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Analytical Study of Foreign Body Ingestion in Paediatric age group at a Rural Tertiary Care Center in Villupuram Medical College, Tamil Nadu, India

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ABSTRACT

Background: Foreign body ingestion (FBI) is a common pediatric emergency, particularly among children under 5 years, due to oral exploratory behavior and immature swallowing coordination. Commonly ingested objects include coins, pins, toy parts, bones, button batteries, and magnets. Although many foreign bodies pass spontaneously, some require endoscopic or surgical removal, with batteries and magnets posing a high risk of perforation, fistula, and hemorrhage. Delayed presentation, limited access to pediatric endoscopy, and inadequate caregiver awareness can increase morbidity. Therefore, studying FBI at Villupuram Medical College is important to identify local patterns, high-risk groups, outcomes, and preventive strategies relevant to Tamil Nadu.

Objectives: The study aimed to describe the epidemiological and clinical profile of foreign body ingestion in children, including the types of foreign bodies and age- and sex-wise distribution, and to assess the duration of expulsion and management outcomes, including conservative, endoscopic, and surgical treatment.

Methodology: This hospital-based analytical case series included children aged <18 years with confirmed foreign body ingestion, presenting to the Pediatric Surgery Department from October 2021 to October 2025. Consecutive eligible cases were included, and data on demographics, foreign body type, investigations, management, and outcomes were collected using a structured proforma. Ethical approval was obtained, confidentiality was maintained, and informed consent was waived for de-identified routine clinical data. Data were analyzed using SPSS version 16, with descriptive statistics and Fisher's exact test; $p < 0.05$ was considered statistically significant.

Results: Among 51 Study Participants, the mean value was 4.20 ± 2.55, with values ranging from 1 to 12. The age distribution showed that age 4 years was most common (11; 21.6%), followed by age 2 years (10; 19.6%). Ages 3 and 5 years each accounted for 8 (15.7%), while the remaining ages had fewer participants. 29 (56.9%) were males and 22 (43.1%) were females, with males comprising the majority. The most common Management was spontaneous expulsion in 40 (78.4%) participants, followed by removal by rigid esophagoscope in 3 (5.9%) and laparotomy in 2 (3.9%). Six (11.8%) participants had no follow-up. Most participants achieved expulsion within 2 days (20; 39.2%), followed by 1 day (14; 27.5%). Expulsion by 3 and 4 days occurred in 11.8% and 7.8%, respectively, while 6 (11.8%) had no follow-up.

Conclusion: Foreign body ingestion in children is usually accidental. Although most foreign bodies pass spontaneously without complications, early identification and appropriate management are essential to prevent morbidity and ensure favourable outcomes.

Keywords: *Foreign Body, Paediatric emergency.*

INTRODUCTION

Foreign body ingestion (FBI) is a common paediatric emergency in India and a frequent cause of emergency department visits, hospital admissions, and occasional mortality among children. In Tertiary Care Centers, FBI accounts for a significant proportion of pediatric surgical and otolaryngology caseloads, with most cases occurring in children under 5 years of age, especially between 6 months and 3 years. This age group is particularly vulnerable due to oral exploratory behavior, incomplete molar development, and immature swallowing coordination.[1-3]

The spectrum of ingested objects in India includes coins, safety pins, screws, nails, toy parts, hair clips, bobby pins, bones, and increasingly, button batteries and small magnets from electronic toys and household devices. While many ingested objects pass spontaneously through the gastrointestinal tract, a substantial proportion become lodged in the esophagus, stomach, or intestines and require endoscopic or surgical removal. Button batteries and multiple high-power magnets are of particular concern because they can cause rapid tissue injury, including corrosive burns, perforation, fistula formation, and life-threatening hemorrhage, sometimes within hours of ingestion.[4-6]

Indian studies highlight that delayed presentation, limited access to paediatric endoscopy in rural areas, and variable awareness among caregivers and primary care providers contribute to increased morbidity and occasional fatalities. Tele-triage and referral pathways have been shown to reduce diagnostic delays in rural settings, underscoring the need for strengthened emergency systems and caregiver education. Recent reports from major Indian centers emphasize a rising trend in high-risk ingestions, particularly button batteries, and the importance of rapid recognition and removal within 2 hours when lodged in the esophagus.[7-11]

Despite this burden, comprehensive multicentre epidemiological data from India remain limited, and most published work consists of single-centre retrospective or observational studies. Analytical studies of foreign body ingestion in the Paediatric age group in Villupuram Medical College are therefore essential to define local patterns of ingestion, identify high-risk objects and demographic groups, evaluate clinical outcomes, and inform preventive strategies and clinical guidelines tailored to Tamil Nadu healthcare settings.

Objectives:

Primary objective:

To analytically describe the epidemiological and clinical profile of foreign body ingestion in children presenting to a tertiary care hospital in India.

Secondary objective:

1. To determine the types of ingested foreign bodies.
2. To assess age-wise and sex-wise distribution of cases.
3. To evaluate Duration of Expulsion and outcomes of management (conservative, endoscopic, surgical).

METHODOLOGY:

Study design and area:

Hospital-based Analytical case series of children with foreign body ingestion at Department of Pediatric Surgery of the Villupuram Medical College & Hospital in from October 2021 to October 2025.

Study population

All children aged 0–18 years Presenting with confirmed foreign body ingestion.

Case definition

Case is defined as any child with a clear history of foreign body ingestion or strong clinical suspicion, and Confirmation of foreign body by imaging (X-ray/CT/ultrasound) and/or endoscopy and/or surgical findings.

Inclusion criteria

Age <18 years with Confirmed foreign body ingestion

Sampling

Consecutive sampling: all eligible cases meeting inclusion criteria during the study period are included

Data collection

Data collected Prospectively from case records, endoscopy logs, operation theatre registers, radiology reports, and emergency department records using a structured proforma. Data were collected using a structured proforma covering

socio-demographic variables (age, sex) and foreign body characteristics (type). Diagnostic work-up (imaging modalities and findings), management (conservative, endoscopic, or surgical; timing and success).

Ethical considerations

Institutional Ethics Committee approval was obtained for the study. A waiver of informed consent was requested as only de-identified routine clinical data were used. Patient confidentiality was maintained by coding identifiers and storing data securely.

Statistical Analysis:

Descriptive statistics (means, medians, proportions). Statistical significance assessed via Fisher exact test. P Value <0.05 considered as significant. Analysis performed using SPSS software Version 16.

RESULTS:

Among 51 Study Participants, the mean value was 4.20 ± 2.55, with values ranging from 1 to 12. The age distribution showed that age 4 years was most common (11; 21.6%), followed by age 2 years (10; 19.6%). Ages 3 and 5 years each accounted for 8 (15.7%), while the remaining ages had fewer participants. 29 (56.9%) were males and 22 (43.1%) were females, with males comprising the majority. The most common Management was spontaneous expulsion in 40 (78.4%) participants, followed by removal by rigid esophagoscope in 3 (5.9%) and laparotomy in 2 (3.9%). Six (11.8%) participants had no follow-up. Most participants achieved expulsion within 2 days (20; 39.2%), followed by 1 day (14; 27.5%). Expulsion by 3 and 4 days occurred in 11.8% and 7.8%, respectively, while 6 (11.8%) had no follow-up.

Table1: Age Distribution of Study Participants:

Age	Frequency	Proportion	Total
1	4	7.8	51(100%)
2	10	19.6	
3	8	15.7	
4	11	21.6	
5	8	15.7	
6	5	9.8	
8	1	2.0	
10	1	2.0	
11	2	3.9	
12	1	2.0	

Table2: Sex Distribution of Study Participants:

Sex	Frequency	Proportion	Total
Female	22	43.1	51(100%)
Male	29	56.9	

Table3: Management of Study Participants:

Management	Frequency	Proportion	Total
Laparotomy done and removed	2	3.9	51(100%)
No follow	6	11.8	
Removed by Rigid esophagoscope	3	5.9	
Spontaneous expulsed	40	78.4	

Table4: Duration of Expulsion of Study Participants:

Duration of Expulsion	Frequency	Proportion	Total
1 Day	14	27.5	51(100%)
2 Days	20	39.2	
3 Days	6	11.8	
4 Days	4	7.8	
7 Days	1	2.0	
No Follow up	6	11.8	

Figure 1: Hygroscopic Ball removal:

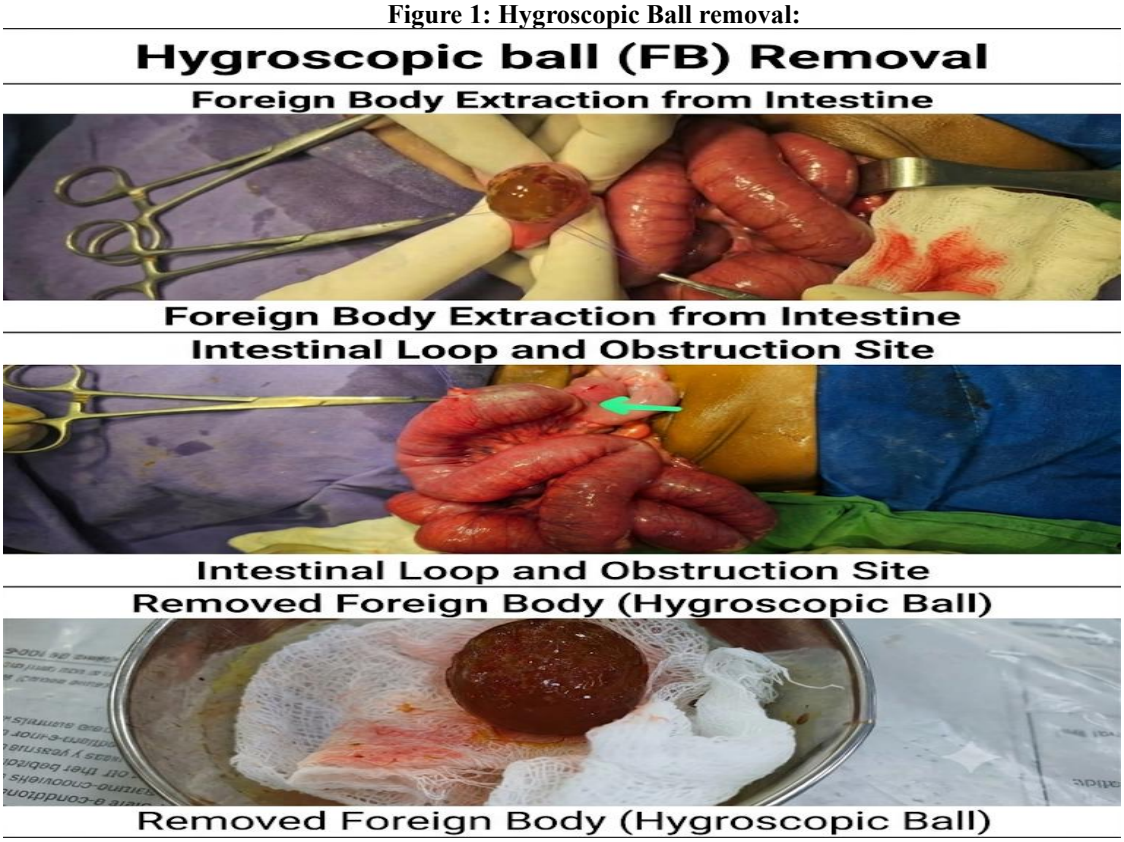


Figure 2: FB Cricoid:

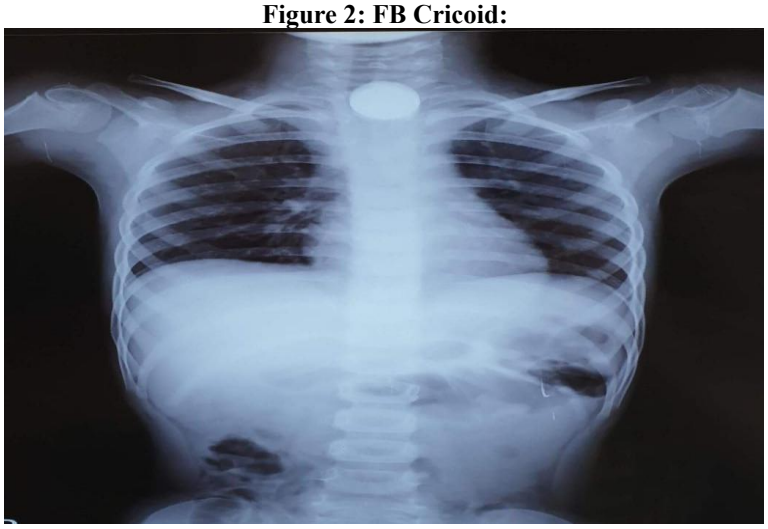
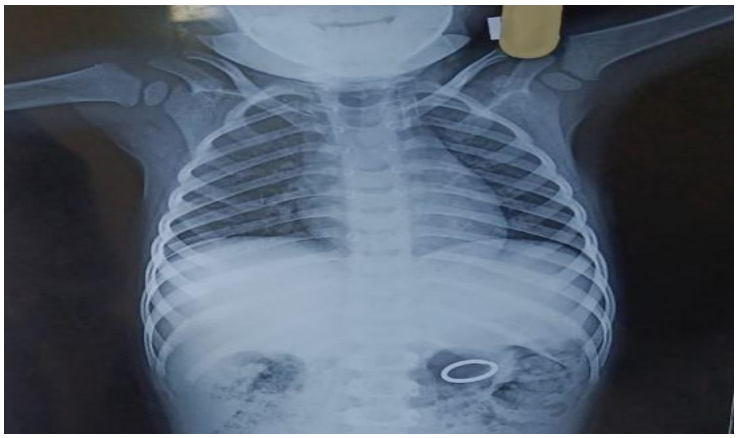


Figure 3: FB Ring:



DISCUSSION:

Our study showed that Among the 51 study participants, the mean age was 4.20 ± 2.55 years, with an age range of 1–12 years. Children aged 4 years were the most frequently represented (11; 21.6%), followed by those aged 2 years (10; 19.6%), while ages 3 and 5 years each accounted for 8 (15.7%) participants. There was a slight male predominance, with 29 (56.9%) males and 22 (43.1%) females. Regarding management outcomes, spontaneous expulsion was the most common, occurring in 40 (78.4%) participants, while 3 (5.9%) required removal by rigid esophagoscope and 2 (3.9%) underwent laparotomy and removal. Six (11.8%) participants had no follow-up. Among those followed up, expulsion most commonly occurred within 2 days (20; 39.2%), followed by 1 day (14; 27.5%). Expulsion within 3 days occurred in 6 (11.8%), while 4 (7.8%) achieved expulsion by 4 days and 1 (2.0%) by 7 days.

Jayakumar P[12] et al stated that A total of 133 cases were included, with a mean age of 6.15 years and a higher prevalence in males (60.2%). The most common age group affected was 5–13 years (50.4%). The mean length of ingested FB was 2.77 cm, with 52.6% of cases ingesting FBs >2 cm. The majority of FBs were blunt (92.5%) and circular in shape (61.7%). The primary reason for ingestion was playing (95.5%). The most common site of FB impaction was the intestine (50.4%). Most cases were managed by observation (93.2%).

Diaconescu S[5] et al stated that 61 patients (median age of 3.25 ± 4.7 years).The most frequently ingested objects were coins (26.23%), unidentified metal objects (13.11%), bones (8.19%), batteries, and buttons (6.55%). The clinical features we encountered included abdominal pain (55.73%), vomiting (34.42%), and asymptomatic children (29.5%). Routine Xray examination enabled finding the foreign body in 42 of the cases. An esophagogastroduodenoscopy was performed within 24–72 hours. 25 cases resulted in a negative endoscopy (40.98%), 19 objects (31.14%) were removed using a polypectomy snare, and extraction failure occurred in 17 patients (27.86%). 28 foreign bodies were passed without incidents; in 14 cases, the swallowed objects were never found. In one case, a battery was stuck in the esophageal folds and led to tracheal-esophageal fistula and bronchopneumonia and later to esophageal stenosis. Batteries and sharp objects lead to severe complications and preschool-age children are at high risk for such events.

Sreelatha Martha et al stated that Of the total 68 children studied 72% of cases were below the age of 3 years. 54.41% of cases were males and 45.58% were females. Common presenting symptoms were vomiting (39.70%) followed by cough (26.47%) and pain abdomen (13.23%).17.64% of cases were presented with no symptoms other than the history of some foreign body ingestion. Among all the cases studied,95.5 % of cases were recovered without any complications. The outcome was good with no mortality.

Our findings were comparable with previous studies, showing a predominance of young children and males. The mean age in our study was 4.20 ± 2.55 years, with 56.9% males, similar to Jayakumar P et al. (60.2% males) and Sreelatha Martha et al. (54.41% males). Management outcomes were favorable, with 78.4% achieving spontaneous expulsion, compared with 93.2% conservatively managed cases reported by Jayakumar P et al. and 95.5% uncomplicated recovery reported by Sreelatha Martha et al. Most of our participants expelled the foreign body within 2 days, indicating early spontaneous passage. Diaconescu S et al. similarly reported spontaneous passage in several cases, although complications were noted particularly with batteries and sharp objects.

CONCLUSION:

Foreign body ingestion occurring in children is mostly accidental and associated with significant morbidity. Most of these foreign bodies pass through the gastrointestinal tract without any issues. Timely identification and proper management of foreign body ingestion can help in minimizing complications and achieving favourable outcomes.

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