

Clinical Presentation and Management of Foreign Bodies in Airway of Pediatrics – A Retrospective Study.

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ABSTRACT

Background: Accidental inhalation of foreign bodies continues to be the common problem in Children & common cause of childhood morbidity & mortality requiring perfect recognition & mortality requiring perfect recognition & early treatment to minimize the potentially serious & sometimes fatal consequence. Aim: To study the clinical presentation of Laryngo-tracheobronchial foreign body aspiration in Children for its early diagnosis. **Methods:** This is a retrospective study of a total number of 97 Children less than 12 years of age with suspected Laryngo-tracheobronchial foreign body aspiration who attended the pediatric department at Institute of child health & hospital for Children, Madras Medical college. **Results:** Laryngo-tracheobronchial foreign body was confirmed in 75 out of 97 children. Majority of foreign bodies in our series were groundnut seed 72%. There was equal distribution of lodgment in both right and left bronchus. 60% of Children had positive history of foreign body aspiration, and most of the Children presented with combination of symptoms & sign like cough choking attack respiratory distress, diminished air entry, wheeze, stridor. Obstructive emphysema 58.7% was the commonest finding in chest x-ray. All foreign bodies removed by rigid bronchoscopy as emergency except one case, sewing needle right lower lobe which was removed by thoracotomy, after repeated bronchoscopies had been unsuccessful. **Conclusion:** Foreign body aspiration is a life-threatening clinical situation, with children <3 years of age being most commonly affected. Foreign body aspiration must be considered a matter of emergency, especially in the case of organic foreign bodies. This study aimed to increase the awareness of Laryngo-tracheobronchial foreign bodies, as early diagnosis and management decrease the incidence of complications and make removal of aspirated foreign body easier.

Keywords: Foreign body, Pediatrics, Inhalation.

INTRODUCTION

Accidental inhalation of foreign bodies continues to be a cause of childhood mortality, and morbidity Tracheobronchial foreign body aspiration can result in a spectrum of presentations from minimal symptoms often unobserved to respiratory compromise, failure, and even death. Foreign body aspiration is a common problem in children peak age in between 1 & 3 years. Increased incidence in preschool Pediatrics has been attributed to several factors. They tend to put small objects in their mouth.^[1,2] They often cry, shout, run & play with objects in their mouth. They do not have molars to chew or grind certain foods like groundnut adequately swallowing reflex not adequate & not fully developed. Definition of the foreign body; A foreign body is an object or a substance foreign to the location where it is found. There are two general

classes, namely exogenous, including substance from outside the body and endogenous, including those from within the body.^[3] The type of foreign body inhaled depends upon the nature of the environment in which the child finds itself. Vegetable foreign body predominate in rural areas, whereas pins & coins in urban population. Among vegetative foreign body commonest are nuts, vegetable seed, and fruits. Nonorganic materials include toys pen capstone marbles balloons. The symptoms & signs produced depends upon the nature, size, location & time since lodgment of the tracheobronchial foreign body, and age of the child.^[4] In most cases of inhaled foreign bodies, there is the definite history of choking followed by paroxysmal coughing which eventually subsides. This is followed by an asymptomatic period, which is responsible for the delay in diagnosis. The symptoms of the triad of choking, coughing, and unilateral wheeze is present in most cases and acute respiratory distress in some cases of an inhaled foreign body.^[5] Long-standing airway foreign bodies can result in a spectrum of changes, ranging from symptoms of a cough & wheeze & wheeze to recurrent or resolving respiratory sequela. The symptoms mimic other respiratory conditions like

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bronchial asthma, pneumonia or trachea bronchitis, which may be wrongly diagnosed and treated. All foreign vegetable body irritate the tracheobronchial mucosa, the reaction is diffuse, and its severity results in obstructive swelling. Roasted groundnut and peanut are so oily they do not swell, and the angularity permits partial passage, whereas beans and grains of corn (maize) swell enormously and are not irregular in contour when swollen, thus combining with the mucosal swelling to produce a tight corking of the invaded bronchus.^[6,7] A Smooth, metallic nonobstructive exogenous foreign body will produce only a slight local inflammation, so long as it remains smooth and nonobstructive. A metallic exogenous foreign body that is rough and obstructive, or if and when it acquires these qualities by corrosion, causes localized inflammation and mucosal swelling that perfects the occlusion of the bronchus, a stop –valve type of obstruction. A one-way valve obstruction may have preceded complete obstruction. Shortly after occlusion of a bronchus, the tributary area –the segment, lobe or entire lung-collapse; this means atelectasis without pneumothorax. If atelectasis persists for many weeks, infective mucosal inflammation begins in the atelectatic areas, because of lowered resistance resultant from lack of ventilation and drainage. Pus accumulates, and a condition of the drowned lung is established. Complete obstruction may not be reached in an adult ,but it may be reached within few weeks in a child under two years of age, and in an even shorter period in an infant a few months old.^[8,9] The diagnosis of Laryngo-tracheobronchial foreign body requires a high index of suspicion by the otolaryngologist even in the absence of apposite history to prevent morbidity & mortality due to delayed or misdiagnosed. So any child with history suggestive or suspicious of foreign body aspiration, clinical or radiological evidence of Laryngo-tracheobronchial foreign body is considered as an emergency and should be treated immediately by rigid bronchoscopy, and long-standing foreign bodies after confirmed by flexible bronchoscopy.

Aim

To study the clinical presentation and management of Laryngo-tracheobronchial foreign body aspiration in pediatrics.

MATERIALS AND METHODS

This is a retrospective study done in less than 12 years of age with suspected Laryngo-tracheobronchial foreign body aspiration who attended the pediatric department at Institute of child health & hospital for Children, Madras Medical college. The study included 96 pediatrics cases who presented with a definitive history of foreign-body aspiration or recent onset of cough, or difficult breathing with suspicious of foreign-body aspiration.

Detailed data for each patient were recorded concerning the sex, age, type and site of the foreign-body, presenting symptoms and signs, and interval between foreign-body inhalation or symptom onset to hospital admission. A thorough clinical examination was performed in each patient, including a general examination and head, neck, and chest examination. A chest X-ray was performed in all patients, but a computed tomography (CT) scan was recorded only when indicated. Routine laboratory investigations were also performed. Rigid bronchoscopy was performed under general anesthesia for therapeutic purposes in cases in which foreign-body was detected preoperatively and by X-ray or flexible bronchoscopy for diagnostic and therapeutic purpose in cases in which foreign-body was not preoperatively detected.

RESULTS

The study included a total of 97 paediatric cases. Foreign body confirmed in 75 children out of 97 Pediatrics admitted with suspicious foreign body. The commonest age group was between 1 to 2 years, boys were 46 and girls were 29. The majority of foreign bodies were ground nut. The commonest site of foreign body lodgment was in right main bronchus. Most of the Pediatrics came to the hospital within 1 week.

Table 1: Distribution of Age group.

Years	No. of cases	Percentage
0-1 Yrs	13	17.3%
1-2 Yrs	32	42.7%
2-4 Yrs	21	28%
4-6 Yrs	4	5.3%
6-12 Yrs	5	6.7%

Table 2: Types of Foreign body.

Type of Foreign body	No. of cases	Percentage
Ground nut	54	72%
Betel nut /Aricha nut	4	5.3%
Custard apple seed	2	2.7%
Tamarind seed	1	1.3%
Coconut piece	3	4%
Garlic	1	1.3%
Plastic whistle	2	2.7%
Metal Screw	1	1.3%
Sewing needle	1	1.3%
Shell	1	1.3%
Pen cap	1	1.3%
Led bulb with steel	1	1.3%
Safety pin	1	1.3%
Rubber eraser	1	1.3%
Chalk	1	1.3%



Figure 1: Rare foreign bodies removed during this study.

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Table 3: Distribution of foreign body.

Site	No. of cases	Percentage
Right main bronchus	35	46.7%
Left main bronchus	30	40%
Subglottis	4	5.3%
Trachea	5	6.7%
Lower lobe lung	1	1.3%

Table 4: Time taken between aspiration and removal of foreign body.

Days	No. of cases	Percentage
0-1	9	12%
1-2	22	29.3%
3-7	14	18.7%
8-15	11	14.67%
16-30	10	13.3%
>30	9	12%

45 children (60%) had positive history of foreign body aspiration and 30 Pediatrics (40%) did not give any history of foreign body aspiration. Most of the Pediatrics presented with combination of symptoms. Most common symptom was cough. Most of the Pediatrics had diminished air entry on the affected side. Obstructive emphysema was the commonest finding.

Table 5: Distribution of Presenting Symptoms.

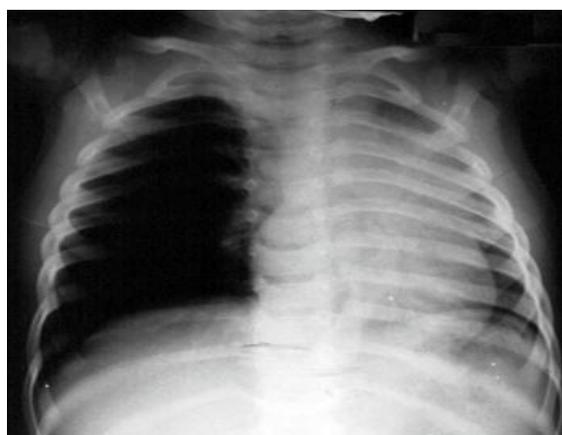
Symptoms	No. of cases	Percentage
Cough	52	69.3%
Respiratory distress	49	65.3%
Choking attack	40	53.3%
Fever	30	40%

Table 6: Distribution of Presenting signs.

Signs	No. of cases	Percentage
Diminished air entry	57	76%
Wheeze	40	53.3%
Stridor	12	16%
Crepitations	35	46.7%

Table 7: Distribution of Radiological Findings

Chest X-Ray Finding	No of cases	Percentage
Obstructive emphysema	44	58.7%
Collapse	6	8%
Consolidation	5	6.7%
Radio opaque Foreign body	6	8%
Bronchopneumonia	8	10.7%
Normal	6	8%

**Figure 2: X-Ray of a case with obstructive emphysema.****Figure 3: Figure 2 X-Ray of a case with foreign body.**

In one case of tamarind seed aspiration child, developed pneumothorax 1.3%. In 4 cases of betel nut foreign body we encounter excess intraoperative bleeding 5.3%. In sewing needle aspiration case 1.3% we could not remove by Rigid Bronchoscope as it was in the right lower lobe. Subsequently foreign body removed by thoracotomy by paediatric surgeon.

DISCUSSION

Foreign body aspiration was commonly seen in Pediatrics less than 3 years. This study correlates with Amith.I. Naragund et al¹⁰ and other authors.^[11,12] Increased incidence in preschool Pediatrics is due to immature swallowing coordination, lack of adequate dentition (last molar).^[13,14] The male predominance in this study correlates with Rothmann and Boeckman et al,^[15] stating the reason for this male predominance as more adventurous nature of males. Groundnut being the commonest vegetative foreign body 72% cases, because it is cheap and commonly eaten foodstuff and is given to crying children.^[11,15] There was no significant difference between foreign body in the right and left bronchus. This result correlates with Kaur K et al.^[13] According to Cohen et al,^[16] foreign body aspiration common in left bronchus. Pediatrics with aspirated foreign body (12%) cases reached hospital within 24 hours, 60% cases within 1 week and 12% after one month. All these correlates with Kaur K et al.^[13] History of foreign body aspiration was noted in 45 cases (60%) out of 75 cases. Similarly Rothman and Boeckman et al in his study also had similar distribution (74.9%),^[15] contrary to Amith I Naragund et al¹⁰ study which was (36.4%). The most common symptom was cough in 52 cases (69.3%), followed by respiratory distress in 49 cases (65.3%) This correlates with Amith I Naragund et al study 90.9% cases had cough, contrary to McGuirt et al study which was 28%.^[10,17] The most common

sign was diminished air entry in 57 cases (76%) .This correlates with Amith.I.Naragund et al study which was 72.7% but contrary to McGuirt et al which was 47%.^[10,17] The next common sign was wheeze in 40 cases (53.3%) This correlates with Kamaljit Kaur et al¹³ study which was 64% but contrary to Amith. I. Naragund et al which was 90.9%.^[10] Fever was present in long standing cases in 30 cases (40%) which correlates with Amith.I Naragund et al study which was 36.4%.^[10] In long standing cases symptoms may mimic intermittent tracheobronchitis, recurrent pneumonia or asthma. Specifically for this reason, Pediatrics with atypical or prolonged pulmonary symptoms, the possibility of foreign body aspiration should be considered. In our hospital for such cases fiber optic bronchoscopy was done by Paediatric Pulmonologist to verify presence of foreign body. Chest X-Ray PA view showed obstructive emphysema in 44 cases (58.7%), Normal X-Ray in 6 cases (8%). This correlates with Amith.I.Naragund et al study which was 54.5% and 9.1% respectively.^[10] Chest X-Ray shows consolidation in 5 cases (6.7%) but Amith .I.Naragund et al study showed 31.82%.^[10] In one case of tamarind seed removal, child developed pneumothorax 1.3%.Intercostal drainage done and child shifted to Pediatric intensive care unit and treated .Child discharged after 10 days. In 4 cases of betel nut foreign body removal we encountered excess intraoperative bleeding. 5.3% Increased bleeding was due to granulation tissue produced by betel nut and we managed conservatively This correlates with the study of Muhammad Riaz Khan et al.^[8] They encountered bleeding in 10.6% cases and Pneumothorax in .9% cases. In sewing needle aspiration case we could not remove by Rigid bronchoscope as it was in the right lower lobe inaccessible to rigid scope .Subsequently sewing needle removed by thoracotomy by paediatric surgeon. In study conducted by Jack S. Salomon M.D.et al,^[18] Bronchotomy and removal of foreign body was done in 4 cases after repeated bronchoscopies had been unsuccessful.

CONCLUSION

Any child with the history of foreign body aspiration bronchoscopy should be done at the earliest to prevent mortality and morbidity. In long-standing cases with foreign body, a flexible bronchoscopy will be helpful. Although rigid bronchoscopy is relatively easy and common procedure in our hospital, it carries preventable life-threatening risks during and after the procedure. Teamwork of anesthetist, surgeon and pediatric pulmonologist is essential to ensure safe procedure to prevent intra-operative and postoperative complications. Tracheotomy and bronchotomy are indicated in failed, repeated bronchoscope.

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