


CASE REPORT

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Endoscopic clip-induced acute appendicitis in a patient on chronic hemodialysis: a case report with literature review

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Abstract

Background Foreign body-induced acute appendicitis is rare but could most often be caused by fish bones; those caused by endoscopic clips are highly rare. Herein, we report a case of acute appendicitis caused by endoscopic clips that developed 2 years after the endoscopic procedure.

Case presentation A 68-year-old man with a 2-year history of hemodialysis (HD) for diabetic nephropathy visited our hospital with pain in the right lower quadrant. He had undergone endoscopic submucosal dissection (ESD) for gastric adenoma 2 years earlier. Abdominal computed tomography revealed acute gangrenous appendicitis and a high-density structure lodged in the appendix. This structure was determined to be an endoscopic clip that was lodged in the patient's appendix for 2 years. The patient underwent an emergency laparoscopic appendectomy, and an endoscopic clip covered by a fecalith was found in the appendix.

Conclusion Endoscopic clips usually fall off spontaneously in approximately a week and pass through stool. However, in this case, appendicitis developed 2 years after the ESD. An emergency surgical appendectomy may be recommended for appendicitis caused by foreign bodies. Prophylactic appendectomy or removal of foreign bodies should be considered for HD patients, even in the absence of symptoms owing to the potential severity of appendicitis in such patients.

Keywords Appendicitis, Endoscopic clip, Hemodialysis, Foreign bodies

Background

The general cause of acute appendicitis is fecaliths, followed by calculi, lymphoid hyperplasia, infectious processes, and benign or malignant tumors [1]. Appendicitis caused by foreign bodies is rare; nonetheless, it may be

caused by fish bones, which are a relatively common cause [2].

An endoscopic clip is used for hemostasis of the gastrointestinal tract; they dislodge spontaneously in approximately a week and pass with the stool.

We encountered a patient on chronic hemodialysis (HD) whose abdominal computed tomography (CT) scan revealed a metallic object that appeared to be an endoscopic clip lodged in the appendix. Herein, we report a case of acute appendicitis caused by an endoscopic clip in a patient on chronic HD.

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Case presentation

A 68-year-old man from Japan with a 2-year history of HD owing to diabetic nephropathy visited our hospital with abdominal pain in the right lower quadrant since early morning. He had undergone endoscopic submucosal dissection (ESD) for gastric adenoma 2 years earlier, during which endoscopic clips were used for hemostasis. We noticed the clip lodged in the appendix on an abdominal CT done 2 years ago, but he had been asymptomatic since then.

His medications at the time of admission included aspirin, rabeprazole, amlodipine, carvedilol, olmesartan, rosuvastatin, ezetimibe, ferric citrate hydrate, bilastine, nalfurafine hydrochloride, precipitated calcium carbonate, and lanthanum carbonate hydrate.

Physical examination indicated a body temperature of 36.7 °C, blood pressure of 148/66 mmHg, heart rate of 60 beats/min, and oxygen saturation of 98% on room air. On palpation, rebound tenderness and pain were observed in the right lower quadrant of the abdomen.

Blood tests indicated a white blood cell count of 11,730/ μ L with 85.6% neutrophils and juvenile granulocytes, and the C-reactive protein level was 0.41 mg/dL. The patient had multiple colonic diverticula, and appendicitis and diverticulitis were considered differential diagnoses. Abdominal CT without a contrast agent revealed an enlarged appendix with elevated lipid concentration, fluid retention, and a high-intensity structure in the appendix (Fig. 1).

The patient was diagnosed with gangrenous appendicitis. On the day of admission, the patient underwent an emergency laparoscopic appendectomy, and an endoscopic clip was retrieved from the appendix (Fig. 2). The patient had an uneventful postoperative course and was discharged on the fourth postoperative day.

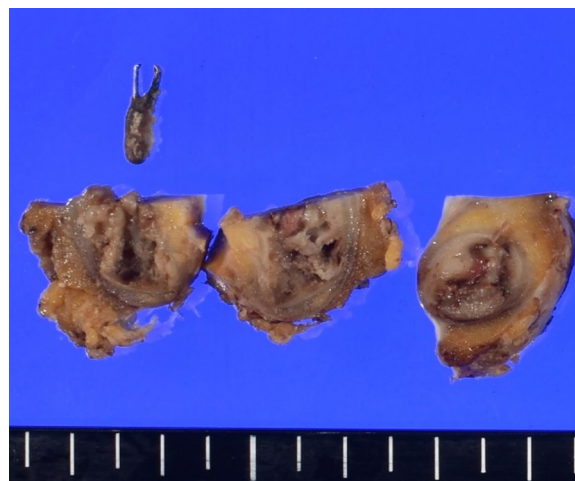


Fig. 2 Resected appendix. The endoscopic clip covered with fecaliths was lodged into the appendix

Discussion

Summary of the case

We diagnosed a case of appendicitis caused by an endoscopic clip in a patient on HD. This endoscopic clip was used for gastric ESD 2 years ago. The patient had been asymptomatic since then. Endoscopic clips are typically blunt in shape with a low risk of gastrointestinal perforation; this may explain why the patient was asymptomatic for 2 years.

Pathophysiology of appendicitis caused by foreign bodies

Approximately 80–93% of ingested foreign bodies pass through the gastrointestinal tract without any event; therefore, foreign bodies in the appendix are rare [3]. Fish bones are the most common foreign body, but rarely, dental prostheses and medical devices such as endoscopic clips may also result in appendicitis [4]. A PubMed

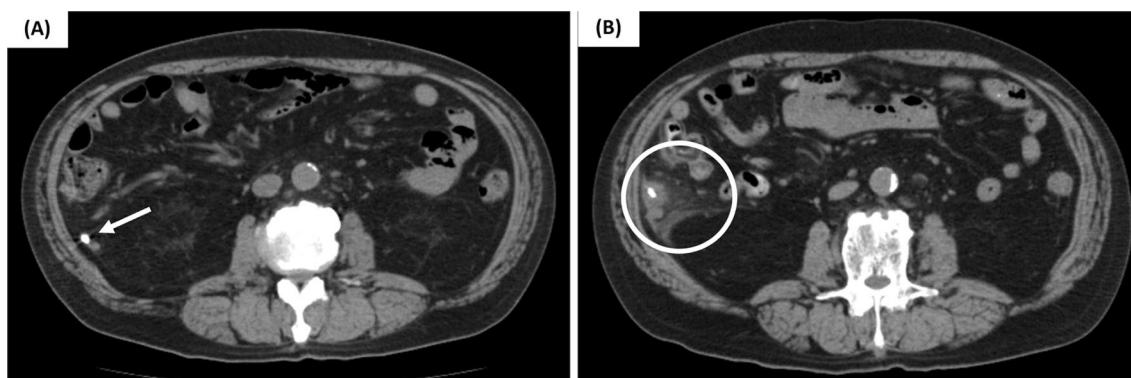


Fig. 1 **a** Abdominal CT performed 2 years ago. An endoscopic clip was found in the appendix (white arrow). **b** Abdominal CT on admission revealed appendicitis gangrenosa and the presence of an endoscopic clip in the appendix (white circle). *CT* computed tomography

Table 1 Summary of five cases of endoscopic clip-induced appendicitis and the present case

| Author | Year | Age(y)/sex | Kidney disease | Time to onset | Procedure | Organ | Treatment | References |
|------------------|------|------------|----------------|---------------|----------------------|---------|-----------------------|------------|
| Kohama et al. | 2009 | 56/M | Non-CKD | 4 months | Preoperative marking | Stomach | Surgical appendectomy | [5] |
| Hoshino et al. | 2010 | 66/F | N/A | 7 years | Polypectomy | Colon | Surgical appendectomy | [6] |
| Toyota et al. | 2013 | 81/M | HD | 2 years | Polypectomy | Colon | Surgical appendectomy | [7] |
| Shimada et al. | 2016 | 70/M | N/A | 22 months | Polypectomy | Colon | Surgical appendectomy | [8] |
| Staghetto et al. | 2021 | 65/F | N/A | 6 weeks | Polypectomy | Colon | Surgical appendectomy | [9] |
| Present case | | 68/M | HD | 2 years | ESD | Stomach | Surgical appendectomy | |

M male, F female, HD hemodialysis, CKD chronic kidney disease, N/A not available, ESD endoscopic submucosal dissection

search using the terms “acute appendicitis” and “hemostatic clip” yielded one published case in English after the year 2009. Ichushi-Web and google scholar search using the terms “appendicitis” and “endoscopic clips” yielded four cases in both sources. These cases are summarized in Table 1 [5–9]. Endoscopic clips might be covered by fecalith and occlude the appendix for appendicitis to develop; this process may proceed for days to years [4].

Management of appendicitis caused by foreign bodies

Surgical appendectomy is preferred in appendicitis caused by foreign bodies. Although interval appendectomy and conservative treatment prior to surgery are options, most cases of appendicitis caused by foreign bodies are treated with an emergency appendectomy. Dislodging foreign bodies once they are lodged in the appendix is challenging owing to peristalsis toward the tip of the appendix [10]. Prophylactic appendectomy may be performed in such cases. Endoscopic removal of foreign bodies in the appendix has also been reported in the literature as another option [11]. In this case, appendicitis was already complicated by an abscess, and an emergency appendectomy was performed. However, emergency appendectomy is usually recommended for all appendicitis cases caused by foreign bodies, regardless of complications such as abscess formation and perforation. Despite this, if a foreign body is found in the appendix and appendicitis has not developed, the patient may be monitored for 8 weeks to allow the foreign body to be excreted from the appendix [12].

Appendicitis in patients undergoing hemodialysis

The clinical features of appendicitis, one of the most common acute abdominal diseases in HD patients, differ between HD and non-HD patients. The mortality rate of appendicitis is 0.09–0.24% in the general population but 4.0% in HD patients [13, 14]. The risk of perforated appendicitis is also higher in them [15]. The poor outcomes of acute appendicitis in HD patients may be explained by the diseases that leading to HD, (such as diabetes and arteriosclerosis), and hemodynamic instability

during HD [15]. Comorbidities such as autonomic dysfunction and compromise immunity in HD patients may also be responsible for these poor outcomes as well as the higher rate of perforated appendicitis in HD patients [16, 17]. A previous study reported that typical symptoms associated with appendicitis, such as nausea, vomiting, right lower quadrant abdominal pain, and leukocytosis, were less common in HD patients [18]. Early diagnosis of appendicitis in HD patients, despite the lack of characteristic symptoms of appendicitis, may be explained by the fact that HD patients regularly visit clinics to receive their treatment. In the present case, the onset of symptom (pain) was on dialysis day, which led to an early diagnosis even though the patient had no fever, nausea, or vomiting. The patient had diabetes mellitus and was at high risk of developing severe appendicitis, but the early diagnosis may have contributed to the uncomplicated course of the disease.

Conclusion

Herein, we reported a highly rare case of appendicitis caused by an endoscopic clip used for gastric ESD. Surgical appendectomy is recommended in such cases. Appendicitis tends to be severe in patients on HD, and careful management is crucial. Prophylactic appendectomy or removal of foreign bodies by endoscopy should be considered for patients undergoing hemodialysis.

Abbreviations

HD Hemodialysis
ESD Endoscopic submucosal dissection
CT Computed tomography

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Author contributions

DY, YF, AT, and YT managed this case. DY and YF revised and corrected the manuscript. AT, YS, YT, and YT assisted with the revision, correction, and reconstruction of the manuscript. All authors have read and approved the final manuscript.

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Consent for publication

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Competing interests

The authors declare no competing interests for this article.

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