Int J Clin Exp Med 2016;9(7):14792-14795
www.ijcem.com /ISSN:1940-5901/IJCEM0026300

Case Report

Successful percutaneous management of gastric perforation caused by ingesting a screwdriver: a case report

Geng-Yuan Hu, Feng Tao, Ke-Tao Jin, Guo-Quan Xu, Wei Wang

Department of Gastrointestinal Surgery, Shaoxing People's Hospital, Shaoxing Hospital of Zhejiang University, Shaoxing 312000, Zhejiang Province, China

Received February 20, 2016; Accepted June 2, 2016; Epub July 15, 2016; Published July 30, 2016

Abstract: We present a case of a 24-year-old male who presented with an unusual abdominal mass secondary to ingesting a foreign body 4 months ago. This is a case report of a screwdriver ingestion resulting in gastric perforation and fibrotic closed fistula formation that eventually required surgical intervention. Percutaneous removal is a simple and minimally invasive surgical procedure for this particular case.

Keywords: Foreign body, gastric perforation, screwdriver, percutaneous

Introduction

Ingestion of foreign bodies is a common occurrence in emergency medicine. Gastric perforations secondary to foreign body ingestion are uncommon [1]. We herein present a rare case of gastric perforation caused by ingesting a screwdriver. The patient was successfully treated by percutaneous retrieval of the foreign body with a minimal incision.

Case report

A 24-year-old male presented to the emergency department of our hospital, with a 4-week history of increasing epigastric pain and 1-week history of an enlarging right upper quadrant mass. No vomiting or weight loss was reported. On physical examination, the patient was afebrile and hemodynamically stable. There was an ill-defined superficial 3 × 3 cm mass beneath his right subcostal margin that was erythematous but not fluctuant. He exhibited signs of discomfort during palpation and was distressed by deep palpation. Haematological investigations revealed a significantly increased white cell count of 20.5 × 10^3 cells/μL, with a neutrophilia of 17.2 cells/μL. His haemoglobin was normal at 138 g/L. He had elevated inflammatory makers including a C-reactive protein level of 22.26 mg/L. His amylase was normal. Urine dipstick was normal.

An abdominal computed tomography (CT) scan. **Figure 1** revealed the foreign body was intragastric, and clearly outside of the stomach wall and within the abdominal musculature with surrounding inflammatory changes. Following the CT scan, the patient revealed that he ingested a screwdriver while he was quarreling with his wife 4 months ago. As he had been quite well after this incident, no further medical care was sought. An upper gastrointestinal radiography with oral contrast agent revealed a metallic foreign body in the lower mid-abdomen penetrated through the full thickness of the gastric wall, reaching the muscles of the anterior abdominal wall. No contrast agent leaked out of the stomach (**Figure 2**).

With these findings, a preliminary diagnosis of gastric perforation of foreign body with subcutaneous fistula formation was made. The findings seen on radiologic imaging were discussed with the patient as well as the therapeutic options that can be offered, including laparoscopic versus open exploration of the abdomen with planned removal of the foreign body. A per-

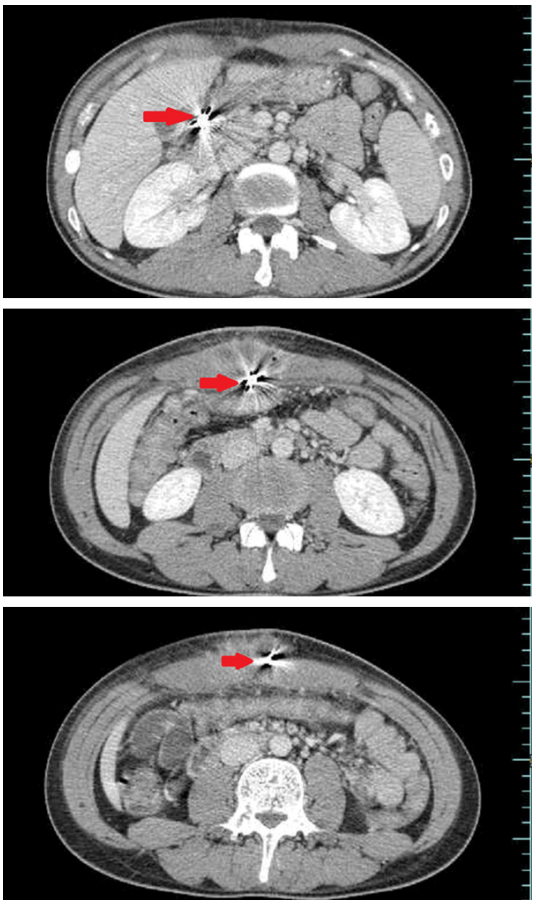

Figure 1. Serial computed tomography images revealed the ingested foreign body (red arrow) fully penetrated through the anterior wall of the stomach and into the anterior abdominal musculature.

cutaneous removal of the intragastric foreign body was also offered. The patient willingly consented for a percutaneous trial prior to a more invasive surgical intervention understanding the risks and benefits of his choice. As a result, a 2-cm targeted incision led to the percutaneous removal of a 12-cm screwdriver through the subcutaneous fistula (**Figures 3** and **4**), and a silicone tube was inserted through the subcutaneous fistula as percutaneous gastrostomy tube (**Figure 5**). No complications occurred after surgery, the drain was removed on the fifth post-operative day, and the patient was discharged free of symptoms 7 days after surgery. During the follow-up period of 3 month, no sequelae were observed.

Discussion

Ingestion of foreign bodies is common in the pediatric, alcohol abuse, psychiatric, and prison populations [8]. More often, these objects include tooth picks, dentures, and dietary foreign bodies such as fish bone and chicken bone. In the present case, a patient who swallowed a screw driver is a rare event. Fortunately, the majority of ingested foreign bodies pass through the gastrointestinal tract spontaneously and perforation is rare, occurring in less than 1% of ingested bodies [10]. Perforations usually occur in areas of physiological sphincters, acute angulations and areas of previous surgery. However, the most common sites of perforation are in the distal ileum, the ileocecum and the sigmoid colon. Sharp elongated objects are the most likely to penetrate or perforate the gastrointestinal tract [2]. Perforations have a wide spectrum of clinical presentations that can vary with acute or chronic symptoms. They mostly present with peritonitis, which may be localized or generalized. An intraabdominal mass, obstruction, abscess formation, hemorrhage, fistula and mucosal ulcerations are the some other complications reported [10]. In stark contrast, some perforation may seal off spontaneously with unspecific gastrointestinal symptoms as the perforation hole is small and normally covered with fibrin and omentum [2]. Delayed presentation and silent perforations of stomach caused by foreign bodies has also been reported [5]. In the case presented here, the patient did not mention any foreign body ingestion until he was confronted with the scan results. However, as a fibrotic closed fistula was found by surgery, the perforation was thought to have occurred a long time before.

X-rays can be used to gain information not only on the location of the ingested body, but mostly also about the configuration, number, and size of the ingested foreign bodies [6]. As the perforation is usually covered by fibrin, omentum, or adjacent loops of bowel, pneumoperitoneum is rare, being present in only 15.9% of patients [2]. CT scanning is considered to be a sensitive tool for foreign body detection, and it may be able to identify the site of perforation and the extent of intraabdominal inflammation either with or without abscess formation [3]. Oral contrast agent administration was used in our patient to aid the diagnosis and showed a foreign body with subcutaneous fistula formation, without intraabdominal leakage of contrast agent.

Treatment of perforation secondary to foreign body ingestion is influenced by the patient's age and symptoms, the nature and type of for-

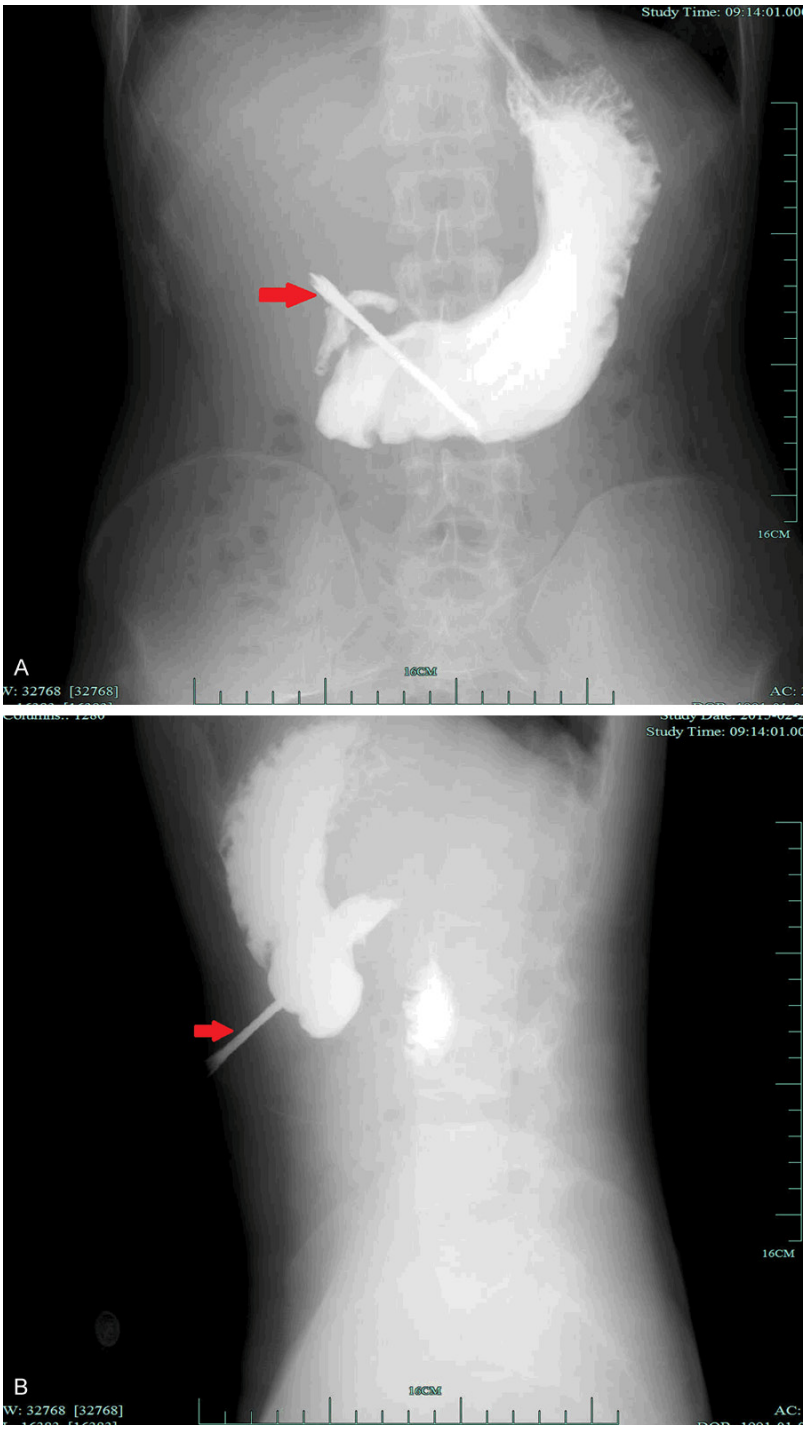

Figure 2. An upper gastrointestinal radiography, which demonstrates in sagittal (A) and coronal planes (B) a long radio-opaque object (red arrow) penetrating the gastric wall, reaching the muscles of the anterior abdominal wall.

eign body and anatomical location [4]. The management may consist of conservative or interventional methods, endoscopic, laparoscopic or laparotomy surgery. The traditional treatment of gastrointestinal perforation has been open surgery due to its advantages in localizing the perforation, closure or repair of the defect, and peritoneal lavage. However, laparoscopic or endoscopic management of gastric perforation caused by ingested foreign bodies has also be reported [7, 9]. In the present case, we removed a screwdriver and subsequently drainaged the gastric juice from the abdominal wall fistula with a 2-cm incision which is nearly the same as the length of a laparoscopic trocar incision. A perforation caused by ingested foreign body presenting with an abdominal mass is rare, and it helped us make a targeted minor incision. Our percutaneous management is a simple and minimally invasive surgical procedure, which may have a low morbidity and mortality as compared to other treatment of gastric perforation.

Acknowledgements

This study was reviewed and approved by the Institutional Review Board of the Shaoxing People's Hospital. The study participant provided written informed consent prior to study enrollment.

Disclosure of conflict of interest

None.

Authors' contribution

Hu GY, Tao F and Xu GQ performed the surgery; Wang W collected the patient's clinical data; Hu

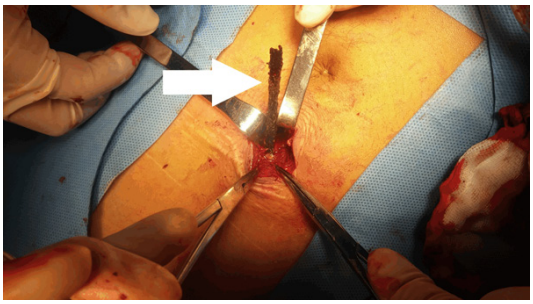

Figure 3. Retrieving the screwdriver (*white arrow*).

Figure 4. The foreign body (screwdriver).

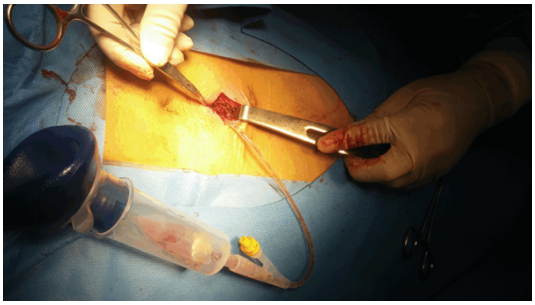

Figure 5. A silicone tube was inserted through the subcutaneous fistula as percutaneous gastrostomy tube.

GY wrote the manuscript; Jin KT proofread and revised the manuscript; all authors approved the version to be published.

Address correspondence to: Dr. Geng-Yuan Hu, Department of Gastrointestinal Surgery, Shaoxing People's Hospital, Shaoxing Hospital of Zhejiang University, No. 568 Zhongxing North Road, Shaoxing 312000, Zhejiang Province, China. Tel: +86-575-88229452; Fax: +86-575-85138402; E-mail: hugengyuan27@163.com

References

[1] Ambe P, Weber SA, Schauer M, Knoefel WT. Swallowed foreign bodies in adults. Dtsch Arztebl Int 2012; 109: 869-875.

[2] Goh BK, Chow PK, Quah HM, Ong HS, Eu KW, Ooi LL, Wong WK. Perforation of the gastrointestinal tract secondary to ingestion of foreign bodies. World J Surg 2006; 30: 372-377.

[3] Guelfguat M, Kaplinskiy V, Reddy SH, DiPoce J. Clinical Guidelines for Imaging and Reporting Ingested Foreign Bodies. AJR Am J Roentgenol 2014; 203: 37-53.

[4] ASGE Standards of Practice Committee, Ikenberry SO, Jue TL, Anderson MA, Appalaneni V, Banerjee S, Ben-Menachem T, Decker GA, Fanelli RD, Fisher LR, Fukami N, Harrison ME, Jain R, Khan KM, Krinsky ML, Maple JT, Sharaf R, Strohmeyer L, Dominitz JA. Management of ingested foreign bodies and food impactions. Gastrointest Endosc 2011; 73: 1085-1091.

[5] Lam PY, Marks MK, Fink AM, Oliver MR, Woodward A. Delayed presentation of an ingested foreign body causing gastric perforation. J Paediatr Child Health 2001; 37: 303-304.

[6] Lee JH, Kim HC, Yang DM, Kim SW, Jin W, Park SJ, Kim HJ. What is the role of plain radiography in patients with foreign bodies in the gastrointestinal tract? Clin Imaging 2012; 36: 447-454.

[7] Shaheen MF, Barrette P. Successful endoscopic management of gastric perforation caused by ingesting a sharp chicken bone. Int J Surg Case Rep 2015; 9: 12-14.

[8] Velitchkov NG, Grigorov GI, Losanoff JE, Kjossev KT. Ingested foreign bodies of the gastrointestinal tract: retrospective analysis of 542 cases. World J Surg 1996; 20: 1001-1005.

[9] Vishwanath G. Laparoscopic Removal of Large and Sharp Foreign Bodies from the Stomach. Oman Med J 2008; 23: 42-45.

[10] Webb WA. Management of foreign bodies of the upper gastrointestinal tract: update. Gastrointest Endosc 1995; 41: 39-51.