CASE REPORT

An Unusual Foreign Body (Toothbrush) in the Esophagus: A Case Report

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Esophageal foreign body ingestion, particularly, a toothbrush, is a rare clinical presentation. This case report described a 19-year-old woman with no prior history of psychiatric or neurological conditions who accidentally swallowed a toothbrush while cleaning her teeth. Chest X-ray confirmed the presence of the foreign body in the esophagus. Early diagnosis and prompt removal are crucial to prevent complications like perforation and infection. Rigid esophagoscopy can be an effective and minimally invasive approach for safe foreign body removal. In addition, patients should consider the potential risks associated with activities affecting their digestive or respiratory systems, including eating, medication, and oral hygiene. By taking care of themselves, patients can reduce the likelihood of complications.

Keywords: Foreign bodies; Esophagoscopy; Esophagus

Received 25 June 2024 | Revised 25 September 2024 | Accepted 9 October 2024

J Med Assoc Thai 2024;107(11):926-9

Website: http://www.jmatonline.com

Adults with a history of ingesting non-food foreign bodies exhibit a higher prevalence of psychiatric and social difficulties compared to the general population. However, the underlying causes of this association remain unclear, and it is important to note that not all cases involve such co-morbidities[1,2]. The ingestion of toothbrushes is an uncommon occurrence within the spectrum of foreign body ingestions[1-6]. This is due to the size and shape of a typical toothbrush, which may not be easily swallowed accidentally. However, isolated cases of toothbrush ingestion have been documented in medical literature. The present case had been approved by the Human Research Ethics Committee of Sawanpracharak Hospital, COE No.33/2567.

Case Report

In October 2023, a 19-year-old woman presented to the ear, nose, and throat (ENT) department at Sawanpracharak Hospital. She reported accidentally ingesting a toothbrush while performing oral hygiene. The toothbrush had been held within her mouth by the handle. A comprehensive medical history revealed she had no prior diagnoses of psychiatric illness or neuromuscular disorders. Family and social histories were unremarkable as well.

On presentation, the patient reported mild discomfort in the neck and chest region. Vital signs were within normal limits with blood pressure at 120/80 mmHg, respiratory rate at 18 breaths/minute, pulse at 80 beats/minute, and oxygen saturation 99%. The patient was normothermic, Lung auscultation revealed normal breath sounds.

A plain chest X-ray obtained in the postero-anterior (PA upright) view revealed radiopaque toothbrush bristles within the esophagus at the level of the midclavicular line. The radiographic image corroborated this finding (Figure 1).

Following informed consent, the patient underwent rigid esophagoscopy under general anesthesia for foreign body removal. Direct visualization confirmed the presence of the toothbrush within the esophagus. The foreign body was successfully extracted using esophageal grasping forceps. The total procedure time was ten minutes. A meticulous re-examination with the rigid esophagoscope revealed no esophageal perforation or evidence of additional foreign bodies.

Following the foreign body removal procedure, the patient underwent a standard monitoring period of 24 hours. This monitoring included checking vital signs such as blood pressure, heart rate, respiratory

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How to cite this article:

Ittiphanitphong C, Jirawatthanaanan S. An Unusual Foreign Body (Toothbrush) in the Esophagus: A Case Report. J Med Assoc Thai 2024; 107:926-9.

DOI: 10.35755/jmedassocthai.2024.11.926-929-01313

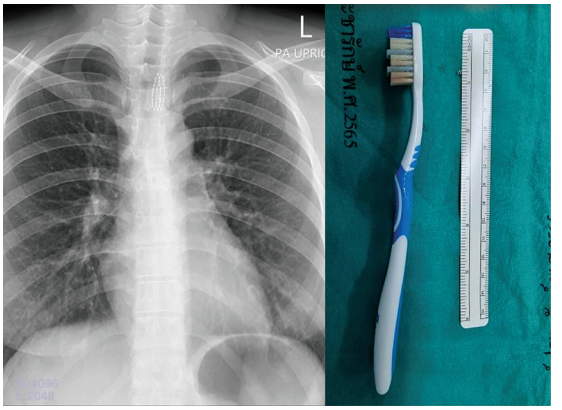

Figure 1. Posteroanterior (PA upright) chest radiograph demonstrating the radiopaque toothbrush bristles within the esophagus.

rate, and oxygen saturation, assessment for pain, and observation for any signs of potential complications like bleeding, perforation, or esophageal discomfort. The patient did not have any immediate postoperative complications during this monitoring period.

A comprehensive psychiatric evaluation was conducted to explore the possibility of underlying mental health conditions potentially associated with this accidental ingestion. This evaluation involved a comprehensive mental health history and standardized psychological testing. The results of this assessment were reported within normal limits, suggesting no identifiable psychiatric factors contributing to the incident.

At the one-week follow-up, the patient reported no complications.

Discussion

Type of foreign body

Esophageal foreign bodies (EFBs) are a frequent clinical presentation in otolaryngology. Coins, bones, meat boluses, dentures, and seeds are common EFB, while toothbrushes are uncommon EFB[1-6]. Other unusual objects like toys[7],beer bottle caps[8], forks[9], and spoons[10] have also been documented.

A comprehensive review of medical records at the authors' hospital revealed no prior documented cases of EFB specifically involving a toothbrush. This finding aligns with the existing medical literature, which classifies toothbrush ingestion as an uncommon presentation of EFB compared to objects like coins or food boluses.

Site

EFBs tend to get lodged at specific anatomical narrowing within the esophagus. These narrowing act like natural choke points, increasing the likelihood of an object getting stuck. The three most common sites for EFBs are the cricopharyngeal ring, the aortic arch constriction, and the esophagogastric junction (EGJ)[10,11]. The cricopharyngeal ring is the upper most narrowing, located at the junction between the pharynx (throat) and the esophagus. It is formed by a band of muscles that controls the opening and closing of the upper esophageal sphincter (UES). The aortic arch constriction is the narrowing that occurs where the aorta, the major artery leaving the heart, curves over the esophagus in the mid-chest. The esophagogastric junction (EGJ) is the lower esophageal sphincter (LES), a muscular valve at the connection between the esophagus and the stomach. The LES relaxes to allow food to pass into the stomach and tightens to prevent stomach contents from flowing back up. Prompt removal of EFBs is crucial to minimize the risk of perforation and subsequent complications such as mediastinitis, peritonitis, lung abscess, retropharyngeal space abscess, and esophageal perforation.

The chest X-ray in the present case revealed the toothbrush lodged at the level of the midclavicular line, which is a radiographic finding that can be associated with impaction at the aortic arch constriction. However, it was important to note that plain X-rays may not always definitively differentiate between different esophageal narrowing sites.

Host

Studies suggest an increased prevalence of unusual foreign body ingestion in females aged 15 to 23 years. This may be linked to emotional distress or eating disorders such as bulimia or anorexia nervosa[4]. Other reported at-risk groups include children, individuals with intellectual disabilities, and those with impaired swallowing due to severe dementia or alcohol intoxication[12].

Case reports have documented instances of accidental toothbrush ingestion in individuals with no apparent underlying medical or psychological conditions. The present case suggests that accidental ingestion can occur even in healthy adults, highlighting the importance of maintaining a high index of suspicion for EFB in patients presenting with a relevant history, regardless of their medical background.

Imaging

In suspected EFBs impaction, including

toothbrush ingestion, various imaging modalities play a crucial role in diagnosis and treatment planning. The chest X-ray serves as the initial investigation due to its widely available and cost-effective[13]. While the plastic composition of a toothbrush may limit its direct visualization, a chest X-ray can reveal indirect signs of obstruction, such as air-fluid levels or esophageal dilation. For a more definitive diagnosis and evaluation of the foreign body's location and potential complications, a neck and chest computed tomography (CT) scan with contrast dye is often the next step for a more definitive diagnosis and evaluation of the foreign body's location and potential complications. This modality provides detailed cross-sectional images of the esophagus, allowing for better visualization of the object and surrounding structures[13].

For more precise localization of the foreign body and surrounding structures, CT scans with contrast dye can be a valuable diagnostic tool. While a CT scan was not performed in this case due to the patient's immediate treatment and lack of suspected complications, it remains an important imaging modality for situations where the X-ray findings are inconclusive or there are concern about potential complications.

The method of foreign body removal

Early endoscopy and prompt removal is recommended to minimize morbidity and avoid complications. The method of EFB removal depends on several factors, including surgeon preference, the specific anatomy of the impaction site, and the characteristics of the foreign body itself. Flexible endoscopy[3,11,14-16], rigid esophagoscopy with foreign body removal[2,16], and open surgery[5,16] represent the spectrum of potential interventions.

Flexible esophagoscopy represents a significant advancement, offering several distinct advantages over its rigid counterpart. Its flexible design markedly decreases the risk of esophageal trauma, thereby enhancing patient safety. Moreover, the superior visualization afforded by flexible esophagoscopy facilitates more precise identification of foreign bodies, mucosal lesions, and other esophageal pathologies. These combined benefits, coupled with its minimally invasive nature and cost-effectiveness, have contributed to its widespread adoption as a preferred diagnostic and therapeutic modality in clinical practice. Rigid esophagoscopy offers several advantages in the removal of foreign bodies, particularly those large or deeply embedded. Its rigid design provides superior control and maneuverability, allowing for precise manipulation of the foreign body and instruments. Additionally, the increased force that can be applied with a rigid scope may be necessary to extract deeply embedded or tightly lodged objects. The rigid esophagoscopy may be particularly advantageous in children due to its enhanced airway protection and easier management of non-food foreign bodies[16-18].

Flexible and rigid esophagoscopy have demonstrated comparable efficacy in the removal of EFBs. Despite equivalent overall complication and perforation rates, the selection between these techniques may be influenced by individual patient characteristics and the availability of specialized expertise. Institutions that offer both flexible and rigid esophagoscopy can provide a personalized approach, potentially diminishing the necessity for surgical intervention and related adverse outcomes. Given the comparable clinical outcomes, a reassessment of formal training and certification standards for rigid esophagoscopy may be advisable to ensure that healthcare professionals are adequately prepared to employ this valuable technique when appropriate[17,18].

In the present case, rigid esophagoscopy was chosen as the primary intervention for foreign body removal. This decision hinged on several factors, including the characteristics of the foreign body itself. Rigid esophagoscopes offer greater control and stability compared to flexible endoscopes, which can be advantageous when manipulating and extracting larger or more rigid objects like a toothbrush. Additionally, rigid esophagoscopy typically requires general anesthesia, which can help minimize patient discomfort and movement during the procedure.

Limitation

A single case report cannot be generalized to the broader population. The findings were specific to this particular 19-year-old woman and may not represent all cases of toothbrush ingestion.

Conclusion

EFB ingestion, while uncommon, can occur in adults and present with a variety of objects, including toothbrushes as documented in the present case. Early diagnosis and prompt removal are crucial to prevent complications like perforation and infection. Rigid esophagoscopy, as demonstrated in the present case, can be an effective and minimally invasive approach for safe foreign body removal.

What is already known on this topic?

Toothbrush ingestion is a documented but uncommon EFBs, reported in case studies. Prompt removal is crucial to minimize the risk of perforation and subsequent complications like mediastinitis, peritonitis, lung abscess, and esophageal strictures.

What does this study add?

This case report contributes to the existing knowledge about EFB removal and highlights the possibility of accidental toothbrush ingestion in individuals with no apparent predisposing conditions.

Funding disclosure

The present study received a grant from Sawanpracharak Medical Education Center.

Conflicts of interest

The authors declare no conflict of interest.

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