

CT Findings of Foreign Body Reaction to a Retained Endoloop Ligature Plastic Tube Mimicking Acute Appendicitis: A Case Report

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Many hospitals experience one or more retained surgical instrument events with risk of patient morbidity and medicolegal problems. Identification of retained surgical instrument is important. The radiologists should be familiar with imaging finding of retained surgical instrument. In a 62-year-old female with a retained plastic tube, localized peritoneal infiltration around air-containing tubular structure mimicked acute appendicitis on abdomen computed tomography (CT), one year after laparoscopic cholecystectomy. We reported CT findings of foreign body reaction related to retained Endoloop ligature plastic tube mimicking acute appendicitis.

Index terms: Retained surgical instrument; Foreign body; Peritonitis

INTRODUCTION

In spite of precautions, a foreign body retained in the abdominal cavity after surgery may lead to persistent problems such as adhesions, perforation, and abscess or fistula formation (1-3). Endoloop ligature (Ethicon, Somerville, NJ, USA) is surgical instrument to facilitate the ligation of pedicles in laparoscopic procedures. Vicryl (polyglactin 910) and polydioxanone (Ethicon) Endoloop ligature can be used. It consists of a 45 cm long ligature inserted into a plastic tube (narrow at one end and scored at the other). The plastic tube should be removed after the suture is formed in a ligature with a knot. Retained plastic

tube of the Endoloop ligature in the abdominal cavity is difficult to detect in the absence of clinical suspicion and familiarity with the appearance, since it is very narrow and thin. There has been no report on CT findings of retained Endoloop ligature plastic tube.

With the approval of the Institutional Review Board of our hospital, we describe CT findings of foreign body reaction related to retained Endoloop ligature plastic tube, which was misinterpreted as acute appendicitis.

CASE REPORT

A 62-year-old female presented with right lower quadrant pain. She complained of rotating abdominal pain for a year. Her past history had laparoscopic cholecystectomy a year ago. She has undergone CT scan due to intermittent abdominal pain one month after laparoscopic cholecystectomy. CT images showed no abnormal finding at that time. The physical examination revealed tenderness in right lower quadrant abdomen. Laboratory examination showed mild leukocytosis with neutrophilia (11900/uL, 85.3%).

CT scan was again performed under suspicion of acute appendicitis. CT scans showed localized peritoneal

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infiltration around air-containing tubular structure (Fig. 1A-D) in right lower quadrant of the abdomen. Initial diagnosis was acute appendicitis. Appendectomy was performed. Operative findings and pathologic results revealed localized peritonitis related to retained Endoloop ligature plastic tube (Fig. 1E) that was used in laparoscopic cholecystectomy and appendix was normal. On retrospective review of CT images, we could detect the present of foreign body (Fig. 1F-H).

DISCUSSION

The imaging appearances of retained surgical instruments in the postoperative abdomen and pelvis can be confusing and difficult to identify. Unintentionally retained surgical instruments lead to substantial morbidity, and mortality

rates with the range of 11–35% (4). To our best knowledge, the presented case is the first report of CT findings of foreign body reaction related to retained Endoloop ligature plastic tube, which had been misdiagnosed as acute appendicitis because of the location and morphologic characteristics.

Among retained surgical instruments, gossypiboma in the abdomen counts for 50% of malpractice claims for retained foreign body (2). Gossypiboma is the term sometimes used to describe the foreign body reaction to a surgical sponge retained within the body for a long period. The radiologists consider a gossypiboma to be specifically indicated by a CT finding of a low-density heterogeneous mass with an external high-density wall that is further highlighted on contrast-enhanced imaging and that has a spongiform

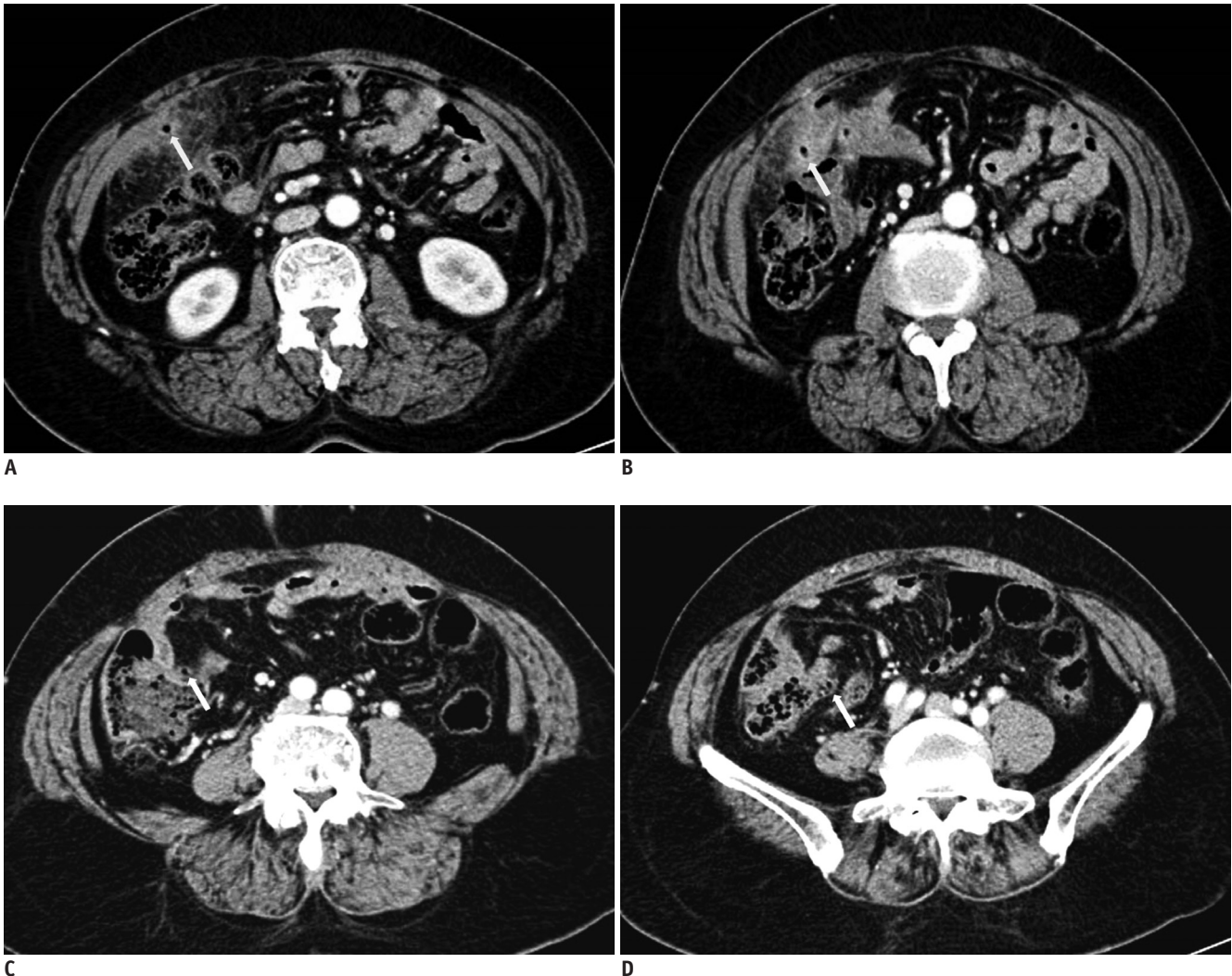
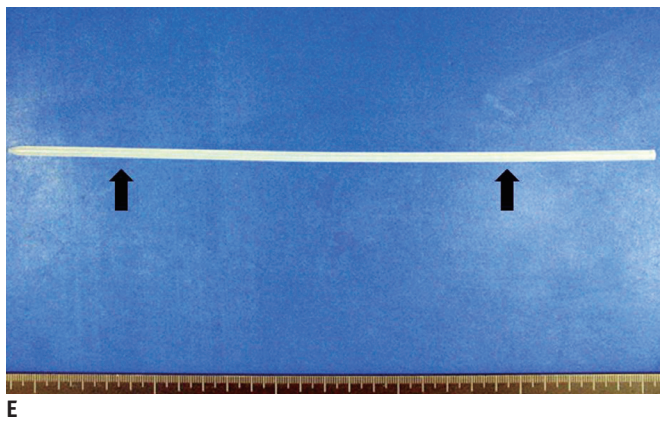
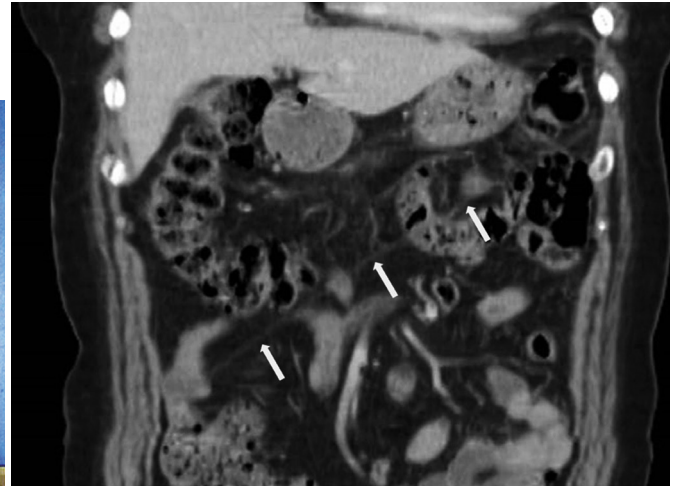


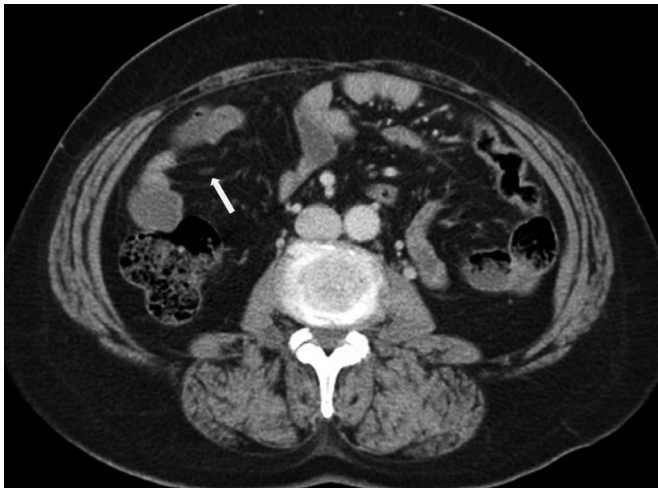
Fig. 1. 62-year-old female presented with right lower quadrant pain one year after laparoscopic cholecystectomy. A-D. Axial CT images show localized omental infiltration around air-containing tubular structure in right lower quadrant of abdomen (arrows). These CT findings may mimic acute appendicitis considering its location and appearance. Operative and pathologic results revealed localized peritonitis related to retained Endoloop ligature plastic tube that was used in laparoscopic cholecystectomy.



E



F



G



H

Fig. 1. 62-year-old female presented with right lower quadrant pain one year after laparoscopic cholecystectomy.

E. Endoloop ligature plastic tube. Endoloop ligature is surgical instrument to facilitate ligation of pedicles in laparoscopic procedures. Vicryl and polydioxanone Endoloop ligature can be used. It consists of 45 cm long ligature inserted into plastic tube (arrows) (narrow at one end and scored at other). Plastic tube should be removed after suture is formed in ligature with knot. **F.** Coronal reformation CT image shows bizarre tubular structure with oblique direction (arrows) in upper abdomen. We neglected this finding as unexplained artifact. **G, H.** Axial CT images were reported as no abnormal finding at examined time. On retrospective review of CT images, there was bizarre tubular structure (arrows) corresponding to one seen on **F**.

pattern containing air bubble (5). The spongiform pattern with gas bubbles is the most characteristic CT finding for gossypibomas (5). Gossypibomas cause two types of responses in the body: exudative and aseptic fibrous. The latter can have adhesions, encapsulation, and eventually, granuloma formation. The former usually occurs early in the postoperative period and may involve secondary bacterial contamination, which results in various fistulas and abscess (5). CT findings of the presented case were localized peritonitis around air-containing tubular structure in right lower quadrant of the abdomen. The underlying mechanism of localized peritonitis can be explained by the nidus formation of the retained plastic tube as foreign body

reaction and surrounding inflammation around the retained plastic tube nidus. These CT findings may mimic those of acute appendicitis considering its location and appearance. We misinterpreted these CT findings as acute appendicitis. However, in hindsight, there were some differences between the CT findings of acute appendicitis and those of presented case; 1) tubular structure was artificially straight, 2) relatively long and evenly outlined, and 3) air was contained inside the tubular structure. Therefore, the possibility of a retained foreign body should have been considered.

We failed to identify the retained Endoloop ligature plastic tube without surrounding inflammation on CT scans

performed one month after laparoscopic cholecystectomy. On the retrospective review, CT images at that time showed bizarre tubular structure in upper abdomen. We neglected this finding as an unexplained artifact because we did not have any knowledge on a retained surgical item in the patient. For the radiologist, correct interpretation of the findings is even more challenging because 1) no surgical item is suspected, 2) the radiologist may not recognize the item as a foreign body, and 3) retained items often elicit a reaction creating a fluid collection that mimics a postoperative abscess or even tumor recurrence (6). The confidence in the ability to identify or exclude suspected and incidentally encountered retained surgical items is critical. The radiologist's failure to identify a retained surgical item is closely related to lacking high index of suspicion. If there is any suspicion related symptom from the retained surgical item, radiologist should recommend further study such as ultrasonography or MRI and image-based retained surgical item detection may be enhanced. Therefore, radiologists should remember that unintentionally retained surgical instruments are often clinically unsuspected and may be first recognized on imaging. A higher index of suspicion should be maintained when bizarre findings cannot be explained in any other way.

In summary, we identified that CT findings of foreign body reaction related to retained Endoloop ligature plastic tube might mimic acute appendicitis. The retained Endoloop ligature plastic tube was artificially straight, relatively long and evenly outlined, and air-containing tubular structure

in contrast of inflammatory appendix. The possibility of a retained foreign body should be considered and a higher index of suspicion should be maintained when unfamiliar findings cannot be explained in any other way. With the increased complexity and more frequent use of surgical instruments, the radiologists need to be familiar with the imaging findings of a variety of unintentionally retained surgical instruments.

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