

Foreign body ingestion in children and their follow-up in a tertiary care hospital – A prospective study



Jayakumar P¹, Selvakumar M², Meenakshi Sundari S³, Rock Britto D⁴

¹Assistant Professor, ²Associate Professor, Department of Paediatric Surgery, Government Mohan Kumaramangalam Medical College Hospital, Salem, ³Professor, Department of Paediatric Surgery, Madurai Medical College, Madurai, ⁴Professor, Department of Community Medicine, Dhanalakshmi Srinivasan Medical College, Perambalur, Tamil Nadu, India

Submission: 15-03-2022

Revision: 28-03-2023

Publication: 01-05-2023

ABSTRACT

Background: Foreign body (FB) ingestion is a common pediatric surgery emergency, with potential complications such as perforation, obstruction, and bleeding. The demographics, characteristics, and management of these cases can vary based on factors such as age, gender, and type of FB ingested. **Aims and Objectives:** This study aimed to analyze these factors in a prospective study of children with FB ingestion. **Materials and Methods:** This was a prospective observational study done under 13 years of age with FB ingestion who presented to a tertiary care hospital over a period of 15 months. **Results:** 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%). **Conclusion:** FB ingestion is a common pediatric emergency, with a higher prevalence in males. Most cases can be managed by observation, and endoscopic removal or PR may be required in a small proportion of cases. Awareness of the risk factors and clinical presentation of FB ingestion can aid in prompt diagnosis and management of these cases.

Key words: Children; Foreign body ingestion; Outcome

INTRODUCTION

Foreign body (FB) ingestion in children is a common and potentially dangerous problem, which can cause a range of complications including perforation, obstruction, and infection. The incidence of FB ingestion in children is highest in children under the age of 3-years-old. Children at this age are more likely to put objects in their mouth and are unable to distinguish between edible and non-edible items. Moreover, the prevalence of FB ingestion is higher in boys than in girls. The most common foreign bodies ingested by children include coins, toys, and food items. Ingestion of batteries, magnets, and sharp objects can lead to serious complications and require urgent medical attention.¹⁻³

Aims and objectives

This prospective observational study aimed to analyze the outcome of children with FB ingestion.

MATERIALS AND METHODS

In this prospective observational study, children under the age of 13 years old with FB ingestion were followed in our department of pediatric surgery, Government Rajaji Hospital (GRH), Madurai. Total duration of the study was 15 months.

RESULTS

Total FB ingested cases registered were 133, (Male-80 [60.2%] and female-53 [39.8%]), mean age of children was

Access this article online

Website:

<http://nepjol.info/index.php/AJMS>

DOI: 10.3126/ajms.v14i5.53248

E-ISSN: 2091-0576

P-ISSN: 2467-9100

Copyright (c) 2023 Asian Journal of Medical Sciences



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Address for Correspondence:

Dr. Jayakumar P, Assistant Professor, Department of Paediatric Surgery, Government Mohan Kumaramangalam Medical College Hospital, Salem, Tamil Nadu, India. **Mobile:** +91-9659798981. **E-mail:** drjayakumar1999@gmail.com

6.15 years. M:F ratio was 1.5:1.

Age ≤2 years were 17 (Male-12 and female-5) (12.8%), age >2–5 years were 49 (Male-26 and female-23) (36.8%), and age >5–13 years were 67 (Male-42 and female-25) (50.4%).

Common FB ingested was coin, 58 (43.61%), followed by button battery 12 (9.1%), magnet 8 (6%), closed safety pin 5 (3.76), hair clip 4 (3%), nail 4 (3%), marble ball 3 (2.26%), anklet screw 2 (1.5%), fish tank stone 2 (1.5), iron dice 2 (1.5%), key 2 (1.5%), nut 2 (1.5%), open safety pin 2 (1.5%), and others were plastic cap, pen cap, toy bullet, gold ring, metal ring, button, key with ring, etc.

Mean length of FB ingested was 2.77 cm. FBs ≤2 cm were 63 (47.4%). Mean length was 1.59 cm. Mean time taken to pass out was 58.25 h. FBs more than 2 cm were 70 (52.6%). Mean length was 2.7 cm. Mean time taken to pass out was 123.30 h.

Shape of the ingested FB's includes circular-82 (61.7%), oval-20 (15%), irregular-12 (9%), cylindrical-11 (8.3%), rectangular-6 (4.5%), hexagonal-1 (0.8%), and triangular-1 (0.8%) circular and cylindrical time taken to pass out for circular-118 h, cylindrical-67.94, irregular-58.9, oval-52.6, and rectangular-40.25 h.

Among the foreign bodies ingested, 123 of them (92.5%) were blunt objects, with a mean age of 6.07 years, and took an average of 94.66 hours to pass out. The remaining 10 foreign bodies (7.5%) were sharp objects, with a mean age of 7.15 years and took an average of 73.88 hours to pass out. These findings suggest that blunt objects are more commonly ingested by children, but take longer to pass through the digestive system compared to sharp objects.

Primary cases received in GRH-60 (45.1%), time to reach GRH- 18.44 h

Among the referred cases 73 (54.9%) from other places , primary care center reach time was 3.24 hours, and GRH (Tertiary center)-27.77 hours. In total time to reach GRH for 133 cases-23.56 hours. How ingestion happened or reason for ingestion, while playing-127 (95.5%), fed by sibling-2 (1.5%), magnetic resonance-1 (0.8%), PICA-1 (0.8%), and not known-2 (1.5%).

Caretakers noticed while child playing with the FB in 52 (40.1%), not seen in 77 (57.9%), and data not available in 4 (3%).

X-ray position showing possible place of FB in intestine-67 (50.4%), stomach-29 (21.8%), radiolucent-12 (9%), rectosigmoid-10 (7.5%), esophagus-9 (6.8%), and X-ray not available or not seen-5 (3.8%).

Primarily managed by observation alone in 124 (93.2%), endoscopic removal in 6 (4.5%), and per rectal examination done in 3 (2.3%) for retrieval of FB.

No mortality was noted, and none of the patient required surgical management.

Associated disease like pica recorded in 13 (9.8%) and mental retardation in 1 (0.8%) patients. The remaining 119 (89.4%) had no associated disease.

In the cross-table analysis, time taken to pass out more than 48 h in increasing age, large size and width of the FB, and more time delay to attend GRH (Figure 1). When there was increase in the length of the FB > 2 cms, there was delayed passage of the FB noted (Figure 2). Time taken to pass out was significantly high when the width of the

CHARACTERISTIC	Time to pass out		p value by 't' test
	> 48 hrs	< 48 hrs	
Age	6.59 (± 3.22)	5.28 (± 3.27)	0.037
Length Size in Cms	2.38 (± 0.59)	1.98 (± 0.92)	0.009
Width Size in Cms	1.91 (± 0.69)	1.29 (± 0.77)	0.001
Time to GRH in hours	39.15 (± 62.11)	9.37 (± 13.36)	0.002

Figure 1: Time take to pass out versus age, length and width of foreign body, and time taken to reach Government Rajaji Hospital

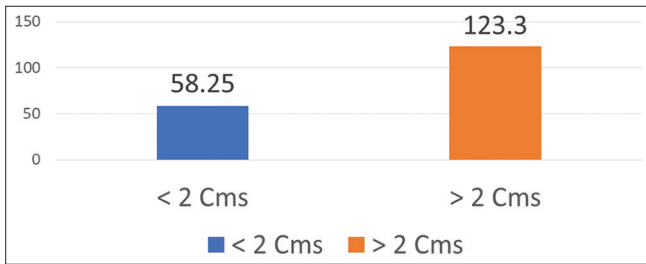


Figure 2: Time taken to pass out versus length

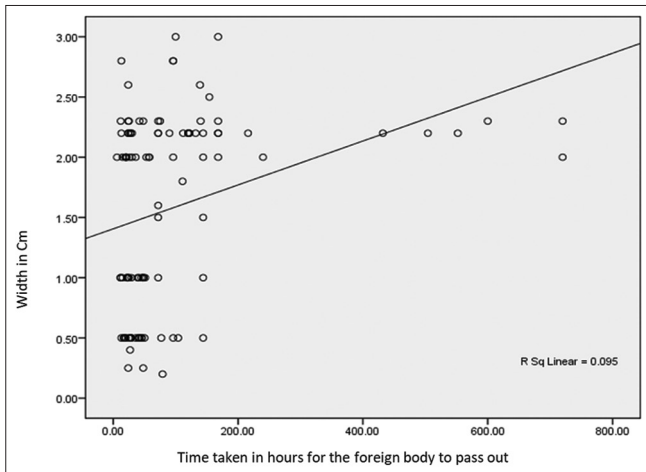


Figure 3: Time taken to pass out versus width

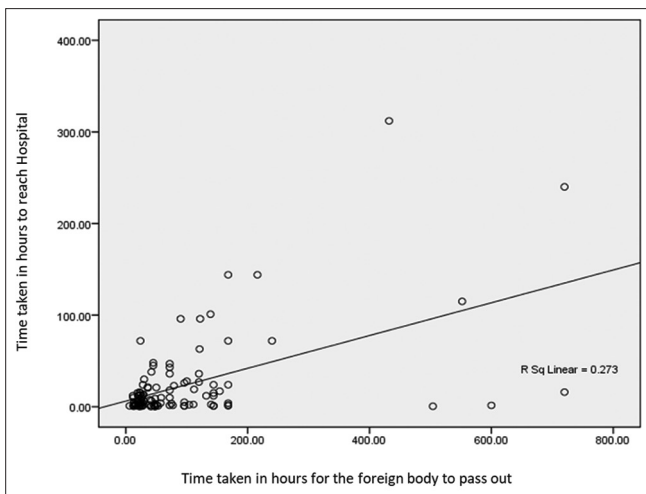


Figure 4: Time taken to pass out versus time taken to reach hospital

FB increases ($P=0.001$) (Figure 3). People who reach early for hospital was associated with early pass out of the FB noted (Figure 4). Among the shape of the FB's, circular and cylindrical FB's take more time to pass out compared to irregular, oval and rectangular FB's (Figure 5).

DISCUSSION

The results of our study showed that a total of 133 cases of FB ingestion were registered, with a male predominance

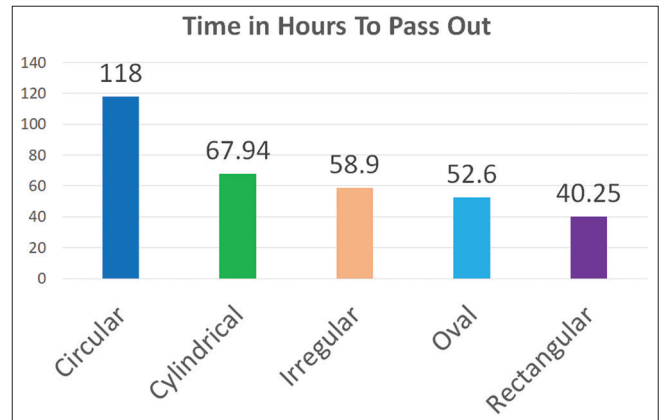


Figure 5: Shape of foreign body's versus time taken to pass out

of 60.2%. The mean age of the children was 6.15 years. Our study found that the most commonly ingested FB was a coin, followed by button batteries, magnets, and safety pins. These findings are consistent with the previous studies conducted in different parts of the world.^{4,5}

The mean length of the ingested FB was 2.77 cm, with a higher proportion of foreign bodies ≤ 2 cm in length. The time taken for the FB to pass out of the body was longer for foreign bodies longer than 2 cm. This finding is consistent with other studies that have reported a longer time for larger foreign bodies to pass out of the body.^{6,7}

The shape of the ingested FB in our study was predominantly circular, followed by oval and irregular shapes. The time taken for the FB to pass out of the body varied depending on the shape of the FB. Circular and cylindrical foreign bodies took longer to pass out of the body compared to other shapes.

Our study found that blunt foreign bodies were more commonly ingested than sharp foreign bodies, and the mean age of children who ingested blunt foreign bodies was lower than those who ingested sharp foreign bodies. This finding is consistent with the previous studies that have reported a higher incidence of blunt FB ingestion among children.^{8,9}

Our study revealed that the majority of cases (93.2%) were primarily managed by observation alone. Only a small proportion of cases (4.5%) required endoscopic removal, and per rectal examination was done in 2.3% of cases for FB retrieval. This finding indicates that most cases of FB ingestion in children can be managed conservatively without the need for invasive procedures. Endoscopy primarily used for the FB's in the esophagus and stomach.^{9,10}

Our previous retrospective study also shows similar outcomes and demographics except this prospective study

shows low mean age of children and comparatively high number of children in 5 years and less age group.¹¹

Limitations of the study

This study was an observational and single center study only.

CONCLUSION

Our study highlights the pattern and outcome of FB ingestion in children. Coin ingestion was the most common type of FB ingestion, commonly by male children and the majority of the ingested foreign bodies were blunt objects. Most cases can be managed by observation, and endoscopic removal or PR may be required in a small proportion of cases. Our findings emphasize the importance of preventive measures such as proper storage of small objects and parental education to avoid FB ingestion in children.

ACKNOWLEDGMENT

We would like to acknowledge the patients participated in the study.

REFERENCES

1. Lee JH. Foreign body ingestion in children. *Clin Endosc.* 2018;51(2):129-136.
<https://doi.org/10.5946/ce.2018.039>
2. Conners GP and Mohseni M. Pediatric foreign body ingestion. In: *StatPearls.* Treasure Island, FL: StatPearls Publishing; 2018. p. 1-5.
3. Severien S and Teufel M. Foreign body ingestion in childhood at Coast County Hospital. *Padiatrische Prax.* 2014;81(4):605-614.
4. Yusufu LM, Yongu WT, Garba ES and Ahmad BM. Foreign body ingestion in children: Experience from a developing country. *Int J Pediatr Otorhinolaryngol.* 2007;71(9):1461-1464.
5. Karanthi K, Samuel M, Cingo A, Mathew J, Tauro DP, Seshadri S. Foreign body ingestion in children: Lessons learnt from 104 cases. *Indian J Otolaryngol Head Neck Surg.* 2008;60(1):22-25.
6. Bronstein AC, Spyker DA, Cantilena LR Jr., Green JL, Rumack BH, Heard SE, et al. 2007 annual report of the American association of poison control Centers' national poison data System (NPDS): 25th annual report. *Clin Toxicol (Phila).* 2008;46(10):927-1057.
<https://doi.org/10.1080/15563650802559632>
7. Kramer RE, Lerner DG, Lin T, Manfredi M, Shah M, Stephen TC, et al. Management of ingested foreign bodies in children: A clinical report of the NASPGHAN Endoscopy Committee. *J Pediatr Gastroenterol Nutr.* 2015;60(4):562-574.
<https://doi.org/10.1097/MPG.0000000000000729>
8. Palta R, Sahota A, Bemarki A, Salama P, Simpson N and Laine L. Foreign-body ingestion: Characteristics and outcomes in a lower socioeconomic population with predominantly intentional ingestion. *Gastrointest Endosc.* 2009;69(3 Pt 1):426-433.
<https://doi.org/10.1016/j.gie.2008.05.072>
9. Webb WA. Management of foreign bodies of the upper gastrointestinal tract: Update. *Gastrointest Endosc.* 1995;41(1):39-51.
[https://doi.org/10.1016/s0016-5107\(95\)70274-1](https://doi.org/10.1016/s0016-5107(95)70274-1)
10. Kay M and Wyllie R. Pediatric foreign bodies and their management. *Curr Gastroenterol Rep.* 2005;7(3):212-218.
<https://doi.org/10.1007/s11894-005-0015-6>
11. Hemanthkumar B, Karrupasamy N, Jayakumar P, Aravindan C, Srinivasakumar R and Dharshini KR. Foreign body ingestion in children and their follow-up in a tertiary care paediatric surgery institution. *IOSR J Dent Med Sci.* 2019;18(8):33-36.
<https://doi.org/10.9790/0853-1808083336>

Authors' Contributions:

JP- Definition of intellectual content, Literature survey, Concept, design, clinical protocol, data collection, manuscript preparation, editing, Prepared first draft of manuscript, implementation of study protocol, submission of article, and manuscript revision; **SM**- Concept, design, clinical protocol, manuscript preparation, editing, and manuscript revision; **MSS**- Concept, design, clinical protocol, manuscript preparation, editing, and manuscript revision; **RBD**- Design, manuscript preparation, editing, data analysis and manuscript revision.

Work attributed to:

Government Rajaji Hospital, Department of Paediatric Surgery, Madurai Medical College, Madurai, Tamil Nadu, India.

Orcid ID:

Jayakumar P - <https://orcid.org/0000-0002-2321-2562>
Selvakumar M - <https://orcid.org/0009-0005-9286-0896>
Meenakshi Sundari S - <https://orcid.org/0009-0001-2582-2217>
Rock Britto D - <https://orcid.org/0000-0002-6825-9540>

Source of Support: Nil, **Conflicts of Interest:** None declared.