

CASE REPORT

Foreign body embedded in the esophageal wall as a cause of dysphagia and regurgitation in a 16-month-old child: a case report and mini review

Bartłomiej Czerwiec¹, Julia Skowrońska-Borsuk¹, Tomasz Janiga², Łukasz Dembiński², Marcin Banasiuk²

¹Student Scientific Group GEKON at the Department of Paediatric Gastroenterology and Nutrition, Medical University of Warsaw, Poland

²Department of Pediatric Gastroenterology and Nutrition, Medical University of Warsaw, Poland

ABSTRACT

Esophageal foreign bodies are a common clinical finding; however, transmural embedding of a foreign object into the esophageal wall is rare. In pediatric patients, the diagnosis may be particularly challenging due to non-specific and diverse symptomatology. Clinical manifestations of an esophageal foreign body may include regurgitation, odynophagia, or vomiting during food intake. This article described the case of a patient suspected of having a foreign body embedded in the esophageal wall, who primarily presented with symptoms of regurgitation during eating. We aimed to emphasize the importance of proper diagnosis and diagnostic procedures as well as increasing awareness of this condition. Additionally, the article included a brief literature review of pediatric cases with varied clinical presentations despite similar diagnosis.

KEY WORDS:

esophagus, gastroenterology, paediatrics, chronic foreign body.

INTRODUCTION

Foreign body ingestion is commonly encountered in clinical practice, particularly in gastroenterology departments and emergency rooms, where it is often classified as a medical emergency. The majority of ingested foreign bodies pass through the gastrointestinal tract uneventfully within approximately seven days. Unfortunately, choking or aspiration may occur without secondary evacuation, which requires medical intervention. The most common site of obstruction caused by swallowed foreign bodies is the esophagus [1]. Among reported cases, foreign bodies are more frequently observed in pediatric groups, especially in children aged 6 months to 3 years [2–5].

CASE REPORT

A 16-month-old boy was admitted to the Pediatric Gastroenterology and Nutrition Clinic on an emergency basis due to persistent regurgitation. According to the medical history, the patient tolerated milk and liquid foods well; however, since the introduction of solid foods (5–6 months), he experienced frequent choking and expelled food boluses. The mother reported that the child had a good appetite, and after choking episodes, he actively demanded continued feeding. Concerned by these difficulties, the parents consulted an ambulatory speech therapist, who found no abnormalities. The child had a history of frequent regurgitation during breastfeeding since birth. He had been hospitalized at 10 months

ADDRESS FOR CORRESPONDENCE:

Bartłomiej Czerwiec, Student Scientific Group GEKON at the Department of Paediatric Gastroenterology and Nutrition, Medical University of Warsaw, 63A Żwirki i Wigury, 02-091 Warsaw, Poland,
e-mail: bartek.czerwiec3@onet.pl

of age due to an episode of choking on a piece of tissue paper (no abnormalities were found on chest X-ray at that time). Another hospitalization occurred at 16 months because of upper limb tremor and perioral cyanosis during influenza A infection.

On that admission, anemia was diagnosed, and the patient has since been on iron supplementation. Additionally, the child remained under cardiology care due to the presence of patent foramen ovale (PFO)/atrial septal defect (ASD) and patent ductus arteriosus (PDA) diagnosed neonatally. Upon admission, the boy slept through the night, not requiring any urgent interventions. Physical examination was normal. Laboratory tests revealed microcytic erythrocytes, with hemoglobin (Hb) and hematocrit (HCT) values at lower limits for his age (Hb: 10.4 g/dl; red blood cell [RBC] count: 4.92 million/ μ l; HCT: 34.1%; mean corpuscular volume [MCV]: 69.3 fL), mild thrombocytosis (platelet count [PLT]: $518 \times 10^3/\mu$ l), and elevated level of aspartate aminotransferase (AST: 59). In the upper gastrointestinal series, modeling of the upper part of the esophagus was seen anteriorly at the Th 2–3 level (Figure 1).

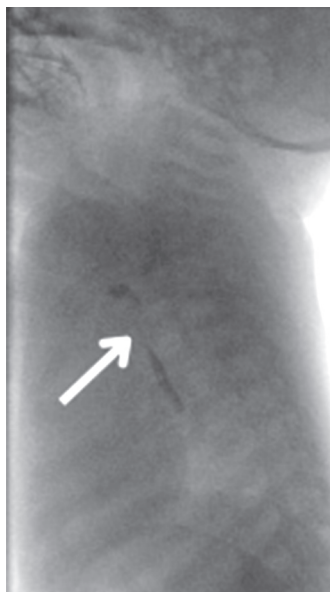


FIGURE 1. Upper gastrointestinal series

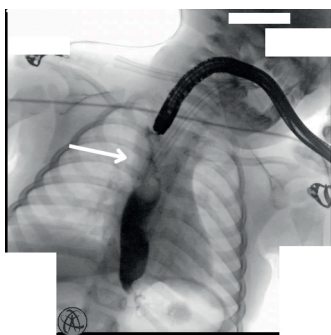


FIGURE 2. Contrast computed tomography imaging of the chest for suspected esophageal foreign body

A vascular ring was suspected, and further diagnostics were recommended. To confirm the presence of the ring, a contrast-enhanced chest computed tomography (CT) was performed, which ruled out this diagnosis. The esophageal lumen was visible only for a short distance at the Th2 level, abnormally positioned to the right of the midline. The anterior contour of the trachea was slightly modeled by the brachiocephalic trunk at this level, and the trachea was narrowed to 4 mm in the AP projection, likely due to external compression by the vessel (Figure 2).

Three days later, a gastroscopy was performed. An endoscope with a diameter of 9.8 mm was inserted into the esophagus, where at approximately 14 cm from the lip line, esophageal narrowing with a diverticulum and apparent dual lumens was observed. The narrowing prevented the passage of endoscope. Water-soluble contrast was administered, showing irregular narrowing, and below it, the contrast freely passed through the rest of esophagus into the stomach. A guidewire was introduced into both apparent lumens, each time reaching the stomach without resistance. Due to difficulties with access, the endoscope was changed to one with a diameter of 5.8 mm, which passed through the narrowing with slight resistance. Below, in the esophagus, stomach, and duodenum, no abnormalities were found. At the site of narrowing, a foreign body was visualized embedded into the mucosal membrane, likely to be responsible for the choking incident 7 months earlier.

Due to anatomical proximity of large vessels and airways, attempts of removal during endoscopy were abandoned, and the procedure was planned in an operating room setting with bronchoscopy and surgical assistance. During this procedure, an endoscope with a diameter of 9.8 mm was inserted into the esophagus, and a tissue overhang and narrowing preventing the endoscope passage were visualized. After changing the endoscope to one with a diameter of 5.8 mm, the device passed the narrowing, and a foreign body embedded into the mucosa was observed. Since the attempts to grasp the foreign body were unsuccessful, the narrowing was gradually dilated to 10.5 mm using a balloon and the larger size endoscope was reintroduced. Using forceps, the foreign body was successfully removed from the diverticulum of mucosal membrane. The procedure was completed endoscopically, and the foreign body turned out to be a toy shell from a bracelet-making set (Figure 3).

The esophagus was checked endoscopically and radiologically, showing an edema, hematoma, and mucosal overhang, but no signs of active bleeding or perforation. Three weeks after the procedure, follow-up examination revealed a significant stricture accompanied by scarring and an overhang of mature granulation tissue (Figure 4), which was qualified for excision during the next surgery. The child remain under the care of pediatric gastroenterologists.

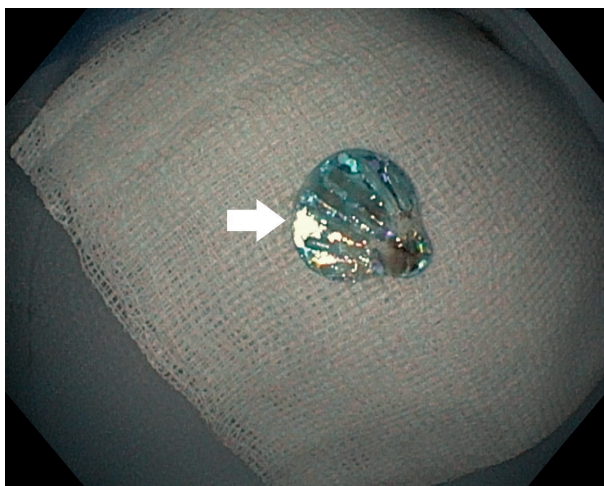


FIGURE 3. Impacted foreign body in the esophagus retrieved via endoscopy

DISCUSSION

Children may show non-specific symptoms, because the actual ingestion of a foreign body might be overlooked by caregivers, and occur long before the patient presents for medical evaluation. In children, most foreign bodies become lodged in the upper part of the esophagus (cervical segment) at the cricopharyngeal junction, which is the narrowest part of the esophagus [2, 3, 6]. The most commonly ingested items are coins (61.7%), followed by toys (10.3%), jewelry (7.0%), and more dangerous items, such as batteries (6.8%) [7]. Moreover, with increasing age, swallowing of objects becomes more prevalent, and includes bones, fish bones, or meat pieces, common among adolescents and adults [6, 8]. Foreign bodies are more often ingested by boys (52.9%) [7]. Another factor predisposing to a higher risk of items lodging in the digestive system is the presence of stenosis [2, 3, 9] and fistulas in the digestive system [10] as well as intellectual disabilities and psychiatric disorders [5, 9].

The diagnosis of a swallowed foreign body can be difficult due to variety of symptoms in patients. When an object lodges in the esophagus, the most commonly triggered gastroenterological symptoms are dysphagia, odynophagia, retrosternal pain, a sensation of obstruction in the esophagus, nausea, vomiting, and excessive salivation [9–11]. Respiratory symptoms, such as choking, dyspnea, and stridor due to aspiration of saliva or pressure on the trachea, are also frequently observed [10]. Patients with retained foreign bodies present with respiratory symptoms (76%) more often than with digestive system indications (22%) [12].

Dysphagia in children is a disorder, which can have various causes. It may result from serious life-threatening conditions, complications of milder health problems, or be a symptom of organic diseases [13]. Dysphagia can be classified as oropharyngeal dysphagia or esophageal dysphagia. Patients with esophageal dysphagia complain of a range of symptoms (Table 1) [13, 14], while in cases

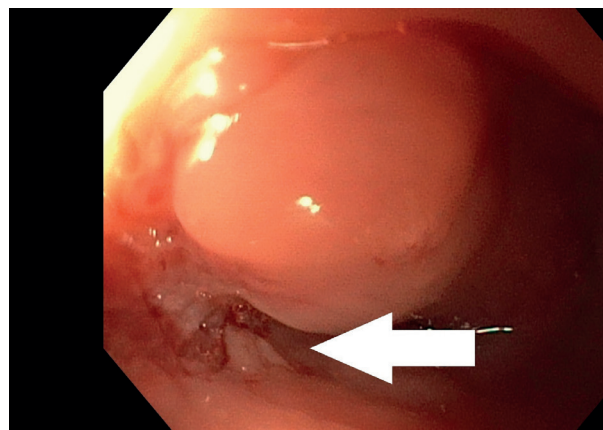


FIGURE 4. A significant stricture with accompanying scarring and an overhang of mature granulation tissue observed during follow-up examination

TABLE 1. Common and peculiar clinical features of oropharyngeal and esophageal dysphagia [13, 14]

Symptoms of dysphagia	Dysphagia	
	Oropharyngeal	Esophageal
Drooling	Positive	Positive
Feeding issues	Positive	Positive
Growth failure/Weight loss	Positive	Positive
Prolonged meal duration	Positive	Positive
Refusal of certain consistences	Positive	Positive
Recurrent respiratory infections	Positive	Positive
Respiratory symptoms	Positive	Positive
Sleeping difficulties/Irritability	Positive	Positive
Changes in voice	Positive	Negative
Choking	Positive	Negative
Food spillage from lips	Positive	Negative
Nasal regurgitation of food	Positive	Negative
Uncoordinated oral movements	Positive	Negative
Food sticking in the mouth or throat	Positive	Negative
Chest pain	Negative	Positive
Epigastric pain	Negative	Positive
Food bolus	Negative	Positive
Food sticking in the throat or behind the sternum	Negative	Positive
Heartburn	Negative	Positive
Vomiting	Negative	Positive

with differential diagnosis of dysphagia, it is important to consider whether foods causing difficulty in swallowing are solid or liquid, and whether the symptoms are progressive or intermittent [15].

Embedded foreign bodies in the esophagus occur when an object becomes lodged in the esophageal wall and

grows into the tissue, and it cannot pass freely through the upper digestive tract. This often happens due to unconscious swallowing of objects, especially in small children who are still learning to control their behavior while eating and playing. Children, especially young ones, often put various objects in their mouths, leading to choking or lodging in the esophagus. The most common occurrence of objects' swallowing occur during play [11]. A situation where a swallowed item becomes embedded in the esophagus is relatively rare, with few cases reported in the literature.

One such case is that of a 5-year-old patient with a chronic cough lasting for two years. The cough was initially treated as asthma (cough variant). However, during a visit to a gastroenterology clinic, dysphagia and odynophagia were noted, which were more pronounced during the consumption of solid foods, similar to the patient described in the current case. Despite the absence of foreign body evidence in the initial X-ray and lack of obvious symptoms immediately following the swallowing incident, further imaging (esophagography, chest CT) revealed the presence of a plastic object embedded into the esophageal wall, leading to secondary inflammatory and morphological changes, including formation of a diverticulum [16]. This case confirms that the absence of radiopaque material does not rule out the presence of a foreign body, and in the patient with chronic, atypical symptoms from both the respiratory and digestive systems, a repeat history-taking and expanded diagnostics are necessary.

Another case reported in the literature describes a boy, whose mother reported persistent, vague upper respiratory symptoms for seven months, including food regurgitation and frequent vomiting. Initially, gastroesophageal reflux disease was diagnosed and treated with little success. After a series of tests, including X-ray and contrast-enhanced CT, a foreign body was found to be a battery. Multiple attempts to remove it were unsuccessful, leading to thoracotomy [4]. Complications from swallowed foreign bodies are mainly related to the duration of their retention. In this case, the child swallowed a battery, which is a potentially dangerous situation. In children, it is often unknown what they may have swallowed, but it is crucial for prognosis. Foreign bodies remaining in the esophagus for more than 24 hours are associated with a higher risk of ulceration (46%) [17], and the risk of esophageal injury increases with the duration of impaction [12].

Another case of a chronically retained foreign body in the esophagus is a 3-year-old girl, who swallowed an aluminum tab from a can at 10 months of age [18]. Since this incident, the child had persistent symptoms of dysphagia when consuming solid foods, recurrent regurgitations, and feeding difficulties. Basic laboratory tests again raised no concerns, and a chest X-ray did not reveal the presence of a foreign body or any other pathology. Only endoscopy showed narrowing in the upper esophagus and a pre-narrowing diverticular pouch containing food remnants.

This case once again demonstrates how essential additional tests are in children suspected of swallowing foreign bodies. It is important to remember that a negative history does not rule out the presence of a foreign body; therefore, in children and adults with respiratory and swallowing disorders of unknown cause, extra caution is necessary. Although X-ray does not detect all potentially swallowed objects, it is recommended for all patients suspected of having a foreign body in the esophagus, and if necessary, pharyngo-esophagoscopy is suggested as the treatment of choice [5, 19, 20]. In clinical practice, contrast examinations are not recommended in routine diagnostic evaluation due to the risk of aspiration. These agents may impair subsequent endoscopic procedures by coating the esophageal wall and foreign body. In selected pediatric cases, CT may be utilized for the diagnosis of radiolucent ingested foreign bodies, taking into account the associated risk of X-ray exposure [21]. In cases of suspected perforation, a CT scan can be performed [3, 10], but it is rarely used with limited benefits, and only when earlier fluoroscopy or a routine X-ray indicates the presence of a localized object obstructing the esophagus [3]. Ultrasound is another diagnostic tool, which has restricted value in foreign body imaging, but may reveal secondary signs of perforation [22], while the exact role of MRI in defining and localizing swallowed foreign bodies remains unclear [3]. The most widely used diagnostic and therapeutic method for swallowing and impaction of foreign bodies in the esophagus is endoscopy. It is the common indication for most patients with a history of swallowing a foreign body [3, 5, 6, 20, 23]. Due to timely implementation of effective therapy, complications can be avoided, including mediastinitis, periesophageal abscess, mediastinal emphysema, subcutaneous emphysema, pleural effusion, trachea-esophageal fistula, aorto-esophageal fistula, aspiration, and asphyxiation [24].

Diagnosing a foreign body in the digestive system is a challenge, especially when the object is in the esophagus and presents with non-obvious symptoms, which can vary from completely asymptomatic to fatal. A thorough medical history and physical examination are integral to patient care, but often it is necessary to implement imaging studies and conduct further diagnostic tests. Complications arising from swallowing are mainly related to the duration of impaction. Treatment resolving the problem, such as endoscopic or surgical removal of the foreign body, should not be delayed, while the scope of the procedure is case-dependent. Parents of young children should pay particular attention to storing objects, which can potentially be swallowed.

CONCLUSIONS

We presented our case to broaden knowledge about the symptoms of suspected foreign body ingestion in pediatric patients. The goal is to increase awareness among

doctors about such situations and encourage them to consider more detailed diagnostics of dysphagia. The possibility of a foreign body embedded into upper gastrointestinal tract should be considered as a potential diagnosis in children with dysphagia, odynophagia, substernal pain, a feeling of obstruction in the esophagus, nausea, vomiting, excessive saliva production, choking, or shortness of breath.

DISCLOSURES

1. Institutional review board statement: Not applicable.
2. Assistance with the article: None.
3. Financial support and sponsorship: None.
4. Conflicts of interest: None.

REFERENCES

1. Crysdale WS, Sendi KS, Yoo J. Esophageal foreign bodies in children. 15-year review of 484 cases. *Ann Otol Rhinol Laryngol* 1991; 100: 320-324.
2. Baraka A, Bikhazi G. Oesophageal foreign bodies. *Br Med J* 1975; 1: 561-563.
3. Al-Qudah A, Daradkeh S, Abu-Khalaf M. Esophageal foreign bodies. *Eur J Cardiothorac Surg* 1998; 13: 494-498.
4. Alam E, Mourad M, Akel S, Hadi U. A case of battery ingestion in a pediatric patient: what is its importance? *Case Rep Pediatr* 2015; 2015: 345050. DOI: 10.1155/2015/345050.
5. Cheng W, Tam PK. Foreign-body ingestion in children: experience with 1,265 cases. *J Pediatr Surg* 1999; 34: 1472-1476.
6. Nandi P, Ong GB. Foreign body in the oesophagus: review of 2394 cases. *Br J Surg* 1978; 65: 5-9.
7. Orsagh-Yentis D, McAdams RJ, Roberts KJ, McKenzie LB. Foreign-body ingestions of young children treated in US Emergency Departments: 1995-2015. *Pediatrics* 2019; 143: e20181988. DOI: 10.1542/peds.2018-1988.
8. Sittitrai P, Pattarasakulchai T, Tapatiwong H. Esophageal foreign bodies. *J Med Assoc Thai* 2000; 83: 1514-1518.
9. Brady PG. Esophageal foreign bodies. *Gastroenterol Clin North Am* 1991; 20: 691-701.
10. Ashraf O. Foreign body in the esophagus: a review. *Sao Paulo Med J* 2006; 124: 346-349.
11. Isa HM, Aldoseri SA, Abduljabbar AS, Alsulaiti KA. Accidental ingestion of foreign bodies/harmful materials in children from Bahrain: a retrospective cohort study. *World J Clin Pediatr* 2023; 12: 205-219.
12. Miller RS, Willging JP, Rutter MJ, Rookkapan K. Chronic esophageal foreign bodies in pediatric patients: a retrospective review. *Int J Pediatr Otorhinolaryngol* 2004; 68: 265-272.
13. Lanzoni G, Sembenini C, Gastaldo S, Leonardi L, Bentivoglio VP, Faggian G, et al. Esophageal dysphagia in children: state of the art and proposal for a symptom-based diagnostic approach. *Front Pediatr* 2022; 10: 885308. DOI: 10.3389/fped.2022.885308.
14. Rommel N, Hamdy S. Oropharyngeal dysphagia: manifestations and diagnosis. *Nat Rev Gastroenterol Hepatol* 2016; 13: 49-59.
15. Park MI. Approach of dysphagia. *Korean J Gastroenterol* 2021; 77: 57-63 [Article in Korean].
16. Glover P, Westmoreland T, Roy R, Sawaya D, Giles H, Nowicki M. Esophageal diverticulum arising from a prolonged retained esophageal foreign body. *J Pediatr Surg* 2013; 48: e9-e12. DOI: 10.1016/j.jpedsurg.2012.11.032.
17. Denney W, Ahmad N, Dillard B, Nowicki MJ. Children will eat the strangest things: a 10-year retrospective analysis of foreign body and caustic ingestions from a single academic center. *Pediatr Emerg Care* 2012; 28: 731-734.
18. Tashtush NA, Bataineh ZA, Yusef DH, Al Quran TM, Rousan LA, Khasawneh R, et al. Ingested sharp foreign body presented as chronic esophageal stricture and inflammatory mediastinal mass for 113 weeks: case report. *Ann Med Surg* 2019; 45: 91-94.
19. Tringali A, Thomson M, Dumonceau JM, Tavares M, Tabbers MM, Furlano R, et al. Pediatric gastrointestinal endoscopy: European Society of Gastrointestinal Endoscopy (ESGE) and European Society for Paediatric Gastroenterology Hepatology and Nutrition (ESPGHAN) guideline executive summary. *Endoscopy* 2017; 49: 83-91.
20. Wai Pak M, Chung Lee W, Kwok Fung H, van Hasselt CA. A prospective study of foreign-body ingestion in 311 children. *Int J Pediatr Otorhinolaryngol* 2001; 58: 37-45.
21. Thomson M, Tringali A, Dumonceau JM, Tavares M, Tabbers MM, Furlano R, et al. Paediatric gastrointestinal endoscopy: European Society for Paediatric Gastroenterology Hepatology and Nutrition and European Society of Gastrointestinal Endoscopy Guidelines. *J Pediatr Gastroenterol Nutr* 2017; 64: 133-153.
22. Kuzmich S, Burke CJ, Harvey CJ, Kuzmich T, Andrews J, Reading N, et al. Perforation of gastrointestinal tract by poorly conspicuous ingested foreign bodies: radiological diagnosis. *Br J Radiol* 2015; 88: 20150086. DOI: 10.1259/bjr.20150086.
23. Hawkins DB. Removal of blunt foreign bodies from the esophagus. *Ann Otol Rhinol Laryngol* 1990; 99: 935-940.
24. Boo SJ, Kim HU. Esophageal foreign body: treatment and complications. *Korean J Gastroenterol* 2018; 72: 1-5 [Article in Korean].