

Foreign body embedded in the lower esophageal wall located by endoscopic ultrasonography

A case report

Li Cao, MD, Nianjun Chen, MB, Yao Chen, MB, Min Zhang, MB, Qiaozhen Guo, MB, Qian Chen, MD, PhD, Bin Cheng, MD*

Abstract

Rationale: Ingested esophageal foreign bodies are commonly seen in adult population. In very few instances, esophageal foreign body may pass through the mucosal surface, re-epithelialize or migrate into surrounding soft tissues.

Patient concerns: A 55-year-old Chinese male was admitted to our hospital with a 10-day history chest and upper abdominal pain without dysphasia, cough or other symptoms.

Diagnoses: We initially suspected chronic gastritis, and thoracic computed tomography and endoscopy ultrasonography (EUS) were used to identify a fish bone completely embedded within the lower esophageal wall.

Interventions: Under the EUS-guidance, we marked the foreign body using methylene blue with saline solution, which was followed by successful thoracoscopy and surgical removed of the foreign body.

Outcomes: The patient recovered well and was discharged 1 week postoperatively. One month postoperatively, the patient was symptom free and the chest wound was complete healed.

Lessons: Our case showed that computed tomography is necessary to diagnose the esophageal foreign body, and EUS may help confirm the position of foreign body, especially those embedded in the esophageal submucosa. We advocate necessary surgery at the first accurate diagnosis in patient with esophageal foreign body when endoscopy is not possible.

Abbreviations: CT = computed tomography, EGD = esophagogastroduodenoscopy, EUS = endoscopy ultrasonography.

Keywords: EGD, esophagus, EUS, foreign body, submucosa

1. Introduction

Foreign body ingestion occurs frequently in gastroenterology.^[1] Upper gastrointestinal foreign bodies are located mainly in the esophagus, and bony ingested foreign bodies comprise the majority of identified foreign bodies in Chinese patients.^[2] Complications induced by esophageal foreign bodies in adults are associated with high morbidity and mortality rates. If ingested foreign bodies do not pass through the gastrointestinal tract spontaneously, endoscopic removal is recommended within 24 hours.^[3,4] In most cases, esophageal foreign bodies remain in the esophagus where they are visible and can be removed using esophagogastroduodenoscopy (EGD). We describe a rare case of a fish-bone foreign body completely embedded in the esophageal wall in a 55-year-old man with symptoms of chest and abdominal

pain. Standard EGD revealed a smooth esophageal mucosal surface. We then performed thoracic computed axial tomography (CT), which identified an irregular high-density shadow within the lesion that was visualized as a fish-bone-like structure on three-dimensional reconstructed CT images. Endoscopic ultrasonography (EUS) revealed obvious wall thickening and a hyperechoic structure within the lower esophageal muscularis mucosa and submucosa. Under EUS guidance, we marked the foreign body location using methylene blue with saline, which was followed by successful surgical removal of the foreign body during thoracoscopy.

2. Case report

The Ethics Committee of Tongji Medical College, Huazhong University of Science and Technology has approved this study. Informed consent was obtained from all patients for being included in the study. A 55-year old man was referred to our hospital with a 10-day history of mild chest and upper abdominal pain after eating food. He was not experiencing dysphagia, cough, or dyspnea and had no special medical history. He was initially diagnosed as having chronic erosive gastritis in the local hospital based on EGD findings and was managed with a proton pump inhibitor and gastric mucosal protectant for several days. However, his symptoms worsened, and on admission to our hospital, his vital signs were stable, and physical examination revealed no neck, chest, or abdominal mass on palpation, although upper abdominal tenderness could be elicited with deep palpation. His stool was negative for occult blood, and routine blood tests showed a normal complete blood count and slightly elevated C-reactive protein (5mg/L) level and erythrocyte

Editor: N/A.

The authors have no conflicts of interest to disclose.

Department of Gastroenterology and Hepatology, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China.

* Correspondence: Bin Cheng, Department of Gastroenterology and Hepatology, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China (e-mail: bcheng@tjh.tjmu.edu.cn).

Copyright © 2018 the Author(s). Published by Wolters Kluwer Health, Inc. This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial License 4.0 (CCBY-NC), where it is permissible to download, share, remix, transform, and buildup the work provided it is properly cited. The work cannot be used commercially without permission from the journal.

Medicine (2018) 97:26(e11275)

Received: 26 March 2018 / Accepted: 23 May 2018

<http://dx.doi.org/10.1097/MD.00000000000011275>

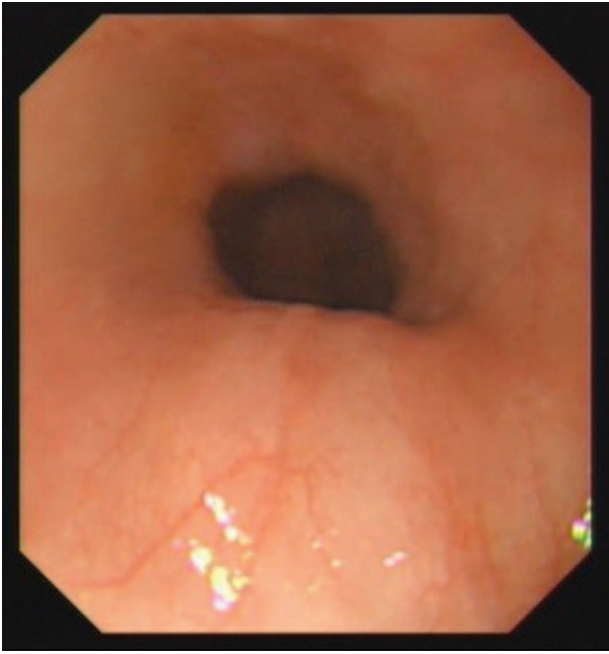


Figure 1. Esophagogastroduodenoscopy showing a smooth mucosal surface without an obvious foreign body retained in the lower esophagus and no apparent ulceration or erosion.

sedimentation rate (26 mm/h). Repeat EGD revealed no obvious esophageal foreign body and no apparent ulceration or erosion (Fig. 1). Thoracic computed axial tomography (CT) showed high-density dot shadows in the lower esophagus at the level of the tenth thoracic vertebra. High-resolution thoracic CT after three-dimensional reconstruction again highlighted an irregularly-shaped high-density shadow in the posterior wall of the locus inferior that appeared as a linear fish bone-like structure with sharp ends (Fig. 2). We then performed EUS to locate the

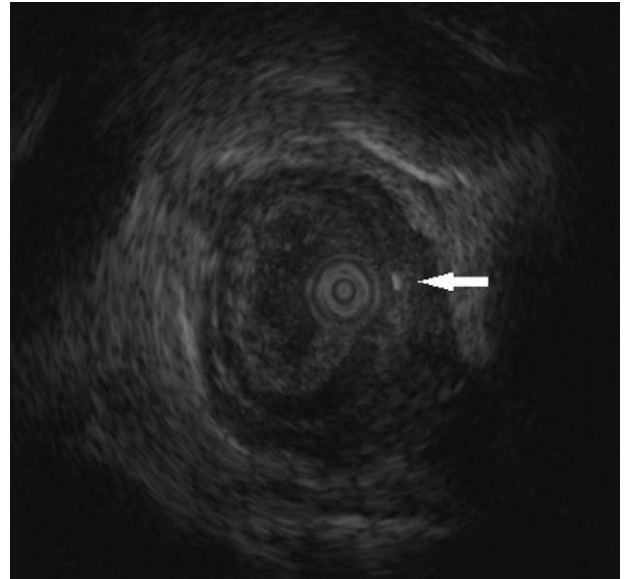


Figure 3. Endoscopic ultrasound image showing obvious wall thickening and a hyperechoic structure within the lower esophageal muscularis mucosa and submucosa (white arrowhead).

foreign body indicated by CT, which revealed obvious wall thickening and a hyperechoic structure within the muscularis mucosa and submucosa of the lower esophagus (Fig. 3). Endoscopic removal of the foreign body was impossible because it was not visible on the esophageal surface. Methylene blue with saline solution was then injected into the submucosa under EUS guidance to mark the foreign body location (Fig. 4), followed by successful removal of the foreign body during thoracoscopic surgery (Figs. 5 and 6). The esophageal wall was incised 1 cm higher than the methylene blue mark, and closed routinely after

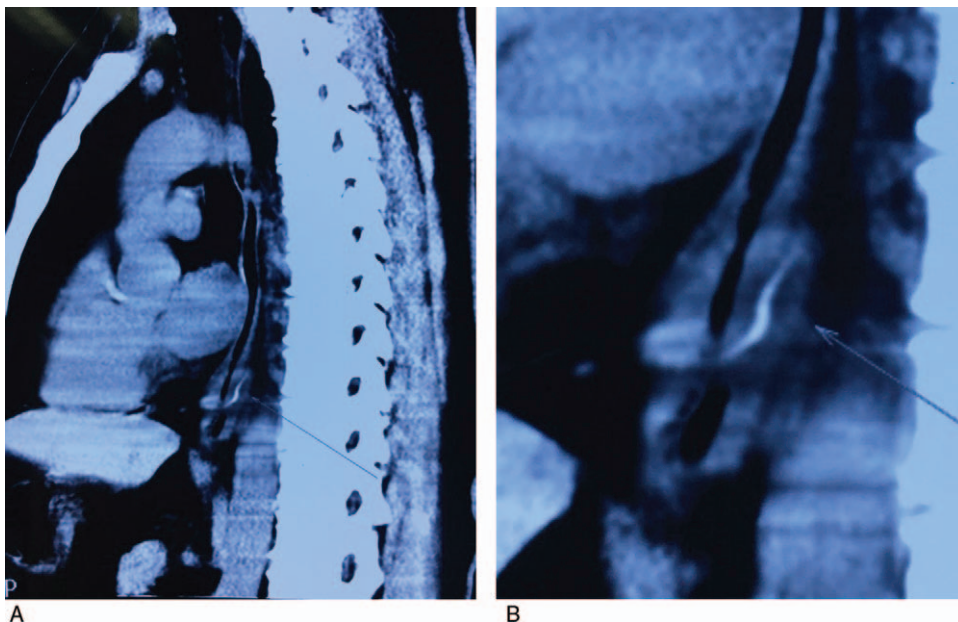


Figure 2. Thoracic computed tomographic scans after reconstruction (A) showing irregular-shaped high-density shadows in the posterior wall of the lower esophagus seen as a linear fish-bone-like structure with sharp ends (black arrowhead as shown in [B]).

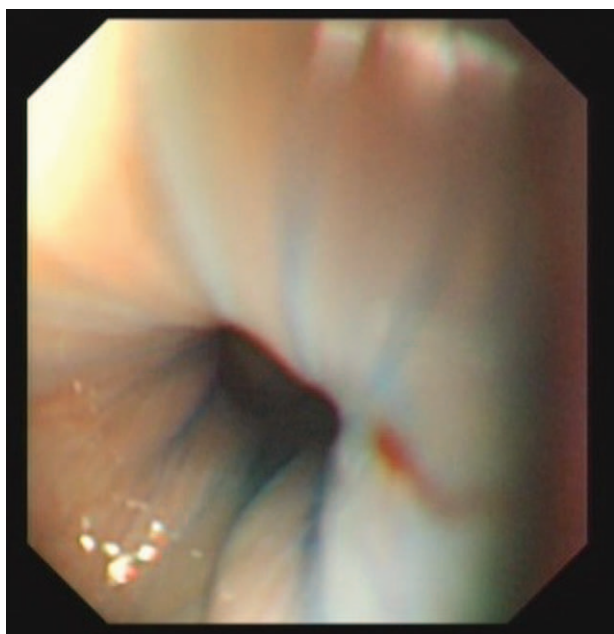


Figure 4. Methylene blue with saline solution was injected into the submucosa under endoscopic ultrasound guidance to mark the foreign body location.

foreign body removal. The patient experienced no gastrointestinal tract complications and no esophageal-lesion-related symptoms postoperatively. One week after surgery, the patient had recovered well and was discharged. One month postoperatively, the patient was asymptomatic, and the chest wound had completely healed.

3. Discussion

Foreign body ingestion occurs commonly and is a frequent reason for emergency endoscopy.^[5] In China, because dietary customs differ from Western countries, the majority of foreign bodies are fish bones, jujube shells, poultry bones, and dental prostheses.^[6] Most ingested foreign bodies pass through the gastrointestinal tract spontaneously without complications; however, approximately 20% of patients require nonoperative intervention, and

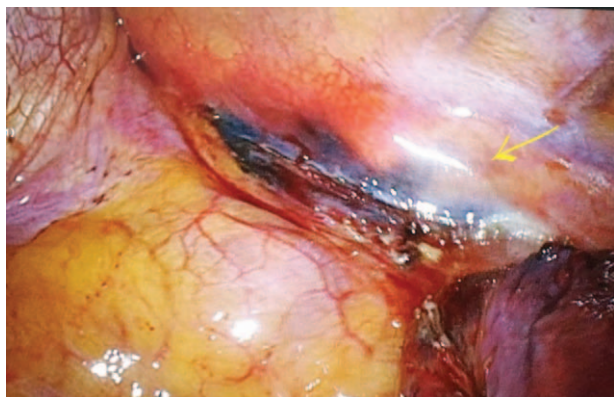


Figure 5. The patient underwent thoracoscopic surgery and the esophageal wall was incised 1 cm higher than the methylene blue stain. The incision was then repaired routinely after removing the foreign body.



Figure 6. The foreign body was removed successfully by thoracoscopic surgery and measured approximately 2 cm in length with sharp ends.

another 1% or fewer require surgery.^[7] EGD has developed rapidly and become widely used for ingested foreign bodies since it was first reported in 1972 by McKechnie who described successful foreign body extraction using a flexible endoscope.^[8] In China, most patients with foreign bodies are treated endoscopically because of the frequency and relatively lower cost.^[2]

Foreign bodies are most likely to embed in the esophagus because of its specific anatomical features including the multiple physiological strictures and its long tube-like structure.^[6] If esophageal foreign bodies do not pass through the gastrointestinal tract spontaneously, endoscopic intervention is recommended for removal within 24 hours because delayed intervention, especially in older patients, and with sharp foreign bodies, reduces the likelihood of successful removal and increases the risk of complications including esophageal mucosal injury, hemorrhage, perforation, and mediastinal abscess.^[9,10] Different endoscopic accessories should be chosen depending on the different types of foreign bodies. Frequently used tools include grasping forceps, polypectomy snares, Dormia basket, retrieval snare net, and overtubes, which are beneficial in preventing the object from accidentally dropping into the airway and more effectively facilitate passing the endoscope for piecemeal removal of food impactions.^[11,12]

Diagnosing foreign body ingestion is usually based on a thorough history and typical symptoms including poststernal pain, dysphagia, odynophagia, or a vague foreign body sensation.^[13,14] If no history is available, noncontrast CT should

be performed.^[15,16] Three-dimensional reconstruction may improve CT sensitivity and help confirm the location, size, shape, and number of ingested foreign bodies, while also helping to identify the relationship between the foreign bodies and neighboring structures, thus, evaluating the potential risk of complications.^[17] As in our patient, the history was uncertain, and no obvious abnormalities appeared on the esophageal surface based on standard endoscopy. It was not until we performed three-dimensional thoracic CT that we could see the embedded foreign body as a fish-bone-like structure and make a presumptive diagnosis. Surprisingly, the bony foreign body was completely embedded in the esophageal wall without obvious mucosal injury, perforation, hemorrhage, or other lethal complications identified by CT. To identify the accurate location of the foreign body, EUS revealed obvious wall thickening and a hyperechoic structure within the lower esophageal muscularis mucosa and submucosa. The mechanism by which the foreign body migrated through the soft tissues is unknown and likely secondary to movement of the neck muscles, carotid pulsations, esophageal peristalsis, and tissue reaction. Kikuchi et al. reported a similar patient with a chronic foreign body granuloma in the esophageal submucosa caused by a fish bone.^[18] The patient did not undergo surgery because of a lack of complaints and no apparent complications. Fortunately, at the 1-year follow-up, the foreign body had disappeared, possibly because it had dislodged or disintegrated. In our patient, surgery was necessary because the patient had developed symptoms suggestive of possible perforation caused by the 2 sharp ends of the fish bone over time. We injected methylene blue with saline under EUS guidance to mark the foreign body location, which helped determine where to incise the esophageal wall, and minimized the incision size and invasiveness. The favorable outcome also confirmed the safety and feasibility of our management strategy for this patient.

The following points are important teachings in this case: If the history is uncertain, early CT of the neck and chest should be performed when in doubt regarding foreign body ingestion. The usefulness of EUS in diagnosing foreign bodies is promising, especially for those located in unconventional positions such as the esophageal submucosa. Esophageal foreign body management is multidisciplinary. In cases of unsuccessful or impossible endoscopy, timely thoracic surgery avoids severe complications caused by delayed intervention in patients with esophageal foreign bodies.

Author contributions

Formal analysis: Li Cao, Min Zhang.

Funding acquisition: Bin Cheng.

Investigation: Qian Chen.

Methodology: Yao Chen.

Software: Nianjun Chen, Qiaozhen Guo.

Supervision: Bin Cheng.

Writing – original draft: Li Cao.

References

- [1] Chauvin A, Viala J, Marteau P, et al. Management and endoscopic techniques for digestive foreign body and food bolus impaction. *Dig Liver Dis* 2013;45:529–42.
- [2] Li ZS, Sun ZX, Zou DW, et al. Endoscopic management of foreign bodies in the upper-GI tract: experience with 1088 cases in China. *Gastrointest Endosc* 2006;64:485–92.
- [3] Birk M, Bauerfeind P, Deprez PH, et al. Removal of foreign bodies in the upper gastrointestinal tract in adults: European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline. *Endoscopy* 2016;48:489–96.
- [4] Loh KS, Tan LK, Smith JD, et al. Complications of foreign bodies in the esophagus. *Otolaryngol Head Neck Surg* 2000;123:613–6.
- [5] Vitek WS, Pagidas K, Gu G, et al. Xq;autosomal translocation in POF: Xq27.2 deletion resulting in haploinsufficiency for SPANX. *J Assist Reprod Genet* 2012;29:63–6.
- [6] Zhong Q, Jiang R, Zheng X, et al. Esophageal foreign body ingestion in adults on weekdays and holidays: a retrospective study of 1058 patients. *Medicine (Baltimore)* 2017;96:e8409.
- [7] Eisen GM, Baron TH, Dominitz JA, et al. Guideline for the management of ingested foreign bodies. *Gastrointest Endosc* 2002;55:802–6.
- [8] McKechnie JC. Gastroscopic removal of a phytobezoar. *Gastroenterology* 1972;62:1047–51.
- [9] Geng C, Li X, Luo R, et al. Endoscopic management of foreign bodies in the upper gastrointestinal tract: a retrospective study of 1294 cases. *Scand J Gastroenterol* 2017;52:1286–91.
- [10] Malick KJ. Endoscopic management of ingested foreign bodies and food impactions. *Gastroenterol Nurs* 2013;36:359–65. quiz 66-7.
- [11] Faigel DO, Stotland BR, Kochman ML, et al. Device choice and experience level in endoscopic foreign object retrieval: an in vivo study. *Gastrointest Endosc* 1997;45:490–2.
- [12] Nelson DB, Bosco JJ, Curtis WD, et al. ASGE technology status evaluation report. Endoscopic retrieval devices. February 1999. American Society for Gastrointestinal Endoscopy. *Gastrointest Endosc* 1999;50:932–4.
- [13] Erbil B, Karaca MA, Aslaner MA, et al. Emergency admissions due to swallowed foreign bodies in adults. *World J Gastroenterol* 2013; 19:6447–52.
- [14] Ambe P, Weber SA, Schauer M, et al. Swallowed foreign bodies in adults. *Dtsch Arztebl Int* 2012;109:869–75.
- [15] Matsuda S, Yoshimura H, Yoshida H, et al. Usefulness of computed tomography image processing by OsiriX software in detecting wooden and bamboo foreign bodies. *Biomed Res Int* 2017;2017:3104018.
- [16] Kamali A, Moudi E. Unusual presentation of an abdominal foreign body: a case report. *Caspian J Intern Med* 2017;8:126–8.
- [17] Takada M, Kashiwagi R, Sakane M, et al. 3D-CT diagnosis for ingested foreign bodies. *Am J Emerg Med* 2000;18:192–3.
- [18] Kikuchi K, Tsurumaru D, Hiraka K, et al. Unusual presentation of an esophageal foreign body granuloma caused by a fish bone: usefulness of multidetector computed tomography. *Jpn J Radiol* 2011;29:63–6.