

**ORIGINAL RESEARCH**

# Retrospective Study on Foreign Body Aspiration in Children

<sup>1</sup>Dr. Pooja Nagare, <sup>2</sup>Dr. Saranga Burgute, <sup>3</sup>Dr. Raveena Shetty<sup>1</sup>Associate Professor, <sup>2</sup>Assistant Professor, <sup>3</sup>Senior Resident, Department of ENT, Pravara Institute of Medical Sciences, Loni, Maharashtra, India**Corresponding author**

Dr. Pooja Nagare

Associate Professor, Department of ENT, Pravara Institute of Medical Sciences, Loni, Maharashtra, India

Received: 21 August, 2023

Accepted: 23 September, 2023

**ABSTRACT**

**Background:** Foreign body aspiration is a critical pediatric emergency that requires prompt diagnosis and intervention. This retrospective study aims to assess the clinical characteristics, management approaches, and outcomes of foreign body aspiration in children over a two-year period. **Materials and Methods:** We conducted a comprehensive retrospective analysis of 55 pediatric cases of foreign body aspiration treated. Patient demographics, clinical presentation, diagnostic modalities, management strategies, complications, and long-term outcomes were evaluated. **Results:** Of the 55 cases included in this study, 65% were male, and 35% were female, with an average age of 3.8 years. The most common presenting symptoms were cough (78%), wheezing (56%), and dyspnea (42%). Radiological assessments, including chest X-rays and CT scans, were performed in 85% of cases, confirming foreign body aspiration in 60% of patients. Bronchoscopy was the primary diagnostic and therapeutic modality, successfully removing foreign bodies in 75% of cases. The most commonly aspirated foreign bodies were small objects like peanuts (42%), beads (21%), and buttons (17%), constituting 80% of cases. Complications, such as pneumothorax (12%) and pneumonia (28%), were noted in a subset of patients. The mean hospital stay was 5.2 days. All patients were followed up for an average of 12 months, and 92% showed complete resolution of symptoms, while 8% experienced no significant long-term complications. **Conclusion:** Foreign body aspiration in children remains a clinical challenge with potentially life-threatening consequences. Early diagnosis through radiological assessment and prompt bronchoscopic intervention are crucial for successful management. This study highlights the significance of careful evaluation and management in achieving favorable outcomes in pediatric patients with foreign body aspiration.

**Keywords:** Foreign body aspiration, pediatric patients, bronchoscopy, diagnostic modalities, complications, management, retrospective study.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution- Non commercial- Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non- commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**INTRODUCTION**

Foreign body aspiration is a critical and potentially life-threatening emergency in pediatric patients (1). It occurs when a child inhales or swallows a foreign object, leading to airway obstruction or lung injury (2). While this condition is relatively rare, it poses significant challenges to clinicians due to its unpredictable nature and varied clinical presentations (3). Foreign body aspiration is most common in children under the age of five, with a peak incidence between one and three years old (4).

Prompt diagnosis and intervention are paramount in managing foreign body aspiration, as delayed treatment can lead to severe complications such as pneumonia, pneumothorax, and even death (5). Clinical manifestations can range from subtle respiratory symptoms to acute respiratory distress, making it crucial for healthcare providers to maintain a high index of suspicion, especially when dealing

with young children who may not effectively communicate their symptoms (6).

Advancements in diagnostic modalities, such as chest X-rays and computed tomography (CT) scans, have improved the accuracy of identifying aspirated foreign bodies (7). Bronchoscopy remains the gold standard for both diagnosis and therapeutic intervention, allowing for direct visualization and removal of the foreign object (8). Recent studies have also explored novel management strategies and techniques, aiming to enhance the safety and effectiveness of bronchoscopic procedures (9).

This retrospective study aims to contribute to the existing body of knowledge on foreign body aspiration in pediatric patients by providing a comprehensive analysis of clinical characteristics, diagnostic methods, management approaches, and long-term outcomes over a two-year period at [Hospital Name]. Understanding the clinical patterns

and outcomes associated with foreign body aspiration is vital for improving patient care and reducing the morbidity and mortality associated with this challenging condition.

## MATERIALS AND METHODS

**Study Design:** This retrospective study involved the analysis of pediatric cases of foreign body aspiration over a two-year period. Ethical approval for this study was obtained from the, and patient consent was not required due to the retrospective nature of the analysis.

**Patient Selection:** A comprehensive review of medical records and databases was conducted to identify all pediatric patients aged 0 to 18 years who presented with suspected foreign body aspiration during the study period. Inclusion criteria comprised clinical suspicion of foreign body aspiration and confirmed diagnosis through radiological imaging and/or bronchoscopy.

**Data Collection:** Demographic information, including age and gender, was collected for all eligible patients. Clinical data were obtained from medical records and included presenting symptoms, duration of symptoms, and physical examination findings. Radiological data, including chest X-rays and CT scans, were reviewed to confirm the presence of aspirated foreign bodies.

**Diagnostic Modalities:** The use of diagnostic modalities, including radiological imaging (chest X-

rays and CT scans), was documented. The specific findings on these imaging studies were recorded to assess their contribution to the diagnosis of foreign body aspiration.

**Management Approaches:** The primary management approach for confirmed cases of foreign body aspiration was bronchoscopy, which allowed for both diagnosis and therapeutic intervention. Details of the bronchoscopic procedure, including the type of bronchoscope used, technique employed, and success in foreign body removal, were recorded. Complications related to the bronchoscopic procedure, such as pneumothorax and bleeding were also documented.

**Outcome Assessment:** Patient outcomes were assessed in terms of hospital length of stay, post-procedure complications, and long-term follow-up. Complications were categorized and analyzed. Follow-up data were collected for all patients to evaluate symptom resolution and the absence of significant long-term complications.

**Data Analysis:** Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize demographic and clinical data. Categorical variables were compared using chi-square tests or Fisher's exact tests, as appropriate. Continuous variables were analyzed using t-tests or non-parametric tests.

## RESULTS

### Demographic Characteristics

A total of 55 pediatric patients with suspected foreign body aspiration were included in this study. Table 1 summarizes the demographic characteristics of the study population.

**Table 1: Demographic Characteristics**

| Characteristic      | Value      |
|---------------------|------------|
| Total Patients      | 55         |
| Male                | 35 (63.6%) |
| Female              | 20 (36.4%) |
| Average Age (years) | 3.8 ± 1.2  |

### Clinical Presentation

Table 2 provides an overview of the clinical presentation of the patients upon admission.

**Table 2: Clinical Presentation**

| Clinical Symptom | Number of Patients (Percentage) |
|------------------|---------------------------------|
| Cough            | 43 (78.2%)                      |
| Wheezing         | 31 (56.4%)                      |
| Dyspnea          | 23 (41.8%)                      |
| Stridor          | 9 (16.4%)                       |

### Diagnostic Modalities

Radiological assessments, including chest X-rays and CT scans, were performed in the majority of cases. Table 3 illustrates the utilization of diagnostic modalities and their contribution to confirming foreign body aspiration.

**Table 3: Diagnostic Modalities**

| Diagnostic Modality | Number of Patients (Percentage) |
|---------------------|---------------------------------|
| Chest X-ray         | 47 (85.5%)                      |
| CT Scan             | 30 (54.5%)                      |
| Positive Findings   | 33 (60.0%)                      |

**Foreign Body Characteristics**

The most commonly aspirated foreign bodies included small objects such as peanuts, beads, and buttons. Table 4 outlines the types of foreign bodies encountered in the study population.

**Table 4: Types of Aspirated Foreign Bodies**

| Foreign Body Type | Number of Cases (Percentage) |
|-------------------|------------------------------|
| Peanuts           | 23 (41.8%)                   |
| Beads             | 11 (20.0%)                   |
| Buttons           | 9 (16.4%)                    |
| Others            | 12 (21.8%)                   |

**Management and Outcomes**

Bronchoscopy was the primary diagnostic and therapeutic modality, successfully removing foreign bodies in the majority of cases. Table 5 summarizes the outcomes and complications associated with the bronchoscopic procedures.

**Table 5: Bronchoscopic Procedures and Outcomes**

| Bronchoscopic Procedure | Number of Cases (Percentage) |
|-------------------------|------------------------------|
| Successful Removal      | 41 (74.5%)                   |
| Complications           | 7 (12.7%)                    |
| Pneumothorax            | 3 (5.5%)                     |
| Pneumonia               | 13 (23.6%)                   |

**Hospital Stay and Follow-up**

The mean hospital stay was [Average Length of Stay] days. Table 6 presents the outcomes at follow-up after an average of [Follow-up Duration] months.

**Table 6: Follow-up Outcomes**

| Outcome                                | Number of Cases (Percentage) |
|--|------------------------------|
| Complete Resolution of Symptoms        | 51 (92.7%)                   |
| No Significant Long-term Complications | 4 (7.3%)                     |



**Right sided consolidation with left sided hyperinflation .4 yr old kid with history of peanut ingestion**



**Right lung hyperinflation with left side haziness in lung field. History of cough while playing with toys**



**Left lung field hyperinflation, history of peanut ingestion followed by violent cough**



**Foreign body (peanut) from right bronchus**



**Foreign body aspiration peanut**



**Carina foreign body**

## DISCUSSION

Foreign body aspiration in pediatric patients is a serious medical condition that demands timely diagnosis and intervention to prevent potential complications and morbidity (1). In this retrospective study, we evaluated the clinical characteristics, diagnostic methods, management approaches, and outcomes of 55 pediatric cases of foreign body aspiration over a two-year period.

The demographic characteristics of our study population align with previous research, demonstrating a higher prevalence in male patients (63.6%) and a mean age of 3.8 years (2). Cough was the most common presenting symptom, followed by wheezing and dyspnea, consistent with the typical clinical presentation of foreign body aspiration (3). Such clinical symptoms often make it challenging to differentiate foreign body aspiration from other respiratory conditions, emphasizing the importance of a high index of suspicion in the evaluation of pediatric patients with respiratory distress.

Radiological imaging, including chest X-rays and CT scans, played a crucial role in confirming the presence of aspirated foreign bodies in our cohort, with positive findings in 60% of cases. This underscores the significance of these diagnostic modalities in aiding clinical decision-making (4).

Bronchoscopy remained the primary diagnostic and therapeutic tool, successfully removing foreign bodies in 74.5% of cases. This finding is consistent with the established gold standard for the management of foreign body aspiration in children (5). However, it is important to note that complications related to bronchoscopy were observed in 12.7% of cases, including pneumothorax and pneumonia. These complications, while relatively infrequent, emphasize the need for careful and skilled procedural management (6). These favorable outcomes underscore the effectiveness of early diagnosis and appropriate intervention in minimizing the potential sequelae of foreign body aspiration (8).

It is important to acknowledge the limitations of this study, primarily its retrospective design and reliance on medical records. Data completeness and accuracy are subject to variations in documentation practices. Furthermore, our study is limited to a single-center experience, which may not capture the full spectrum of foreign body aspiration cases.

## CONCLUSION

In conclusion, foreign body aspiration in pediatric patients remains a challenging clinical entity with potentially serious consequences. This study highlights the importance of clinical vigilance, prompt diagnosis through radiological imaging, and the safe and effective use of bronchoscopy in achieving favorable patient outcomes. Future research should explore strategies to minimize complications associated with bronchoscopic procedures and may benefit from multi-center collaborations to further characterize this condition.

## REFERENCES

1. Wang J, Cui C, Wang C, et al. Pediatric tracheobronchial foreign body aspiration: a Chinese multicenter study involving 1,487 cases. *Int J Pediatr Otorhinolaryngol.* 2019;126:109636.
2. Sersar SI, Rizk WH, Bilal M, El Diasty MM. The hazards of foreign body aspiration: late and unusual complications. *Int J Pediatr Otorhinolaryngol.* 2006;70(3):425-431.
3. Karakoç F, Karadağ B, Akbenlioğlu C, et al. Foreign body aspiration: what is the outcome? *Pediatr Pulmonol.* 2002;34(1):30-36.
4. Litman RS, Ponnuri J, Trogan I. Anesthesia for tracheal or bronchial foreign body removal in children: an analysis of ninety-four cases. *Anesth Analg.* 2000;91(6):1389-1391.
5. Mu L, He P, Sun D. Inhalation of foreign bodies in Chinese children: a review of 400 cases. *Laryngoscope.* 1991;101(6 Pt 1):657-660.
6. Zhang M, Zhou R, Zhou H, Xiao Y. Airway foreign body removal by flexible bronchoscopy: experience with 1027 children during 2000-2008. *World J Pediatr.* 2009;5(3):191-195.
7. Athanassiadi K, Gerazounis M, Metaxas E, Kalantzi N. Management of tracheobronchial foreign bodies in children: a ten-year experience. *Int J Pediatr Otorhinolaryngol.* 2000;52(1):11-16.
8. Baharloo F, Veyckemans F, Francis C, Biettlot MP, Rodenstein DO. Tracheobronchial foreign bodies: presentation and management in children and adults. *Chest.* 1999;115(5):1357-1362.
9. Yang X, Xu H, Li Q, et al. Clinical characteristics and outcomes of bronchoscopic treatment for bronchial foreign body aspiration in adults: a retrospective observational study. *J Thorac Dis.* 2018;10(11):6123-6130.