Clinical Case Report

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Perforated appendicitis after colonoscopy: cause or coincidence?

A rare case report and literature review

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Abstract

Rationale: Colonoscopy is a relatively safe and common procedure with low risks of complications, and acute appendicitis with perforation is an extremely rare complication of colonoscopy. The current study presents an unusual case of acute gangrenous appendicitis with perforation following a screening colonoscopy.

Patient concerns: A 73-year-old man presented to our emergency department with lower right abdominal pain 3 days after a routine screening colonoscopy. On physical examination the patient had signs of generalized peritonitis. Abdominal and pelvic computed tomography (CT) revealed the presence of multiple free gas in the right subphrenic space and abdominal cavity with exudate effusions in both sides of the paracolic sulci and the pelvic cavity, especially around the ascending colon and caecum. The CT scan also showed a dilated and inflamed appendix with fecaliths.

Diagnoses: The patient was diagnosed with acute gangrenous appendicitis with perforation after colonoscopy.

Interventions: The patient underwent emergency exploratory laparotomy. Intraoperative findings revealed an inflamed gangrenous appendix with focal perforation and impacted fecaliths. The colon showed no evidence of perforation or other areas of concern and thus, a conclusive diagnosis was achieved. An appendectomy was performed and the abdominal cavity was rinsed and drained thoroughly.

Outcomes: The postoperative course was uneventful.

Lessons: This study may increase clinical awareness with regard to perforated appendicitis after colonoscopy. Acute appendicitis should be included in the differential diagnosis of lower right abdominal pain following a colonoscopy, in addition to possible colonic injury. Furthermore, emergency surgery should be recommended for the typical signs of perforation with peritonitis and free pneumoperitoneum. Early recognition and prompt surgical treatment are critical, which can avoid severe outcomes and improve the prognosis.

Abbreviation: CT = computed tomography.

Keywords: appendicitis, colonoscopy, complications, perforation

Editor: Bülent Kantarçeken.

X-cZ and C-wH are equal contributors and co-first authors.

Z-yH and ZL are co-corresponding authors.

Informed Consent: Written informed consent for the publication of this case report was obtained from the patient. This study was approved by the Institutional Review Board of Wenzhou Central Hospital.

Authors' contributions: X-cZ performed literature review, drafted and revised manuscript. C-wH, Z-yH and ZL participated in the design of the study and revised the manuscript for intellectual content. Y-yD evaluated histopathological features and contributed to histopathological part of manuscript. All authors read and approved the final manuscript.

This study was supported by grants from Medical and Health Technology Planning Project of Zhejiang Province (No. 2017KY622) and Technology Planning Projects of Wenzhou Science & Technology Bureau (No.Y20150251).

The authors have no conflicts of interest to disclose.

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Medicine (2017) 96:46(e8747)

Received: 11 June 2017 / Received in final form: 18 October 2017 / Accepted: 19 October 2017

http://dx.doi.org/10.1097/MD.0000000000008747

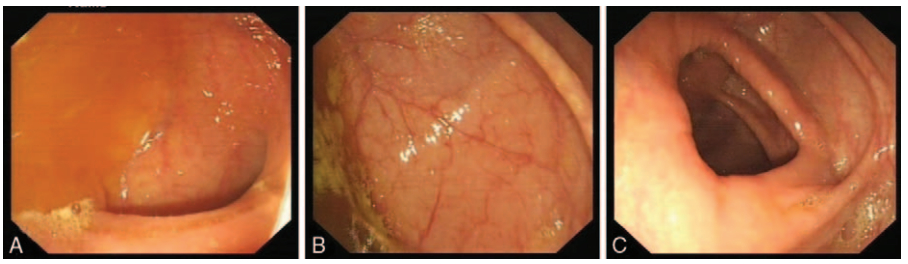

Figure 1. The procedure itself was uneventful, and intubation into the terminal ileum (A) was easily performed. The bowel preparation was excellent and good visualization of the caecum (B), appendiceal orifice, and ileocaecal valve (C) was obtained. There were no signs of inflammation in the caecum or around the appendiceal orifice.

1. Introduction

Colonoscopy is a relatively safe and common procedure performed by gastroenterologists and surgeons for screening, diagnosing, surveilling, and treating colonic disease. Colonic perforation and bleeding are the most common serious complications of colonoscopies, but the incidence of these complications is very low.[1–4] Moreover, the lower incidence of colonoscopic perforation (0–0.17%) has been reported.[4] In general, colon is the common site of perforation, but acute appendicitis with perforation following a screening colonoscopy is extremely rare. Here, we report 1 such case of acute gangrenous appendicitis with perforation after colonoscopy.

2. Case presentation

A 73-year-old man presented to our emergency department with lower right abdominal pain 3 days after a routine screening colonoscopy. His past medical history was significant for hypertension and gout. No significant abnormalities were found through the colonoscopy and no biopsy was performed. The procedure itself was uneventful, and intubation into the terminal ileum was easily performed. The bowel preparation was excellent and good visualization of the caecum, appendiceal orifice, and ileocaecal valve was obtained (Fig. 1). There were no signs of inflammation in the caecum or around the appendiceal orifice. The patient initially felt mild lower right abdominal pain shortly after the procedure, but he did not pay enough attention to it at that time and left the hospital.

Three days later his lower right abdominal pain gradually intensified and spread to the whole abdomen, accompanied by nausea, vomiting, and fever. The vomitus was stomach contents. On examination he was found to have a temperature of 38.3 °C, a pulse of 109 bpm, and a blood pressure of 158/84 mmHg. On physical examination the patient had signs of generalized peritonitis. His abdomen was diffusely tender, especially in the lower right quadrant, with rebound tenderness and guarding. The laboratory results revealed a white blood cell count of 13.1×10^9 cells/L, a neutrophil count of 11.8×10^9 cells/L (90.4%) and a C-reactive protein level of 188.9 mg/L. Abdominal and pelvic computed tomography (CT) (Fig. 2) revealed the presence of multiple free gas in the right subphrenic space and abdominal cavity with exudate effusions in both sides of the paracolic sulci and the pelvic cavity, especially around the ascending colon and caecum. The CT scan also showed a dilated and inflamed appendix with fecaliths, and cholecystolithiasis.

The patient was arranged for exploratory laparotomy after initial diagnosis. A right middle-lower vertical rectus abdominis incision was made. Intraoperative findings were of a large amount of yellow purulent fluid in the abdomen, the greater omentum abnormal gathering in the right lower abdomen, and an inflamed gangrenous appendix with focal perforation in the midportion. The appendix was about 8.5 cm long and 1.5 cm wide with impacted fecaliths in the lumen of the appendix root. The colon showed no evidence of perforation or other areas of concern. An appendectomy was performed and the abdominal cavity was rinsed and drained thoroughly. Histopathological examination (Fig. 3) subsequently confirmed the clinical diagnosis of acute gangrenous appendicitis with periappendicitis, perforation, and appendiceal fecaliths. The postoperative course was uneventful.

3. Discussion

Colonoscopy is a relatively low-risk procedure with known associated risks. Major complications include colonic perforation, bleeding, postpolypectomy syndrome, and other complications.[1,5,6] Acute appendicitis is a very rare complication of

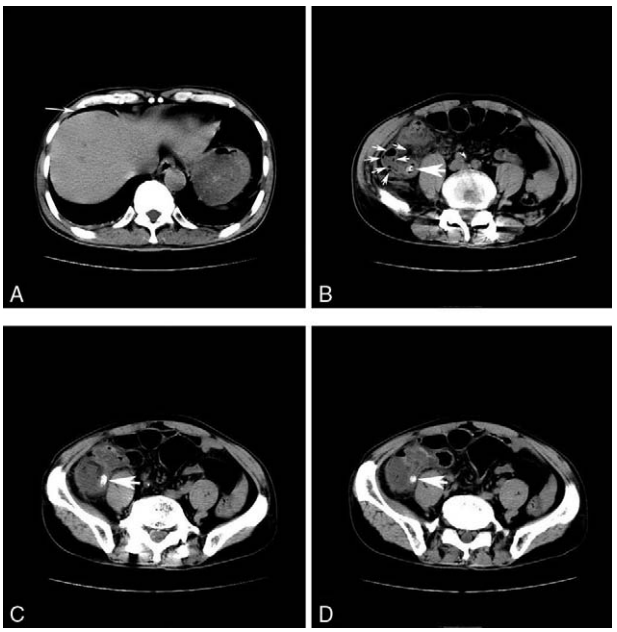

Figure 2. Abdominal and pelvic computed tomography (CT) revealed the presence of multiple free gas (thin arrows) in the right subphrenic space and abdominal cavity with exudate effusions in both sides of the paracolic sulci and the pelvic cavity, especially around the ascending colon and caecum. The CT scan also showed a dilated and inflamed appendix with fecaliths (thick arrows), and cholecystolithiasis.

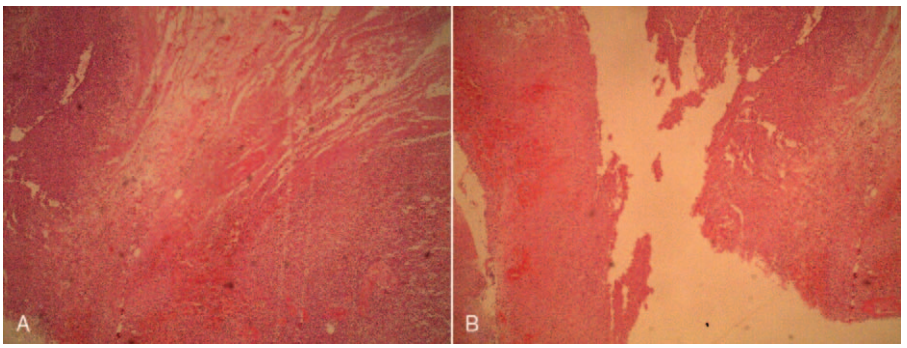

Figure 3. Histopathological examination showed acute gangrenous appendicitis with periappendicitis, perforation, and appendiceal fecaliths (Hematoxylin-eosin stain; original magnification ×50).

colonoscopy with a total incidence of 0.038%[6,7] and acute gangrenous appendicitis with perforation after colonoscopy is even rarer. In 1988, Houghton and Aston[8] firstly reported appendicitis as a rare complication of colonoscopy, and there was no perforation of the appendix in their report. Until today there are only a few case reports describing perforated appendicitis occurring after colonoscopy in the literature. As we know, the total reported case number with perforated appendicitis after colonoscopy is 14 by now.[9] All of these cases had presented symptoms from immediate to 27 hours after the colonoscopy. These cases aged from 45 to 79 years old (average age was 56.9 years old). The male and female ratio in these patients was 8:6.

The mechanisms by which colonoscopy results in appendicitis remain unclear, but several hypotheses have been proposed, including: preexisting subclinical disease of the appendix,[6,9–11] barotrauma as a result of overinsufflation,[6,7,9–11] introduction of a fecalith into the appendix, leading to obstruction or inflammation,[6–11] edema caused by direct intubation of the appendiceal lumen,[6,7,9–14] and exposure of the mucosa to the residual glutaraldehyde-type solution used in cleaning the endoscope, leading to inflammation.[6,10,11]

The surgical findings of previous studies showed perforated appendicitis. Considering the time and surgical findings, this kind of perforated appendicitis may be associated with mechanical injury by colonoscope. In our study, the case suffered with acute gangrenous appendicitis with perforation after 3 days. The abdominal and pelvic CT revealed the presence of multiple free gas in the right subphrenic space and abdominal cavity. The CT scan also showed a dilated and inflamed appendix with fecaliths. The histopathological examination further showed evidence of acute gangrenous appendicitis with periappendicitis, perforation, and impacted fecaliths in the lumen of the appendix. The main reason that causes the fecaliths introduced into the appendix maybe by the air insufflation, which caused obstruction, inflammation, and perforation. However, the possibility of the presence of fecaliths in the lumen of the appendix prior to the colonoscopy could not be entirely excluded.[9] Another possible reason for the appendiceal perforation is barotrauma due to overinsufflation from the endoscope. Because preoperative CT showed a typical sign of colonic perforation with free pneumoperitoneum. Subsequent exploratory laparotomy confirmed acute gangrenous appendicitis with perforation and appendiceal fecaliths. While the colon showed no evidence of perforation or other areas of concern. Furthermore, multiple free gas in the right subphrenic space would not appear in the common appendicitis with perforation. In the present case, the caecum and appendiceal orifice appeared normal during the endoscope. It is also unlikely to make direct luminal trauma while appendiceal orifice was not intubated.[15]

The present case revealed that colonoscopically induced acute gangrenous appendicitis with perforation, which as a clinical entity may be easily misdiagnosed as colonic perforation prior to surgery if only clinical manifestation and CT scan are used. However, in patients with acute abdomen, CT is the preferred diagnostic method, as the imaging characteristics of free intraperitoneal air are fairly typical for gastrointestinal perforation. Furthermore, the CT scan has high sensitivity and specificity to detect acute appendicitis,[16] and is probably more accurate than ultrasonography for diagnosing appendicitis.[17] Based on this physical examination and CT findings, the need for exploratory laparotomy was obvious and the patient was taken to the operating room where an inflamed gangrenous appendix with focal perforation and fecaliths was removed. He had a good prognosis after the surgery. Thus, surgeons should pay more attention to this late perforated appendicitis after colonoscopy.

4. Conclusions

Perforated appendicitis is an extremely rare complication of colonoscopy. The clinical awareness of postcolonoscopy appendicitis must be increased. Acute appendicitis should be included in the differential diagnosis of lower right abdominal pain following a colonoscopy, in addition to possible colonic injury. Emergency surgery should be recommended for the typical signs of perforation with peritonitis and free pneumoperitoneum. Early recognition and prompt surgical treatment are critical, which can avoid severe outcomes and improve the prognosis.

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