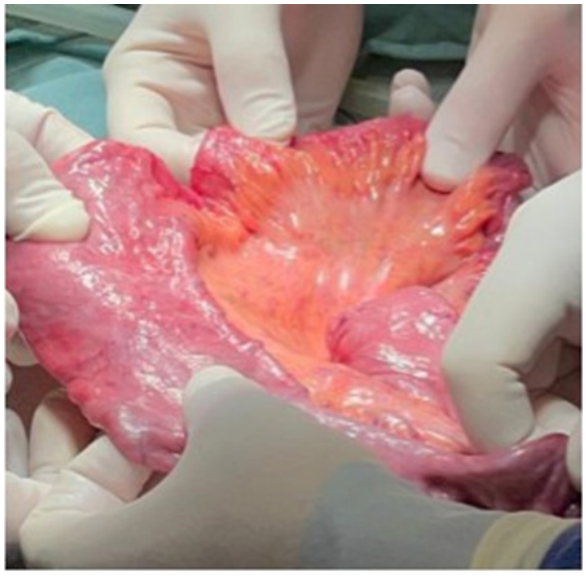
She presented with a 3-day history of fever (maximum temperature 38.0°C), chills, and diarrhea. On physical examination, she appeared ill, with mild lethargy. Her heart rate was 120 beats/min, respiratory rate 24 breaths/min, and axillary temperature 37.9°C. The remainder of the physical examination was unremarkable. Laboratory investigations showed a hemoglobin level of 11.6 g/dL, a white blood cell count of 19,200/µL (88% neutrophils), a platelet count of 267,000/µL, a C-Reactive Protein level of 14.4 mg/dL, and a Procalcitonin level of 0.46 ng/mL. Venous blood gas analysis, blood glucose, and serum electrolytes were within normal limits. Abdominal ultrasonography demonstrated dilated bowel loops and the right colon containing fluid, as well as multiple inflammatory-appearing mesenteric lymph nodes.

A multiplex gastrointestinal PCR panel was positive for *Campylobacter*. Blood cultures subsequently grew *Campylobacter jejuni*, which was susceptible to ciprofloxacin.

The patient was treated with intravenous ciprofloxacin for 3 days, followed by oral ciprofloxacin for an additional 4 days, with a favorable clinical response. She showed a favorable clinical course and was discharged after a 3-day hospital stay.

In May 2022, six months after this episode, following multidisciplinary evaluation by a pediatrician, a gastroenterologist, and a pediatric surgeon, it was concluded that the patient had reached the appropriate time for surgical intervention.During surgery, 180 mm of small bowel was resected. Examination of the surgical specimen revealed a stenotic segment with proximal luminal dilatation. The mucosa showed areas with preserved folds alternating with flattened villi, cobblestone-like changes, and ulcerations with irregular margins. Histopathological examination revealed pseudopyloric metaplasia and a diffuse, abundant mixed inflammatory infiltrate within the lamina propria, predominantly composed of mononuclear cells. The final histopathological diagnosis was chronic active jejunitis, with morphological findings considered most consistent with Crohn’s disease.

Currently, the patient remains clinically stable on monthly infliximab therapy as her only treatment. She continues regular follow-up with her pediatrician and gastroenterologist. She has received immunizations against meningococcus (ACWY and B), human papillomavirus (quadrivalent HPV vaccine), pneumococcus (23-valent pneumococcal polysaccharide vaccine), and COVID-19.



Female 13 year old with Crohn's disease. Intraoperative appearence of the small bowel, showing proximal bowel dilatation (left) adjacent to the stenotic segment (right).

Discussion

The case presented illustrates the challenges involved in diagnosing Crohn's disease in an adolescent, a potentially severe condition in which effective management of both the underlying disease and its complications can lead to remission [1,3].

The diagnostic process in this 13-year-old adolescent was based on clinical symptoms, including recurrent abdominal pain, vomiting, and abdominal distension. Notably, diarrhea, a common symptom of Crohn's disease, was absent. Anemia was an important finding that prompted further diagnostic evaluation. Magnetic resonance enterography revealed intestinal stenosis, a finding consistent with Crohn's disease. Based on the clinical presentation and imaging findings, the medical team established the diagnosis and initiated treatment despite the absence of histological confirmation. This situation is not uncommon in Crohn's disease, and diagnosis may sometimes be delayed because obtaining histological confirmation can be challenging, particularly when typical lesions are located in the ileum or other segments of the small bowel that are difficult to access by conventional endoscopy and biopsy [15].

More than half of patients with Crohn's disease develop small bowel strictures during the course of their disease, as occurred in our patient. Despite anti-inflammatory treatment, these strictures may ultimately require surgical intervention [2]. In this case, MR enterography not only enabled a timely diagnosis but also provided findings that guided effective surgical management.

As in our patient, surgery is the treatment of choice for luminal narrowing caused by inflammation, fibrosis, and muscular hypertrophy and/or hyperplasia associated with Crohn's disease [1,2,16].

Previous studies have reported favorable outcomes following surgery in adolescents, with clinical improvement observed in 84% of cases [16]. In this adolescent, the decision to perform surgery at 14 years of age was based on the severity of the intestinal stenosis, despite the absence of other complications such as abscess formation or growth impairment. Surgical treatment resulted in significant clinical improvement and symptom relief.

According to the Paris classification, our patient presented with A1b, L4b, B2, G0 Crohn's disease, characterized by jejunal involvement and stricturing behavior [19]. This phenotype represents a less common presentation of pediatric Crohn's disease, as ileocolonic involvement and non-stricturing, non-penetrating behavior are more frequently observed at diagnosis [20].

In patients such as the one described in this case, who are immunocompromised as a result of treatment for their underlying disease and present with fever, with or without gastrointestinal symptoms, *Campylobacter* bacteremia should be considered as a potential diagnosis [9,11,12,14,18].

Although campylobacteriosis is most common in children younger than 5 years, the immunocompromised status of our patient, related to immunosuppressive therapy for Crohn's disease, likely contributed to the development of bacteremia. Immunocompromised individuals are at increased risk of severe and systemic infection, prolonged illness, and bacteremia [11].

Campylobacter jejuni, the specie isolated in our patient, is one of the most frequently identified *Campylobacter* species causing human infection. According to Tinévez et al., *C. jejuni* and *C. fetus* together accounted for approximately 85% of *Campylobacter* bacteremia cases, which occurred predominantly in patients with underlying conditions, particularly immunosuppression [11].

The diagnosis of *Campylobacter* bacteremia relies primarily on blood cultures, although microbiological identification may be challenging because of the fastidious growth characteristics of *Campylobacter* species [17,18]. This may potentially delay diagnosis, particularly in immunocompromised patients, in whom early recognition and appropriate antimicrobial treatment are essential [14]. *C. jejuni* may require prolonged incubation times, which can complicate and potentially delay diagnosis.The literature indicates that some blood culture systems may require a median of 5–10 days to detect *C. jejuni*, whereas other systems can detect growth within 2–3 days.

Considering that blood cultures are routinely incubated for approximately 3–5 days, prolonged growth may contribute to missed or delayed detection of *C. jejuni* bacteremia [17,18]. In our case, the blood culture became positive after 75 hours of incubation (3 days and 3 hours).

Antibiotic treatment remains controversial when *Campylobacter* infection is limited to the gastrointestinal tract in immunocompetent patients, as most cases are self-limiting [5]. In contrast, antimicrobial therapy is indicated in patients with bacteremia or other extraintestinal infections [9,11]. Macrolides and fluoroquinolones have traditionally been used for the treatment of *Campylobacter* infections; however, increasing resistance to fluoroquinolones has become an important concern. Nielsen et al. reported ciprofloxacin resistance in 26% of *Campylobacter* blood isolates [9]. In our patient, ciprofloxacin was administered with a favorable clinical response and subsequent resolution of the infection.

Conclusion

This case highlights the diagnostic challenges of Crohn's disease in adolescents, particularly when the clinical presentation is atypical and histological confirmation is difficult to obtain. Clinical findings together with appropriate imaging studies, especially MR enterography, may therefore play a key role in achieving a timely diagnosis and guiding appropriate treatment.

Furthermore, patients with Crohn's disease who become immunocompromised as a result of treatment are at increased risk of severe and systemic infections. In these patients, *Campylobacter* bacteremia should be considered in the presence of fever, even in the absence of gastrointestinal symptoms. Early recognition, appropriate blood culture incubation, and timely antimicrobial

therapy are essential to achieve favorable clinical outcomes.

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