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ORIGINAL ARTICLE – OPEN ACCESS

Most Frequent Esophageal Foreign Bodies Ingested by Children

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ABSTRACT

Objective: The presence of a foreign body in the esophagus represents one of the gastroenterological emergencies. In this study, we aimed to evaluate retrospectively foreign bodies attached to the esophagus.

Materials and Methods: The files of pediatric patients admitted to the university hospital due to ingestion of foreign bodies between January 2018 and January 2019 were examined retrospectively, and those attached to the esophagus were evaluated.

Results: A total of 215 pediatric patients were admitted with the complaint of foreign bodies ingestion, and 63 (29.3%) of them had foreign bodies impacted in the esophagus. The mean age of the 63 patients (55.6% males) was 4.8±3.9 years. The mean age of 152 cases (58% males) was 5.3±3.8 years. Of the cases with foreign bodies impacted in the esophagus, 10% were Syrian refugees. Most of the foreign bodies removed from the esophagus endoscopically were coins, which were frequently attached to the upper esophageal sphincter. In the remaining patients, the foreign bodies (mostly coins) pass through the gastrointestinal tract without any problems.

Conclusion: Endoscopy is an important method in the treatment of esophageal foreign bodies. An early intervention is important in patients who ingested a button battery. However, adolescents who have food impacted in the esophagus should be evaluated earlier in terms of eosinophilic esophagitis.

Keywords: Esophagus, foreign body, pediatric

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INTRODUCTION

Infants are quite keen on swallowing foreign bodies because they start to explore the external world using their mouth. The vast majority of patients swallowing foreign bodies are under 5 years of age, and unlike adults, almost all of the events occur accidentally in children. Children mostly swallow coins, pieces of toys, jewelry, magnets, or batteries found in their surroundings (1). A total of 80%–90% of ingested foreign bodies pass the gastrointestinal tract spontaneously without impaction, while 10%–20% are removed endoscopically, and 1% of them require open surgery due to complications (2). Foreign bodies are most commonly lodged in the upper esophageal sphincter, middle esophagus, lower esophageal sphincter, pylorus, duodenal fold, Treitz ligament, ileocecal valve, and rectosigmoid region (3). Foreign bodies impacted in the esophagus should be removed immediately due to the risk of perforation. Foreign body in the esophagus should be suspected in the presence of a sudden onset of sore throat and difficulty at swallowing saliva or food. It is possible to visualize radiopaque foreign bodies radiographically; however, if nothing can be seen, and foreign body ingestion is suspected, endoscopy is required. Esophageal foreign bodies can be removed up to 24 hours in asymptomatic cases, while in symptomatic cases and those where batteries, magnets, or sharp objects are ingested, foreign bodies should be removed within 2 hours without delay (1). The present study aimed to evaluate the cases with foreign body ingestion and cases when foreign bodies were impacted in the esophagus.

MATERIALS and METHODS

The files of the patients admitted to the Erciyes University Faculty of Medicine Department of Pediatric Gastroenterology between January 2018 and January 2019 with the complaint of foreign body ingestion were examined retrospectively. The age, gender, admission time, type of foreign body, endoscopic findings, comorbidities, and city of residency were collected from the patient files. The records of the patients who were listed with T18 and a foreign body in the gastrointestinal tract as the code and name of diagnosis according to the International Classification of Diseases were screened retrospectively in the data-processing records of our hospital. The study was approved by the ethics committee of Erciyes University Faculty of Medicine (Date: 04/17/2019, Decision No: 2019/281). Written and verbal consents were also obtained from the parents of the patients.

An X-ray including the thorax and abdomen was obtained from the children admitted to our clinic with the complaint of foreign body ingestion. If the patient swallowed a button battery, and it was impacted in the esophagus, the foreign body was removed endoscopically regardless of the fasting duration. In cases other than button battery ingestion, 4–6 hours of fasting were conducted, and the cases were then evaluated endoscopically. The radiographies taken after 6–8 hours revealed that the foreign body in the stomach or intestine progressed. The cases living in Kayseri were called for control visit after 2 days; however, it was waited for the foreign bodies to pass the gastrointestinal tract completely in cases coming from upstate. Anesthesia (midazolam 0.1 mg/kg, propofol 1.5 mg/kg, fentanyl 1µg/kg) was administered by the anesthesiologist during the endoscopy procedure. The cases admitted during the working hours were taken to the Pediatric Endoscopy Unit, while those who came in during the off-hours and weekends were treated in the operation room of the hospital. While removing esophageal foreign bodies, patients were intubated by the anesthesiologist to protect their respiratory tract. Endoscopy was performed using the Fujinon 4400-HD-EG530FP model endoscopy system. An EG530N model endoscope was used in cases <8 kilograms. After the removal of the foreign body via the endoscopic examination, patients were evaluated with control endoscopy for injury. Patients were monitored for 2–4 hours nil by mouth after the procedure, and they were then fed orally. Those patients without complications such as nausea and vomiting were discharged.

Statistical Analysis

Data were evaluated by SPSS v. 22.0, using the descriptive statistical method.

RESULTS

A total of 215 children were brought to our clinic with the complaint of foreign body ingestion between January 2018 and January 2019. Foreign bodies were impacted in the esophagus of 63 (29.3%) cases. In other 152 cases (mean age 5.3±3.8 years, 58% males), foreign bodies were expelled with feces after passing through the gastrointestinal tract. The mean age of the 63 patients (55.6% males) was 4.8±3.9 years (range, 1–17 years). The vast majority of cases presented from Kayseri (Fig. 1). However, 6 (10%) of the patients who had foreign bodies in the esophagus were Syrian refugees. The mean age of Syrian refugees was 7.6±3.8 years (range 2–15 years). Two patients with foreign bodies in the esophagus had autism, and others had no other systemic disease. The majority of objects removed from the esophagus via the upper gastrointestinal endoscopic examination were coins.

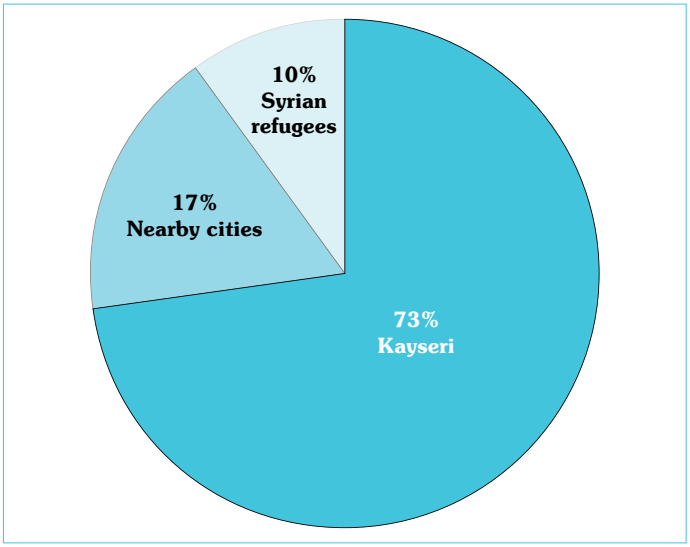

Figure 1. Distribution of cases by place of residence

Table 1. Distribution of foreign bodies impacted in the esophagus

Foreign body	n	%
Coin	45	71.3
Safety pin	4	6.3
Toy piece	3	4.8
Button battery	3	4.8
Latch spring	2	3.2
Keychain piece	1	1.6
Pin	1	1.6
Meat	1	1.6
Cornelian cherry	1	1.6
Peach seed	1	1.6
Button	1	1.6
Total	63	100

This was followed by pins, pieces of toys, and button batteries. The distribution of foreign bodies impacted in the esophagus is presented in Table 1. A few of the foreign bodies extracted from the esophagus are shown in Figure 2. Esophageal foreign bodies were localized in the upper esophageal sphincter in 58 (92%) of the cases with an esophageal foreign body, and in the middle esophagus in the remaining 5 (8%) cases.

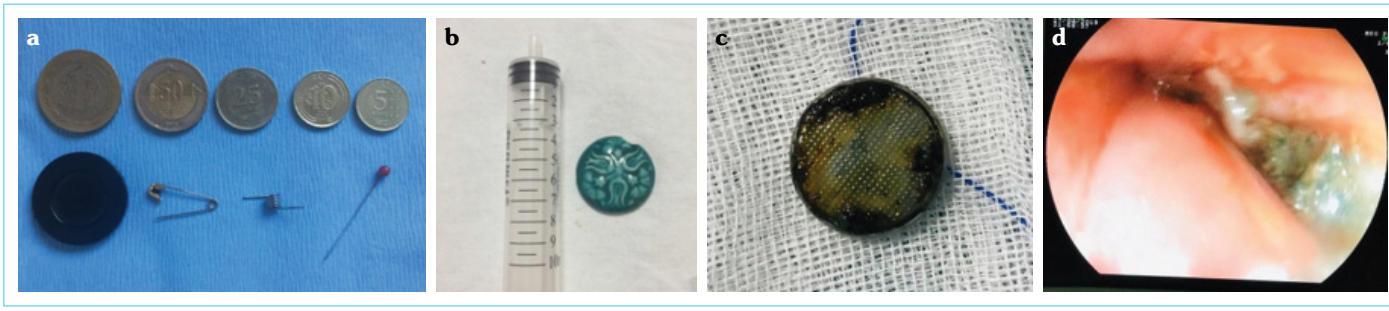

Figure 2. a–d. (a) Foreign bodies extracted from the esophagus; (b) a keychain piece; (c) a button battery; (d) esophageal injury caused by the button battery

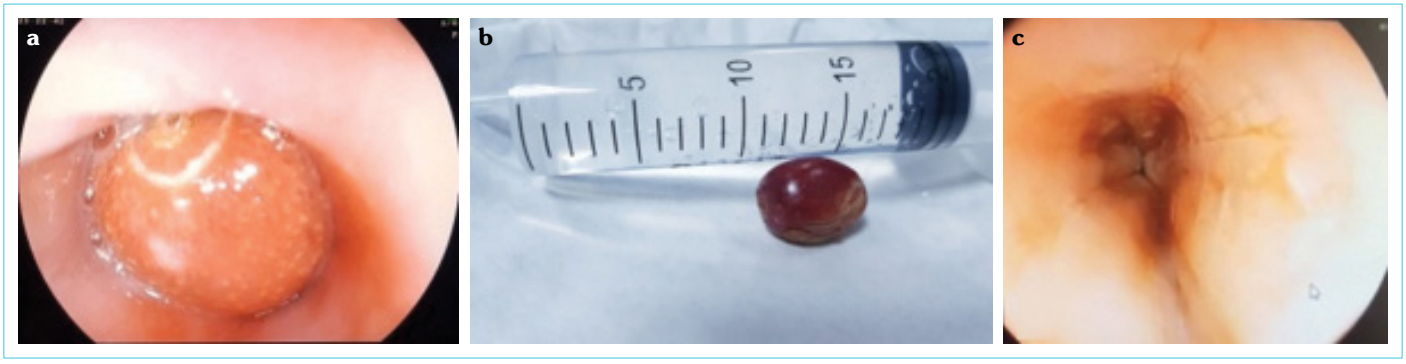

Figure 3. a–c. (a) Cornelian cherry impaction in the esophagus; (b) cornelian cherry removed from the esophagus; (c) proximal-mid esophagus imaging with furrows and trachealization

There were 83 coins (54.6%), 16 hair clips (10.5%), 12 button batteries (7.9%), 12 toy balls (7.9%), 10 iron wires (6.5%), 8 metal zippers (5.3%), 6 buttons (3.9%), 4 latch springs (2.6%), and 1 earring (0.6%) among 152 foreign bodies passing through the esophagus. These foreign bodies had left the gastrointestinal tract without any problems.

Except for 1 patient who swallowed a button battery impacted in the esophagus, none of the cases had injury secondary to foreign body ingestion as proven endoscopically. Only 1 patient had superficial necrosis due to the battery present in the upper esophagus. This 1-year-old was brought to our clinic 2 hours after swallowing the battery, and the endoscopic procedure was performed right away. This patient was monitored nil by mouth for 4 days, and water was allowed on the 5th day. After no problems were detected, liquid diet was initiated. No complications occurred during monitoring, and the patient was discharged as recovered.

A 9-year-old male had a feeling of a cornelian cherry impaction in his esophagus for 2 days, followed by difficulty at swallowing and nausea complaints. Thoracic computed tomography was performed to see if there were any foreign bodies in the esophagus or respiratory system in another hospital before being referred to our clinic. It was determined that there was a foreign body that was 8 mm in size in the proximal part of the esophagus, and the patient was brought to the emergency department of our hospital. Esophagogastroduodenoscopy under general anesthesia indicated that there was a cornelian cherry impaction in the upper part of the esophagus (Fig. 3a). This cornelian cherry was pushed with the endoscope and down to the stomach. The foreign body 17 mm in size was removed using a mesh snare (Fig. 3b). The esophagus mucosa was pale; there were longitudinal and transverse furrows and slight trachealization (Fig. 3c). The gastric and duodenal mucosa were normal. As a result of 20–25 eosinophil counts in a large amplification in the histopathology of biopsies taken from the esophagus, the diagnosis was reported as eosinophilic esophagitis. Since the patient living outside the province could not be reached, allergy testing could not be performed.

Foreign bodies were removed endoscopically in all patients brought with foreign body ingestion and foreign body impaction in the esophagus. No endoscopic pathology was detected, except for the cases with button battery and cornelian cherry ingestion. Following an endoscopic removal of foreign bodies, all patients underwent control endoscopy and no additional pathology was noted esophagogastroduodenoscopically.

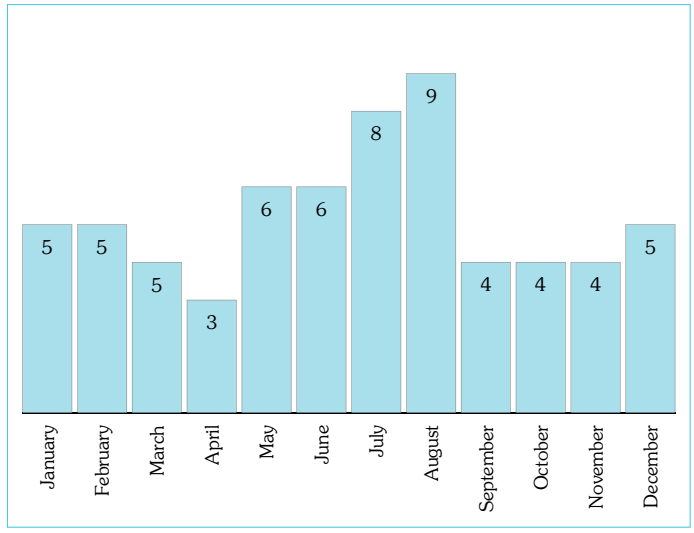

Figure 4. Monthly distribution of foreign bodies in the esophagus

The number of cases who underwent endoscopy due to esophageal foreign body increased during the summer months, mostly between July and August (Fig. 4).

Endoscopy was performed under general anesthesia, and endotracheal intubation in all patients admitted with the suspicion of foreign body ingestion and foreign body impacted in the esophagus was conducted. Foreign bodies in the anatomical regions other than the esophagus were observed to progress on sequential radiographs and reported to pass the gastrointestinal tract without requiring endoscopic intervention.

DISCUSSION

The majority of patients with a foreign body ingestion complaint are infants and toddlers. The impaction of ingested foreign body in the esophagus is one of the gastroenterological emergencies. Coins are the most commonly ingested foreign bodies in childhood and often lodge in the cricopharyngeal sphincter (1). While coins are frequently swallowed in Western countries, fishbone is the most frequently swallowed foreign body in Asian countries (4). Most of the foreign bodies impacted in the esophagus were coins in the present study, and they were most frequently lodged in the upper esophagus, which is at the level of the cricopharyn-

geal sphincter. In children aged >5 years, objects smaller than 20 mm are less likely to be impacted into the esophagus (1). In our study, objects attached to the esophagus were impacted because they were large in size.

Studies on foreign body ingestion reported that boys had a slightly greater tendency for foreign body ingestion (5–7). The present study also supported that statement with a slightly higher rate of foreign body ingestion in males. Similar results from different geographic regions suggest the tendency of boys to ingest foreign bodies; however, we encountered no studies on the subject in the literature.

Turgut et al. (8) reported that the rate of accidental foreign body ingestion was higher in children with attention-deficit/hyperactivity disorder. Serour et al. (9) presented the case of an autistic adolescent in whom intestinal obstruction developed secondary to a plant foreign body ingestion. Two patients had autism in the present study. Both ingested coins, which were removed endoscopically since they were impacted in the esophagus.

Ten percent of the cases who underwent endoscopic intervention due to foreign bodies in the esophagus were Syrian refugees. The mean age of these cases was above the general mean age. Poor living conditions of the Syrian cases might have had an impact.

Patients who ingested a foreign body are admitted to hospitals every month of the year. The present study pointed to an increase in hospital admissions, especially in the summer months. This was explained by the fact that the children acted more freely during summer months. Summer school break may also contribute to this situation

Food in the esophagus is the most common foreign body in the adolescent and adult group. Food impactions in the esophagus are often secondary to an underlying esophageal pathology, such as reflux esophagitis, eosinophilic esophagitis, and esophageal motility disorders (1). The dimensions of the average cornelian cherry fruit are 21x15 mm, and the average seed size is 14x7 mm in Turkey (10). In our case, the cornelian cherry fruit was impacted in the upper part of the esophagus, and it led to chest pain in addition to dysphagia and vomiting. Foreign bodies that are impacted in the esophagus can cause dysphagia, odynophagia, and chest pain (11, 12). Eosinophilic esophagitis is one of the important predisposing reasons for food impaction in the esophagus, especially among adolescents who have not previously undergone esophageal surgery. Eosinophilic esophagitis is an inflammatory disorder of the esophagus due to food allergy (13). If a patient applies with esophageal food impaction, the bolus must be endoscopically removed in the first 24 hours (1, 13). Acute or recurrent food impaction is a common finding in eosinophilic esophagitis. It is reported that food impaction–secondary to eosinophilic esophagitis is more common among boys aged 9–10 years (1). Indeed, our patient was a 9-year-old boy. Our patient had been hungry for a long time when he got to our clinic, thus, he underwent emergency gastrointestinal endoscopy, and the cornelian cherry was endoscopically removed. Biopsies were taken during the endoscopy due to the mucosal changes in the esophagus, and the patient was diagnosed with eosinophilic esophagitis. Hiremath et al. (14) emphasized in their meta-analysis that food impaction can be an indication of eosinophilic esophagitis and that the relationship between them is usually ignored. Typical endoscopic findings of eosinophilic esophagitis include esophageal rings, thickened or pale mucosa accompanied by furrows, white exudates, and less frequently, narrowing of the esophagus (15). The diagnosis of this case was made through the biopsies taken during the endoscopy due to the pathology of the esophageal mucosa. The patient was old enough to consume cornelian cherries; however, due to the eosinophilic esophagitis, the cornelian cherry could not pass to the distal and was impacted.

Among the foreign bodies swallowed were objects such as toy pieces and latch springs. Small toy pieces pose a danger for young children. Similarly, children can swallow the spring that occurs when they are split into two while playing with a latch. In our study, in 2 patients who swallowed the latch spring, it was impacted in the esophagus, and the other 4 had passed it without impaction. This finding was associated with latch springs being of different dimensions.

A plain radiography (X-ray) is obtained in all patients admitted to our clinic with the complaint of foreign body ingestion. If the plain X-ray shows the foreign body in the esophagus, it is removed endoscopically using the foreign body extraction forceps under anesthesia and endotracheal intubation after completing the fasting period. If the foreign body cannot be removed by forceps, after being lowered by pushing into the stomach by the endoscope, and if it is not food, it is removed with the help of a mesh snare, while the food segment is not further processed. In a case who swallowed a peach seed, the foreign body was pushed into the stomach and then removed by means of a mesh snare. A button battery that was invaded into the esophagus tissue (in only 1 case) was removed using the Magill forceps. If the foreign body is in the stomach or small intestine, a control X-ray should be taken after 6–8 hours to monitor its passage in the gastrointestinal tract. If it progresses further, it is awaited for endoscopy. The present study showed that 215 children were brought to our clinic due to foreign body ingestion. Foreign bodies were impacted in the esophagus in approximately one-third of the cases, while they were expelled after completing the passage in the gastrointestinal tract in the remaining cases. No foreign-body-related complications occurred except in 2 cases. One ingested a button battery, and the other was diagnosed with eosinophilic esophagitis after the impaction of a cornelian cherry.

In conclusion, unfortunately, foreign body ingestion happens despite the all warnings. The present article aimed to emphasize that the ingestion of button batteries was very risky in terms of esophageal injury, thus warranting an urgent removal endoscopically, and that the food impaction in the adolescent age group, an important sign of eosinophilic esophagitis, should be paid special attention. We suggest that pediatricians warning families at every visit about being always careful concerning foreign bodies ingestion will reduce the number of cases.

Ethics Committee Approval: The study was approved by the ethics committee of Erciyes University Faculty of Medicine (Date: 04/17/2019, Decision No: 2019/281).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – D.Altay; Design – D.Altay; Supervision – D.Altay, D.Arslan; Resource – D.Altay, D.Arslan; Materials – D.Altay; Data Collection and/or Processing – D.Altay, D.Arslan; Analysis and/or Interpretation – D.Altay, D.Arslan; Literature Search – D.Altay; Writing – D.Altay; Critical Reviews – D.Arslan.

Conflict of Interest: The authors have no conflict of interest to declare.

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