Techniques in Gastrointestinal Endoscopy 16 (2014) 32–39

Contents lists available at ScienceDirect

Techniques in Gastrointestinal Endoscopy

journal homepage: www.techgiendoscopy.com/locate/tgie

Removal and management of esophageal foreign bodies

Patrick R. Pfau, MD

Division of Gastroenterology, University of Wisconsin Medical School, Madison, Wisconsin

ARTICLE INFO

Article history:
Received 1 August 2013
Received in revised form
17 October 2013
Accepted 17 October 2013

Keywords:
Foreign body
Esophagus
Endoscopy

ABSTRACT

Esophageal foreign bodies and food bolus impaction occur frequently and are a common endoscopic emergency. Though the vast majority of gastrointestinal (GI) bodies do not result in serious clinical sequelae or mortality, it has been estimated that 1500-2750 patients die annually in the United States because of the ingestion of foreign bodies. More recent studies have suggested the mortality from GI foreign bodies to be significantly lower, with no deaths reported in over 850 adults and 1 death in approximately 2200 children with a GI foreign body. As a result of the frequency of this problem and the rare but possible negative consequences it is important to understand the best method for diagnosis, the patients in need of treatment, and the correct techniques for the management of GI foreign bodies. Flexible endoscopy has become the diagnostic and treatment method of choice for both esophageal food impaction and true esophageal foreign bodies because of high success rates and low complication rates. This review covers and focuses on the techniques needed to diagnose and effectively treat esophageal food impaction and true foreign bodies

1. Introduction

Esophageal foreign bodies and food bolus impactions occur frequently and are a common endoscopic emergency. Though most gastrointestinal (GI) bodies do not result in serious clinical sequelae or mortality [1], it has been estimated that 1500-2750 patients die annually in the United States because of the ingestion of foreign bodies [2-4]. More recent studies have suggested the mortality from GI foreign bodies to be significantly lower, with no deaths reported in more than 850 adults and one death in approximately 2200 children with a GI foreign body [5-11]. As a result of the frequency of this problem and the rare, but possible, negative consequences, it is important to understand the best method for diagnosis, the patients in need of treatment, and the correct techniques for the management of GI foreign bodies. Flexible endoscopy has become the diagnostic and treatment method of choice for both esophageal food impactions and true (nonfood) esophageal foreign bodies because of high success rates and low complication rates. This review covers and focuses on the techniques needed to diagnose and effectively treat esophageal food impactions and true foreign bodies.

2. Epidemiology

True foreign bodies may be the result of either unintentional or intentional ingestion. The most common patient group that unintentionally ingests foreign bodies is children. Overall, 80% of foreign body ingestions occur in children, with most occurring between the ages of 6 months and 3 years [12,13]. In adults, common risk factors for accidental ingestion include impaired tactile sensation, compromised judgment, and occupational hazards.

Intentional ingestion of foreign bodies is frequent in psychiatric patients or prisoners [14,15]. These patients ingest foreign bodies for a secondary gain and often ingest multiple objects and the most complex objects.

Esophageal food impaction is a much more common problem than true esophageal foreign body ingestion, with an estimated annual incidence of 13-16 episodes per 100,000 people [16]. Most patients (75%-100%) who present with a food impaction have some type of predisposing esophageal pathology [5,16-19]. The most commonly observed abnormalities associated with food impaction are Schatzki rings or peptic strictures and, with increasing frequency, eosinophilic esophagitis (EoE) [20]. Less commonly found as the predisposing cause are extrinsic compression, surgical anastomoses, fundoplication wraps, or esophageal cancer [21]. Motility disorders such as achalasia, diffuse esophageal spasm, and nutcracker esophagus are infrequent causes of food impactions [22]. In the United States, meat such as hot dogs, pork, beef, and chicken are the most common foods that result in impaction,

The author reports no direct financial interests that might pose a conflict of interest in connection with the submitted manuscript.

E-mail address: prp@medicine.wisc.edu

0049-0172/$ - see front matter © 2014 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.tgie.2013.10.004

whereas in Asian countries and coastal areas, fish and fish bones are the most common causes [23-25].

3. Patient preparation

3.1. History and physical examination

For communicative adults, a history of ingestion including timing, type of foreign body ingested, and onset of symptoms is usually reliable. History is particularly reliable for food impactions as patients are almost always symptomatic and can detail the exact onset of symptoms. Esophageal obstruction, partial or complete, almost always results in symptoms, such as substernal chest pain, dysphagia, gagging, vomiting, or a sensation of choking, drooling, or inability to handle secretions [26].

These types of symptoms may aid in determining whether an esophageal foreign body is still present. If the patient presents with dysphagia, dysphonia, or odynophagia, there is almost an 80% chance that a foreign body or food impaction would be present. If the symptom is only retrosternal pain or pharyngeal discomfort, less than 50% of patients would have an identifiable esophageal foreign object [27].

The history and symptoms for true foreign bodies is often less reliable than food impaction because true foreign bodies are often ingested by children, mentally impaired adults, or adults who have ingested the foreign body for secondary gain. With esophageal foreign bodies, 20%-38% of children would be asymptomatic [28]. Symptoms are subtle and include drooling, poor feeding, blood-stained saliva, or a failure to thrive [29]. Because of lack of symptoms and an inadequate history in children with esophageal foreign bodies, there should be a low threshold to investigate with endoscopy.

Medical history is important in regard to previous episodes of either food impaction or foreign body ingestion. Previous food impaction or a previous need for esophageal dilation makes recurrent episodes more likely. A history of allergies (asthma, allergic rhinitis, urticaria, hay fever, atopic dermatitis, and food or medicine allergy) may be a clue that the patient has EoE [30]. Patients with previous true foreign body ingestion are often patients who are multiple ingestors who are more likely to ingest multiple objects and complex objects.

Physical examination would aid little in determining the presence or location of a foreign body, but it is important to detect potential ingestion-related complications. Determination of airway and level of consciousness is crucial before any endoscopic or nonendoscopic intervention. Lung examination should be performed to detect the presence of wheezing or aspiration. Esophageal or oropharyngeal perforation may result in swelling, erythema, or crepitus of the neck or chest region. If these are present, investigation with radiographs should be performed before endoscopic intervention.

4. Diagnosis

Patients with suspected foreign body ingestion should undergo anteroposterior and lateral radiographic examinations of the chest and abdomen to help determine the presence, type, and location of a foreign body. Plain film radiographs also aid in detecting complications such as aspiration, abdominal free air, or subcutaneous emphysema [26,27]. Radiographs and imaging techniques are not routinely required for investigation of a food impaction unless there is a high suspicion of an associated bone in the food impaction. False-negative rates with plain film radiographs are as high as 47% and false-positive rates are close to 20% in the investigation of foreign bodies [27,31]. False-negative rates for food impactions have been reported to be as high as 87% [32]. Further, 35% of radiographs read by a non-radiologist for the presence of foreign bodies have been found to be misread [33].

Generally, it is accepted that barium studies should not be performed in the evaluation of GI foreign bodies. If aspiration occurs, the hypertonic contrast agents used can cause acute pulmonary edema [34]. Barium evaluation can delay a necessary therapeutic endoscopic procedure by interfering with endoscopic visualization and complicating removal of a foreign body [35].

Endoscopy provides the most accurate diagnostic modality in suspected foreign body ingestions and food impactions. Any patient with persistent symptoms and a continued clinical suspicion of a GI foreign body should undergo an upper endoscopy even after negative or unrevealing findings on radiographic evaluation [36]. This approach ensures the correct diagnosis of food impactions, nonradiopaque objects, and radiopaque objects that are obscured by overlying bony structures [37].

Endoscopy is the best method to detect underlying pathology such as esophageal strictures or rings that contribute to a food impaction or a foreign body that would not pass readily through the GI tract. Endoscopy can also closely examine the GI mucosa to assess for laceration or damage that may contribute to continuing symptoms after a foreign body has spontaneously passed. Foremost, diagnostic endoscopy is directly linked to when endoscopy would be used for therapy—treatment or extraction of a known or suspected foreign body.

5. Treatment

5.1. Nonendoscopic therapies

Medical therapies have been used as in the treatment of esophageal foreign bodies and food impactions. Glucagon, given in doses of 0.5-2.0 mg, can produce relaxation of the esophageal smooth muscle and the lower esophageal sphincter, with the potential to permit passage of the impacted food or foreign body [38,39]. Success with primary glucagon therapy ranges from 12%-58% in treating food impactions [40-42]. Glucagon used in conjunction with endoscopy can promote clearance of the food bolus when the scope is passed into the esophagus [38]. Nifedipine and nitroglycerin are not recommended because of hypotension-related side effects. Gas-forming agents such as carbonated beverages are purported to release carbon dioxide gas to distend the lumen and act as a piston to push the object from the esophagus into the stomach [43]. However, the effectiveness of this method is doubtful, and perforations have been reported [44]. Similarly, the meat tenderizer papain is not recommended for the treatment of esophageal meat impactions because of lack of efficacy and risk of complications, including perforation and mediastinitis [45,46].

Under fluoroscopic guidance, radiologic methods including Foley catheters, suction catheters, wire baskets, and magnets have been used to retract objects [47]. The most commonly described device is the Foley catheter; the balloon tip of the catheter is passed distal to the object, inflated, and then the object is withdrawn into the oropharynx. Success of Foley catheter extraction of esophageal foreign bodies under fluoroscopic guidance has been described as more than 90%. However, all radiographic methods suffer from lack of control of the object, particularly at the level of the upper esophageal sphincter and hypopharynx. Complications may include nosebleeds, laryngospasm, aspiration, perforation, and even death [48]. Radiographic methods are generally recommended only if flexible endoscopy is not available.