

## Foreign body ingestion in children: 67 cases presenting in Pediatric Emergency

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### Abstract

**Aim:** The aim of the study was to determine the clinical presentation, types and characteristics of foreign bodies in the pediatric age group and their management. **Materials and Methods:** The study was conducted over a period of 6 months. Out of 100 random cases with age <14 years attending emergency department with the suspicion of foreign body ingestion, 67 cases were included in the study. Note was made of their clinical presentation, diagnosis, type of foreign body ingested, whether spontaneously passed or not, management and outcome. **Results:** Most of the children were between 6 months and 6 years of age. A variety of gastrointestinal symptoms such as vomiting and drooling as well as respiratory symptoms such as coughing and stridor were associated with foreign body ingestion. The oesophagus, in particular the upper third, was the common site of foreign body obstruction. Coins were the most commonly ingested foreign body. Objects in the stomach and intestine were spontaneously passed more frequently than at any other sites in the gastrointestinal system. **Conclusion:** Foreign body ingestion is a common pediatric problem presenting with a wide range of symptoms depending upon the site of lodgement. Although most foreign bodies in the gastrointestinal tract pass spontaneously without complications, endoscopic or surgical removal may be required in a few children. Endoscopy has a high success rate in removing ingested foreign bodies. Laparotomy may be required rarely when foreign body gets impacted in intestine. Sharp objects should be removed immediately to avoid complications while others can be observed for spontaneous passage.

**Keywords:** Foreign body ingestion, Pediatric, Endoscopy

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### Introduction

Foreign body ingestion is a common problem among pediatric populations. The most commonly ingested foreign body in children are coins and eatables like peanuts. Common household items such as small toys, marbles, batteries and erasers are often ingested some of which are particularly harmful and life threatening. The incidence of foreign body ingestion in the upper gastrointestinal tract accounts for 75-85% of foreign body ingestions in pediatric patients. Pre-schoolers of both sexes, adolescent boys, and children with mental health issues are at the highest risk.

Most swallowed foreign bodies will harmlessly pass through the gastrointestinal tract, but some will lead to health problems if they become lodged in oesophagus, stomach or intestine, traumatise the mucosa (sharp or pointed bone or object) or cause caustic burn injury (like button battery). The most common site for obstruction is at the thoracic inlet, which is the area between the clavicles on x-ray. The cricopharyngeus sling located at C6 is also located at this level and known to be a common site for the lodgement of foreign bodies.

Diagnosis of foreign body ingestion is particularly difficult in infants and young children who have a tendency to put everything in mouth. This along with their inability to communicate properly aggravates the problem. Older children usually ask for help in case of such a misadventure or at least give proper history on asking. An ingested foreign body may completely or partially obstruct the lumen of gastrointestinal tract where it gets lodged. Oesophageal foreign bodies should be suspected in children who present with a sore throat, or difficulty swallowing saliva or food without an obvious reason. A foreign body that has become obstructed within or injured the oesophagus may cause chest pain or foreign body sensation.

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Symptoms may be more notable when swallowing. Younger children may drool, gag, vomit or refuse food. Hematemesis and cough may be present. A foreign body lodged in the stomach or intestines may cause abdominal pain, vomiting or bloody stools[1].

Importantly, however, there may be no signs or symptoms (or they may be subtle and hard to recognize) in pediatric ingestions. Since many foreign body ingestions by children are unwitnessed, the possibility of non-specific symptoms being caused by foreign body ingestion should always be considered. In one series, for example, only half of the patients had any symptoms whatsoever despite witnessed ingestion of a foreign body[2].

If serial X-rays do not show progressive movement of an ingested foreign body in asymptomatic children, it can be observed for 24 hours. Notably, 80-90% of foreign bodies in the gastrointestinal (GI) tract are passed spontaneously without complications, 10-20% are removed endoscopically, and 1% require open surgery secondary to complications[3].

Pre-existing gastrointestinal tract abnormalities, such as previous surgery, strictures, fistulas, diverticula, or functional abnormalities, increases the risk of a swallowed foreign body becoming lodged at the site of the abnormality[1].

Recently, owing to developments in and greater awareness of the usefulness of upper gastrointestinal endoscopy in children, endoscopic removal of foreign bodies is commonly considered an option in addition to waiting for spontaneous passage. If endoscopic removal of the foreign body is not an emergency, or if it is not an absolute indication, the risk-benefit ratio ought to be considered in terms of assessing the complications expected to occur owing to the foreign body itself and those secondary to the procedure of foreign body removal. Parameters that need to be considered regarding the timing of endoscopy in children with ingested foreign bodies are the children's age or body weight, the clinical presentation, time since the last meal, time lapse since ingestion, type, as well as the size and the shape of the foreign body, and its present location in the GI tract[4].

**Materials and methods**

**Study design**

Retrospective cohort study.

**Study setting**

Emergency department in tertiary care centre.

**Sample size**

67 children.

**Inclusion criteria**

1. Age <14 years.
2. Presenting within 24 hours of symptoms.

**Exclusion criteria**

1. Children with liquid ingestion.
2. Children who received first aid at other centres.

**Method**

All the children with clinical features or history suggestive of foreign body ingestion were included in the study. As soon as the case was received in the emergency, patency of airway and breathing was evaluated. Complete history was taken and physical examination was done and if required, imaging was done and repeated as required. Healthy children with recent, low-risk ingestions were simply observed. In others usually plain radiographs were advised. If foreign body was assessable in oropharynx, attempt was made to take it out with hand, pulled out by using foley’s catheter or forceps, otherwise

the child was shifted to particular speciality for further intervention and management. If there was no improvement in children who were put under observation for 24 hours, further intervention and management was sought. Patients were followed up till discharge.

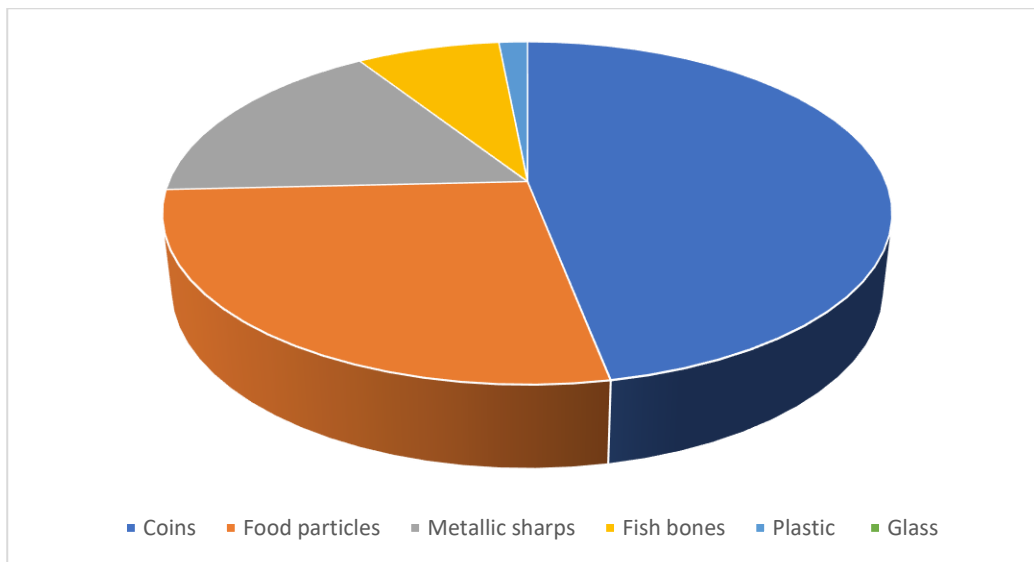
All data was tabulated, graphical analysis was made and statistical analysis in the form of ratios and percentages was done. The suitable statistical test was applied to the available data for subgroup analysis.

**Results**

Foreign bodies were detected in 67 out of 100 children presenting to emergency (67%) with history or clinical features of foreign body ingestion. All the children were <14 years of age with majority in the age group 6 months to 6 years (mean, 4.3 years). Three children were mentally subnormal (04.48%). The most common ingested foreign bodies were coins (31 cases, 46.27%) followed by food particles (18 cases, 26.87%) especially corn, peanuts and food bolus. X-ray was successful in detecting all metallic objects, most of other radio-opaque objects with overall detection of 64.18% foreign bodies. Commonest site of lodgement was oesophagus in 49 patients (73.13%). In 15 children (22.39%) foreign bodies were passed out spontaneously with stools. About 70% of the ingested foreign bodies were lodged at sites suitable for removal by rigid esophagoscopy alone with success rates of more than 95%. 6 patients (08.96%) required endoscopic removal and two patient (02.99%) required laparotomy for sharp foreign body (pin) removal one each from small intestine and large intestine.

**Table 1: Distribution of cases according to type of foreign body detected.**

Type of Foreign body	Number of children	Percentage
Coins	31	46.27
Food particles	18	26.87
Metallic sharps	11	16.42
Fish bones	05	07.46
Plastic	01	01.49
Glass	01	01.49
Total	67	100



**Fig 1: Distribution of cases according to type of foreign body ingested**

**Table 2: Distribution of cases according to site of lodgement of foreign body.**

Site of lodgement	Number of cases	Percentage
Oropharynx	03	04.48
Oesophagus	49	73.13
Stomach	08	11.94
Small intestine	06	08.96
Large intestine	01	01.49

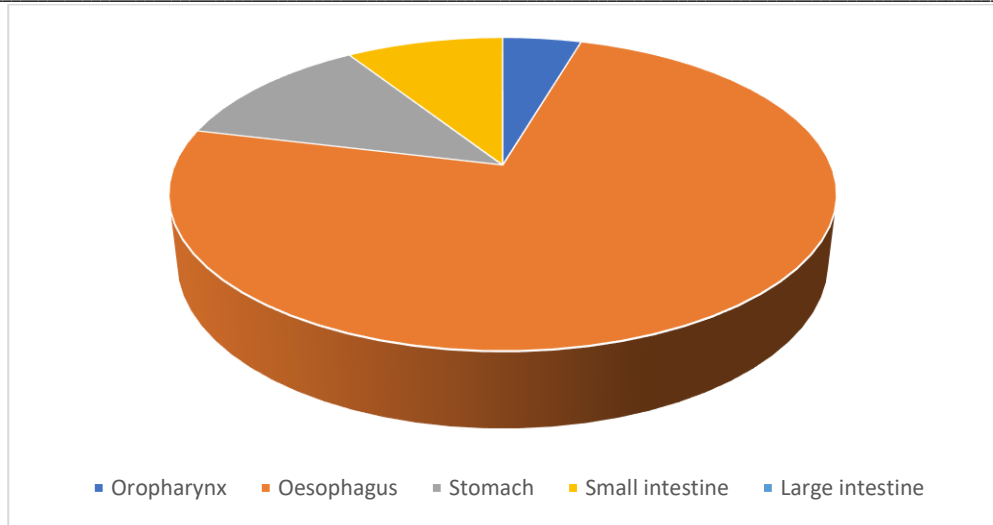


Fig 2: Distribution of cases according to site of lodgement of foreign body

Table 3: Distribution of cases according to management of foreign body.

Management/Removal	Number of cases	Percentage
Spontaneously passed	15	22.39
Rigid esophagoscopy	44	65.67
Endoscopy	6	08.96
Laparotomy	2	02.99

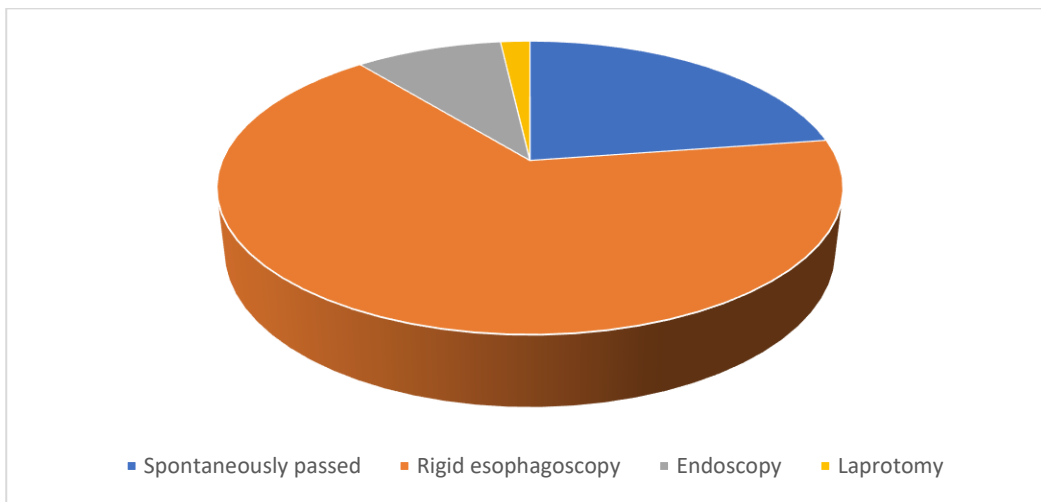


Fig 3: Distribution of cases according to management of foreign body



Fig 4: X-Ray (AP view) of a 6 years old girl child who accidentally swallowed a coin while playing.

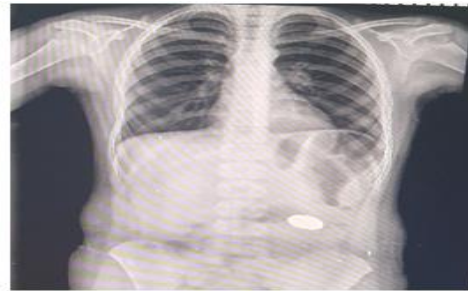


Fig 5: X-Ray of a 9 years old girl child showing foreign-body in small intestine.

## Discussion

Children commonly swallow foreign bodies. The vast majority of ingestions occur in the six months to three years age range. Typically, pediatric foreign body ingestion is accidental, although deliberate ingestion can also occur. Most cases occur in children due to the ingestion of small objects. Even infants may swallow foreign bodies that are given to them, perhaps by older siblings. Unusual or recurrent foreign body ingestion should prompt consideration of psychosocial concerns and an evaluation by a mental health professional. Foreign body ingestion may be risk-taking or attention-seeking behaviour. Abuse or neglect may be present. Mental illness may lead some children to swallow foreign bodies[1]. Coins are most commonly swallowed followed by peanuts or other eatables. Other commonly ingested foreign bodies include rings, small toys, bangles, batteries, marbles, glass or metallic sharps.

Usually, plain radiographs suffice initially. Healthy children with recent, low-risk ingestions may be simply observed. Metallic swallowed foreign bodies, such as coins and batteries, will show up readily on a plain radiograph. Metal detectors are occasionally used, especially in the setting of known coin ingestion[5,6,7].

It is not unusual to find an unexpected foreign body on a radiograph obtained for the evaluation of non-specific symptoms, such as a cough, fever, or weight-loss. Most glass fragments are visible on a radiograph. Radiolucent objects, such as a large piece of meat or a plastic toy, may not be apparent on radiographs, although their edges or irregularities may still be noticeable on radiography. Affected patients may require more advanced imaging techniques, such as contrast-enhanced radiography or MRI scanning, but these patients may also be considered for treatment (e.g., endoscopy) without further imaging[8,9,10]. Most ingested foreign bodies are passed spontaneously through the GI tract without complications although endoscopic or surgical removal is required in a few children. However, optimal indications and/or timing of these procedures to be performed in children remain controversial. Fortunately, >90% of oesophageal foreign bodies are removed spontaneously without complications; however, a few cannot easily pass through the pylorus, stomach, duodenum, ileocecal valve, Meckel's diverticulum, and/or anus, [11] and therefore, 10% of ingested foreign bodies may remain in the gastrointestinal tract[12,13]. Factors influencing the spontaneous passage of a coin are its location in the oesophagus, age of the child, and the size of the coin. Usually, the rate of spontaneous passage of swallowed coins in children is approximately 30%[14]. Consideration of the patient's symptoms, level of lodgement, and type of foreign body will determine whether immediate intervention or a conservative approach is warranted[15]. Children with history of non-metallic sharp object ingestion should undergo direct laryngoscopy despite negative radiological finding, both as a screening procedure or treatment[16]. Management of children with ingested foreign bodies requires a multi-speciality approach. If an oesophageal foreign body is not passed spontaneously within 24 hours, it must be removed considering the possibility of an anatomical anomaly or oesophageal perforation[17,18]. Symptomatic children need a consultation with a pediatric surgeon for surgery, and asymptomatic children may be followed with serial X-rays to assess progression. Sharp or pointed, and long or large and wide foreign bodies located in the oesophagus or stomach require endoscopic removal. Coins, magnets, or sharp foreign bodies in the oesophagus should be removed within 2 hours in symptomatic and within 24 hours in asymptomatic children[19]. Recently, the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) Endoscopy Committee revised the recommendations pertaining to the timing of endoscopic intervention. Coins, magnets, sharp foreign bodies, or food impaction in the oesophagus all mandate removal within 2 hours if the children's secretions cannot be controlled. In asymptomatic children, they may be removed within 24 hours. Long foreign bodies lodged in the oesophagus mandate removal within 24 hours regardless of the presence of symptoms. Magnets retained in the stomach in symptomatic children require removal within 2 hours. In asymptomatic children, they should be removed within 24 hours.

Coins in the stomach of symptomatic children should be removed within 24 hours. In asymptomatic children, these can be observed for 24 hours. Long or large foreign bodies in the stomach necessitate removal within 24 hours.

A button/disc battery may be distinguished from a coin when seen on a radiograph by its characteristic two-layer appearance when seen on-end, or a circle-within-a-circle appearance when seen front-to-back. The NASPGHAN Endoscopy Committee recommends button battery removal within 2 hours in asymptomatic children regardless of size[20]. A button battery  $\geq 20$  mm located in the stomach of an asymptomatic children aged  $< 5$  years should be removed within 24 to 48 hours.

Most foreign bodies in the small bowel are passed spontaneously without complications. Therefore, physicians should reassure the children and/or caregivers and advise them to check the children's stool for the passage of foreign bodies. If the foreign body is not eliminated even after a week, children need to visit the hospital and obtain an X-ray to identify the accurate location of the foreign body. Children should be strictly advised of the need to visit the hospital earlier if they develop signs of perforation or obstruction of the intestine, such as vomiting, severe abdominal pain, fever, or intestinal bleeding.

Oesophageal obstruction is the most common complication of foreign body ingestion in children[21]. However, some foreign bodies may erode through the gastrointestinal tract, causing complications due to perforation or migration of the object. Rarely, ingested foreign body can lead to oesophageal or stomach perforation, pneumothorax, mucosal erosion, aortoenteric fistula, pressure necrosis or failure to thrive secondary to decreased oral intake. Occasional death reports from ingestion occur, but mortality is generally very low from foreign body ingestion[22,23,24]. Prevention of foreign body ingestion in children is a high priority. Caregivers should be educated about preventing children from access to small objects and metals. Toddlers should not be left unsupervised and younger children should be given eatables under supervision of elders.

## Study limitations

The study is a retrospective cohort study which decreases the level of evidence to 3.

## Conclusion

Many children who have swallowed foreign bodies are asymptomatic, so emergency resident should maintain a high index of suspicion. Proper imaging techniques should be used to confirm the diagnosis. Although most foreign bodies in the gastrointestinal tract pass spontaneously without complications, endoscopic or surgical removal may be required in a few children. Laparotomy may be required rarely when foreign body gets impacted in intestine. Efforts for prevention of ingestion should be emphasized on preschool and toddler group. Proper supervision and selection of toys helps in avoiding dangerous consequences.

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