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## RESEARCH ARTICLE

### BRONCOSCOPY: FOREIGN BODY ASPIRATION: A CASE REPORT

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#### ABSTRACT

Bronchial foreign body aspiration is a critical condition that jeopardizes the respiratory function of children. Prompt diagnosis and removal of the foreign body can reduce occurrence of foreign body complications and mortality. Aspiration of plastic whistles is rare, and this is difficult to retrieve. **Patient concerns:** An 8-year-old boy developed fever and intermittent cough after he accidentally inhaled a plastic whistle 5 months ago. Chest computed tomography scan revealed dense material with central lucency in the right lower lobe. **Diagnoses:** Foreign body in the right lower lobe. **Interventions:** Retrieval by Rigid bronchoscopy was undertaken. **Outcomes:** The plastic whistle was successfully retrieved and the child recovered uneventfully. **Lessons:** Foreign body aspiration in children constitutes a medical emergency in severe cases. Flexible bronchoscopy and balloon-tipped catheter retrieval can also be used along with Rigid Bronchoscope.

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#### INTRODUCTION

Foreign body aspiration can be life threatening emergency. An aspirated solid or semisolid object may lodge in the larynx or trachea. If the object is large enough to cause nearly complete obstruction of the airway, asphyxia may rapidly cause death. Geographic differences in the spectrum of objects commonly found in a particular environment and variations affect the relative frequency with which various objects are aspirated. Airway foreign bodies pose a severe choking hazard for children, particularly those who are younger than 3 years of age. Children aged 1-3 years are at risk for foreign body aspiration because of their tendency to put everything in their mouths and because of the way they chew. Young children chew their food incompletely with incisors before their molars erupt. Objects or fragments may be propelled posteriorly, triggering a reflex inhalation. Children are at risk for putting small toys, candies, groundnuts, almonds, pen caps, cells, magnets and shoe whistles (Fig 1-3). In the United States, it is estimated that 17,537 children aged 14 years or younger visited emergency departments for choking-related episodes in 2001, and many of these episodes were associated with candy/gum (19.0%) and coins (12.7%) (American Heart Association and American Academy of Pediatrics, 2015). Review of tracheobronchial foreign body (FB) aspiration in children in South Africa revealed that metal foreign bodies are the most common (44%) followed by plastic foreign bodies (21%).

Furthermore, coins are the commonly aspirated foreign bodies (30%) followed by beads (8%). In China, on the contrary, nuts are the most common inhaled foreign bodies in children (Lewis Spitz and Arnold, 2012), with 1 report indicating that peanuts account for 87% of foreign bodies (Samarei, 2014). Rigid bronchoscopy remains the gold standard for the removal of FB from the tracheobronchial tree under direct vision (Basu, 1998; Korlacki, 2011).

**Indications of Bronchoscopy:** Bronchoscopy can be used diagnostically and therapeutically (Fig 4). Antero-posterior and lateral chest radiographs should be performed. Most foreign bodies are radiolucent. Radiologic procedures do not have extreme diagnostic accuracy and aspiration events are not always detected. The children present with classic triad (i.e. coughing, wheezing and decreased breathing sounds) and sometimes fever. The presentation may be delayed, and the patient may have been unsuccessfully treated for other conditions. It is performed under General Anesthesia with Spontaneous ventilation is optimal<sup>3</sup>. Storz bronchoscope sizes relative to the child's age and airway diameter are mentioned in table 1.

#### CASE REPORT

A 8 years old male child, weighing 18 kg was brought to the Emergency Department with the known History of Foreign body aspiration from 5-6 months.

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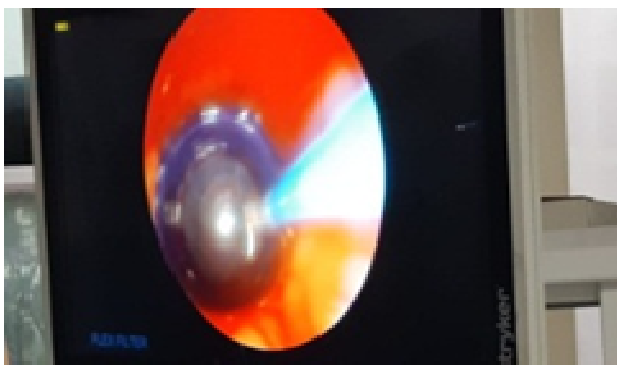


Figure 1. Pen cap



Figure 2. Bulb



Figure 3. Peanut

Child was intervene with the evaluate –identify- intervene” E-I-I” approach (American Heart Association and American Academy of Pediatrics, 2015).

**Evaluate:** The steps of Evaluation were as follows.

**Initial impression:** According to Pediatric assessment Triangle, appearance and Skin color of the child was normal. Work of Breathing was also found to be normal.

**Primary assessment:** Airway was stable.

**Breathing-** Respiratory rate was 28/min, Respiratory Efforts were normal. Rt. lower lobe entry was less, No Stridor/Wheeze or Crackles. SpO<sub>2</sub> was 98% (Room Air).

**Circulation** – HR was 108/min, CFT < 3 sec (Normal), Central pulses and Peripheral Pulses were Good and Skin temperature was warm to touch.

**Disability** –GCS: E<sub>4</sub>V<sub>5</sub>M<sub>6</sub>, Pupils size was normal, Pupils reacting to light and the activity was normal and symmetrical.

**Exposure** – Color is normal, no pallor /Cyanosis.

- **Secondary Assessment:** Focused History showed Child had cough expectorated from 5 months and Fever was present. Focused Examination depicted decreased Rt. lower lobe air entry.
- **Diagnostic Tests:** CCET Chest done 14 DAYS back to admission. Report showed Radio-dense material in Rt. lower lobe likely Foreign Body (FB). Chest X Ray on same day showed Rt. lower lobe collapse.

**Identify:** Foreign Body in right lower lobe. According to Triage Classification child was in Level 4 (Less Urgent).

**Intervene:** Child was started on injectable- Augmentin 450 mg TDS, PCM 300mg QID, Hydrocortisone 100mg TDS and Duolin nebulization TDS.

Rigid Bronchoscopy was planned. Child was maintaining with 95% -99% saturation of oxygen. On first day, Rigid Bronchoscopy was done but the foreign body was not retrieved. Patient was shifted to ICU, Arterial blood gas analysis (Table 2) was done and showed child in Respiratory acidosis. Child was continued with the same treatment for next day. The instruments required for the [rocedure were bronchoscope sizes (L-30cm, ID-7.1, OD-7.8), optical alligator forcep, Telescope 0 Degree 2, Optical lead with optical camera, Warm water, Gloves, suction catheter (10) with suction tube, dressing guaze, lubricating jelly and 1-2 syringes

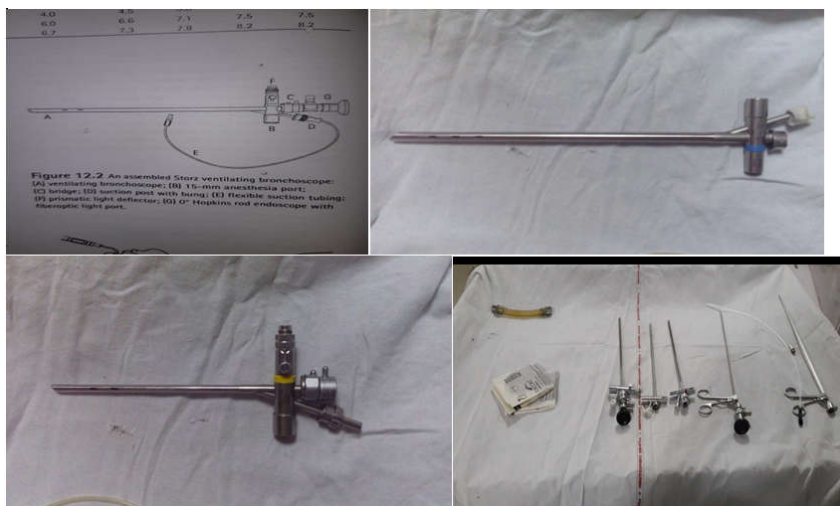


Figure 4. Bronchoscope with parts and Sheath

**Table 1. Storz bronchoscope sizes relative to the child's age and airway diameter.**

Age of Child	Preterm-1 month	1-6 months	6-18months	18months- 3 years	3-6 years	6-9years	9-12 years	12-14 years
ID(mm)	3.5	4.3	5.0	6.0	6.6	7.1	7.5	7.5
OD(mm)	4.2	5.0	5.7	6.7	7.3	7.8	8.2	8.2

**Table 2. ABG Analysis**

Parameters	Day 1	Day2
PH	7.16	7.26
Oximetry O2	97%	99%
PO2 mmHg	117	211
PCO2 mmHg	69.3	56.5
HCo3mmol/l	23.7	24.9
Hb g/dl	11.7	11.5

**Figure 5. Optical Forcep alligator****Figure 6. Parts of whistle (Foreign Body)**

(5ml or 10ml). Next day, child was again taken for Rigid Bronchoscope and with the help of Optical forcep (Fig. 5) the foreign body was retrieved in 3 parts. All foreign body particles (Whistle) were extracted (Fig.6). Extracted object was carefully examined for integrity. Again a check bronchoscopy was done to confirm if any parts left. Child was extubated and shifted in recovery room. Fowlers position was given, Saturation probe attached and vital signs recorded as HR-77/min, Temp-37°C and SpO<sub>2</sub> -100%. Adrenaline nebulization (1:1000) was given to the child, RL started @ 100ml/hr. Previous prescribed medications were resumed. Child was shifted back to intensive care unit within 2 hrs. By next day, the child was discharged with follow up after 1 week.

## DISCUSSION

Foreign body aspiration in children constitutes a medical emergency in severe cases and is a major cause of accidental death in infants and preschool children (Basu, 1998). Foreign Body Ingestion is a life threatening condition. The former includes decreased arterial blood saturation, bradycardia, bronchial spasm and others complications. The latter includes larynx edema, pneumothorax, and sudden cardiac arrest. Rigid bronchoscopy is the procedure of choice for removing foreign bodies in children and in most adults. Success rates for extracting foreign bodies are reportedly more than 98%.<sup>6</sup>

## Conclusion

Foreign Body Ingestion is a life threatening problem. Large solid and semisolid objects are best managed immediately in the operating room with rigid bronchoscope and appropriate grasping instruments.

It requires early diagnosis and multidisciplinary approach to prevent mortality and surgical interventions like bronchotomy and segmental resection.

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