Esophageal Stricture Complicated by a Foreign Body Successfully Removed with the Endoscopically-Guided Foley Catheter Technique

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Abstract
Esophageal foreign bodies require prompt recognition and targeted intervention. Foreign bodies have great variation in size, shape and consistency posing a unique clinical challenge for gastroenterologists. We report a rare case of an esophageal stricture complicated by an impacted esophageal foreign body refractory to retrieval with conventional interventional modalities. The endoscopic-Foley catheter technique is a well-documented and viable technique that can be applied to these extenuating circumstances in which traditional endoscopic methods have failed.

Introduction
Among the pediatric population, esophageal foreign body impaction is well documented. In children, 98% of ingestions are accidental and foreign body ingestions include coins, toys, jewelry, magnets and batteries. Most ingested foreign bodies are best treated with flexible endoscopy. However, every case of ingestion is unique and requires careful endoscopic planning in order to avoid recognized adverse outcomes: aspiration, esophageal perforation, abscess formation and, in rare cases, esophagogastric fistula. We report a distinctive case of endoscopy in the setting of pre-existing anatomical abnormalities, refractory to classical interventions, utilizing the endoscopic-Foley catheter technique resulting in the successful retrieval of an esophageal foreign body.

Case Presentation
A 14-year-old male with Angelman Syndrome (a neuro-genetic disorder characterized by developmental delays with regards to lack of speech, seizures and walking and balance disorders) was transferred to our facility with a 3-hour history of increased salivation, tachycardia and concern for foreign body ingestion. At the time of presentation, the patient was attempting to force emesis. He was awake and alert without respiratory distress, active hematemesis or signs of trauma. His prior history was significant for severe gastroesophageal reflux disease, existing peptic esophageal stricture status post multiple prior endoscopic dilatations, and prior foreign body ingestions.

A lateral and posterior-anterior chest x-ray showed a radio-opaque circumferential foreign body (1.9 cm diameter) projecting over the cervical esophagus (Figure 1). Pediatric gastroenterology was consulted and esophagogastroduodenoscopy was performed under general endotracheal anesthesia. Endoscopy revealed a marble impacted at 14 cm from the incisors (Figure 2). Initially, a 26 mm Twister® net was deployed and partially encircled the marble but on several passes, it ultimately slipped off. Next, an attempt with a 3 cm Roth net® failed as the device would not open due to the narrow lumen. Subsequently, a 12 Fr Foley catheter was passed via the mouth under direct endoscopic visualization, positioning the balloon tip beyond the marble (Figure 3). The balloon was filled with 10 ml of water. Withdrawing both the endoscope and Foley catheter together, the marble was successfully delivered into the hypopharynx where it was visualized with a laryngoscope and removed using Magill forceps. The gastroscopy was re-introduced and a stricture was visualized approximately 20-22 cm from the incisors, the remnant of his prior complex stricture that had extended from 17 cm distally. The patient was given famotidine and monitored overnight with discharge the following morning after tolerating a full diet.

Discussion
Foreign body ingestions are a common occurrence especially in the pediatric population. Coins are cited to be the most commonly aspirated object (~68% cases), while marbles are a more rare ingestion (~4% cases). 80% or more of foreign objects will pass without intervention, 10-20% will require endoscopic intervention and <1% of cases will require surgery. The proximal esophagus is the most common lodgment site followed by the middle esophagus, stomach, pharynx, distal esophagus and lastly the duodenum. A through history and physical examination will be key in the diagnosis of foreign body ingestions and impaction. It is imperative to be aware of presenting
symptoms of esophageal obstruction that may require endoscopic intervention: choking, refusing to eat, vomiting, drooling, wheezing, blood-stained saliva or respiratory distress.\(^8\) It is also important to note that patients with chronic disabilities can present with signs and symptoms that are imprecise and ambiguous.\(^7\) If the patient is unable to pass the foreign body spontaneously, endoscopy should be considered as first-line management.

The American Society of Gastrointestinal Endoscopy guidelines on the endoscopic management of foreign body ingestions requires the operator to ask crucial questions about the airway (strongly consider protection with endotracheal intubation), timing (which will be determined by shape, size, context of foreign body, anatomic location and clinical status) and proper equipment (availability of a proper spectrum of retrieval devices in endoscopy suite).\(^2\)

Non-endoscopic methods initially gained popularity because of shorter hospitalizations, avoidance of anesthesia and esophagoscopy and lower overall costs. Non-endoscopic methods include esophageal buogienage, the penny pincher technique and Foley catheter technique which can be blind, fluoroscopically driven or with endoscopically driven. Per case series by Schunk et al., the Foley catheter technique with fluoroscopy has documented safety and efficacy in foreign body retrieval in children. In their study, the Foley catheter technique was successful in 91% of their cases.\(^8\) However, the lack of direct visualization and inability to protect the airway has lead Western countries towards frequently utilizing endoscopy.\(^9\)

Flexible endoscopy is often first line in the removal of foreign bodies in Western countries. Knowing the location, size, shape and consistency of the foreign body will help aid the operator in selecting

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**Figure 1.** Posterior-Anterior Chest X-Ray demonstrating the presence of a foreign body in the proximal esophagus.

**Figure 2.** Endoscopic visualization of marble (1.9 cm diameter) in a narrowed proximal esophagus.
the appropriate retrieval devices during endoscopy which can include: rat-tooth forceps, alligator forceps, polypectomy snare, polyp graspers, baskets, retrieval nets, magnetic probes or banding caps. Flexible endoscopy comes with its own set of challenges. Specifically, patients with pre-existing anatomical abnormalities in the gastrointestinal tract are at increased risk of complications. A case series by Park et al. revealed endoscopic complications occurring in 8.3% of patient with esophageal foreign body impactions. The potential adverse effects includes: bleeding, mucosal erosion, vomiting, airway compromise, bronco-aspiration and even possibly perforation.

To prevent complications, the American Society of Gastrointestinal guidelines advocate against distal movement of the object without endoscopic examination of the esophagus distal to the obstruction.

In our patient’s case, the patient’s history of severe erosive esophagitis, esophageal peptic strictures and the fact that the marble was lodged in the proximal esophagus made it more difficult to retrieve the object. Multiple attempts with endoscopic retrieval devices including nets and baskets failed to effectively encircle the object. It is essential that gastroenterologists remain familiar with multiple endoscopic retrieval modalities, including the well-documented endoscopic-Foley catheter method. This technique should be considered a viable option for select cases of esophageal foreign body ingestions within the setting of existing anatomical challenges.

Disclosures
No financial disclosures to report. Informed consent was obtained.

References