

Foreign body ingestion in Turkish children

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SUMMARY: Aydođdu S, Arıkan , akır M, Baran M, Yůksekaya HA, Saz UE, Arslan MT. Foreign body ingestion in Turkish children. Turk J Pediatr 2009; 51: 127-132.

Foreign body ingestion (FBI) is a common problem in the pediatric population. Even though morbidity and mortality due to foreign body ingestion are rare in childhood, they may cause serious anxiety in parents. We aimed to analyze the clinical presentation, etiology and management strategy of FBI in children in our country. Records of children admitting with a history of FBI over a three-year period were reviewed retrospectively. Data regarding gender, age, type of the ingested body, management strategy and outcome of the patients were recorded. Of 176 children, 98 (55.6%) were male. Mean age \pm SD of the patients was 3.75 \pm 4.25 years, and most of the patients were below four years of age (71.5%). Most of the children (64.7%) were seen within 48 hours, and most were asymptomatic. Blue beads attached to a safety pin (a cultural good luck charm) (38.6%), coins (27.8%) and turban pins (18.1%) were the most commonly observed foreign bodies. The blue beads/safety pin were found to be ingested primarily by infants, while ingestion of turban pins was mostly seen in adolescent girls who covered their heads. Localization of the foreign bodies was in the distal small intestine, stomach and esophagus in 61.4%, 23.8% and 14.7% of the cases, respectively. Sixty-nine endoscopic interventions were performed in 61 patients (34.6%), and these accounted for 7.3% of all endoscopic interventions during the three-year period. No major complication was observed during the procedure, and none of the patients underwent surgery. The frequently used accessory devices were retrieval net basket (57.9%), snare for pins (17.3%), tripod forceps and rat-tooth forceps. The blue beads/safety pin and turban pin were the commonly ingested foreign bodies in our center due to cultural factors. Education of the parents and of adolescent girls should greatly reduce the incidence of FBI. Endoscopic removal is safe without any major complications.

Key words: children, foreign body ingestion, safety pin, turban pin.

Foreign body ingestion is a common problem in the pediatric population¹. Even though morbidity and mortality due to foreign body ingestion are rare in childhood, they may cause serious anxiety in parents.

Foreign bodies with smooth edges usually do not pose a serious problem but a sharp foreign object if not retrieved at the earliest possible time may penetrate the wall and cause complications. Most of the foreign bodies that have gone beyond the esophagus will pass uneventfully through the intestinal tract. However, 10% to 20% of all cases will require non-operative interventions, and 1% or less will require surgical procedures^{2,3}.

The nature of the foreign bodies, the presentation and the management in the pediatric population differ from those of the adult population. In addition, the presentation and management of foreign bodies may vary in different ethnic populations and in different age groups in children and may require special management³⁻⁶. In this study, we analyzed the clinical presentation, etiology and management strategy of foreign body ingestion in children in our country.

Material and Methods

Records of children admitting to Ege University pediatric emergency outpatient clinic or pediatric gastroenterology unit with history of foreign body

ingestion over a three-year period were reviewed retrospectively. Data regarding gender, age, type of the ingested body, management strategy and outcome of the patients were recorded.

X-ray investigation, including the neck, chest and abdomen, was routinely obtained in all cases in order to determine the location of the foreign body. Fluoroscopy was performed if the location could not be clearly determined by X-ray investigation.

Patients with foreign bodies that passed the pylorus were followed for signs of intestinal obstruction for 24-48 hours. They were discharged from the hospital after the foreign body was eliminated spontaneously. Upper endoscopy was carried out immediately in the case of sharp foreign body ingestion or chemical foreign body ingestion (e.g. battery), with localization in the esophagus. If the foreign body was located in the stomach, we applied a "wait and observe" method except in the case of long sharp objects such as needles and pins (>3-4 cm). We advised parents to observe the stools for two weeks, and we performed follow-up X-rays at one-week intervals. The foreign body was removed by endoscopy after two weeks if it was not eliminated spontaneously.

After fasting 2 to 4 hours, patients underwent upper endoscopy under local pharyngeal anesthesia (Xylocaine spray) with midazolam (0.2 mg/kg, i.v.) sedation. Heart rate and oxygen saturation were monitored during the procedure. Flexible endoscopes (Olympus GF Endoscopy; Japan) were used in all children. Accessories used to remove foreign bodies included rat-tooth forceps, snares, V-shaped forceps, tripod forceps, biopsy forceps and retrieval net basket. After removal, the endoscope was reinserted and the site of the foreign body lodging was examined for any mucosal erosion. After the procedure, all patients were followed for a few hours.

Results

During the study period, 176 children (98 male, 78 female) with mean age \pm SD of 3.75 \pm 4.25 years (range: 9 months-17 years) were admitted to our pediatric emergency and pediatric gastroenterology departments with a history of foreign body ingestion. Most of the patients were below four years of age (126/176; 71.5%).

Most of the children (64.7%) were seen within 48 hours after having swallowed the foreign body. The most common presenting complaint was that of having ingested the foreign body; all patients were asymptomatic. Other common symptoms were vomiting, abdominal pain and excessive saliva production, which are commonly associated with esophageal foreign body. None of the patients had major symptoms such as cyanosis or respiratory distress. All patients underwent X-ray examination, and fluoroscopy was performed in 23.2% of the cases. Blue beads attached to a safety pin (a cultural good luck charm) (n=68, 38.6%), coins (n=49, 27.8%) and turban pins (n=32, 18.1%) were the most common foreign bodies. Other foreign bodies included magnets, hair-clips, rings, marbles, playing toys and metallic wires (Fig. 1).



Fig. 1. Illustration of some foreign bodies retrieved by endoscopy.

Blue beads/safety pin were found to be ingested primarily by infants (mean age \pm SD: 22.08 \pm 10.37 months) (Fig. 2), while ingestion of turban pins was mostly seen in adolescent girls who covered their heads according to religious/cultural tradition (mean age \pm SD: 9.6 \pm 4.7 years). Turban pin ingestion was found in four boys due to their holding their mothers' turban pins in their mouths (Table I).

The majority of the foreign bodies were located in the distal small intestine at initial presentation (n=108, 61.3%), and the most common items were small coins, pins and metallic pieces. All of these foreign bodies were eliminated spontaneously. Only one case with pin ingestion was hospitalized for three days. Foreign bodies



Fig. 2. Abdominal radiography revealed a safety pin with its attached blue bead in the stomach.

were located in the stomach in 42 patients (23.8%), and five of the patients (11.9%) underwent endoscopy immediately for sharp foreign body ingestion. Spontaneous elimination was observed in seven patients (7/37, 18.9%) after two weeks, and endoscopic intervention was performed in the remaining 30 patients (81.1%). The most common foreign bodies in the stomach were coins, pins, marbles, hair-clips, metallic pieces and blue beads (Fig. 3). Small coins were generally eliminated spontaneously after two weeks. The foreign body was located in the esophagus in 26 children (14.6%). They were extracted or pushed into the stomach by endoscopy within 24 hours in all cases depending on the severity of the symptoms and fasting state of the patients. Most of the foreign bodies in the esophagus were blue beads/safety pin and large coins (>3 cm) that could not pass the lower esophageal sphincter (Fig. 4).

Overall, 69 endoscopic interventions were performed in 61 patients (34.6%), accounting for 7.3% of all endoscopic interventions over the three-year period. In eight cases, endoscopic procedures failed to extract the whole foreign body in the first intervention (11.5%). Six

Table I. Age Distribution of Patients According to Ingested Foreign Bodies

	6 months – ≤2 years		>2 years – ≤4 years		>4 years		Total
	Female	Male	Female	Male	Female	Male	
Blue beads attached to a safety pin	13	24	8	19	1	3	68 (38.6)
Coins	7	7	8	18	3	6	49 (27.8)
Turban pin	-	-	4	4	24	-	32 (18.1)
Others	2	3	5	4	6	7	27 (15.3)
Total	22 (12.5)	34 (19.3)	25 (14.2)	45 (25.5)	34 (19.3)	16 (10.7)	176

Note that blue beads attached to a safety pin were more commonly found in infants while turban pins were more frequently found in adolescent girls.

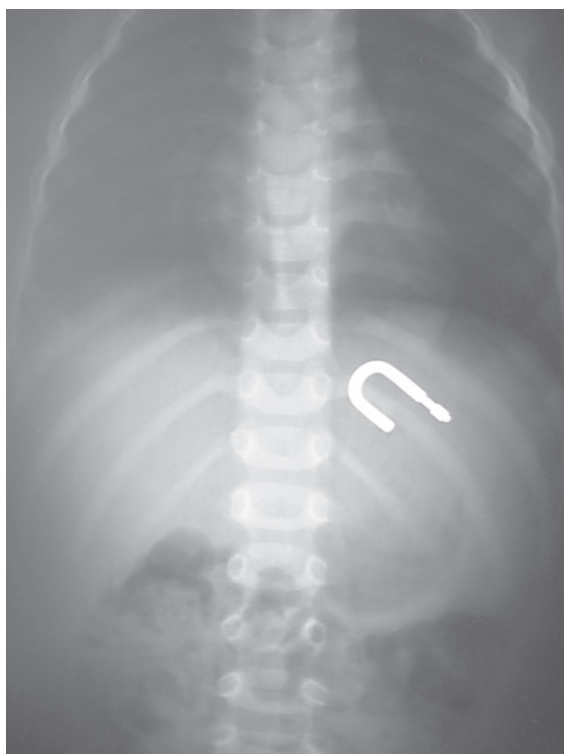


Fig. 3. Abdominal radiography of a 5-year-old boy showed distal part of a key chain.

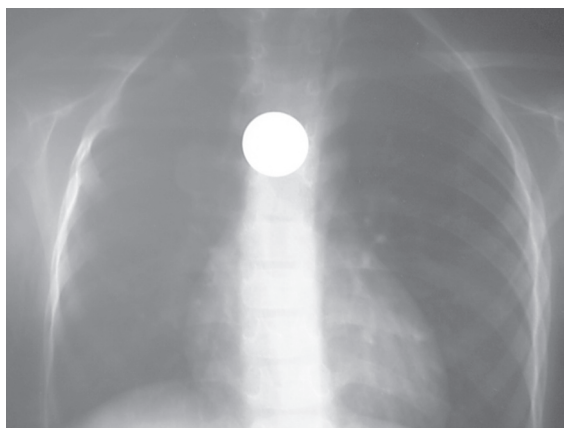


Fig. 4. A swallowed coin lodged in the esophagus.

(9.8%) of them required a second endoscopic intervention, and the foreign body not found in the stomach in two patients had passed the pylorus. No major complication was observed during the procedure, and none of the patients underwent surgery (Table II). The frequently used accessory devices were retrieval net basket (57.9%), snare for pins (17.3%), tripod forceps and rat-tooth forceps. Pulling with retrieval net basket was the most effective method to extract the coins and the blue beads/safety pin.

Table II. Location of the Foreign Bodies at Initial Admission and Management Strategy

	Esophagus	Stomach	Distal small intestine	Total
Number of cases, n (%)	26 (14.7)	42 (23.9)	108 (61.4)	176
Passed spontaneously	-	7	108	115 (65.3)
Endoscopic removal	26	5	-	
Immediately	-	30	-	
After follow-up	1	5	-	61 (34.7)
Second intervention				

Discussion

Foreign body ingestion is a common problem in the pediatric population, especially in infants, due to their natural tendency to place objects in their mouths because of their oral orientation. Rapid diagnosis and treatment of foreign bodies are important because they may sometimes cause serious complications in infants such as mucosal erosion, airway obstruction and bowel perforation. We compiled records of 176 pediatric cases with history of foreign body ingestion in our center during a three-year period, and found that blue beads/safety pin (36.8%) and coins (27.8%) were the most commonly encountered objects. The mean age \pm SD of the children was 3.75 \pm 4.25 years (range: 9 months - 17 years), and the majority were younger than four years old. Blue beads/safety pin were the main objects ingested by small infants, with a mean age \pm SD of 22.08 \pm 10.37 months. Some findings in our study were inconsistent with the previous studies. Cheng et al.⁷ reported 1,265 children from China, and Arana et al.⁸ reported 325 children from Belgium. In both studies, coins were the most frequently ingested foreign body, with rates of 49% and 27%, respectively. The type of foreign body and its clinical presentation may vary in different ages and cultures. In our country, it is widely believed that a blue bead protects small children from evil. Such pins are typically attached to a baby's clothing with a safety pin. The safety pin can open while small children play with the blue beads, and babies may take the blue beads with or without the safety pin to their mouths. This explains the frequency of ingestion of the blue beads/safety pin in our country, especially in children less than two years of age. Additionally, we determined that turban pin ingestion was common among adolescent girls. "Turban pin aspiration" syndrome was defined in a case by Ucan et al.⁹ and in adolescent girls by Kaptanoglu et al.¹⁰. It was described as a different entity from other foreign body aspirations because of gender and age difference. In Victorian countries, adolescent girls begin to wear a turban for the rest of their lives. It is a very complex task; both hands are busy with wrapping the turban around the head, and four or five pins held between the teeth are attached to the turban sequentially. The pins can easily

be ingested while talking, deep breathing or coughing during these maneuvers. In our series, there were four boys with turban pin ingestion among our patients younger than four years old. They had been clutching the turban pins in their mouths for their mothers for the same reason.

The majority of the foreign bodies that reach the gastrointestinal tract will pass spontaneously. Twenty-five to 85% of the pediatric cases require endoscopic removal depending on the management strategies of each center. Operative intervention is indicated in only 1% of the patients¹¹⁻¹⁵.

Most of the esophageal foreign bodies were safety pins that lodged in the esophageal mucosa or large coins (>3 cm) that could not pass the lower esophageal sphincter. Although there is consensus about the immediate endoscopic removal of safety pins, endoscopic removal of esophageal coins is still controversial, especially if the patient is asymptomatic. In symptomatic patients, immediate endoscopic intervention is recommended to prevent complications. Observation for 8 to 16 hours in the emergency department is recommended in previously healthy children with asymptomatic esophageal foreign body. It was shown that asymptomatic esophageal coins are far likelier to be located in the lower esophagus and the rate of spontaneous passage of foreign bodies in the lower esophagus is higher than in the upper esophagus (8% vs 47%), and it is not associated with the coin size. Some management strategies such as esophageal bougienage, fluoroscopic-guided Foley catheter and endoscopic removal by accessory devices have been defined¹⁶⁻¹⁹. Endoscopic removal using accessory devices such as retrieval net basket or pushing the coin to the stomach under anesthesia by a skilled endoscopist seem to be more reliable. In our center, we immediately perform endoscopic intervention for esophageal foreign bodies. Observation in the emergency department may decrease the intervention rate, but increases repeated radiography requirements and family anxiety, and may also increase the complication rate of endoscopic intervention in the late period due to prolonged retention of a foreign body in the esophagus. No complication was encountered in our patients during the endoscopic intervention for esophageal foreign body.

Approximately 20 to 25% of the foreign bodies were located in the stomach at initial examination. Immediate endoscopic intervention is only recommended in sharp foreign body or battery ingestions for foreign bodies in the stomach. The “wait and observe” attitude is recommended in other conditions⁸. Spontaneous elimination of the foreign body was approximately 20% in our study, in accordance with that of Kim et al.¹³ who reported a 22% spontaneous elimination rate for foreign body in the stomach. Sometimes parents may fail to detect the elimination of the foreign body, and a repeated radiography is indicated before the endoscopy.

Intestinal obstruction secondary to foreign body aspiration is rare. Extraction is only recommended for large foreign bodies (>5 cm). Surgical intervention is required in safety pin ingestion lodged in the intestinal wall. In our study, all the foreign bodies were eliminated spontaneously without any complication.

Overall, the incidence of endoscopic removal was 34.7%, accounting for 7.3% of all endoscopic interventions in our center. No major complication was observed during the intervention, and no patient underwent surgery. The success rate was 88.5% in the first intervention; 9.8% of the patients required a second intervention. Endoscopic intervention rate for foreign bodies is as high as 80-90% in China and Korea, whereas only 25% of the cases require endoscopic intervention in Belgium^{8,14}. Retrieval net basket and snare were the most frequently used accessory devices. Coins and other metallic pieces may easily be removed by retrieval net basket. Retrieval net may also be used for safety pins if they are closed. Several techniques have been described for the removal of open safety pins, such as Magill forceps, magnets and flexible endoscope with snare²⁰. An open safety pin within the esophagus with the open end proximal is best managed by pushing the pin to the stomach. It can then be removed by a retrieval net basket if it is small. If the pin is large, it may be closed by a polypectomy snare.

In conclusion, we report our experience with foreign body ingestion in children in our center over a three-year period. Blue beads/safety pin and turban pin ingestions are common in our center due to cultural factors. Education of parents and adolescent girls should greatly reduce the incidence of foreign body ingestion. Endoscopic removal is safe without any major complication.

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