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Case Report

Misdiagnosis of acute pancreatitis in a patient with foreign body ingestion: a case report and literature review

Shunying Yu#, Shuxian Su#, Xinyu Shao, Yuqing Zhou, Yang Yu, Xiaoyi Kuai*, Chunli Zhou*

*Department of Gastroenterology, The Affiliated Suzhou Hospital of Nanjing Medical University, Suzhou Municipal Hospital, Gusu School, Nanjing Medical University, Suzhou, Jiangsu, China. #Equal contributors. *Equal contributors.*

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Abstract: Foreign body ingestion is a rare but important clinical event. We herein describe a patient who was misdiagnosed with acute pancreatitis after inadvertent ingestion of a toothpick while drunk. The toothpick penetrated the stomach and migrated to the pancreas, resulting in abdominal pain for nearly 1 month. We present the clinical manifestations, diagnosis, and treatment of the patient and summarize the characteristics of patients with foreign body ingestion by a systematic literature review. This report illustrates an unusual of misdiagnosed acute pancreatitis caused by foreign body. This case reminds us to make full use of different diagnostic tools and multidisciplinary collaboration to leverage their complementary strengths and improve the diagnostic accuracy.

Keywords: Foreign body, abdominal pain, gastric perforation, misdiagnosis, acute pancreatitis

Background

Foreign body ingestion is a rare but important clinical event. Although it may occur in people of all ages, it mostly occurs in children [1]; adults uncommonly ingest foreign bodies. Ingestion of foreign bodies by adults is usually caused by mental problems, behavioral disorders, emotional disorders, or alcohol-related accidents [2]. Toothpicks, sewing needles, fish bones, and other sharp materials are common foreign bodies that may perforate the digestive tract. Perforation can occur in any part of the gastrointestinal tract, but foreign bodies rarely penetrate the stomach and migrate to the pancreas [3]. We herein report a case of misdiagnosis of acute pancreatitis in a patient who accidentally ingested a toothpick while drunk. The toothpick penetrated the stomach and migrated to the pancreas, resulting in abdominal pain for nearly 1 month. Informed consent has obtained from the patient for the publication of anonymized case details and accompanying images.

Case presentation

A 42-year-old man was admitted to a local hospital because of acute abdominal pain. The patient had a history of drinking alcohol and ingesting greasy food prior to onset of the pain. His right upper abdomen was slightly tender, but no rebound pain or muscle tension was present. His serum amylase concentration was 445 U/L, and his lipase concentration was 556 U/L. Ultrasound examination showed gallstones. Computed tomography (CT) showed exudation around the pancreas, and acute pancreatitis was suspected. Therefore, the patient was treated for acute pancreatitis, and his symptoms improved. However, on the second day after discharge, the patient developed persistent middle upper abdominal pain and presented to our hospital. Physical examination revealed localized tenderness in the right upper abdomen. His serum amylase concentration was 398 U/L, and his lipase concentration was 305 U/L. No abnormalities were found in routine blood testing, routine stool and occult bl-

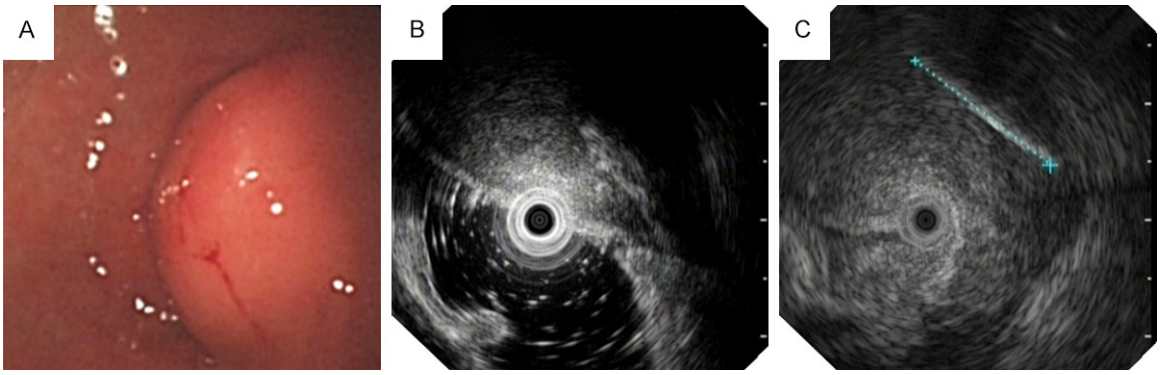

Figure 1. A submucosal mass on the posterior wall of the gastric antrum was observed by gastroscopy (A). Endoscopic ultrasonography at 20 MHz showed that the lesion originated from the muscularis propria layer (B). Endoscopic ultrasonography at 12 MHz showed that the lesion originated from the muscularis propria layer and had a diameter of about 20 mm (C).

Figure 2. CT revealed a foreign body located in the gastric antrum (A). There was exudation around the gastric antrum and some of it adhered to the pancreatic tissue (B).

ood testing, renal and liver function tests, and measurement of tumor markers including carcinoembryonic antigen (CEA), alpha fetoprotein (AFP), carbohydrate antigen 50 (CA50), and carbohydrate antigen 724 (CA724). Gastroscopy revealed a submucosal mass on the posterior wall of the gastric antrum; the mass was about 30 × 30 mm in size and had a smooth surface. The lesion could be slightly moved with biopsy forceps (**Figure 1A**). Endoscopic ultrasonography at 20 MHz showed that the lesion originated from the muscularis propria layer. The lesion exhibited mainly low echo, which was interspersed with high echo. The lesion was large, the far-field attenuation was obvious, and the whole picture could not be explored (**Figure 1B**). A small 12-MHz probe was used to detect a foreign body with a diameter of about 20 mm near the serosa (**Figure 1C**). Careful observation of CT images revealed a linear hyperdense foreign body located in the gastric antrum with exudation, and some of it had adhered to the pancreas (**Figure 2A**, **2B**). Considering the patient's medical history, imaging examination findings, and endoscopy results, we speculated that the abdominal pain was due to a foreign body that had penetrated the posterior wall of the gastric antrum and involved the pancreas.

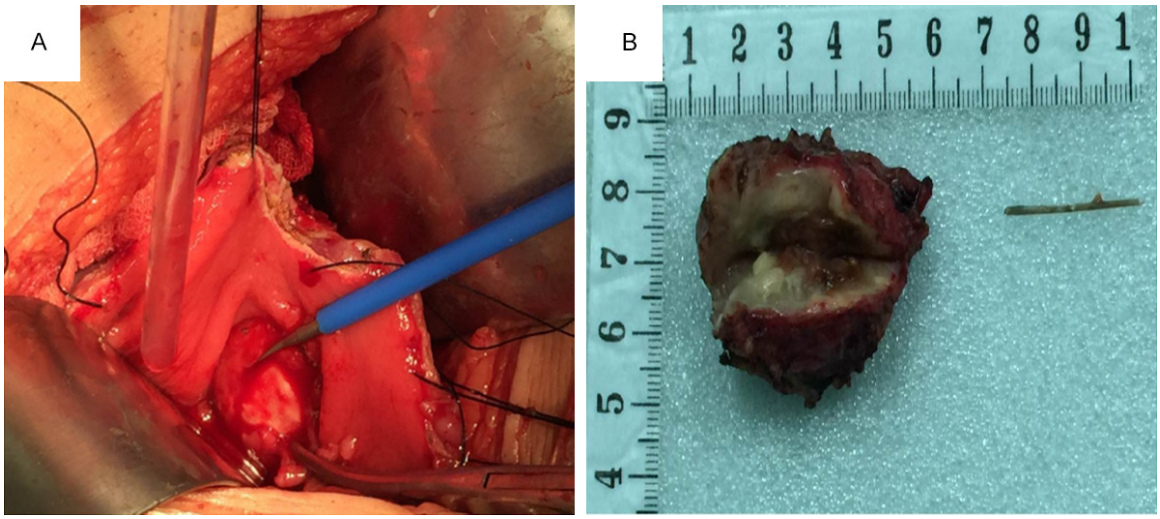

Figure 3. The posterior wall of the mass had become adhered to the pancreatic tissue (A). The size of mass was about 30 × 30 mm, the abscess cavity measured 5 × 5 mm, and the foreign body (a toothpick) was 20 mm in length (B).

An emergency operation revealed a 30 × 30 mm mass on the posterior wall of the gastric antrum, which had adhered to the pancreas (**Figure 3A**). Examination of the resected mass revealed a 5 × 5 mm abscess cavity containing a toothpick of about 20 mm in length (**Figure 3B**). The postoperative course was uneventful. Postoperative pathology revealed suppurative inflammation of the gastric mucosa and chronic inflammation of smooth muscle hyperplasia. The patient recovered and was discharged eventually.

Based on the medical history, endoscopic and imaging examination findings, and surgical and postoperative pathology results, we considered that the onset of abdominal pain was due to accidental ingestion of a toothpick that had penetrated the gastric antrum and moved to the pancreas. This case was initially misdiagnosed as acute pancreatitis.

Discussion

Sharp foreign bodies such as fish bones, chicken bones, toothpicks, and sewing needles can be accidentally ingested. The cricopharyngeal sphincter, pylorus, C-loop of the duodenum, duodenojejunal junction, and ileocecal junction are common perforation sites [4]. The terminal ileum is the most common perforation site, followed by the duodenal C-loop [5]. Approximately 75% of ingested foreign bodies obstruct the oral cavity and laryngopharynx. Most foreign bodies pass through the gastrointestinal tract spontaneously. Only 1% of foreign bodies penetrate the gastric and duodenal walls and migrate to the liver, pancreas, chest cavity, or abdominal cavity, leading to abscess formation, abdominal cavity infection, mediastinitis, and empyem [3, 6-9]. Common treatments include endoscopic removal, surgical removal, appropriate antibiotic therapy, and abscess drainage if necessary [10]. However, definitive diagnosis and clinical treatment may be delayed because patients are often unable to recall a history of foreign body ingestion, and their clinical symptoms are nonspecific. Missed diagnosis or misdiagnosis can lead to death, which occurs in about 10% of patients [11]. Therefore, early diagnosis and timely clinical intervention are necessary to improve the prognosis.

We searched the PubMed database for relevant articles using the key words “foreign body”, “pancreas”, “digestive tract”, “gastric perforation”, and “intestinal perforation”. The 11 most relevant articles were selected.

Table 1 presents the sex, age, foreign body types, foreign body locations, clinical manifestations, diagnostic techniques, and treatment methods among the reported cases. The average age of the patients who ingested foreign bodies exceeded 50 years, and there was no significant sex-related difference. Fish bones were the most common foreign bodies [3, 7,

Table 1. Statistics of sex, age, foreign body types, location, clinical manifestations, diagnostic tools, and treatments in literature review

First author	Sex	Age	Foreign body	Location	Clinical symptom	Diagnose tool	Treatment
Fatih Dal [17]	Female	23 years old	Sewing needle	Stomach	Epigastric pain and retrosternal burns	X-ray, CT	Laparoscopy
Óscar Núñez Martínez [12]	Male	60 years old	Fish bone	Stomach	Epigastric, retrosternal pain and fever	CT	Endoscopy, Antibiotic
Amit Jain [4]	Female	28 years old	Sewing needle	Duodenum	Epigastric pain	X-ray, CT	Endoscopy, Laparoscopy
Francesk Mulita [7]	Female	59 years old	Fish bone	Stomach	Epigastric pain and fever	CT	Endoscopy, Laparoscopy
Christopher Lim [13]	Male	60 years old	Fish bone	Stomach	Epigastric pain	CT, Endoscopy	Endoscopy
Kosuke Mima [10]	Male	80 years old	Fish bone	Stomach	Epigastric pain	CT	Endoscopy, Laparoscopy
Rui Xie [3]	Male	32 years old	Fish bone	Stomach	Abdominal pain	Endoscopy, CT	Endoscopy, Laparoscopy
Yang Wang [14]	Male	67 years old	Fish bone	Stomach	Epigastric pain	CT	Laparoscopy, Antibiotic
Takayuki Toyonaga [8]	Male	50 years old	Needle	Duodenum	Diarrhea	X-ray, CT	Surgery
Takashi Yasuda [15]	Female	73 years old	Fish bone	Duodenum	Upper abdominal dull pain	CT	Endoscopy, Surgery
Francesk Mulita [16]	Female	59 years old	Fish bone	Stomach	Epigastric pain	CT	Laparoscopy

10, 12-16]. Most foreign bodies penetrated the stomach and migrated to the pancreas [3, 7, 10, 12-14, 16, 17]. A small number of foreign bodies passed through the duodenum [4, 8, 15]. Almost all patients had abdominal pain. Atypical symptoms included retrosternal burning and pain [12, 17]. One patient presented with diarrhea, which was found to have been caused by acute enteritis, and a foreign body was incidentally discovered during X-ray screening [8].

Common diagnostic tools included X-ray, CT, and endoscopy. Compared with X-ray examination, abdominal CT has important advantages in terms of diagnosis, localization, identification of complications, and the choice of surgical methods [17]. Endoscopy helps to reveal the nature of the foreign body, its location of migration, and its relationship to the surrounding tissue [18, 19]. Notably, if a foreign body is completely surrounded by the mucosa, only gastric mucosal edema can be seen under endoscopy. This may be the reason why some patients had normal results on X-ray or endoscopy in our review. Additionally, patients' clinical symptoms are atypical and they cannot always accurately recall a history of foreign body ingestion, further challenging the endoscopic diagnosis.

In the present case, the foreign body gradually adhered to the surrounding tissues, the thickened gut wall and adjacent omentum sealed the perforation, the patient showed no typical symptoms of digestive tract perforation during his disease course, and gastroscopy showed only a submucosal mass on the posterior wall of the antrum. After endoscopic ultrasound examination and careful observation of the abdominal CT images, the foreign body on the gastric antrum was finally found. This reminds us to make full use of different diagnostic tools and multidisciplinary collaboration to leverage their complementary strengths and improve the diagnostic accuracy.

Endoscopy is considered the first-line treatment for ingested foreign bodies. The success rate of endoscopic foreign body removal reportedly exceeds 95% [20, 21]. Less than 1% of the patients in our review received surgical treatment [22]. Among the available surgical treatments, laparoscopy has the advantages of less postoperative pain, a lower incidence of wound infection, and less surgical pressure, thus promoting wound healing [8, 15, 23]. Because of the long disease course in our patient, the foreign body had adhered to the surrounding tissue and formed an abscess; therefore, the mass was surgically removed and the foreign body was found within the abscess cavity.

Gastric perforations caused by foreign bodies in the upper digestive tract and involving the pancreas are rare in the clinical setting. For patients with atypical symptoms and prolonged disease, the possibility of foreign body ingestion should be considered as a differential diagnosis. Acquisition of a detailed medical history, reasonable selection of imaging and endoscopic examinations, and multidisciplinary cooperation are of great significance to avoid misdiagnosis.

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Disclosure of conflict of interest

None.

Address correspondence to: Chunli Zhou and Xiaoyi Kuai, The Affiliated Suzhou Hospital of Nanjing Medical University, Suzhou Municipal Hospital, Gusu School, Nanjing Medical University, Suzhou 215000, Jiangsu, China. Tel: +86-13962124345; E-mail: zhouchunli079@163.com (CLZ); Tel: +86-137760-84279; E-mail: zoekxy@126.com (XYK)

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