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Removal of foreign objects seen in the upper gastrointestinal tract with the help of endoscopy: A retrospective cohort study

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Ethics Committee Approval
The study was approved by Bandırma Onyedi Eylül University Ethics Committee with the decision numbered 2023-71 on April 13, 2023. All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

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Abstract

Background/Aim: Delay in diagnosing and treating gastrointestinal (GI) tract foreign bodies may lead to serious complications. In this study, we aimed to retrospectively evaluate the patients who underwent emergency upper GI endoscopy for foreign body ingestion in our clinic.
Methods: Between 2015 and 2022, we evaluated 68 patients who underwent emergency upper GI endoscopy with a prediagnosis of foreign body ingestion. The evaluation included factors such as age, gender, presenting complaints, foreign body type, localization, and treatment parameters.
Results: Out of the 68 patients included in the study, 21 (30.89%) were female, and the mean age was 54.00 years. Among them, 43 (63.23%) presented with no active complaints, 23 (33.82%) with dysphagia and odynophagia, and two (2.94%) with vomiting. The swallowed objects were classified as follows: coin (n=2), pin (n=5), battery (n=11), drug plaque (n=6), esophageal foreign body (n=7), piece of meat (n=5), chicken bone (n=4), fish bone (n=5), razor (n=7), lighter (n=3), and toothpick (n=1). The foreign bodies were located in the esophagus in 23 cases (33.82%), in the stomach in 32 cases (47.05%), and in the duodenum in one case (1.47%). For 12 patients (17.64%), the foreign body could not be detected endoscopically but was detected using radiologic methods. Among the foreign bodies, 54 (79.41%) were successfully removed. In one patient (1.47%) who could not be removed endoscopically and another patient (1.47%) who developed gastrointestinal perforation due to a foreign body (toothpick), a surgical procedure was performed.
Conclusion: Early diagnosis and treatment of foreign body ingestion are crucial in preventing serious complications. Endoscopy, a minimally invasive procedure, can be a safe alternative to surgical procedures, which may carry higher morbidity and mortality risks.

Keywords: gastrointestinal tract, endoscopy, foreign body, minimally invasive approach

Introduction

Gastrointestinal tract (GI) foreign bodies can result in significant morbidity and mortality, particularly in vulnerable populations such as children, the elderly, and psychiatric patients. Notably, around 85% of foreign bodies are asymptomatic and naturally expelled from the body through peristalsis. However, certain foreign bodies may necessitate endoscopic or surgical intervention [1].

Ingestion of foreign bodies can occur in adult patients, particularly in cases of accidental ingestion of needles, inadequately chewed pieces of meat, and animal bones that fail to progress through esophageal peristalsis and end up invading the mucosa. Additionally, it may also be observed in psychiatric populations and among prisoners attempting voluntary suicide while in prison. While some swallowed foreign bodies may pass through the digestive system without causing harm, sharp-edged objects, impaired gastrointestinal motility, and large objects that cannot progress may lead to significant morbidity and mortality [2].

The initial step in the diagnosis involves a detailed history and physical examination. While some patients may exhibit gastrointestinal symptoms, others may remain asymptomatic. The shape and localization of the ingested foreign body and the patient's age and body structure play a crucial role in developing complications and gastrointestinal symptoms [3]. The most frequently reported symptoms include dysphagia, odynophagia, a choking sensation, and vomiting [4]. Prompt diagnosis and treatment are essential for foreign bodies in the gastrointestinal system. In this regard, physical examination is complemented by radiologic imaging for accurate diagnosis [5].

Delay in diagnosing and treating gastrointestinal foreign bodies may result in life-threatening complications, including perforation and obstruction. The size, location, shape, and duration of time elapsed after ingestion are crucial factors influencing the development of complications [6].

Endoscopy presents a minimally invasive alternative when compared to surgery. In this study, we have highlighted the significance of upper GI endoscopy for patients admitted to our clinic with foreign body ingestion.

Materials and methods

Between January 2015 and January 2022, we conducted a retrospective evaluation of 74 patients who presented to the emergency department of our hospital with foreign body ingestion.

Six of the admitted patients refused treatment and left the hospital. For all patients admitted to the emergency department with a history of foreign body ingestion, the primary evaluation involved a physical examination followed by direct radiography. In cases where opacity was observed on the direct radiography, the patients underwent upper GI endoscopy. Those who did not show opacity on direct radiography but had a reliable history of foreign body ingestion were included in the endoscopy procedure. On the other hand, patients with low reliability in their anamnesis underwent computed tomography.

The endoscopy procedures were carried out using single-channel endoscopes (EPX-3500 HD, Fujifilm, Singapore; EPK- i5000, Pentax, Japan) by endoscopists with 5 years of experience.

The inclusion criteria for this study were being over 18 years of age and providing consent for endoscopic procedures. Patients who could not be anesthetized, those who refused to undergo endoscopic procedures, and individuals below 18 years of age were excluded from the study.

We evaluated 68 patients who underwent emergency upper GI endoscopy for foreign body ingestion. The assessment focused on various aspects, including age, gender, symptoms, physical examination results, radiological findings, type and localization of the foreign body, and the treatment method used.

This study received approval from the Bandırma Onyedi Eylül University Ethics Committee on April 13, 2023, under decision number 2023-71.

Statistical analysis

All data analyses were conducted using SPSS statistical software program, version 19.0 for Windows (SPSS Inc., Chicago, IL, USA). The Chi-square test or Fisher's exact test was utilized for the statistical analysis of categorical data. Ratios were calculated with a 95% confidence level. A *P*-value <0.05 was deemed statistically significant.

Results

Of the 68 patients included in the study, 21 (30.89%) were female, and 47 (69.11%) were male. The mean age of the patients was 54.00 (14.33) years, with an age range of 22–90 years. Among the patient population, 16 patients (21.2%) had a psychiatric diagnosis (1 with schizophrenia and 15 with psychosis), while 33 patients (48.50%) were prisoners.

When analyzing the patients' complaints, 43 (63.23%) had no active complaints, 23 (33.82%) presented with dysphagia and odynophagia, and two (2.94%) presented with vomiting. The ingested objects were classified as follows: coin (n=2) (Figure 1), pin (n=5), battery (n=11) (Figure 2), drug plaque (n=6), esophageal foreign body (n=7), meat piece (n=5), chicken bone (n=4), fish bone (n=5), razor blade (n=7), lighter (n=3), and toothpick (n=1).

Figure 1: Multiple coins arranged in a row (endoscopic image).

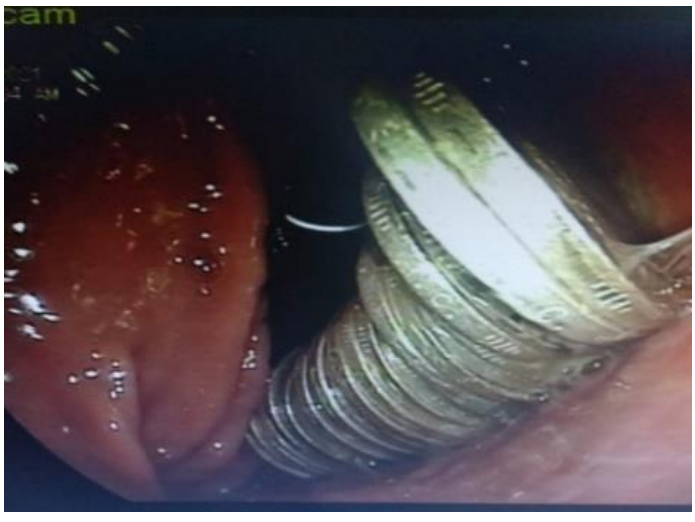

Figure 2: Endoscopic image of swallowed AA battery in the stomach.

All the patients who ingested batteries (AA type and AAA type alkaline batteries) as foreign objects were prisoners. Patients who ingested unchewed meat and chicken bones were mostly elderly (median age 68.00 years, n=32). Esophageally implanted foreign objects, pins, drug plates, batteries, razor blades, lighters, and toothpicks were found in young and middle-aged patients (median age 34.00 years, n=36).

When evaluating the localizations of the foreign bodies, 33.82% were located in the esophagus (n=23), 47.05% in the stomach (n=32), and 1.47% in the duodenum (n=1) (Table 1).

Table 1: Demographic characteristics, foreign body symptoms, types and localizations of the patients.

Parameter	
Age mean (SD), year	54.00 (14.33)
Sex	n (%)
Female	21 (30.89%)
Male	47 (69.11%)
Application complaint	n (%)
Asymptomatic	43 (63.23%)
Dysphagiaandodynophagia	23 (33.82%)
Vomiting	2 (2.94%)
Foreign body	n
Coin	2
Pin	5
Battery	11
Drugplaque	6
Implanted in the esophagus	7
Meatpiece	5
Chicken bone	4
Fishbone	5
Razorblade	7
Lighter	3
Toothpick	1
Foreign body location	n (%)
Esophagus	23 (33.82%)
Gastric	32 (47.05%)
Duodenum	1 (1.47%)

n: number, SD: Standard deviation.

Among the patients with foreign bodies in the esophagus, 22 (95.6%) presented with odynophagia within the first 24 h, while only one (4.4%) patient experienced odynophagia after 24 h. Following anamnesis, direct radiography was performed on all patients. Upper GI endoscopy was conducted in 51 (75.00%) patients who showed opacity on direct radiography. Additionally, endoscopy was performed in 11 (16.17%) patients based on high reliability of anamnesis, even when no opacity was observed on direct radiography, but there was a history of foreign body ingestion. Computed tomography was used as an advanced imaging procedure in six (8.82%) patients with low reliability in anamnesis. In these six cases, endoscopy confirmed the presence of foreign bodies.

Based on the anamnesis, the patients were admitted to the emergency department within a median of 12 h (min–max, 2–74 h). In 54 (79.41%) patients, the foreign body was successfully removed through emergency endoscopy. However, in 12 (17.64%) patients, the foreign body could not be detected even with the advancement of the endoscopy to the second part of the duodenum. These patients were subsequently followed up as outpatients and allowed to pass the foreign body spontaneously. In the followed-up patient group, spontaneous expulsion occurred within a median time of 24 h (min–max, 8–72 h).

In one (1.47%) patient, the foreign body could not be removed using a gastroduodenoscope, and as a result, the foreign body embedded in the gastric mucosa had to be surgically removed. Fortunately, no complications were reported during the surgical procedure.

Gastrointestinal perforation occurred as a complication related to the foreign body (toothpick) in one (1.47%) patient, leading to the need for emergency surgery. During surgical exploration, it was discovered that the patient had gastric perforation, and the stomach was repaired primarily.

Regarding the battery group, endoscopic removal of the foreign body was successful in seven patients (10.29%), while in four patients (5.88%), endoscopy could not detect the foreign body, and it was allowed to pass spontaneously. Additionally, mucosal erosion was found in five (7.35%) battery ingestion cases.

Discussion

Detailed anamnesis and physical examination are essential for diagnosing ingested foreign bodies. Patients may either be symptomatic or asymptomatic. The shape, localization, structure of the object, age of the patient, and the development of complications all play a role in the emergence of symptoms and signs. The most common symptoms and complaints include pain or discomfort while swallowing, a choking sensation, and vomiting with or without blood [7]. In our study, 43 patients (63.23%) had no active complaints, 23 patients (33.82%) presented with dysphagia and odynophagia, and two patients (2.94%) presented with vomiting.

Foreign bodies in the gastrointestinal system are among the conditions that require urgent diagnosis and treatment. Radiologic imaging methods should be effectively used for diagnosis. The diagnosis can be made through anamnesis and direct radiography. However, objects like glass, plastic, fabric, and wooden items may not be visible on direct radiography. Approximately 88% of ingested foreign bodies are radiopaque, allowing them to be visualized on direct radiographs, including those of the neck and thorax. Computed tomography (CT) may aid in identifying and locating foreign bodies, or gastroscopy may be performed for both diagnosis and treatment [8]. In our study, CT was used as an advanced imaging procedure in six patients (8.82%) with low reliability in anamnesis, and endoscopy was performed upon detecting a foreign body.

Once the diagnosis is made using imaging methods, treatment can be provided through endoscopy as the first option, surgical intervention when necessary, or spontaneous passage in appropriate cases. Approximately 80–90% of swallowed foreign

bodies can pass spontaneously, while endoscopic removal is required in 10–20% of cases, and surgical removal is necessary in less than 1% of cases [9]. Small foreign bodies that are radiopaque and have no sharp edges can be monitored without intervention using direct radiographs [10]. However, objects wider than 2 cm and longer than 10 cm require endoscopic removal as they cannot pass the pylorus [11]. In our study, only one patient (1.47%) underwent a surgical procedure, and the foreign body was successfully removed.

Foreign bodies may disrupt the digestive tract spontaneously or cause impaction, obstruction, perforation, and fistulization [12]. Wang et al. [13] reported an overall complication rate of 4.5%. In our study, one patient (1.47%) experienced gastrointestinal perforation due to a foreign body (toothpick)-related complication, leading to emergency surgery.

Velitchkov et al. [14] reported psychosis in 22.9% of 542 adult patients. A study by Misdrahi et al. [15] found that water intake decisions were influenced by the negative effect of antipsychotic drug non-compliance on treatment efficacy, with rates ranging between 11-80%. Bayindir et al. [16] supported suicidal behavior.

When alkaline batteries come into contact with salty human tissue, they release sodium hydroxide and chlorine gases, causing denaturation and necrosis [17]. One of the most important questions in battery ingestion cases is determining when to perform endoscopic intervention. Anderson et al. [18] reported that in 85% of cases, batteries easily passed through the gastrointestinal tract. Akay [19] emphasized in their study that in cases of battery ingestion in those with stomach ulcers, urgent endoscopic intervention should be performed to remove the batteries instead of allowing them to pass spontaneously.

In our study, among the patients in the battery group, endoscopic removal of the foreign body was performed in seven patients (10.29%), while in four patients (5.88%), endoscopy did not detect the battery, and it was left to pass spontaneously. Notably, the battery group consisted entirely of inmate patients, as the incidence of foreign body ingestion is higher in prisoners or due to psychiatric disorders [20]. The psychiatric examination of the 33 patients evaluated in the prisoner group found that the entire group swallowed foreign bodies as a reaction, with no patients exhibiting suicidal intent.

Limitations and strengths

Our study has both limitations and strengths. The main limitation is that it was retrospective. Additionally, the study's sample size was relatively small, which is another limitation. However, it is worth noting that foreign body ingestion patients are not a common population, and we believe that sharing this study with the literature will be valuable for future research endeavors.

Conclusion

In conclusion, foreign bodies in the gastrointestinal tract generally do not require surgical intervention and can often be removed endoscopically. However, it is essential to keep in mind that surgery may become necessary in certain cases due to complications. The flexible endoscope is an effective and safe method for removing gastrointestinal foreign bodies.

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