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Post-appendectomy Typhlitis Initially Diagnosed as an Intra-peritoneal Residual Abscess until an Exploratory Re-laparotomy: An Abscess-like Finding of Inflammation of the Cecum on CT

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Summary. **We here report the case of a 10-year-old female who developed post-appendectomy typhlitis (PT) that could not be identified until an exploratory re-laparotomy. Computed tomography (CT) performed after the initial appendectomy showed an irregularly enhanced solid mass, including a homogeneous low-density lesion, at the corresponding site of the patient's cecum. The lesion was initially diagnosed to be an intra-peritoneal residual abscess.**

Key words — typhlitis, laparoscopic appendectomy, postoperative complication.

INTRODUCTION

An inflammation of the cecum often co-exists with advanced appendicitis. This condition is generally considered to result from the spread of inflammation to the cecum from the appendicitis[1]. However, a new occurrence of such an inflammation of the cecum after an appendectomy is considered rare. An inflammation of the cecum is generally called "*typhlitis*" ; this term generally means an unusual inflammation of the cecum which tends to especially occur in patients with immune deficiency disorders[2]. We experienced a case of post-appendectomy inflammation of the cecum (i.e. "*typhlitis*") in a previously healthy female, a condition that had been considered to occur shortly after an initial appendectomy. Furthermore, the lesion had been initially diagnosed as an intra-peritoneal residual abscess (IPRA) on computed tomography (CT). We here report a rare case of post-appendectomy "*typhlitis*" (PT) and discuss the interesting CT findings of this lesion, which closely resembled IPRA.

CASE REPORT

A previously healthy, 10-year-old female was admitted to our hospital with a one-day history of high-grade fever and right lower quadrant (RLQ) abdominal pain. On admission, tenderness and involuntary muscle guarding on the RLQ was observed. A peripheral blood analysis showed severe leukocytosis (WBC: $22.6 \times 10^3/\mu l$). A diagnosis of acute appendicitis was made and a laparoscopic appendectomy (LA) was performed. Under general anesthesia with insufflations with CO_2, a three-trocar approach was used. An initial laparoscopic inspection in the peritoneal cavity showed a low amount of purulent ascites in the ileo-cecal and the Douglas` pouch. The omentum partially adhered to the head of the appendix, thus indicating advanced stage appendicitis. An appendectomy was performed using the ordinary procedures, and the appendiceal

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Abbreviations – CT, computed tomography; IPRA, intra-peritoneal residual abscess; LA, laparoscopic appendectomy; PT, post-appendectomy typhlitis; RLQ, right lower quadrant.

stump was simply ligated with an absorbable suture. At this initial surgery, there were no abnormal findings regarding the appendiceal stump, and the cecum also showed a completely normal macroscopic appearance. The appendiceal inflammation was microscopically classified as gangrenous.

The post-operative course was uneventful until the fourth post-operative day. On the fifth post-operative day, though neither nausea nor diarrhea was presented, the patient complained of high fever and mild RLQ pain again. A peripheral blood analysis showed leukocytosis (WBC: 15.6 × 10^3/μl) and elevated serum C-reactive protein level (5.4 mg/dl). Blood and feces cultures were not performed. In view of the patient's history and symptoms, the presence of IPRA was suspected. The administration of very potent broad-spectrum antibiotic agents was initiated. However, the symptoms persisted despite the administration of antibiotics. Furthermore, an immobile palpable tender mass was also noticed in the RLQ on the 10th post-operative day. Abdominal and pelvic CT showed a round shaped mass measuring about 7 cm in diameter at a location corresponding to the site of the cecum. The internal structure of the mass mainly consisted of an irregularly enhanced solid part (Fig.1A, B and C) The cranial part of the mass contained a small area of air density which appeared to continue to the anal side colon (Fig.1A and B). On the other hand, a homogenous low-density lesion with a well-enhanced margin was also observed in an area more caudal to the mass (Fig.1D). This lesion was considered to represent fluid collection; it appeared to be located at an area different from the previous irregularly enhanced lesion. At this point, especially based on the CT view in Fig 1D, the presence of IPRA was suspected. An immediate re-exploration to drain the abscess was subsequently performed.

However, at the re-exploration, no IPRA was found at all; however, a tumor-like cecum which demonstrated ligneous changes in its wall was encountered. The wall of the cecum showed thickening with edema. A diagnosis of PT was thus made. There were no abnormal findings in the terminal ileum, ascending colon, or the appendiceal stump. No additional surgery was performed except for the insertion of a silicon drain into the ileo-cecal pouch.

The abdominal symptoms and the mass quickly disappeared after the re-exploration and the postoperative course was uneventful. The patient was discharged 10 days after the re-exploration.

DISCUSSION

The term "*typhlitis*" was first employed by Wanger et al. in 1970 to describe a case of necrotizing enterocolitis involving the cecum and possibly the ileum or several regions of the colon [2]. Most reported cases tend to be neutropenic pediatric patients with leukemia, but it has also been seen in patients with other forms of neutropenia or immune deficiency and after solid organ transplantation [3]. Therefore, the term "*typhlitis*" is generally accepted to mean an unusual inflammation of the cecum combined with specific systemic disorders. In contrast, the term "*perityphlitis*" means an unusual inflammatory and fibrotic process in the cecum secondary to appendicitis [1]. In this disorder, a fibroblastic proliferation with acute, sub-acute, or chronic inflammation is prominent. In this report, the term "*typhlitis*" is used to mean a nonspecific inflammation of the cecum – which is slightly different from the original meaning of "*typhlitis*" as described by Wanger [2].

We generally encounter a simultaneous inflammation of the cecum which exists with advanced appendicitis. This change is regarded as the result of the spread of inflammation to the cecum from appendicitis. However, in our case, such an inflammation was limited to within the appendix, and the cecum presented normal macroscopic appearance at the time of the initial LA. An IPRA is one of the major complications of acute appendicitis in children[4]. During a re-exploration, we discovered that the abnormal mass detected on CT was really the tumor-like cecum itself (i.e. PT) and not an IPRA. We believe that the PT which occurred in this case had newly occurred after the initial LA, and we do not think that it co-existed with the initial appendicitis. Therefore, our case may be a rare condition of post-appendectomy complications.

The typical CT findings of "*typhlitis*" are reported to be a low-attenuation thickening of the cecal wall and adjacent edema[5,6,7]. In our case, the irregularly enhanced internal structure of the mass on CT may therefore have actually been layers of a low-attenuation thickening of the cecal wall (Fig. 1A, B and C). Furthermore, in one view of the cephalic side of the mass, the internal structure seemed to resemble the halo sign of the colon. These findings are thus considered to indicate that the mass had a serial continuation to the intra-luminal air of the anal side colon (Fig. 1A and B). On the other hand, the homogeneous low-density lesion (Fig. 1D) was the most impressive CT finding in this case. The margin of this lesion was well enhanced and the internal homogeneous low-density resembled the findings of fluid collection.

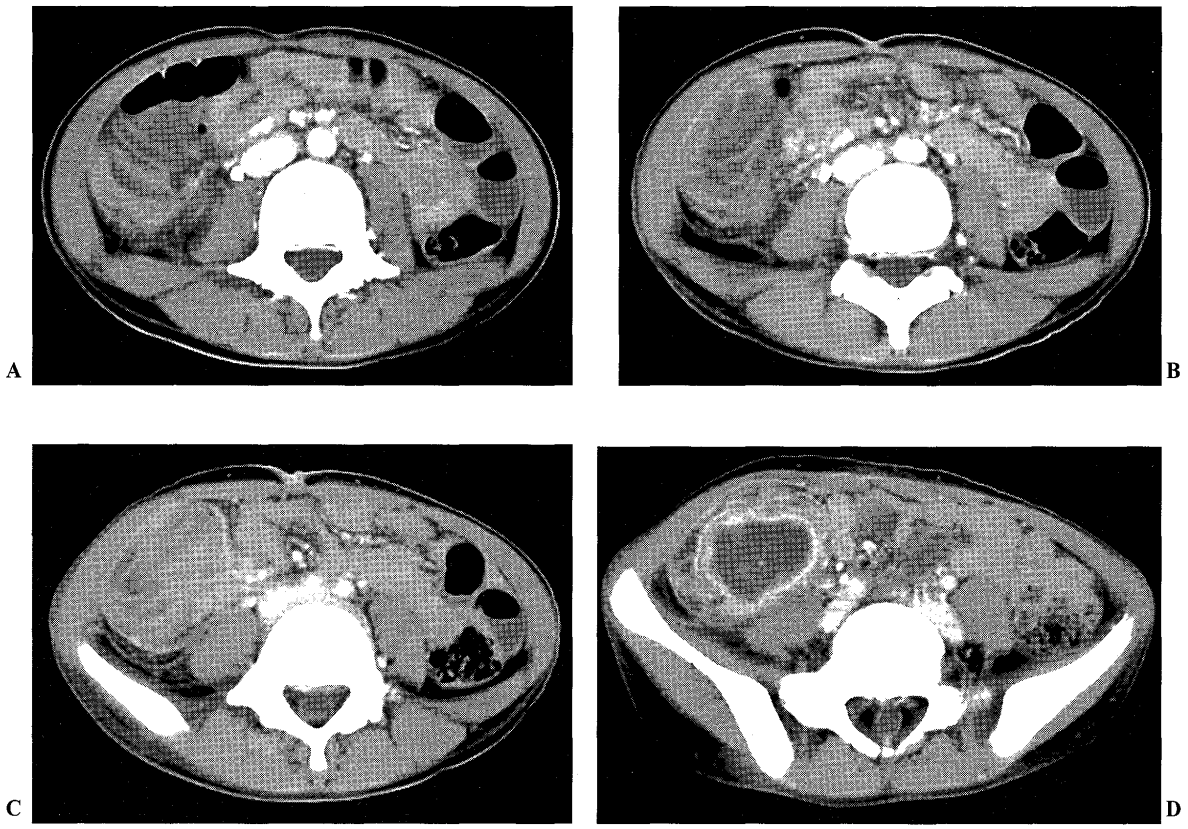

Fig. 1. CT findings of the lower abdomen after administering an intravenous contrast medium before a re-exploration. **A** to **D** indicate a serial series from the cephalic to the caudal part of the mass. **A.** 20 mm cephalic to the level of **C** demonstrated an intra-luminal continuation to the anal side colon. **B.**10 mm cephalic to the level of **C** demonstrated both an irregularly enhanced solid internal structure and small area of air density. **C. C** demonstrated an irregularly enhanced solid internal structure. **D.** 10 mm caudal to the level of **C** demonstrated a homogeneous solitary low-density. This lesion appeared not to adhere to any other structures. These findings seem to indicate the presence of fluid collection which would be compatible with an intra abdominal residual abscess after the initial laparoscopic appendectomy.

The CT appearance of an intra peritoneal abscess varies depending on its age and location. At an early stage, the abscess has a central region of near-water attenuation surrounded by a higher attenuation rim that usually becomes enhanced after the administration of an intravenous contrast material [8]. Furthermore, it is also interesting to note that in this case, this low attenuation with the enhanced rim (Fig. 1D) was located only 10 mm caudal to the level of the dilated ascending colon with a wall thickening (Fig. 1C). The part of low attenuation with the enhanced rim was considered to be apparently located separately from any other parts of the mass. As far as we know, a retroperitoneal abscess caused by the penetration of "*typhlitis*" has been reported, but there have been no reports in which the cecum itself presented with an abscess-like finding on CT. Therefore, the low attenuation lesion was thus considered to present with a localized IPRA, and this lesion seemed to exist independent of the other lesions.

The symptoms of *"typhlitis"* consist of fever, watery or bloody diarrhea, and abdominal pain that may be localized in RLQ, all of which sometimes resemble those of acute appendicitis[2, 3]. Especially, fever symptoms may be extremely frequent in such patients, thus making them more prominent features than the degree of abdominal pain. In our case, however, the symptoms were mild in spite of impressive CT findings[5, 6]. It was also interesting to note that the abdominal symptoms quickly improved after the re-exploration. We speculate that the low-density lesion shown in Fig. 1D might have shown the intra-luminal contents in the cecum. The entire contents of the cecum might thus have spontaneously drained to the anal side of the intra-luminal lumen during the exploratory procedures, which may therefore have resulted in the relief of the abdominal symptoms.

The reason for this condition remains unclear. Recently, a case of a post appendectomy appendiceal

stump abscess has been reported with an expanding of LA[9]. However, in our case, the appendiceal stump showed a normal appearance in both the initial LA and at re-exploration. In contrast, some experimental data have shown that CO_2 intra-peritoneal pressure with pneumoperitoneum may increase the risk of septic diffusion in animals[10]. Although the incidence of IPRA after LA in comparison with that of an open appendectomy remains controversial, Valla et al. reported a higher incidence of IPRA after LA than that after an open appendectomy[11]. Therefore, the pathogenesis of our case might have been related to the laparoscopic procedure itself, including pneumoperitoneum. Further study will be needed to clarify this point.

In conclusion, PT demonstrated CT findings that closely resembled IPRA. PT should thus be considered in the differential diagnosis for IPRA, based on the following conditions: 1) the abnormal lesion that looks like IPRA on CT is located at the corresponding site of cecum itself; 2) the patient's normal cecum could not be identified at the corresponding normal site of the cecum; and 3) the intra-luminal continuation to the anal side colon is confirmed in the serial CT findings to the anal side. Including these three points, if the abdominal symptoms are also mild, then we may conservatively observe such abnormal lesions like IPRA in patients who have recently undergone an appendectomy.

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