Esophageal foreign bodies: an experience with rigid esophagoscope in Otolaryngology

Original Article

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Abstract

Esophageal foreign body (FB) impaction is a medical emergency due to its potential complications. This is a single-center retrospective review of 47 cases of esophageal FB impaction managed with rigid esophagoscopy at a tertiary care hospital between 2013 and 2023. Data on demographics, presentation and complications were analyzed using descriptive statistics, Chi-square, Kruskal-Wallis tests and multivariate logistic regression. Patients had a mean age of 52 years, with 85.1% being adults. Globus sensation (80.9%) and odynophagia (61.7%) were the most common symptoms. Fish bones were the leading FB type in adults (40.0%) and coins predominated in children (58.0%). Complications occurred in 40.4% of cases. Significant associations were observed between object size, delayed presentation and complications ($p< 0.05$). Rigid esophagoscopy is the gold-standard for managing esophageal foreign bodies in the cricopharyngeal and cervical esophagus. Our study suggests that early intervention is critical, particularly for patients presenting with identified risk factors.

Keywords: impacted foreign bodies; esophagus; rigid esophagoscopy

Introduction

Foreign body (FB) ingestion is a common presentation in emergency department (ED), affecting both pediatric and adult populations. In adults, fish and meat bones or dental prothesis are very common, while coins and batteries are more prevalent among children.[1-3] While most of the swallowed FB pass spontaneously, about 10-20% require endoscopic removal and about 1% need surgery. Esophageal foreign body impaction is an emergency that can lead to serious complications such as airway obstruction, esophageal perforation and mediastinitis.[3-5] Clinical presentations of esophageal FB

impaction vary from asymptomatic cases to severe manifestations, including drooling, odynophagia and dysphagia. Patients who delay seeking care, risk worse outcomes when there is an esophageal impaction.[1,7,8] Endoscopy, flexible or rigid, is the preferred treatment for the removal of impacted FBs. Rigid endoscopy is the most effective method for the cricopharynx and cervical esophagus, which is the most common site of objects impaction, as it is the narrowest part of the upper gastrointestinal tract. This technique is particularly advantageous for removing penetrating, blunt or large objects.[1,4,6,7] The present study aims to evaluate the clinical presentation, management and outcomes of a series of patients who underwent rigid esophagoscopy and investigate the risk factors for complications after FB ingestion.

Materials and Methods

A retrospective study was conducted for patients who underwent rigid esophagoscopy for suspected foreign body impaction. It included 47 patients admitted between January 2013 and December 2023 at the Otolaringology Department of Unidade Local de Saúde Santa Maria, Portugal. The data was collected for patient demographics, clinical features and outcomes, which included: comorbidities, symptoms, features and location of the FB, timing until seeking medical observation at ED and complications. Exclusion criteria included lack of foreign body confirmation and successful management by Gastroenterology. Minor complications were confined to the superficial layers of the esophagus, while major complications involved transmural damage and infection of adjacent mediastinal tissues. Statistical analysis was performed using the statistical program for social sciences (SPSS v.29). Non-parametric tests (Chi-square, Kruskal-Wallis) and multivariate logistic regression were used to assess relationships between clinical variables and complications. The statistical significance level used was 0.05. Regarding the ethical considerations, in our institution, retrospective studies do not require formal approval from the Ethics Committee. However, authorization is required for access to clinical data, which was obtained for this study.

Results

Forty-seven patients were included, 13 were males (27.7 %) and 34 females (72.3 %), with male:female ratio of 1:2. The mean age was 52 years (1-97), with the most affected age group being 61-80 years, followed by 41-60 years (Table 1). Seven cases (14.9%) were pediatric, while the remaining 40 (85.1%) were adults.

Most patients presented with globus sensation (80.9%), odynophagia (61.8%), and dysphagia (55.3%). Dyspnea was observed in 6.4% of cases (Table 2). While 72.0% of patients presented to the ED within 24 hours of FB ingestion, 15.0% only showed up after 72 hours (Figure 1). The cricopharyngeal/cervical esophagus was the most common site of FB impaction (97.9%) and there was only one case of impaction in the lower thoracic esophagus.

Rigid esophagoscopy was performed in all cases with 100 % success in the extraction, and almost 30% had a previous failed attempt of flexible endoscopy. There were no complications associated to both procedures.

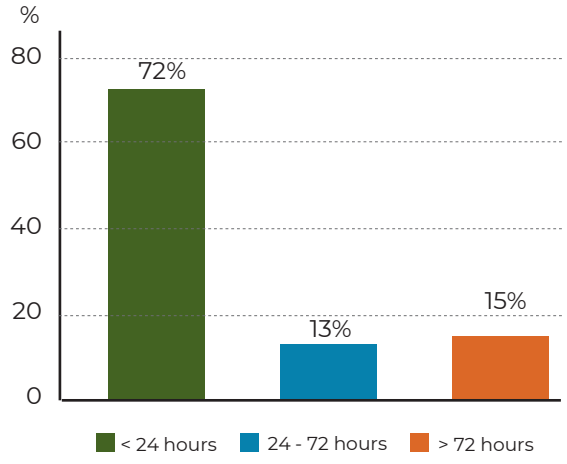
Table 1
Age-wise distribution of patients

Age group (years)	Number of cases	Percentage	Mean age (years)
1-20	8	17.0 %	7.38
21-40	4	8.5 %	31.75
41-60	12	25.5 %	52.17
61-80	21	44.7 %	68.90
81-100	2	4.3 %	90.0

Table 2
Clinical presentation of the 47 patients in this study

Parameter	Number of cases	Percentage
Globus sensation	38	80.9 %
Odynophagia	29	61.7 %
Dysphagia	26	55.3 %
Sialorrhoea	15	31.9 %
Neck pain	4	8.5 %
Dyspnea	3	6.4 %

Figure 1
Graph showing the onset-to-admission interval



Fish bones (40.0%), meat bones (26.0%), and meat bolus (13.0%) were the most common FB in adults, while coins (58.0%) predominated in children (Table 3). Most of the objects measured 2.0 cm, with the smallest being 1.5 cm and the largest 4.0 cm (longest axis). Complications occurred in 19 patients (40.4%), 13 were minor (mucosal laceration = 27.8 % of the total) and 6 major (esophageal perforation = 10.6 %; mediastinitis = 2.1 %). Most complications were identified following the removal of the foreign body. All these cases were managed with nasogastric feeding tube, intravenous broad-spectrum antibiotics and proton-pump inhibitors, leading to favorable outcomes. There was no mortality recorded. We used Kruskall-Wallis analysis to identify associations between the onset to admission interval and reported complications.

A statistically significant relationship was observed between the onset to admission interval and two complications: mucosal laceration and esophageal perforation (p=0.007 and p=0.001). Additionally, a Chi-square test revealed that presenting to the ED more than 24 hours after symptom onset was significantly

Table 3
Esophageal foreign body and age group distribution

	Age group distribution (years)				
Foreign bodies	1-20	21-40	41-60	61-80	81-100
Coins	4	—	—	—	—
Fish bones	—	3	4	10	2
Meat bones	1	—	5	6	—
Dentures	—	—	2	—	—
Meat bolus	1	1	1	3	—
Batteries	1	—	—	—	—
Fruit or vegetable	—	—	—	2	—
Shell	1	—	—	—	—

associated with these complications (p=0.013 and p=0.006, respectively). Multivariate logistic regression revealed that object size was an independent risk factor for mucosal laceration (p<0.001) and esophageal perforation (p=0.014), while delayed presentation to the ED was an independent predictive factor for esophageal perforation (p=0.006).

Discussion

The findings of this study highlight the importance of early intervention in managing esophageal FB impaction. The most affected age groups in our study were 61-80 years, followed by 41-60 years. There are some studies that find the pediatric patients as the most affected[3,9,10] but Tseng et al. showed that the largest proportion of esophageal FB cases occurred in the middle age years, followed by elderly individuals (> 60 years).[4] Our results may likely be related to the sample distribution and the fact that this age group is older. Most of our patients presented to ED in the first 24 hours after swallowing the FB, with symptoms of globus sensation, odynophagia and dysphagia, which is consistent with the literature.[3,5,8] The commonest foreign bodies among children and adults were coin and fish or meat bone, which is also in accordance with the literature, as Wahid et al. and Tseng et al. report in their studies.[4, 8] The cricopharyngeal region, being the narrowest part of the esophagus, was the most common site for object impaction in our study. Rigid esophagoscopy remains the gold-standard for the removal of esophageal foreign bodies, especially for penetrating or blunt objects in the cricopharyngeal region, with reported success rates ranging from 94.0 % to 100.0 %.[3, 11] It was our method of choice and we had no complications associated with this procedure, although some studies report a complication incidence between 0.05 % and 0.34 %.[3]

We had a higher complication rate associated with impacted foreign bodies (40.4 %), comparing to other studies, but most were minor complications.[12,13] This finding may be partially explained by characteristics of our population and the nature of the foreign bodies involved. Notably, a proportion of patients (15.0%) presented to the ED more than 72 hours after symptom onset. Delayed presentation has been consistently associated with an increased risk of complications, likely due to prolonged mucosal irritation, local inflammation, and the potential for deeper tissue penetration or secondary infection.

Furthermore, the predominance of fish bones as the most common type of foreign body in our cohort may have also contributed to this observation. Fish bones are typically thin and pointed, which increases the likelihood of local trauma and migration into adjacent tissues. In line with our findings, Singh et al. have also reported higher complication rates associated with fish bone impaction given its sharp shape.[12] In our study, a time interval exceeding 24 hours between symptom onset and presentation to the ED was significantly associated with the occurrence of esophageal mucosal laceration and esophageal perforation. This finding is consistent with previous research by Hung et al. and Nasef et al., who reported that FBs impacted for more than 24 hours were 14.1 times more likely to result in major complications.[1,14] Furthermore, object size and the time interval from symptoms onset to ED presentation, emerged as independent predictors of both minor and major complications. This aligns with other studies, that identified prolonged duration of impaction, sharp or bony FBs and larger objects as key risk factors for complications.[4,13,15]

It is also important to note that the cases included in our cohort were generally more complex, as our institution is a tertiary referral center and serves as the ENT metropolitan emergency hub for Lisbon.

This was a retrospective single-institution study, which can have limitation on its generalizability. In addition, the sample size can also limit the strength of our results. More prospective, multicentre randomized controlled trials are recommended to validate our findings and optimize management protocols.

Conclusions

Rigid esophagoscopy is a safe and effective method for managing esophageal FBs, particularly in the cricopharyngeal and cervical esophagus. Our study suggests that early intervention is crucial for patients presenting with risk factors such as large FBs or delayed ED presentation to minimize complications and improve outcomes.

Conflicts of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

Data Confidentiality

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

Protection of humans and animals

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the 2013 Helsinki Declaration of the World Medical Association.

Privacy policy, informed consent and Ethics Committee Authorization

The authors declare that they have written consent for the use of photographs of patients in this article.

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Availability of scientific data

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Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The authors did not use generative AI or AI-assisted technologies in the preparation of this manuscript and assume full responsibility for the content of the publication.

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