Clinical Case Report

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Small bowel perforation secondary to foreign body ingestion mimicking acute appendicitis

Case report

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Abstract

Rationale: Foreign body ingestion is often encountered in clinical practice; however, intestinal perforation owing to foreign body ingestion is rare.

Patient concerns: Here, we present the cases of 2 patients who accidentally swallowed foreign bodies and later presented with pain in the right lower abdominal quadrant.

Diagnoses: Both patients were initially diagnosed with acute appendicitis and underwent immediate emergency laparotomy.

Interventions: During the operation, the appendix was found to be only mildly inflamed. On transection of the appendix, the mucosa was found to be inflamed, and yellow-white exudate was noted. We, therefore, decided to explore the entire bowel. The bowel examination revealed small bowel perforations, and palpation of the adjacent bowel revealed a hard, sharp object. The object was removed through the perforation site, the perforation was repaired, and the abdomen was closed in layers.

Outcome: The postoperative recovery, in both cases, was uneventful.

Lessons: Patients who swallow sharp or large foreign bodies should undergo endoscopy as soon as possible to avoid intestinal perforation. Clinicians should inquire about a history of foreign body ingestion. The preoperative diagnosis of intestinal perforation secondary to foreign body ingestion requires a high degree of clinical suspicion and awareness.

Keywords: appendicitis, foreign body, intestinal perforation

1. Introduction

Foreign body ingestion is often encountered in clinical practice; however, gastrointestinal perforation secondary to foreign body ingestion is rare. Approximately 80% to 90% of ingested foreign bodies are excreted from the digestive tract without any complications or morbidity.[1] Less than 1% of foreign bodies, especially large, sharp, and/or pointed objects, cause bowel perforation.[2] When foreign body-induced intestinal perforation does occur, it is often accompanied by abdominal pain, nausea, and vomiting, mimicking acute appendicitis. Unless a specific history of foreign body ingestion before symptom onset is sought by the clinician, the case can be easily misdiagnosed. Acute intestinal perforation secondary to foreign body ingestion is an emergency requiring surgical intervention. Here, we present the cases of 2 patients with intestinal perforation secondary to foreign body ingestion. Both patients presented with symptoms suggestive of acute appendicitis, and their clinical history and preoperative work-up did not reveal foreign body ingestion. The intestinal perforations and ingested foreign bodies were eventually identified on exploratory laparotomy.

2. Case presentation

This study was approved by the ethics committee of the First Hospital of Jilin University, and the written informed consent was obtained from both patients.

2.1. Case 1

A 64-year-old man presented with complaints of abdominal pain and distention, nausea, and vomiting for 1 day. The pain was initially confined to the epigastric region and later to the right lower quadrant, but eventually spread to the entire abdomen. The patient also had nausea and vomiting, with the vomitus consisting of the gastric contents. During the past 7 hours. With increase in the severity of abdominal pain, the frequency of vomiting also increased, from vomiting 1 time every 3 to 4 hours to 1 to 2 hours He denied having any history of recent fever, chills, night sweats, weight loss, or changes in bowel habits. There was no history of recent travel.

A physical examination showed the following: blood pressure, 120/60 mmHg; heart rate, 75 beats per minute; respiratory rate,

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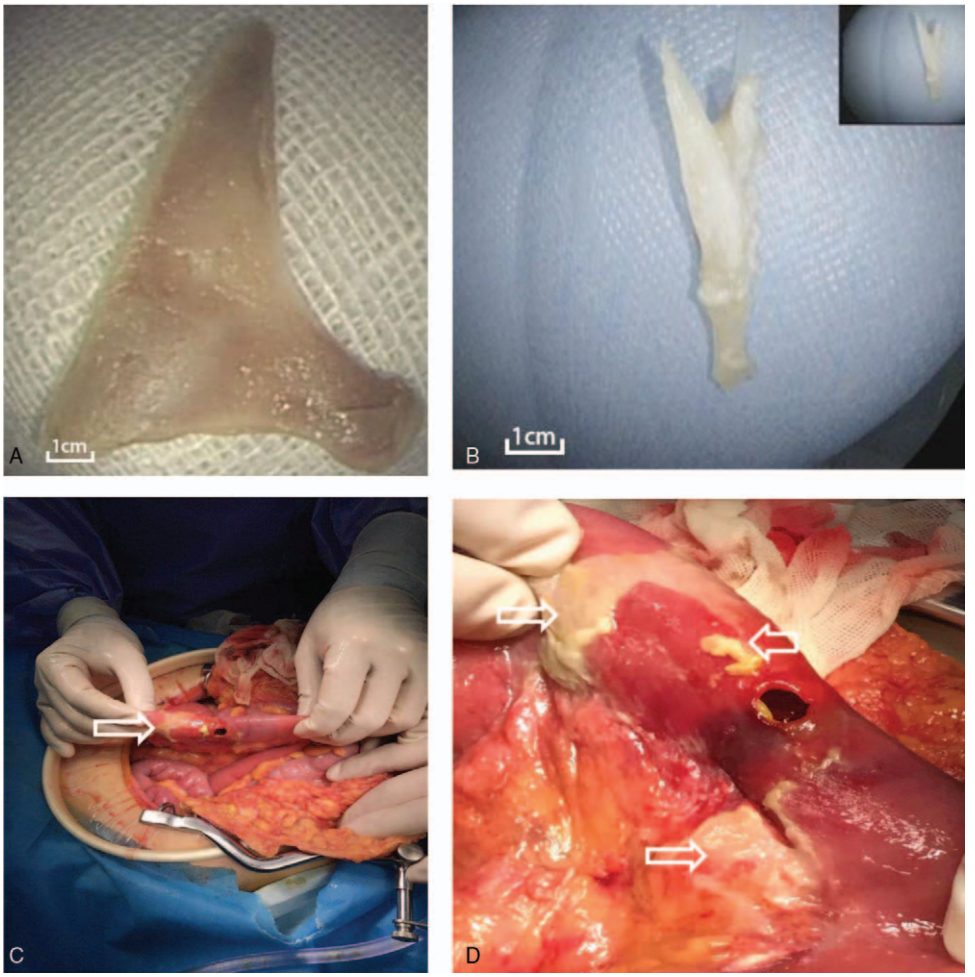

Figure 1. (A) Case 1: The foreign body in the small bowel was a 2-cm-long chicken bone with a big angle. (B) Case 2: The foreign body in the small bowel is a 3-cm-long chicken bone with sharp ends. (C, D) Postoperative specimens showing perforation of the small bowel, purulent exudate (white arrows), and adhesions.

18 breaths per minute; oxygen saturation, 98% on room air; and body temperature, 36.3°C. Abdominal examination revealed tenderness over the entire abdomen, rebound tenderness, and muscle tension. Laboratory examinations revealed the following: increased white blood cell count, 16.9×10^9 cells/L; normal red blood cell count, 4.75×10^{12} cells/L; and normal platelet count, 131×10^9 cells/L. Abdominal fluoroscopy showed a dilated bowel and a small amount of free fluid in the abdominal cavity. Abdominal computed tomography showed no abnormalities in the ileocecal junction, but the appendix could not be clearly visualized. Based on the clinical findings, a provisional diagnosis of appendicitis was made, and surgery was recommended. The patient and his family were informed about the risks of surgical treatment, and they provided written consent to undergo an exploratory laparotomy. During the operation, the appendix was found to be mildly inflamed. We therefore considered a diagnosis of acute appendicitis and decided to perform an emergency appendectomy. On transection of the appendix, the mucosa was found to be inflamed, and yellow-white exudate was noted. We therefore decided to explore the entire bowel. The bowel examination revealed a small bowel perforation, approximately 250 cm proximal to the ileocecal junction. On palpation of the adjacent bowel, a hard, sharp object was felt. The object was removed through the perforation site and was found to be a chicken bone. The site of perforation was then repaired, and the abdomen was closed in layers (Fig. 1A, C, and D). The postoperative recovery was uneventful, and the patient had no pain or discomfort at the time of discharge.

2.2. Case 2

A 66-year-old man presented to the emergency department with pain in the right lower abdominal quadrant and nausea since >1 day. The patient experienced a sudden, continuous pain in the epigastric area and around the navel that had no obvious triggering factors. During the past 8 hours, the pain localized to the right lower abdominal quadrant. He did not have a history of recent fever, chills, changes in bowel habits, or urinary symptoms. He had no chest pain or sputum expectoration. He had no history of any chronic diseases or drug use. A physical examination revealed the following: height, 176 cm; weight, 75 kg; blood pressure, 120/60 mmHg; heart rate, 83 beats per minute; respiratory rate, 18 breaths per minute; and body temperature, 36.8°C. Abdominal examination showed right lower abdominal pain, rebound tenderness, and muscle tension. No palpable mass was detected, and the bowel sounds were

weakened over the entire abdomen. Laboratory examinations revealed the following: white blood cells, 13.40×10^9 cells/L; neutrophil count, 11.20×10^9 cells/L; and neutrophil percentage, 0.827%. Abdominal fluoroscopy showed no obvious abnormalities, and abdominal ultrasonography showed no significant abnormal echoes. An emergency laparotomy was planned under a presumptive diagnosis of appendicitis based on the clinical presentation. The patient was informed in detail about the risks associated with the operation, and he provided written consent to undergo a laparotomy. With the patient under general anesthesia, the abdomen was accessed through a McBurney incision. The intestinal mucosa was found to be inflamed, and yellow-white exudate (~50 mL) was noted. The appendix was localized along the teniae coli. It was approximately 7-cm long and 1.0-cm wide. Its surface appeared hyperemic and covered with pus; a fecal stone was found inside. Therefore, after performing an appendectomy, we decided to explore the entire bowel. The bowel examination revealed a small bowel perforation, approximately 50 cm proximal to the ileocecal junction, and a hard, sharp object was palpated (Fig. 1B). The foreign body was removed through the perforation site, and the perforation was repaired. A surgical drain was placed, and the abdomen was closed. The postoperative recovery was uneventful. The patient was followed up at the clinic 1 month later and was found to have no complications. A detailed interview with the patient and his caretaker revealed that the patient usually ate chicken and that the foreign body might be a chicken bone.

3. Discussion

The ingestion of foreign bodies is common in children, elderly individuals, alcoholics, and individuals with mental retardation.[3–5] Most ingested foreign bodies are excreted uneventfully from the digestive tract.[1] Bowel perforation by an ingested foreign body, when it does occur, typically involves the terminal ileum or the rectosigmoid colon.[3] Intestinal perforation secondary to a foreign body presents as an acute abdominal emergency, which may mimic acute appendicitis or diverticulitis. Patients often develop abdominal pain, nausea, vomiting, and fever after perforation.[4] Some patients are even operated on for acute appendicitis, especially, those with terminal ileal perforation.[5,6] The foreign body is usually found during the preoperative work-up or during surgery.

Both of our patients presented with right lower quadrant pain and significantly increased white blood cell counts. We therefore first considered a diagnosis of acute appendicitis and advised emergency surgery. Interestingly, imaging tests failed to show a foreign body in either of our patients. This may be attributable to the marked local inflammation and abscess formation at the site of the intestinal perforation, which might have obscured the foreign bodies. In the first patient, preoperative examination revealed intra-abdominal free gas, which might have been caused by appendiceal perforation leading to acute abdomen. Both patients and their families were informed about the risks of surgical treatment in detail, and they agreed to undergo exploratory laparotomy. During the surgery, visible intestinal perforations were found, and a hard, sharp foreign body was detected in each patient. Thus, the diagnosis was revised to intestinal perforation secondary to foreign body ingestion.

Foreign body-associated intestinal perforation mimicking acute appendicitis has been reported before, and such perforations are typically repaired successfully.[7,8] In our patients, the first symptom was abdominal pain, which was probably caused directly by the foreign bodies. The foreign body could not be digested in the upper digestive tract and failed to be discharged and was therefore retained in the intestine. Foreign bodies usually pass through the esophagus without any complications. Owing to the thick wall and large volume of the stomach, foreign bodies generally do not cause gastric perforation. If patients who have swallowed a foreign body visit a hospital at this stage, the foreign bodies can be endoscopically removed, thus avoiding complications such as intestinal perforation. The risk of perforation is higher in the small intestine because of its relatively small lumen, especially if the foreign body is sharp and hard (eg, chicken or fish bones). The leakage of intestinal contents through the perforation into the abdominal cavity leads to a local inflammatory response, which tries to contain the foreign body and results in the formation of an inflammatory mass. The clinical manifestations of this process are similar to those of acute appendicitis, which explains the clinical misdiagnosis in our patients. The released intestinal contents may collect in the right iliac fossa, and lead to inflammation of the appendix, causing the symptoms of acute appendicitis. If abdominal discomfort or pain is felt shortly after swallowing a foreign body, patients must seek medical treatment in a timely manner, as in the early stage, endoscopy can be used to find and retrieve the foreign body. If our patients had presented early, the complication of intestinal perforation and more importantly, the cost and trauma of surgery, could have been completely avoided.

Another reason for the initial misdiagnoses was that a detailed history was not sought, and thus, the history of swallowing a foreign body before the onset of abdominal pain was missed. After recovery, both the patients and their caretakers were interviewed in detail about the food history of the patients. They recalled a history of ingestion of cooked meat with alcohol in the evening before the onset of symptoms. The present cases illustrate that in patients with clinical manifestations that mimic acute appendicitis, it is important to carefully ask for a history of foreign body swallowing, specifically a large or sharp foreign body. If such a history is present, early gastroscopy must be performed to avoid intestinal perforation and eliminate the cost and trauma of future surgical treatment. In addition, we should also raise patients' awareness; they should be taught that upon swallowing a foreign body, they must seek medical treatment in a timely manner to prevent serious consequences.

4. Conclusions

Patients who swallow sharp or large foreign bodies should undergo endoscopy as soon as possible to remove the foreign body and avoid intestinal perforation. Clinicians should inquire about a history of foreign body ingestion, which requires a high degree of suspicion and attention. Intestinal perforation should be considered as a part of the differential diagnosis in patients with acute abdominal pain.

Author contributions

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