Free peritoneal perforation in a patient with Crohn’s disease – Report of a case

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ABSTRACT

INTRODUCTION: Bowel perforation with free peritoneal air is a rare complication of Crohn’s disease (CD).
PRESENTATION OF CASE: We report a case of a 36 year-old male patient, with history significant for CD and he presented to the emergency room with a free peritoneal perforation, which was diagnosed by abdominal X-ray and confirmed by CT scan. The patient underwent a laparotomy surgery; however, no site of perforation was identified. The surgical approach was to clean the cavity, close the abdominal wall and administer antibiotic therapy. He demonstrated good early and late postoperative outcomes.

DISCUSSION: We report a rare case of free perforation to the peritoneum in a patient with CD. The most likely hypothesis is that it was a micro-colonic perforation. Antibiotic therapy and a conservative surgical approach without colon resection can be performed and it is reported in the literature.
CONCLUSION: Emergency conditions in CD may result in significant morbidity, but are normally associated with low mortality, if identified and treated properly.

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1. Introduction

Free peritoneal perforation in inflammatory bowel diseases is a rare condition, with few cases reported in the literature. It is considered a serious event and one of the indications for surgical intervention. It occurs in 1–3% of Crohn’s disease (CD) patients as a first manifestation or, in the course of the disease.1,2

Early diagnosis of bowel perforation is important and determines the survival rate. Only 20% of patients with CD and intestinal perforation have pneumoperitoneum on X-ray of the abdomen and/or on erect chest X-ray. Thus, if a physician continues to be suspicious of this complication in a patient with CD, a computed tomography (CT) of the abdomen should be performed. The presence of gas or oral contrast outside the intestinal lumen may confirm the diagnosis of an intestinal perforation. The presence of intestinal thickening, areas of stenosis, fistulas, deep ulcers, hypertrrophied mesenteric tissue near the affected area by the disease are features that suggest CD.3 In a small intestinal perforation, a CT scan may have an accuracy of more than 80% to establish its location.4

The mechanism of free peritoneal perforation in CD is not fully understood. Some authors have proposed the hypothesis that bowel dilatation above a stenotic area with increasing intraluminal pressure could be the cause of this complication. However, intestinal perforation can occur independently in patients with CD, the presence of inflammatory changes in the blood vessels associated with enteritis and/or colitis possibly contributes to an ischemic cause for bowel perforation.5 The rarity of this complication can be explained by the common fibrous reaction and adherence to adjacent organs seen frequently in CD patients.

2. Presentation of case

A 36 year-old, male patient, was seen at emergency room, reporting severe abdominal pain for 1 day, associated with nausea and two episodes of vomiting. He denied fever or change in bowel habits. He has been followed at our Coloproctology Outpatient Clinic at the University of Campinas for Crohn’s disease (CD) for the past 14 years. His surgical history includes two strictureplasties, the last one in 2007, 4 years prior to his current presentation (Fig. 1).

The patient has been on biological therapy since his last surgery, and has been able to maintain remission off corticosteroids. He had been asymptomatic until this recent episode of abdominal pain. The clinical examination showed abdominal distension, worsening abdominal pain with deep palpation, positive rebound and guarding. His blood pressure and heart rate were normal. In addition, his laboratory findings were normal, which included a complete blood count, amylase, and urinalysis.
After an uneventful postoperative course, the patient was discharged 5 days after his surgery. He has been seen at our clinic and remains with good state of health since his surgery 6 months ago, and has been treated with adalimumab and azathioprine.

3. Discussion

Free intestinal perforation may occur in CD at any location in the gastrointestinal tract, including ileum, jejunum and gastroduodenal segments.\(^5\) Perforation in the colon may be secondary to colitis or toxic megacolon, however, other causes include exacerbation of chronic illness mainly in the distal colon complicated by obstruction (stenotic disease) and dilatation upstream, fistulating disease, colorectal cancer associated with perforated CD, and intestinal perforation after colonoscopy. Intestinal perforations by endoscopic dilatation after stent placement for stenosis are reported in the literature, as well as after the capsule endoscopy test and CT colonography.\(^7\)–\(^12\) The transmural nature of CD can cause localized perforation, which may be blocked by adjacent organs, possibly causing fistulae and/or inflammatory tumors. This does not constitute a matter of urgency and/or emergency in most of cases and can be operated on electively. If intestinal free perforation is suspected, the patient should be optimized for surgery, which includes preoperative clinical stabilization, fluid replacement, broad spectrum antibiotics and intravenous corticosteroid replacement if the patient was on steroids preoperatively in order to avoid adrenal insufficiency.\(^13\)

In CD, the surgical approach depends on the site of perforation and the patient's clinical status. If gastroduodenal perforations, debridement and primary repair is considered the best management option, because resections at this level are more complex, often requiring manipulation of the biliary tract. In jejunal–ileal perforations, resection and primary anastomosis is preferred; otherwise, a diversion ileostomy may be performed if conditions are unfavorable. The management of colonic perforations will depend on whether the cause is due to toxic megacolon or segmental colitis. In the first case, the preference is to perform a total colectomy and ileostomy, whereas segmental resection is done for isolated colonic disease. If the origin of the perforation is due to a suspected perforated colorectal cancer in a patient with CD, the recommended approach is a resection of the intestinal segment affected by the neoplasm with oncologic margins, if the patient has reasonable clinical conditions. The primary anastomosis and bypass protection or even an end colostomy will depend on the patient's clinical conditions and the past history of steroid use.\(^14\) Anastomosis in the presence of peritonitis significantly increases mortality rates and therefore is not recommended.\(^15\) The present case showed a distinct scenario, whereas the site of the intestinal perforation was not

The patient underwent an erect chest X-ray (Fig. 2) and CT scan (Fig. 3), which revealed pneumoperitoneum, confirming a free peritoneal perforation.

He subsequently underwent a laparotomy, which revealed air in the abdomen after opening the peritoneum, with little clear free fluid and without enteric content, confirming the findings of the radiological examinations. However, after careful inspection of the abdominal cavity, we could not identify the area related to the perforation. A decision was made to clean the abdominal cavity and administer antibiotic therapy.

![Fig. 1. Strictureplasty features in the last elective surgery of the reported case. (a) Finney strictureplasty and (b–d) Heineke-Mikulicz strictureplasty.](image1)

![Fig. 2. Erect chest X-ray image reveals pneumoperitoneum.](image2)

![Fig. 3. CT scan images show peritoneal free gas. (a) Transverse section and (b) coronal section.](image3)
identified. We hypothesize that this was caused by a micro-colonic perforation, which is supported by the finding of a large amount of free gas in the cavity without enteric content. The approach in this case was to clean the abdominal cavity and provide antibiotic therapy, which resulted in a good outcome.

Intestinal microperforation is also a rare condition, and this complication have been reported in cases of colonic diverticulosis disease.\textsuperscript{16} Also after surveillance colonoscopy and after endoscopic submucosal resection are situations of risk for this complication.\textsuperscript{17,18} There are reports of antibiotic treatment alone without surgery, with a good outcome in these situations listed above. The site of perforation in the present case cannot be found, which is a rare situation, as described by Agresta et al.\textsuperscript{19} The authors mentioned that they did not identify where the microperforation was localized in one of the cases reported. It could be justified by the laparoscopic approach, possibly with less chance of identifying the site of perforation. The management in this case was drainage of the pelvis and copiously irrigation with saline solution by laparoscopic approach.\textsuperscript{19}

Regarding the follow-up of the patients with CD who developed free peritoneal perforation, Werbin et al.\textsuperscript{20} analyzed 13 patients and all of them developed a recurrent disease in long term, being seven with mild symptoms that were managed conservatively.

4. Conclusion

In conclusion, free peritoneal perforation is not frequent and should be suspected in CD patients presenting with severe pain and abdominal distention. Laparotomy is inevitable and bowel resection should be considered if the perforation place is identified and depending upon the segment of the gastrointestinal tract involved. However, in the absence of a clear site of perforation and without enteric contamination, a conservative surgical approach should be considered.

Conflict of interest

Raquel F. Leal and other co-authors have no conflict of interest.

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Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Authors’ contribution

Raquel Franco Leal contributed to the study design and wrote the paper. Marc Ward helped write the paper. Nielce Maria de Paiva contributed with the data collection. Natalia Pranzetti Viera contributed with data collection. João Jose Faguandes contributed to the study. Claudio Saddy Rodrigues Cozy contributed to the study design and revision of the manuscript.

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