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Research Article

Endoscopic management of ingested foreign bodies in children: A tertiary center experience in Bangladesh



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ARTICLE INFO	A B S T R A C T		
<i>Keywords:</i> Foreign body ingestion Children Endoscopy	Aims: To examine the features of foreign body ingestion and evaluate the effectiveness of endoscopic therapy for foreign body ingestion in Bangladeshi children. <i>Methods</i> : I retrospectively reviewed the medical records of 97 children diagnosed with foreign body ingestion that required endoscopic removal from 2016 to 2023. <i>Results</i> : The children were aged between 3 months and 15 years, with a mean age of 2.9 ± 4.9 years, with more than 80 % of the patients being under 5 years of age. Foreign body ingestion was observed at a high frequency (71.1 %) in children aged one to five years. Coins (67 %) and button batteries (5.2 %) were the most common foreign bodies swallowed by kids, and the majority of them were accidental (97.9 %). The majority of the foreign bodies were blunt (74.3 %), but some were sharp (18.6 %). Fifty-six percent of esophageal foreign bodies and 94 % of gastric foreign bodies were asymptomatic. Around 80 % of button batteries and 77.8 % of pointed objects were effectively removed from the body within 24 h of ingestion. Similarly, food impaction and blunt objects (98.6 % and 100 %, respectively) were successfully removed after the 24-h period. Endoscopic removal was successful in 99 % of cases, with minimal complications. When button batteries and sharp objects were consumed, the severity of erythema, erosion, bleeding, and ulceration increased along with the length of impaction. <i>Conclusions</i> : Foreign body ingestion is a frequent occurrence in children under the age of five. Coin was the most common foreign body, with the majority of asymptomatic presentations. Prompt identification and timely extraction of swallowed foreign bodies may improve clinical outcomes.		

1. Introduction

Foreign body ingestion (FBI) is a prevalent clinical issue, and the nature of the foreign bodies consumed differs with age.¹ Food bolus impaction and FBI occur most frequently by accident during dining for adults.² FBI in children can be a major concern, particularly between the ages of six months and three years. In the United States, ingesting foreign

bodies is estimated to cause 1500 fatalities annually and cause severe morbidity in less than 1 % of patients. 3,4

The foreign body (FB) passes without difficulties and is emptied with feces after a few days in 80–90 % of instances, although 10–20 % may require endoscopic removal due to its difficulty or danger. Less than one percent may necessitate surgical intervention.^{5–7} The vast majority of FBIs in children are unintentional, unlike in adults. These cases typically

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(FBI=Foreign body ingestion; FB=Foreign body; ER=endoscopic removal)

Fig. 1. Study flow chart

(FBI=Foreign body ingestion; FB=Foreign body; ER = endoscopic removal).

involve commonplace objects like coins, toys, keys, jewelry, straight pins, needles, iron nails, magnets, and batteries, and they are reported to medical professionals when ingestion is observed or reported.^{4,8}

Most of the time, children are asymptomatic and only go to the doctor because someone sees them swallowing something.^{9–11} If symptoms are present, they are specifically associated with the position and properties of the foreign object within the gastrointestinal tract. When there is a FB in the esophagus, it can cause problems such as difficulty swallowing, noisy breathing, excessive drooling, coughing, chest discomfort,

vomiting blood, refusal to eat, feeling of a lump in the throat, sensation of congestion in the chest, or respiratory issues caused by the object pressing on the windpipe.

Large items can induce pyloric blockage, vomiting, and/or unwillingness to feed, although most patients who have a foreign body transit into their stomach are asymptomatic.¹² Likewise, individuals who have foreign bodies traverse the intestinal tract typically exhibit no symptoms. Complications, including blockage, perforation, and peritonitis, might arise from the infrequent occurrence of ileocecal valve retention. An



Fig. 2. Management algorithm for foreign bodies in esophagus, stomach and duodenum²³ (Emergent = within 2 h; Urgent = within 24 h; Elective = more than 24 h; BB = button battery; ER = endoscopic removal) *Emergent ER in all symptomatic patient.

accurate medical history, thorough physical tests, and radiological assessments are necessary for making a diagnosis. 13

If the FB is sharp, long (>5 cm), or made of a super absorbent polymer, if it is a high-powered magnet or disk battery stuck in the throat, if there are indications of airway blockage or esophageal obstruction (e.g., the patient can't swallow secretions), or if there are symptoms that suggest intestinal blockage or inflammation (abdominal pain, vomiting, fever), then immediate intervention is required to remove the FB.^{14–16} It is reasonable to observe for 12–24 h the spontaneous passage of blunt foreign materials stuck in the esophagus without symptoms if they do not have the aforementioned characteristics.^{3,16,17} It is advisable to remove objects that have been lodged for longer than 24 h or an unknown period. Failure to do so may result in consequences such as *trans*-mural erosion, perforation, and fistulae. When the foreign body is a disk battery, sharp or pointed, non-radio-opaque, or below the upper third of the esophagus, complications are more likely and require prompt treatment.^{14,15}

There is a scarcity of literature regarding the ingestion of foreign objects by children in Bangladesh. The study aims to increase physician awareness regarding management by observing the anatomical locations, number, type, size, and shape of FB's, as well as their etiology, clinical profile, diagnosis, treatment, complications, and outcomes in children attending Bangladesh Shishu Hospital & Institute, a tertiary care hospital in Bangladesh.

2. Methods

2.1. Patients

This cross-sectional descriptive study of 97 children who experienced FBI and underwent endoscopic management for foreign body removal from the upper gastrointestinal tract was conducted at the Department of Pediatric Gastroenterology, Hepatology, and Nutrition at Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh, between January 2016 and December 2023.

2.2. Ethical review committee (ERC) approval

Ethical clearance was obtained from the ethical review committee of Bangladesh Shishu Hospital & Institute (Memo No. 20231214). Written informed consent was obtained from the parents of individual participants after carefully explaining the procedure details and potential complications.

2.3. Inclusion and exclusion criteria

Children under the age of 15 who ingested a FB that required endoscopic removal (ER) were included in this study. \geq 15 years of age, parents who did not consent to the procedure and other than endoscopic removal were excluded from the study. Fig. 1 details the flow chart of the study.

2.4. Operational definitions

Types of FB are classified into four groups. Coins, talismans, plastic hair clips, metal chains, metal zipper pullers, and toy magnets were all examples of blunt FB's. Sharp FB's included thin objects such as keys, ear rings, finger rings, hijab pins, iron nails, metallic lockets, and metallic washers. Button battery (BB) and food impaction were placed in separate groups during analysis. When a FB is ingested unintentionally or unexpectedly, it is referred to as an accidental FBL.¹⁸ When someone



Fig. 3. Radiology (Posteroanterior views): (a) Coin, (b) Button battery, (c) Key, (d) Finger ring, (e) Ear ring (i) (f) Ear ring (ii), (g) Hijab pin, (h) Iron nail, (i) Talisman, (j) Hair clip, (k) Metalic zipper puller, (l) Metalic washer.

intentionally puts anything that can't be digested into their stomach with the goal of hurting themselves or others, it's called intentional FBI.¹⁹ Successful ER of FB's is a minimally invasive technique utilized to effectively extract FB's that have become lodged in the digestive tract after being ingested.²⁰ An unsuccessful or failed ER occurs when the foreign body is not totally or partially removed with endoscopic intervention, necessitating surgical intervention. When the lining of the digestive tract becomes red and inflamed, this condition is known as erythematous mucosa. An erosion is defined as an incomplete breach of the epithelial covering with the loss of superficial epithelial layers of the mucosa, whereas an ulcer is the loss of all epithelial cell layers, extending through to the submucosa.²¹ A hole in the stomach, or esophagus, is called a perforation. During the procedure, a transmural defect in the gastrointestinal wall was directly visualized by endoscopy, leading to the diagnosis.²² A bloody discharge was identified as blood-stained mucus secretion from the removal site after the procedure. Small amounts of bleeding after removal that stopped independently without needing hemoclips, cautery, or epinephrine were classified as minor bleeding. A mixed phenomenon was diagnosed when a patient had minor bleeding and a bloody discharge.

2.5. Timing of endoscopy

Children who had swallowed sharp objects, disc batteries, dysphagia, or patients unable to control their secretions were all treated by emergency endoscopy. ER was indicated in cases where there was no advancement of FB on the radiograph within two days or when reassurance to caretakers failed (Fig. 2).

2.6. Pre-procedure preparation

At baseline, all patients were evaluated by a chief investigator who specialized in pediatric therapeutic endoscopy. The conditions and symptoms associated with the ingestion of a foreign body were recorded. A comprehensive evaluation of symptoms and clinical examination were performed on children with the assistance of their parents. Routinely, X-rays of the neck, thorax, and abdomen were acquired in lateral and anteroposterior orientations for all children in order to determine the likely site of the FB lodgment (Fig. 3). Once the likely site was determined, the patients and their parents were briefed on the type of care, the endoscopic technique, and potential problems. Patients were taken for

endoscopies after providing sufficient informed consent.

2.7. Endoscopic procedures

2.7.1. Preparation

The children didn't eat or drink anything for at least 6 h before the operation, with the exception of emergency procedures. All pediatric upper GI endoscopies were performed by the chief investigator.

2.7.2. Machine

For infants older than two years, the majority of endoscopic procedures were performed utilizing video endoscopes (OLYMPUS GIF-Q190; Olympus, Tokyo, Japan). When dealing with children who were under the age of two or weighed less than 10 kg, endoscopy was conducted utilizing a pediatric video endoscope (OLYMPUS GIF-XP190; Olympus) measuring 5.8 mm in diameter.

2.7.3. Anesthesia

The mode of anesthesia was decided depending on the patient's age, level of cooperation, and the physician's comfort level. As a sedative, midazolam (0.05–0.1 mg/kg IV, maximum single dose of 4 mg) was administered parenterally, with or without ketamine (1 mg/kg I/V). Further dosing was considered according to the patient's comfort level and the maximum dose of the medications. General anesthesia was not used on any patient due to the absence of an anesthetist and anesthetic facility.

2.7.4. Procedure

The patient's oxygen saturation, pulse rate, blood pressure, and other vital indicators were closely monitored during the entire procedure. It was carried out in the lateral left position. Following the proper level of sedation, a mouth-gag was used to introduce a flexible endoscope intraorally. After visualizing the foreign body and determining its size, shape,

and edges, appropriate recovery devices were selected. Typically, forceps such as rat-tooth, alligator, or biopsy forceps (FG47 L-1; Olympus) were used for linear, sharp-pointed foreign items. Various instruments were utilized to remove blunt or irregularly sharp-pointed foreign bodies, including retrieval baskets (MTW Endoskopie, Wesel, Germany), graspers (VDK-FG-23-180-A3), polypectomy snares (VDK-SD-18-160-20-A1), and biopsy forceps (VDK-FB-18-160-O-P-B1). If the initial retrieval device was unable to hold the foreign object, a different kind was deployed. Occasionally, supplementary precautions were used to safeguard the gastrointestinal system while extracting sharp or pointed foreign objects. These precautions included the use of a latex protection hood (DIAGMED, Tirsk, England), an overtube, or a transparent hat (Olympus). After the foreign bodies had been effectively extracted, a subsequent endoscopy was performed to verify the absence of any residual foreign bodies and to ascertain that there were no injuries to the UGI tract (Fig. 4).

2.8. Follow up

After the procedure, children were monitored closely by vital signs. Following the procedure, the vital signs of the children were attentively monitored. Long-term follow-up every month for 6 months, especially in cases of BB ingestion.

2.9. Outcome

ER, whether successful or unsuccessful, were closely monitored.

2.10. Complications

Types of immediate adverse events, impaction time, and long-term complications were recorded following the FBI. Complications related to the procedure were also monitored.



Fig. 4. Endoscopic views: (a) Coin, (b) Button battery, (c) Key, (d) Finger ring (e) Ear ring(i) (f) Ear ring (ii), (g) Hijab pin, (h) Iron nail, (i) Talisman, (j) Hair clip, (k) Metalic zipper puller, (l) Metalic washer.

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Table 1

Characteristics of Study population (n = 97).

Age	No. of patient (%)
<6 months	02 (2.1)
6–11 months	09 (9.3)
1–5 years	69 (71.1)
6–10 years	16 (16.5)
>10 years	01 (1.0)
Sex	
Male	52 (53.6)
Female	45 (46.4)
Location of incident	
Home	77 (79.4)
Public accommodation	7 (7.2)
Others	13 (13.4)
Type of visit	
Walk-in	26 (26.8)
Referred	71 (73.2)



Fig. 5. Etiology of FBI.

2.11. Data management and analysis

All the data regarding anatomical locations, number, type, size, and shape of FB's, clinical profile, diagnosis, management, complications, and outcome of FBI in children was collected from departmental registers before and after the intervention. The data were presented as percentages and numerical values. Statistical program SPSS (Statistical Package for Social Science) of version 24.0 (IBM Co., Armonk, NY, USA). A P-value was considered significant when it was less than or equal to 0.05.

3. Results

3.1. Patient characteristics

Among the 97 patients, they were presented at ages ranging from 3 months to 15 years, with a mean age of 2.9 ± 4.9 years. A high (p = <001) frequency (71.1 %) was observed in children aged between 1 and 5 years. The majority were male (53.6 %), with a male-to-female ratio of 1.1:1. (Table 1).

3.2. Etiology

The vast majority ($p = \langle 001 \rangle$) of cases of FBI were unintentional, accounting for 95 cases (97.9 %), while purposeful ingestion accounted for only 2 cases (2.1 %) (Fig. 5).

Table 2

Distribution of foreign bodies by its characteristics (n = 97).

Types of FB	No. (%)
Coin	65 (67.0)
Button battery	05 (5.2)
Key	04 (4.1)
Ear ring	04 (4.1)
Finger ring	03 (3.1)
Hijab pin	03 (3.1)
Jujube seed	02 (2.1)
Iron nail	02 (2.1)
Talisman	02 (2.1)
Hair clip	02 (2.1)
Metalic chain	01 (1.0)
Metalic zipper puller	01 (1.0)
Metalic locket	01 (1.0)
Metalic washer	01 (1.0)
Magnet of toy	01 (1.0)
Number of FB	No. (%)
Solitary	96 (99.0)
Double	01 (1.0)
Morphology of FB	No. (%)
Blunt	72 (74.3)
Sharp	18 (18.6)
Button battery	05 (5.1)
Food impaction	02 (2.0)
Size of FB (cm)	No. (%)
30-39	81 (83 5)
4.0-4.9	10 (10.3)
50-59	05 (5 2)
>6	01 (1.0)
	31 (110)
Location of FB	No. (%)
Upper esophagus	12 (12.3)
Mid esophagus	03 (3.1)
Lower esophagus	01 (1.0)
Stomach	79 (81.5)
Duodenum	02 (2.1)

3.3. Characteristics of foreign body

Coin (67 %) was the most common (p = <001) FB accidently swallowed by children, followed by BB (5.2 %), key (4.1 %), ear ring (4.1 %), finger ring (3.1 %), and hijab pin (3.1 %). Only one patient ingested two coins at a time, whereas others had a single. Morphologically, the majority of the FB's were blunt (74.3 %), and others were sharp (18.6 %), BB (5.1 %), and food impaction (2.0 %). The size of the foreign body varied between 3 and 7 cm, with a commonly measured diameter between 3 and 3.9 cm. The different types of FB were lodged in different locations. Most of the FB were stuck in the stomach (81.5 %), followed by the esophagus (16.4 %), and the duodenum (2.1 %) (Table 2 and Fig. 6).

3.4. The distribution of FB types varies with age

Different types of FBI were more common in children less than 5 years of age (82.5 %). Coins and blunt objects were the most common FB, especially in patients 6 months to 10 years of age (mean 4.2 years). Sharp objects were more common in children >6 years of age (mean 6.27 years). BB and food impaction were more common in 6 months to 5 years of age (mean 1.37 years) (Fig. 7).

3.5. Clinical presentation

The principal presenting feature was dependent on the location of



Fig. 6. FB after removal: (a) Coin, (b) BB, (c) Key, (d) Finger ring, (e) Ear ring(i), (f) Ear ring (ii), (g) Hijab pin, (h) Iron nail, (i) Talisman, (j) Hair clip, (k) Metalic zipper puller, (l) Metalic washer.



Fig. 7. The distribution of FB types varies with age.

lodging. When a FB becomes lodged in the esophagus, it is symptom-free in 56.2 % of cases (p = 0.60), followed by crying at 12.5 %, feeding refusal at 12.5 %, dysphagia at 12.5 %, and vomiting at 6.2 %. On the other hand, the majority (p = <001) of patients with FB trapped in the

stomach or duodenum did not exhibit any symptoms (93.8 %), with just a small percentage experiencing abdominal pain (3.7 %) and hematemesis (2.5 %) (Table 3).

Table-3

Clinical presentation after foreign body ingestion.

Clinical presentation	Number (n)	Percentage (%)	p value
Esophagus	16	16.4	
Asymptomatic	09	56.2	0.60
Crying	02	12.5	
Feeding refusal	02	12.5	
Dysphagia	02	12.5	
Vomiting	01	6.2	
Stomach & duodenum	81	83.6	
Asymptomatic	76	93.8	< 0.001
Abdominal pain	03	3.7	
Hematemesis	02	2.5	

Table-4

Outcome by endoscopic removal.

Endoscopic removal	Number (n)	Percentage (%)	p value
Successful	96	99	< 0.001
Unsuccessful	1	1	

3.6. Outcome by endoscopic removal

ER is successful in 99 % of cases (p = <001), with only a 1 % failure rate. A toddler arrived 48 h after ingesting a BB, an endoscopy was abandoned midway, with the identification of esophageal perforation (Table 4).

3.7. Timing of foreign body removal

Among the ingested foreign FB's, only 19 (19.6 %) were removed within 24 h of ingestion, 8 (8.2 %) cases were removed between 24 and 48 h, and the remaining 70 (72.2 %) cases were removed after 48 h. Approximately 80 % of BB's and 77.8 % of sharp objects were successfully removed within 24-h of ingestion. However, blunt objects (98.6 %) and food impaction (100 %) were successfully removed after 24 h of ingestion. (Fig. 8).

3.8. Types of immediate adverse events following foreign body ingestion

Erythema, erosion, bleeding, and ulceration were much more common in a sharp group than the blunt group (Fig. 9).

3.9. Types of immediate adverse events according to impaction time

The rate of adverse events was significantly (p = <0.001) correlated with the duration of impaction (Fig. 10).

3.10. Types of procedural complications

About half of the patients did not encounter any complications (p = 0.31) such as mucosal tears, profuse bleeding, or perforation. In the case of 23 (23.7 %) patients, we observed bloody discharge immediately after the procedure, minor bleeding was present in 13 (13.4 %) patients, and both were 9 (9.3 %) cases (Fig. 11).

3.11. Long term complications following FBI

There are no long-term complications in the majority (p = <0.001) of cases. Only 2 (2.1 %) cases developed esophageal stricture following BB ingestion (Fig. 12).

4. Discussion

With timely endoscopic management, children with FBI or upper gastrointestinal impaction can prevent serious consequences in the emergency room. Due to fiber-optic scope accessibility and familiarity, FBI endoscopic therapy has increased. An expert endoscopist can remove most FBs safely and easily.^{24–26}

The study found that 80 % of patients were younger than five years old, with a mean age of 2.9 ± 4.9 years. A similar mean age $(3.25 \pm 4.7 \text{ years})$ was observed by Mazumder et al.⁹ in Bangladesh, with 76 % of patients under 5 years old. Children were more likely to engage in exploratory behaviors in this age bracket. A separate Bangladesh²⁷ and Italy²⁸ study found mean ages of 5.1 and 4.0 years. Lack of therapeutic equipment for younger children and sample bias may be to blame. Other studies from Bangladesh (51.7 %)⁹ and Italy (56.6 %)²⁸ had slightly masculine gender distributions like ours (53.6 %).

Infants, toddlers, and preschoolers are more likely to accidently eat foreign things²⁹ Younger toddlers often use their mouths to explore objects within their reach, however older children tend to unintentionally swallow nonedible objects while playing.^{25,26} In addition, poor swallowing function, partially erupted teeth, parents' safety ignorance, and inappropriate feeding can also cause accidental ingestion.³⁰ Italian²⁸ researchers found 98.3 % of pediatric FBI's were unintentional, like in our



■ Removal within 24 hours of ingestion ■ Removal after ≥24 hours of ingestion

Fig. 8. Timing of FB removal after ingestion.



Fig. 9. Types of adverse events following FBI.





Fig. 10. Types of adverse events according to impaction time.

(97.9 %) study. The two babies were 3 and 4.6 months old. One had a 3-year-old brother and a 3.5-year-old sister. They put the coin and metal washer in the victim's mouth.

The most prevalent FB's ingested by children were coins (67 %), followed by BB's, keys, earrings, finger rings, hijab pins, and so on. Similar results were found in the Bangladesh⁹ (65.2 %), India³¹ (90 %), Jordan³² (58.7 %), and Chinese³⁰ (57 %) studies. More than 2.5 cm of coins can easily get caught in the stomach or esophagus. One taka coin in Bangladesh is two to 3 cm wide; however, smaller children have problems holding two to five taka coins.³³ Compared to other objects, coins are more accessible to children and are found in more places throughout the world. Its texture, color, and glaze are all appealing. Chinese coin consumption is declining due to mobile payments.³⁰ BBs are widely used to power items like watches, remote controls, and toys. This is another kid-friendly item. Bangladesh⁹ (6.9 %), India³⁴ (5.1 %), China³⁰ (6.3 %), Italy²⁸ (4.2 %), USA³⁵ (6.8 %), and Jordan³² (3.2 %) found similar results, whereas Iran³⁶ reported 41 % BB consumption. Increased use of BBs in video games and other leisure products worldwide may be the cause. The Indian subcontinent's ornamentation attracts children with beautiful ear rings or finger rings. Many Muslim Bangladeshi ladies fix their headscarves with hijab pins. Our analysis identified mostly blunt spherical objects (74.3 %), including coins. Research from Bangladesh⁹

(72.4%) and India³⁴ (31.9%) also revealed comparable findings. Round, blunt things that kids can easily swallow could be the major factor.

Typically, objects smaller than 2.5 cm in diameter and/or shorter than 5 cm can pass through the digestive tract. Large or pointy foreign items can lodge. Muscle spasms and constriction can trap small foreign items in the esophagus.³⁷ The esophagus was the most common site of FB lodgment in India^{31,34} (70 % and 77 %), Korea²² (87 %), Jordan³² (71 %) and Iran³⁶ (71 %) studies. In one study from Bangladesh⁹ (79 %), including ours (81 %), the stomach was the dominant site for FB impaction. It may be the cause of over 80 % of FB reported after 24 h of ingestion. In children aged 0–5 years (p = <005), blunt objects like coins, BBs, and food impacts were the most common FBs. China³⁰ found similar results with 0-3-year-olds. The average age of sharp object users was 6.27 years, matching Chowdhury et al.³³ 6.73 years. The availability and nature of FBs may cause age-specific consumption. The clinical signs of FB's vary depending on their location, with 44 % in the esophagus and 6 % in the stomach. The Italian²⁸ study had similar results (50 % and 7 %). Most of the cases of FBI were asymptomatic, as the child was unable to express a feeling.

ER achieved a significant success rate of 99 % and a failure rate of 1 %. A child presented 48 h after eating a BB; an endoscopy was abandoned midway, with the identification of esophageal perforation that required



Minor bleeding Bloody discharge No complications

Fig. 11. Types of procedural complications.



Esophageal stricture No complications

Fig. 12. Long term complications following FBI.

surgical intervention. Korea²² (98.9 %), Jordan³² (90.5 %), and India³⁴ (97 %), had similar results. New flexible fiber-optic endoscopic devices, the availability of sophisticated therapeutic accessories, and early intervention are key to success. The current guidelines recommend prompt ER for esophageal foreign bodies, particularly sharp-pointed items and BBs, but the optimal time for endoscopic removal remains uncertain.^{38–43} The present study successfully removed 77.8 % of sharp items and 80 % of BBs within 24 h of intake, while food impaction (100 %) and blunt items (98.6 %) were removed after 24 h of ingestion. A separate Bangladesh⁹ study found that 34 % of foreign items were eliminated between 24 and 48 h and 55 % after 48 h. Significant children were reported after 48 h, possibly because they were waiting for the condition to pass, seeking local medical advice, undergoing repeated imaging to confirm the current position, delayed referral, or traveling from different regions of the country.

Complications from the FBI rely on young age, sharp items, and the extended duration of impaction.^{30,44} Reddening, erosion, bleeding, and ulceration were more common in the sharp group compared to the blunt group in this study. A study conducted in Korea²² and China³⁰ found similar outcomes. The incidence of perforation was higher when the swallowed object was a BB, and the diagnosis was made after 8 h.⁴⁴ A single child in this study exhibited perforation after 48 h of ingesting a BB. The incidence of side effects increased significantly as the period of impaction grew longer. The findings were consistent throughout multiple investigations.^{20,30,44,45} Both the American⁴⁶ and Turkish⁴⁷ trials found that 41.2 % of people who ingested BB's developed esophageal stricture. The outcomes were 40 % the same in our research. The creation of strictures was mostly dependent on the impaction time, which ranged from 14 to 16 h. The absence of fatalities is in line with the globally reported low mortality rates observed in other FBI investigations.³

A recent study found a significant association between endoscopic intervention and various factors, including the type of foreign body (large-size blunt object, disk battery, food bolus, magnets, sharp-pointed objects) and different clinical presentation (drooling, dysphagia, vomiting, retrosternal pain, abdominal pain, hematemesis, food refusal or poor feeding, and unexplained crying), which increased the probability of the need for endoscopic intervention in children with FBI.⁴⁴

Preventing foreign body ingestion in children is a top priority. Caregivers should be trained on how to keep small children away from small objects that could hurt them if ingested, including button/disc batteries, small magnets, and other high-risk objects. This includes objects placed in garbage cans that may be accessible to children.⁴⁹

5. Conclusions

The FBI seems to be more common in children aged one to five. Most were unintended, and they were hospitalized after 48 h. The FBI was most common in the stomach, especially with coins. Most children had no symptoms. A high suspicion and thorough radiological screening allow prompt intervention. Long-term impaction, sharp objects, and BBs cause devastating effects. ER is safe and effective for upper gastrointestinal foreign bodies. Public and healthcare awareness efforts are critical for preventing, diagnosing, managing, and improving the outcomes of the FBL

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CRediT authorship contribution statement

Salahuddin Mahmud: Writing - review & editing, Writing - original draft, Supervision, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. Madhabi Baidya: Supervision, Methodology, Data curation. Rafia Rashid: Supervision, Methodology, Data curation. Farhana Tasneem: Formal analysis, Conceptualization. Ahmed Rashidul Hasan: Validation, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. Tanzila Farhana: Writing - review & editing, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. Md Jahangir Alam: Writing - review & editing, Supervision, Software, Methodology. Syed Shafi Ahmed: Writing - review & editing, Visualization, Supervision, Project administration, Methodology, Conceptualization.

Declaration of competing interest

All listed authors have read and approved the manuscript as submitted, and we do not have any conflicts of interest to declare.

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