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# Appendiceal Abscesses Reduced in Size by Drainage of Pus from the Appendiceal Orifice during Colonoscopy: A Report of Three Cases

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## Key Words

Appendiceal abscess · Appendectomy · Laparoscopic appendectomy · Interval appendectomy · Colonoscopy

## Abstract

Interval appendectomy (IA) for appendiceal abscesses is useful for avoiding extended surgery and preventing postoperative complications. However, IA has problems in that it takes time before an abscess is reduced in size in some cases and in that elective surgery may result in a delay in treatment in patients with a malignant tumor of the appendix. In order to rule out malignancy, we performed colonoscopy on three patients with an appendiceal abscess that did not decrease in size 5 or more days after IA. After malignancy had been ruled out by examination of the area of the appendiceal orifice, the appendiceal orifice was compressed with a colonoscope, and a catheter was inserted through the orifice. Then, drainage of pus was observed from the appendiceal orifice into the cecal lumen. Computed tomography performed 3 days after colonoscopy revealed a marked reduction in abscess size in all patients. No endoscopy-related complication was noted. Colonoscopy in patients with an appendiceal abscess may not only differentiate malignant tumors, but also accelerate reduction in abscess size.

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## Introduction

Interval appendectomy (IA) for appendiceal abscesses is useful for avoiding extended surgery and reducing postoperative complications [1]. However, IA has problems in that it takes time before an abscess is reduced in size in some cases and in that elective surgery may result in a delay in treatment in patients with a malignant tumor of the appendix [1]. In order to rule out malignancy, we performed colonoscopy on three patients with an appendiceal abscess who chose to undergo IA, but whose abscess did not decrease in size after 5 or more days of treatment with an antibiotic. During the routine procedure of colonoscopy in these patients, drainage of pus was incidentally observed from the area of the appendiceal orifice into the cecal lumen. The abscesses were reduced in size early after colonoscopy. We herein report that performing colonoscopy in patients with an appendiceal abscess may accelerate reduction of abscess size.

## Case 1

A man in his seventies had an appendiceal abscess 50 mm in diameter (fig. 1a). On admission, he had increased inflammatory markers (white blood cell count 11,500/ $\mu$ l, C-reactive protein 4.6 mg/dl), but examination of the abdomen revealed only tenderness localized to the right lower quadrant of the abdomen. Since he wanted to undergo IA, he was fasted after admission and administered an antibiotic (4 g/day of flomoxef sodium). Computed tomography (CT) imaging performed 5 days after admission revealed no reduction in size of the abscess, and therefore colonoscopy was performed the following day. Redness and edema of the mucosa were observed in the area of the appendiceal orifice, but no finding suggestive of malignancy was observed. The area of the appendiceal orifice was examined, followed by compression with a colonoscope. Then, a large amount of pus drained from the appendix (fig. 1b). During the examination, the patient's general condition remained normal, and abdominal pain did not develop. After the examination, there was no increase in inflammatory markers and abdominal pain did not worsen; rather, they were improved. CT imaging performed 3 days after colonoscopy revealed that the abscess had almost resolved (fig. 1c).

## Case 2

A man in his fifties had an appendiceal abscess 50 mm in diameter (fig. 2a). Treatment with IA was decided, and the patient was fasted after admission and administered an antibiotic, as in case 1. Since the abscess did not decrease in size, colonoscopy was performed 10 days after admission. As a result, no finding suggestive of malignancy was observed in the area of the appendiceal orifice. After examination, this area was compressed with the colonoscope, but only a small amount of pus drained from the appendix. Subsequently, a dye-spraying catheter was inserted through the appendiceal orifice. Then, a large amount of pus was aspirated from the appendix (fig. 2b). Colonoscopy was completed without any complication, and abdominal pain was improved from the following day. CT imaging performed the day after colonoscopy revealed that the size of the abscess had decreased to 20 mm in diameter (fig. 2c). The patient was discharged 3 days after colonoscopy.

### Case 3

A woman in her forties had an appendiceal abscess 40 mm in diameter (fig. 3a). On admission, white blood cell count was 9,300/ $\mu$ l and C-reactive protein was 5.7 mg/dl. Since abdominal CT imaging performed 4 days after admission revealed no reduction in the size of the abscess, colonoscopy was performed the following day. After confirming that there was no finding suggestive of malignancy in the appendix, a dye-spraying catheter was inserted through the appendiceal orifice. Then, a large amount of pus was aspirated from the appendix. Furthermore, a large amount of pus drained from the appendiceal orifice into the cecal lumen (fig. 3b). CT imaging performed the day after colonoscopy revealed that the abscess had decreased to 20 mm in diameter (fig. 3c).

### Discussion

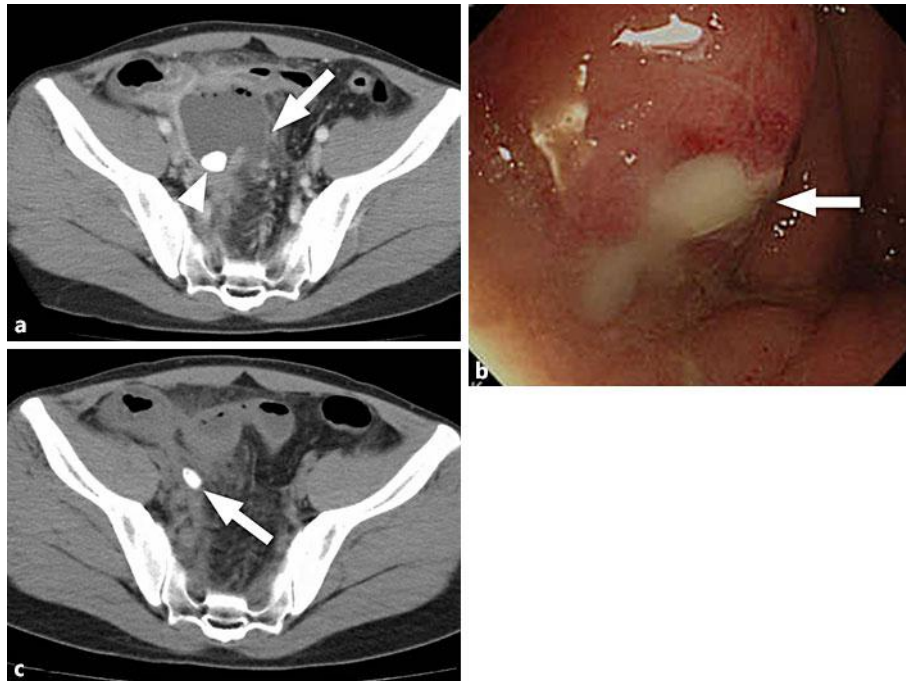
An appendiceal abscess is a condition in which an abscess is formed around the appendix as a result of appendiceal perforation or extension of inflammation to the adjacent tissues due to aggravation of appendicitis. It occurs in 2–6% of patients with appendicitis [2]. IA is a therapeutic strategy used to treat appendiceal abscesses, in which the condition is treated conservatively without surgery in the acute phase, and appendectomy is performed after inflammation has subsided. This strategy has conventionally been used aggressively to manage appendicitis in children [3]. In recent years, it has also been employed for appendiceal abscesses in adults to avoid extended surgery or to prevent postoperative complications [4]. Conservative treatment has been reported to be successful in as many as 80–100% of patients with appendicitis with abscess formation if inflammation was localized [5]. Some patients require percutaneous drainage [6], but most patients can be treated conservatively. However, more than a few patients do not respond to conservative treatment. A longer time to reduction of an abscess means higher medical expenses, and elective surgery may result in a delay in detection of a malignant tumor of the appendix [7]. Therefore, in order to rule out malignancy, we performed colonoscopy on patients whose abscess was not reduced in size after IA. We think that this intervention accelerated the reduction in abscess size and shortened the length of hospital stay required for IA. There have been six reports (including Japanese papers), such as by Said et al. [8] and Ohtaka et al. [9], of cases of appendiceal abscesses that were incidentally drained by endoscopy. In all these cases, endoscopy was performed to search for the cause of abscess formation, as was done in our patients. The abscess drained from the appendiceal orifice during the course of performing biopsy in five of these patients, excluding one. In three of the five patients who underwent surgery after the abscess was drained, appendectomy was the only surgical procedure performed. Performing endoscopy during abscess formation involves a risk of complications, such as perforation, but endoscopy was performed safely in our three patients and the six patients previously reported. It was reported that cecal cancer, diverticulum of the large intestine or Crohn's disease was diagnosed at a later date in some patients who had undergone CT-guided percutaneous drainage, and this may result in a delay in diagnosis [10]. On the other hand, cancer or Crohn's disease can possibly be found by endoscopic drainage, because the mucosa of the large intestine or appendix can be directly observed. We anticipate that drainage of an abscess by endoscopy, which allows examination of the large intestine including the area of the appendiceal orifice, will be an option for the treatment of appendiceal abscesses in the future.

## Disclosure Statement

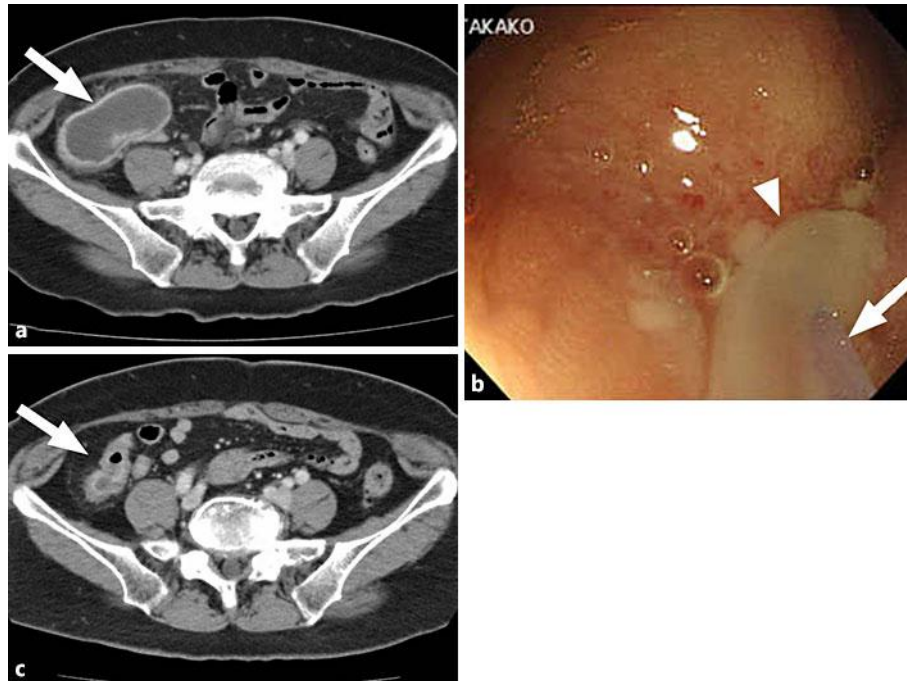
The authors declare no conflict of interests for this article.

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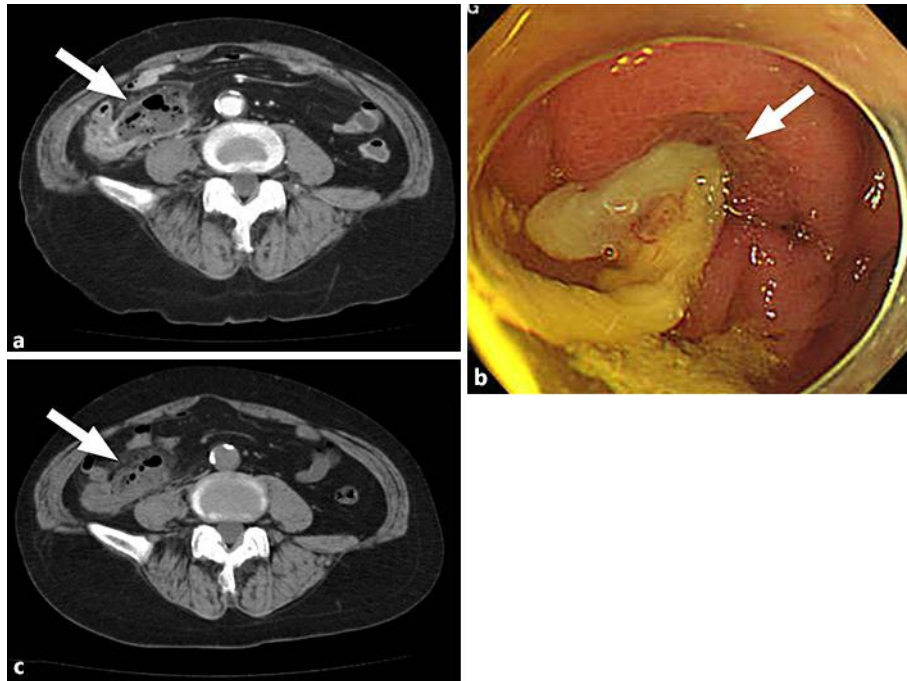
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**Fig. 1.** **a** An abscess (53 × 52 mm) was detected in the pelvis (arrow). A fecalith was also observed in the abscess (arrowhead). **b** When the area of the appendiceal orifice was compressed with a colonoscope, a large amount of white pus drained from the appendix (arrow). **c** CT imaging performed 3 days after colonoscopy revealed that the abscess had almost resolved and only the fecalith remained (arrow).



**Fig. 2.** **a** An abscess (55 × 30 mm) was observed adjacent to the appendix (arrow). **b** When a dye-spraying catheter was inserted through the appendiceal orifice (arrow), a large amount of white pus was aspirated from the appendix (arrowhead). **c** CT imaging performed the day after colonoscopy revealed that the abscess had decreased to 20 mm in diameter (arrow).



**Fig. 3.** **a** An abscess (40 × 30 mm) was observed adjacent to the appendix (arrow). **b** When a dye-spraying catheter was inserted through the appendiceal orifice, pus was aspirated. When the catheter was removed, a large amount of pus drained from the appendiceal orifice into the cecal lumen (arrow). **c** CT imaging performed the day after colonoscopy revealed that the abscess had decreased to 20 mm in diameter (arrow).