Esophageal foreign bodies

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Abstract

Objective: A retrospective review was performed on 180 patients from 1975 to 1997 to evaluate the diagnosis, and management of esophageal foreign bodies. Methods: All patients except two were symptomatic and 145 of them were younger than 14 years of age. Plain films were performed in every patient with a suspected esophageal foreign body (EFB). In all patients, rigid esophagoscopy was done under general anesthesia once the diagnosis of impacted EFB is made. Results: Fifty-five percent of the foreign bodies were coins. In children, the majority of impacted esophageal foreign bodies were located at the level of the cricopharyngeus muscle while in adults the site of impaction was the lower esophageal sphincter. The most common symptoms were vomiting and/or regurgitation. Of the 180 EFBs encountered, 169 were extracted endoscopically, five were pushed into the stomach, five were not found, and one patient needed cervicotomy. There were no deaths in this series. Predisposing factors were found in 15 patients. Fifteen patients (8.3%) had benign strictures. In ten patients (5.5%), minor complications were encountered, none of which were esophagoscopically related. Alternative diagnostic and therapeutic modalities are discussed. Conclusions: All patients with a history of suspected foreign body ingestion should have direct endoscopic examination. If the EFB is not detected a thorough radiographic examination, including CT scan, should be performed to detect a possible intra-or extraluminal object. Preservation of the airway is regarded to be the most important consideration in esophageal foreign body management.

Keywords: Esophagus; Esophagoscopy; Foreign bodies; Ingestion; Bougienage

1. Introduction

The prognosis of untreated esophageal foreign bodies is catastrophic, due to the high rate of complications including esophageal perforation, fistulization, and pleural empyema [1]. In the 1900s, the mortality rate was around 50% according to Terracol [2]. The vast majority of foreign bodies were seen in the pediatric age groups, followed by edentulous adults, prisoners, and psychiatric patients. Of all the factors, the wearing of dentures is most commonly associated with foreign bodies in adults [3,4]. The aim of this study is to present our experience of the removal of esophageal foreign bodies (EFBs) utilizing rigid esophagoscope under general anesthesia over the past 23 years, to update the topic of EFBs, and to identify patients at risk from EFBs.

2. Materials and methods

To determine the incidence and outcome of EFBs the records of EFBs treated at our unit during the 23-year period from April 1975 to March 1997 were retrospectively reviewed.

A total of 180 patients with a history of impacted foreign body in the esophagus were admitted and treated in our surgical department. One hundred patients (55.5%) were males and 80 (44.5%) were females. Five clinical symptoms, namely vomiting, dysphagia, pain on swallowing, choking and excessive salivation were recorded. History of ingestion with vomiting, vague sensation of foreign body and odynophagia were the strongest diagnostic criteria.
A lateral soft-tissue neck roentgenogram and a postero-anterior view that included the oropharynx, neck, chest and abdomen were made pre-endoscopically. Round foreign bodies and coins in the lower third of the esophagus were allowed to pass unless they were ingested earlier than 24 h prior to admission, the patient had complete dysphagia or had a previous history of esophageal disease or surgery. All esophagoscopy procedures were performed under general anesthesia. For bougienage, the patient was secured in the prone position or allowed to sit upright and an appropriately sized bougie-dilator was passed through the mouth into the stomach. In two patients with severe respiratory symptoms, bronchoscopy was carried out and revealed to be normal.

2.1. Post endoscopy management

If the extraction of the EFB has been difficult, an immediate radiographic contrast study was routinely done. In the follow-up period, all patients were watched for signs and symptoms of perforation, such as fever, tachycardia, Shortness of breath, chest pain, abdominal pain, and crepitation in the neck and in all circumstances, an overnight observation was required and before discharge all patients were subjected to a careful physical examination and a chest film in order to rule out the presence of mediastinal air which is generally regarded as an indirect sign of esophageal perforation. If no EFB was found during esophagoscopy, the patient underwent further investigations; such as contrast study, chest computed tomography and in patients with radiolucent foreign bodies magnetic resonance imaging (MRI) may be required.

In the vast majority of cases (76.7%), the location of entrapment of EFBs was in the cervical esophagus, usually immediately below the cricopharyngeus. The site of impaction of the remaining EFBs was as follows: 25 foreign bodies (13.9%) were lodged in the midesophagus and 15 (8.3%) below T-8 in the distal esophagus. In two cases (1.1%), the exact location was not mentioned.

The duration from the EFB’s ingestion to the time of extraction was as follows: less than 6 h: 79 patients, 12–24 h: 46 patients, 1–7 days: 20 patients, 1 month: 3 patients and in two patients the duration of impaction was unknown.

The age, years distribution, and nature of EFB are shown in Figs. 1–3, respectively.

3. Results

Coins were the most common foreign body removed from the esophagus, occurring in 100 patients (55.6%), all children. Sixty-five percent of patients were 3 years or less at the age of admission. The majority of coins were found in patients 3 years of age or older and only 12% of them were removed from patients 1-year-old. The duration of impaction prior to admission was less than 24 h in 153 patients (85%), from 1–6 days in 18 patients (10%) and greater than one week in 9 patients (5%). The duration of the hospital stay was 24 h or less in 153 patients (85%). Several EFBs such as metallic objects, bones and others

![Fig. 1. Age range of patients with esophageal foreign bodies.](https://academic.oup.com/ejcts/article-abstract/13/5/494/416421)
have been encountered in our patient population. Rigid esophagoscopy was used in all patients for the removal of the impacted EFB and was successful in 169 cases (93.8%). In five cases (2.7%) the EFB was pushed into the stomach using dilators and only one patient underwent surgical removal. In the remaining 5 patients (2.7%), the EFB was not found but there was evidence of esophageal injury in the form of erosion, edema and granulation tissue. Multiple foreign bodies were found in 15 of the 180 patients (6.6%). All of them had a bone mixed with pieces of meat. There were no deaths, no perforations, no cases of mediastinitis, and actually no complications secondary to insertion of the esophagoscope and removal of the foreign body. Five patients had ulceration of the esophageal wall, two patients had aspiration pneumonia and in one case, a neck abscess has been formed. The standard of care at our hospital is to keep patients over night for post operative chest physiotherapy, airway humidification and observation.

4. Discussion

The vast majority of foreign bodies (80–90%) will pass spontaneously through the gastrointestinal tract in 7–10
days without causing complications, leaving approximately 10–20% that will be removed endoscopically and about 1% will require surgery [5,6]. Patients with EFBs typically fall into one of three categories: pediatric patients who account for approximately 75–80%, with the preponderance of children aged 18–48 months, psychiatric patients, prisoners, and edentulous adults [7,8].

The diagnosis of a swallowed EFB can be difficult as the physical examination is generally not rewarding for patients with EFBs. However, EFB impaction usually presents acutely, especially in adults, who will normally have a clear history of ingestion. Adult patients may have diffuse chest pain, pressure, vague foreign body sensation, sensation of choking, or neck or throat pain. Children, on the other hand, may have more vague history because a history of swallowing may be absent or overlooked, the event having taken place long before the patient presents to the physician. It is worthy to note that 7–35% of pediatric patients with proved EFBs are asymptomatic. Late clinical presentation may also include signs of perforation or infection such as respiratory or feeding problems as was the case in one patient of this study. The site of impaction of EFBs differs with age. This fact has been confirmed in our series as well as in those reported in the literature that the majority of pediatric patients had foreign bodies lodged at the level of the cricopharyngeus muscle while in adults, the lower third of the esophagus was the most common site of esophageal impaction.

The main diagnostic technique is the use of radiographs to localize the foreign body and radiographic examination should be considered and offered in every patient even asymptomatic unless there is sufficient evidence that the precipitating episodes were self-limited and no evidence of residual disease is present [9]. Such an X-ray should also be obtained immediately before the operation to eliminate any possible evacuation of the foreign body into the stomach where extraction is seldom, if ever, necessary [10]. Barium swallow studies are important to evaluate the non-radio-opaque material that may be lodged within the esophagus, the presence of strictures, diverticulae, or congenital anomalies of the esophagus. Meglumine diatrizoate (gastrografin) is relatively contraindicated as it may cause a severe chemical pneumonitis if aspirated [11]. Newer non-ionic contrast media eliminate these concerns and can be safely used in all cases [12].

Computed tomography scans of the chest are rarely used and are rarely of benefit only when there is a suggestion of a localized obstructive object by a previous fluoroscopy or plain film but the relative high expense of this procedure compared with esophagography limits its role as a routine test.

The exact role of magnetic resonance imaging for defining and locating EFBs remains open but it seems that it is of limited use due to the need for general anesthesia or sedation, plus the possibility that a ferromagnetic object would be dislodged.

The best method for removal of swallowed EFBs is still controversial [13]. However, there is a general agreement for the urgent removal of the lodged EFBs as any delay in their retrieval would produce serious complications but some disagreement as to the optimal management of EFBs. However, it seems that it is of apparent from the published reports. Management of impacted EFBs is dependent on the type of the object and the site of impaction. In 1937 Jackson and Jackson [14] published a monograph on the management of foreign bodies of the upper airway and esophagus in which the rigid esophoscope was used. Eight years later, Richardson [15] reported the use of papain in successfully treating meat obstruction of the esophagus and in 1966 Bigger [16] reported the use of Foley catheter to extract blunt opaque EFBs. Bonadio [17] and co-workers used dilators to push swallowed esophageal coins into the stomach. Other modalities to remove EFBs have been described that include oral administration of enzyme digestants (Adolph’s meat tenderizer) and gas-forming pellets [18]. Both of these methods have reported success, however, major complications have been reported.

As McGuirt stated, those advocating the alternative methods generally are physicians who were not specifically trained in foreign body endoscopy [19]. Consequently, these modalities should be limited to a clinical setting where more standard methods are lacking. Subsequently, in 1972, Morrissey [20] was the first to use the fiberendoscopy for EFB removal. We performed esophagoscopy under general anesthesia as soon as the impaction of an EFB was diagnosed and we believe that the safest method for the retrieval of an EFB is under general anesthesia with a protected airway. Our results are similar to those previously published in the literature regarding the age of the children and the nature of the EFB. Nevertheless, this study presents two particularities; 79% of our patients were children which differs from the experience of other centers where adults and children, were sharing the same percentage and aside from a report from Hong Kong in which fish bones were the most common EFB, coins are by far the most frequently encountered EFB as was the case in the present study [21].

In this series, the duration of impaction in the vast majority of children (85%) was less than 24 h and management was associated with minimal morbidity and no mortality. When passage to the stomach does not spontaneously occur one should look for the site of impaction which is usually in the upper esophagus at the level of cricoid cartilage and as a result the patient is at risk for complications (only one in a child, which was secondary to a migrating coin) and those that were not due to instrumentation occurred after 24 h.

Most were caused by sharp foreign bodies. Despite these results we are in favor of performing rigid esophagoscopy 'once the diagnosis of EFB is made'. Furthermore, 50% or more of the patients with impacted EFBs for longer than 3 days, and all patients with EFBs longer than one week are
reported to have respiratory symptoms such as a case previously published by Al-Qudah [22].

Other reports of serious complications from impacted EFBs have included death, fistulization to the aorta and its branches and trachea and perforation [23,24]. In our unit swallowed EFBs are removed with a rigid esophagoscopy which has the major advantage of direct examination of the esophageal lumen, evaluation of the degree of esophageal injury inflicted by the foreign body and search for multiple foreign bodies. Ten patients (6.67%) in our series with a history and/or radiographic evidence of a foreign body had multiple foreign bodies. The rigid esophagoscopy in the hands of skilled endoscopist is safe. Giordano et al. [25] in a review of the literature reported an estimated incidence of 0.34 perforations and an estimated 0.05 mortality for the use of rigid esophagoscopy in removal of EFBs. The absence of mortality and the perforation study testified the efficacy and safety of such a procedure in the hands of a skilled operating team. Consequently, we fully agreed with Hawkins et al. [26], that this technique is human, controlled and probably one of the safest operations known to modern medicine.

All the problems encountered in this series are similar to those reported in the literature. They were related to exacerbation of pre-existing esophageal and/or respiratory illnesses and the use of blind techniques in order to avoid general endotracheal anesthesia with its slight risk might be made worse by struggling and vomiting that accompany extraction of EFBs.

With regard to the conservative treatment of coins in children, some authors [27,28] have clearly demonstrated that some esophageal coins will pass to the stomach in 1–5 h and as a result it may be that 24 h from the time of ingestion represents a safe period of observation in a child with asymptomatic esophageal coin and without a history of esophageal disease or surgery and where good follow-up is assured. However, parents felt generally inconvenienced by the return visit to the emergency department and preferred to have the coin removed at the initial visit. On the other hand, the degree of the discomfort and risk and the cost of removal would vary depending on the method of removal. The drawback of such an attitude is that a large series is necessary to further delineate the efficacy and confirm the safety of delaying removal for up to 24 h.

Finally, we conclude with others that preservation of the airway is regarded to be the most important consideration in foreign body management. It is best accomplished by general endotracheal anesthesia and foreign body removal under direct vision by esophagoscopy [29]. The high success rate of EFB removal coupled with low failure and perforation rates suggest that endoscopy should be the preferred method for esophageal impactions, in both adult and pediatric cases. Our preference to use rigid esophagoscopy is supported by many authors since the larger instrument allows removal of most objects in one setting and without withdrawing the endoscope.

References