https://doi.org/10.22516/25007440.1185

Case report

Diaphragmatic Disease: Case Report and Literature Review

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Citation:
Molina-Marín JD, Naranjo-Salazar C. Diaphragmatic Disease: Case Report and Literature Review. Revista. colomb. Gastroenterol. 2025;40(1):73-77.
https://doi.org/10.22516/25007440.1185

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Received: 26/02/2024
Accepted: 09/10/2024

Abstract

Diaphragmatic disease of the small intestine, named for its microscopic appearance of concentric rings of fibrotic tissue, is a rare condition with nonspecific symptoms that leads to small bowel strictures. The primary risk factor is prolonged use of nonsteroidal anti-inflammatory drugs (NSAIDs). Presenting symptoms are vague and may include chronic abdominal pain, iron deficiency anemia, weight loss, and constipation. Imaging studies often reveal findings suggestive of adhesions or a mass causing primary small bowel obstruction, making a definitive diagnosis challenging; histopathological confirmation is required. We present the case of an 88-year-old female patient who developed primary intestinal obstruction due to diaphragmatic stricture in the distal ileum, attributed to long-term acetylsalicylic acid use for her underlying comorbidities.

Keywords

Intestinal obstruction, small intestine, anti-inflammatory drugs, gastrointestinal tract.

INTRODUCTION

Small bowel diaphragm disease, named for the microscopic appearance of concentric rings of fibrotic tissue, is an uncommon pathology with nonspecific symptoms, causing small bowel stenosis[(1)]. The main risk factor is the consumption of nonsteroidal anti-inflammatory drugs (NSAIDs) for prolonged periods[(2)]. Presenting symptoms are nonspecific, including chronic abdominal pain, iron deficiency anemia, weight loss and constipation. Imaging studies generally reveal findings related to adhesions or mass causing primary small bowel obstruction[(1)], which makes definitive diagnosis difficult and ultimately confirmed by histopathology. The following is the clinical case of an 88-year-old female patient who presented with primary intestinal obstruction due to diaphragmatic stenosis in the distal ileum due to chronic consumption of acetylsalicylic acid for her underlying comorbidities.

CLINICAL CASE

This is an 88-year-old female patient with a history of cervical cancer treated with radiotherapy. She presented with a one-week history of generalized abdominal pain, associated with episodes of nausea and vomiting, dietary intolerance, and intermittent diarrhea. Upon admission, a non-contrast abdominal computed tomography (CT) scan was performed due to a prior anaphylactic reaction to contrast medium. The scan revealed an intestinal obstruction with a transition zone at the level of the distal ileum

(**Figure 1**). An exploratory laparotomy was scheduled for the same day, given the suspicion of a primary obstruction. Intraoperatively, three consecutive and progressive segments of circumferential stenosis were found, measuring 15 cm in length, creating a transition zone. These findings were initially considered to be related to the side effects of the radiotherapy the patient had previously received. Given these findings, a resection and anastomosis of the affected segment was performed without complications. The patient showed a satisfactory postoperative course, with gradual tolerance to oral intake (clear liquids, full liquids, soft, and solid diet) and the presence of bowel movements, which allowed for discharge.

Figure 1. Intestinal obstruction with a transition zone in the distal ileum. Simple abdominal CT scan, with an arrow pointing to the transition zone, with stenosis in the distal ileum. The image is the property of the authors.

During the outpatient assessment, 10 days after discharge, the patient was in good condition, pain-free, tolerating a normal diet and with an unaltered bowel habit. The pathology result was reviewed, showing stenosed intestinal folds due to a non-neoplastic lesion that expands the submucosa, a finding very consistent with diaphragmatic stenosis disease associated with nonsteroidal anti-inflammatory drugs (NSAIDs) (**Figures 2** and **3**). Based on this report, the patient was questioned about chronic NSAID use, and the finding was attributed to the use of acetylsalicylic acid (ASA), as it was the only medication from this group to which she had been chronically exposed (100 mg/day for the past five years) due to her underlying conditions. It was decided to refer her to internal medicine for evaluation to determine long-term management and whether to continue the medication.

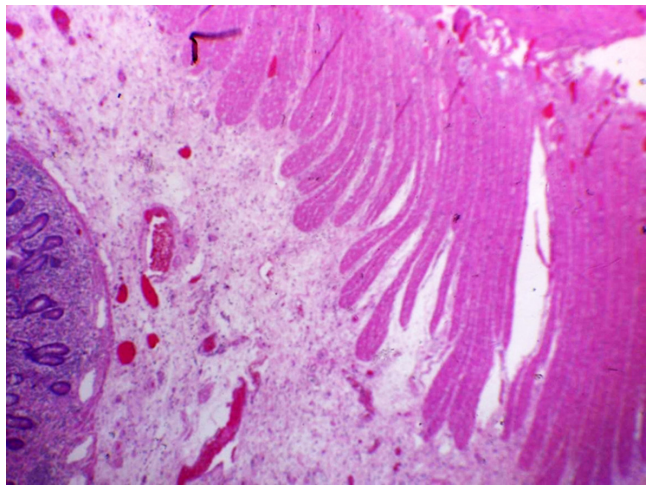

Figure 2. Magnified view at 10x. Shows details of the vertical alignment of muscle fibers and the accompanying vascularized fibrosis, forming an appearance consistent with a circular fold. The image is the property of the authors.

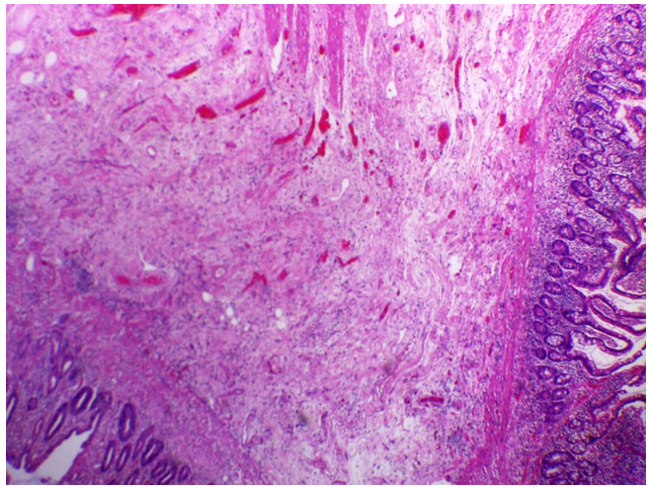

Figure 3. Panoramic view at 4x magnification. It shows how muscle fibers and fibrosis push the epithelium. The image is the property of the authors.

DISCUSSION

Diaphragm disease was first described by Lang et al. in 1988. They reported on seven patients with chronic NSAID use who developed small bowel stenosis. Histopathological analysis revealed lesions resembling perforated diaphragms, which led to the name by which the condition is currently known[3]. Its incidence is difficult to determine due to the limited number of cases reported; however, the literature states that over 50% of patients taking NSAIDs experience some degree of small bowel mucosal injury, and among

these, approximately 2% will go on to develop diaphragm disease[1,4]. Nonetheless, many cases remain undiagnosed due to the nonspecific nature of symptoms, as well as the limited awareness of this pathology among general surgeons.

The pathogenesis of the disease is not clearly defined. It is believed to be caused by the combination of an inflammatory response, fibrosis, and mucosal remodeling within the lumen of the small intestine that has been exposed to NSAIDs for prolonged periods[2]. Ulceration caused by the inhibition of cyclooxygenase 1 (COX-1) leads to microischemia, which is the initial step in the formation of the "diaphragms," described as circumferential stenotic lesions. The disease process is limited to mucosa, while the other layers of the intestine are not affected[5].

The disease can be located anywhere in the gastrointestinal tract, but the cases reported in the literature are mostly found in the small intestine, with the ileum (83%) and jejunum (17%) being the most common sites. However, it is less frequent in the distal ileum, making our case even rarer[2]. This occurs despite recent reports indicating that colonic diaphragm disease is associated with slow-release, enteric-coated NSAIDs, as these have a longer half-life, allowing them to reach the colon before being fully absorbed[6,7].

Risk factors include being female, with a 3:1 ratio, advanced age, as this population is more likely to use analgesics for prolonged periods, and finally, the prolonged use of NSAIDs[2,8]. The use of NSAIDs for at least three to five years is most commonly described, although the literature reports cases with only two months of use that also lead to stenosis, with no documented minimum dose that causes the disease[9,10]. Clinical manifestations are very nonspecific. The onset of the disease can be more insidious, with a wide variety of abdominal symptoms, generally of long duration, including pain, distension, weight loss, and soft stools associated with increased frequency. In more acute presentations, the disease may debut with intestinal obstruction and, in some cases, may even progress to intestinal perforation[5].

Among diagnostic imaging techniques, plain abdominal radiography has no utility, and contrast studies are not specific, as diaphragms can closely resemble circular folds, which may lead to confusion. Computed tomography (CT) often lacks the resolution needed to clearly visualize the "diaphragms". However, CT enterography and magnetic resonance imaging (MRI) may be useful for diagnosis. Still, making differential diagnoses is challenging, as the appearance of the strictures is very similar to Crohn's disease and radiation-induced enteritis. Nonetheless, MRI may offer a better assessment of the strictures[7,11].

Regarding endoscopic methods, due to anatomical distribution, esophagogastroduodenoscopy and colonoscopy are not useful. In contrast, double balloon enteroscopy has been effectively used as a diagnostic method, both preoperatively and intraoperatively. However, it has two limitations: its high cost and limited precision in lesion localization[12]. Nevertheless, it is highly useful intraoperatively when diaphragm disease is suspected, as it allows for intraluminal evaluation of additional affected segments of the small intestine that should be resected to prevent symptom recurrence[1]. Capsule endoscopy has been used as an alternative diagnostic tool, but the risk of retention in areas of stenosis must be considered[6]. Definitive diagnosis is made through histopathological examination, which reveals characteristic lesions such as thickening of the muscularis mucosae with ulceration at the apex of the diaphragms, fibrotic changes in the lamina propria, as well as neovascularization, nerve fibers, and eosinophils within the mucosa[6,12].

Treatment is based on two key components: discontinuation of NSAID use and surgery, with the latter being the cornerstone of treatment. Laparoscopic treatment remains highly debated and appears to have limitations, as the lesions affect only the mucosa and submucosa, leaving the serosa intact and thus undetectable macroscopically. This may lead to missed lesions. In contrast, laparotomy allows for meticulous palpation of the lesions, revealing areas of thickening and stenosis. However, if the lesions are not easily localized, intraoperative enteroscopy is recommended, as it allows for intraluminal evaluation of the affected segments. Definitive treatment consists of complete resection of the involved sections of the intestine to prevent recurrence[12]. Some case reports in the literature describe the usefulness of stricturoplasty as a surgical option in patients with extensive involvement, in whom the risk of short bowel syndrome after resection is considerable. However, the risk of therapeutic failure and recurrence is as high as 50% of cases, mainly due to incomplete resection, either because the full extent of the lesions is not recognized or because NSAID use continues[1,2,4,13,14].

Recently, endoscopic balloon dilation has been considered an alternative therapeutic option, with a very low risk of perforation due to the fibrotic characteristics of the lesions, mucosal thickening, and an intact muscular layer. However, a major limitation is that in most cases, the diagnosis is made based on the histological report of the resected lesions[6,15].

Finally, among the differential diagnoses, Crohn's disease shares similarities with diaphragm disease. However, in Crohn's disease, the entire thickness of the intestinal wall is affected, and granulomas, characteristic of the latter, are absent[5]. Radiation enteritis is particularly relevant in patients with a history of radiotherapy. Macroscopically,

intestinal mucosa shows edema, erythema, and neovascularization. Histopathological features include fibrotic lesions associated with progressive obliterative endarteritis, a vascular manifestation that leads to exaggerated submucosal fibrosis and sclerotic changes. These findings were not documented in our case, and it was ultimately histopathology that enabled the differential diagnosis[16,17]. Other differential diagnoses should also be considered, such as neuromuscular and vascular hamartomas, which resemble NSAID-induced small bowel enteropathy[6,18].

CONCLUSION

Diaphragmatic intestinal stenosis secondary to NSAID use is a rare cause of intestinal obstruction in adults, making it important to suspect in patients with chronic NSAID use, including ASA. Double-balloon enteroscopy is a diagnostic method that can be highly useful both preoperatively and intraoperatively. However, in most cases, the diagnosis is based on the histopathological report when performed by expert pathologists. Its treatment is surgical, involving complete intestinal resections of the affected segment whenever possible, along with discontinuation of anti-inflammatory medications to prevent the development of new lesions.

Conflicts of interest

The authors declare that there is no conflict of interest.

Source of funding

This research has not received specific support from public sector agencies, commercial entities or non-profit organizations.

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Diaphragmatic Disease: Case Report and Literature Review
Enfermedad del diafragma: reporte de un caso y revisión de la literatura

Revista colombiana de Gastroenterología
vol. 40, no. 1, p. 73 - 77, 2025
Asociación Colombiana de Gastroenterología,
ISSN: 0120-9957
ISSN-E: 2500-7440

DOI: https://doi.org/10.22516/25007440.1185