



Pediatric ferromagnetic esophageal foreign body: Retrieval of imbedded grill brush with endoscopic magnet

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Abstract

Foreign body ingestion is a common problem in the pediatric population, and often requires removal in the operating room. Grill brush bristle ingestion is rare, but potentially serious especially if it becomes embedded within the soft tissue.

Keywords: Esophageal foreign body; Grill brush bristle; Endoscopic magnet.

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Case report

A 13-year-old male presented to the emergency department following an episode of gagging while eating grilled chicken. He reported significant odynophagia and globus sensation. He had no symptoms of airway compromise. Neck radiograph was obtained which demonstrated a curvilinear radiopaque structure measuring 3.2 cm in the region of the piriform sinus, presumed to be a chicken bone given the history (Figures 1-2). ENT was consulted and flexible laryngoscopy was performed. No foreign body was identified.

The patient was taken to the OR for airway exam, esophagoscopy, and foreign body removal. Intraoperatively, there was a small area of edema in the postcricoid region with a small mucosal entry point. This was palpated with a right angle and a small amount of purulence was expressed. The right angle was used to probe the wound, confirming the presence of a tract. To localize the foreign body, an ETT was placed into the esophagus and the right angle was positioned within the entry point while an intraoperative x-ray was obtained (Figure 3). This confirmed the location of the foreign body within the posterior esopha-

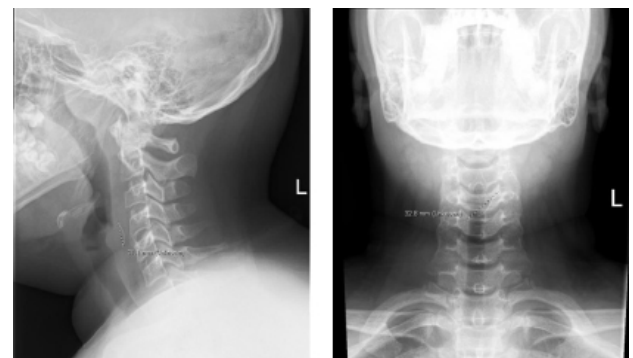


Figure 1 & 2: Neck radiographs demonstrating curvilinear radiopaque structure measuring 3.2 cm in the region of the piriform sinus.

geal mucosa. The microscope was brought into the room to allow for two-handed instrumentation. A sickle knife was used to make a vertical incision in the posterior esophageal mucosa. A combination of scissors, sickle knife, right angle, and suction were used to dissect and probe the wound. Precise localization of the object was difficult due to its small size. To aid in localization, a magnet was fashioned to the end of a nasogastric tube and used to co-localize the magnetic foreign body within the posterior esophageal mucosa. Once the foreign body was visible within the wound, alligator forceps were used to grab and remove the foreign body. The foreign body was consistent with a grill brush bristle measuring 2.8 cm (Figure 4-5).

A dohoff tube was placed in the operating room, and the patient was admitted overnight for observation. He underwent a barium esophagram on post-operative day 1 with no evidence of esophageal leak, and he was subsequently discharged home.

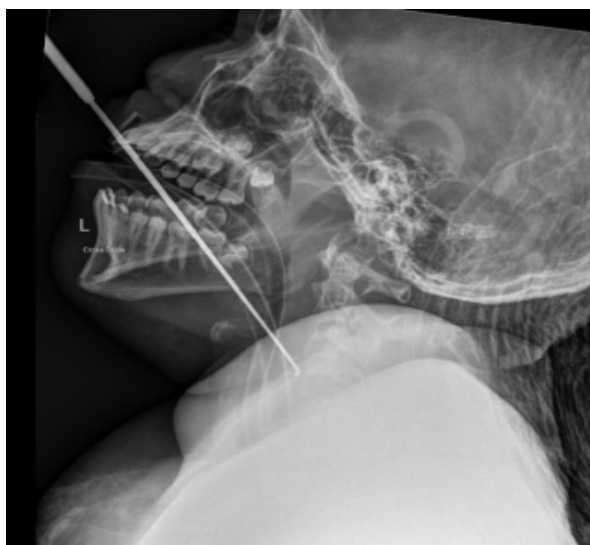
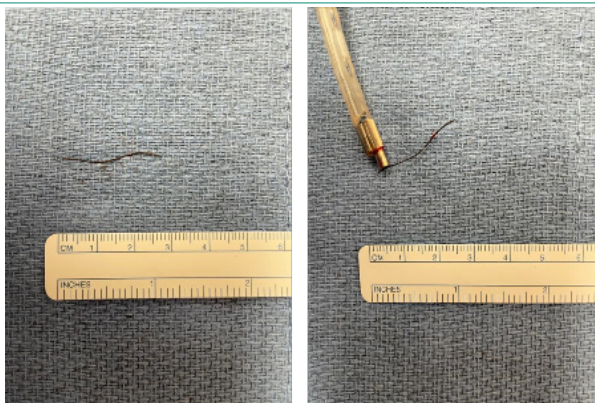


Figure 3: Intraoperative radiograph with a right-angle instrument positioned within mucosal entry point and an endotracheal tube within the esophagus, confirming presence of foreign body within the posterior esophageal mucosa.



Figures 4 & 5: Curvilinear, magnetic, metal grill brush bristle measuring 2.8 cm.

Discussion

Foreign bodies which are sharp may become embedded within the upper aerodigestive tract when ingested. While this is a relatively benign complication of foreign body ingestion, it can lead to serious complications including retropharyngeal abscess, esophageal perforation, or migration into the mediastinum with associated mediastinitis. One review notes bristle migration occurring in 21% of upper aerodigestive tract cases after initial presentation (Miller et al. 2021) [1]. For this rea-

son, prompt identification and removal of a retroesophageal foreign body is crucial. Even with the use of preoperative and intraoperative imaging, precise localization of the object may be challenging. Grill brush bristle ingestion is a public health issue and carries a high risk of becoming embedded within the soft tissue of the aerodigestive tract. The national weighted estimate of patients evaluated in the emergency department after wire bristle ingestion in America between 2002-2014 was 1,700 (Baugh, Hadley, and Change, 2016) [2]. Though the object in this case was originally presumed to be a chicken bone based on history, the appearance on intraoperative imaging led us to suspect a grill brush bristle which prompted us to use a magnet to aid in its localization.

The use of a magnet to remove metal foreign bodies from the gastrointestinal tract is not an entirely novel concept. One article describes the possibility of using a magnetic tube to remove metal foreign bodies, which can potentially be utilized in the awake patient if the object is in the proximal esophagus and not embedded (Choe and Choe, 2019) [3]. Another case we found describes a technique in which a snared magnet is used to endoscopically remove a nonembedded paperclip within the stomach (Coash and Yu, 2012) [4]. However, to our knowledge, intraoperative use of a magnet to aid in the localization of an embedded metal foreign body within the esophageal wall has not been previously described in the literature.

Naunheim describes a similar presentation of a grill brush bristle embedded in the hypopharynx. They used suspension, microscope, and localized intraoperative fluoroscopy (2015) [5]. While intraoperative imaging is helpful for appropriate localization, we found that more accurate localization of the grill brush bristle was accomplished with the addition of a magnet to this technique. In hindsight, if we had employed the magnet earlier in the case, we may have been able to identify the object prior to obtaining intraoperative imaging and could have potentially avoided unnecessary radiation.

Conclusion

Grill brush bristles may unknowingly be ingested and become embedded within the aerodigestive tract. Magnets are a useful adjunct tool that can aid in both the intraoperative localization and removal of grill brush bristles and other metal foreign bodies.

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