



Original Research Article

Study of Foreign Body Aspiration - A Retrospective Study in Pediatric Age Group

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ABSTRACT

Background: Foreign body aspiration (FBA) is a common emergency encountered in pediatric practice.

Objective: To study the pattern, causes, location, type of foreign body, complications, and outcome of FBA in children.

Setting: Pediatric intensive care unit of Krishna Hospital, Karad.

Design: Retrospective Descriptive study.

Method: Data collected of the study group from 2008-2012 in terms of age, sex, time of presentation from the event, presenting complaints, clinical feature, investigations, characteristics of foreign body, site of location, duration of hospital stay and complications encountered.

Results: Out of the 40 patients, 75% patients were males, with mean age of mean age of 3.2 ± 3.078 years for males and 4.25 ± 3.832 years for females. Only 17 (42.5%) patients reported within 24 hours of the event. Definitive history respiratory distress following foreign body aspiration was present in 28 (70%). Evidence of foreign body on radiograph was seen in 4 (10%) cases. The most common foreign body found was groundnut in 16 (40%) cases. Pneumonia 7 (17.5%) was the most common complication encountered.

Conclusion: High degree of suspension of FBA in children presenting with sudden onset wheeze and without any significant past history will prevent delay in diagnosis and thereby saving many lives. Education of parents to keep infants away from small objects will help in reducing the incidence of the problem.

Key words: Foreign body aspiration, Pediatric.

INTRODUCTION

Children are notoriously fond of putting objects into various orifices either on their own or partly as a result of oral phase of psychological development and partly due to innocence. Accidental foreign body aspiration (FBA) is a relatively common

occurrence in the pediatric population^(1,2) and may lead to asphyxiation and death.⁽³⁾ Among the pediatric patients, children between the ages of 12-48 months have been found to be the major victims owing to their poor chewing ability because of the lack of posterior dentition, a tendency to put things

into mouth, and a tendency to have frequent vigorous, uninhibited inspirations when startled, laughing or coughing.⁽⁴⁾

The symptoms and signs produced depend upon the nature, size, location and time since the lodgment of the foreign body in the trachea-bronchial tree. The main symptoms associated with FBA are cough, choking, tachypnoea, stupor, cyanosis or difficulty in breathing.^(5,6) Many a times these features are not correlated to an episode of aspiration of a foreign body and thus the diagnosis is escaped. Such children under-go a battery of investigated and are treated with unnecessary medications but all in vain. This can lead to dangerous consequences for the health and life of the patient due to delayed diagnosis.

The majority of aspirated objects are organic in nature, mainly food. Peanuts are the cause most commonly identified by different authors,⁽⁷⁻¹⁰⁾ but some mention melon and sunflower seeds as the predominant causes. Inhaled foreign bodies can be removed by bronchoscopy, both rigid as well as flexible scopes. However, rigid bronchoscopy offers good visualisation and is the preferred method for foreign body removal.⁽¹¹⁾

This retrospective study was conducted to identify pattern of FBA in children, the causes resulting in FBA, and the location and type of foreign body, complications, and outcome.

MATERIALS AND METHODS

This is a retrospective study conducted in Pediatric Department of Krishna Hospital Karad, Maharashtra. The medical records of all children between 1-14 years who were admitted with a diagnosis of foreign body aspiration in the time period between 2008-2012 were evaluated. Children who under-went a rigid bronchoscopy with definitive foreign body and those who had a definite diagnosis of

foreign body aspiration but collapsed before the procedure were included in the study. And those children whose bronchoscopy did not show a foreign body were excluded. Data collected of the study group was age, sex, time of presentation from the event, presenting complaints, clinical feature, investigations, characteristics of foreign body, site of location, duration of hospital stay and complications encountered. The procedure was carried out using rigid bronchoscopes according to the appropriate size of the patient under general anesthesia. Since this was a retrospective study based on analysis of patient records, it was not necessary to obtain written consent. The study design was retrospective the approval institutional review board was not required. On completion the data was analyzed using SSPE version 15.

RESULTS

Among the forty participants in this study 30 (75%) were males and 10 (25%) were females. The mean age for males was 3.2 ± 3.078 years and for females was 4.25 ± 3.832 years. We had 28 (70%) patients in the age group of 1-3 years and the age wise distribution of patients is given in Table no.1. Seventeen (42.5%) patients reported within 24 hours of the event and the duration of presentation varied more than 10 days as given in Table no 2. A definitive history of respiratory distress following foreign body aspiration was present in 28 (70%) patients and the clinical features of the patients are given in Table no 3. Upon pulmonary auscultation of these patients features observed ranged from normal to asymmetry in breath sound as listed in Table no 4. All our patients were investigated with chest radiographs and foreign was evident in 4 (10%) cases. Other cases showed features of air trapping, atelectasis and non-specific findings. Rigid bronchoscopy was performed in all cases under general

anesthesia, two of our patients both of which presented with severe respiratory distress succumbed to sudden cardiac arrest by the time they were taken up for bronchoscopy. Both these patients were referred to our hospital with X-ray features suggestive of foreign body aspiration. Single foreign body was present in 36 (90%) patients and multiple foreign bodies were present in 2

(5%) patients. Nine (22.5%) foreign bodies were inorganic in nature and rest were organic, details of which are shown in Table no 5, while their location is given in Table no 6. The duration of the stay of the patient ranged from one day to a maximum of 26 days with a mean duration of 5.95 ± 4.506 days. The complications encountered in our study are given in Table no 7.

Table 1- Age-Wise Distribution Of Patients.

Age	Patients		Total
	Males	Females	
1-3 years	22 (73.33%)	6 (60%)	28 (70%)
>3- 10 years	5 (16.66%)	2 (20%)	7 (17.5%)
>10 years	3 (10%)	2 (20%)	5 (12.5%)

Table 2-Duration Of Presentation.

Days	Patients
< 1 day	17 (42.5%)
1-5 days	16 (40%)
6-10 days	5 (12.5%)
>10 days	2 (5%)

Table no 3- clinical features of patients.

Presenting complaints	Number
Dyspnoea	13 (32.5%)
Choking	9 (22.5%)
Cough	6 (15%)
Wheeze	5 (12.5%)
Lower respiratory tract infection	2 (5%)
Cyanosis	2 (5%)
Referral	3 (7.5%)

Table no 4- features on pulmonary auscultation.

FEATURES	PATIENTS
Asymmetrical in breath sounds	27 (67.5%)
Wheezing	5 (12.5%)
Asymmetry with wheeze	6 (15%)
Normal	2 (5%)

Table no 5- charecteristic of foreign body.

Foreign body	Number
Groundnut	16 (40%)
Vegetative matter	3 (7.5%)
Coconut piece	3 (7.5%)
Bone	2 (5%)
Plastic object	3 (7.5%)
French bean	1 (2.5%)
Seeds	4 (10%)
Coin	2 (5%)
Metal piece	2 (5%)
Bead	2 (5%)
Not found (as bronchoscopy not done)	2 (5%)
Total	40 (100%)

Table no 6- location of foreign body.

Location	Patients
Trachea	2 (5%)
Carina	2 (5%)
Right main bronchus	29 (72.5%)
Left main bronchus	4 (10%)
Subglottis	1 (2.5%)
Not detected	2 (5%)

Table no 7- complications.

Complications	Patients
Cardiac arrest	2 (5%)
Pneumonia	7 (17.5%)
Atelectasis	3 (7.5%)
Pneumothorax	1 (2.5%)

DISCUSSION

Inhalation of foreign body is most commonly seen in pediatric emergency setting. Normally, very strong lower respiratory tract sphincteric mechanism of larynx which consists of epiglottis, aryepiglottic folds, false and true vocal cords as well as highly sensitive cough reflex with afferent impulses generated throughout the larynx, trachea and lower down are effective in preventing aspiration of inorganic or organic matter or infections fluids. However, none of these mechanisms is perfect, and foreign bodies frequently get lodged in the airways of children.⁽¹²⁾

Aspiration of foreign bodies by children can lead to serious illness and sometimes even death. Usually there is a

history of choking, although the classical clinical presentation, which coughing, wheezing and diminished air flow is present only in few patients. Thus appropriate and timely diagnosis of FBA can prevent life threatening consequences of FBA.

In our study we found a male: female ratio of 3:1, this is in coordination to other studies conducted by other authors.⁽¹³⁻¹⁷⁾ The preponderance of male children among the victims is understandable because of the rougher, more adventurous, curious and inquisitive nature of boys than the girls.⁽¹⁴⁾

Younger children are at the highest risk for accidental FBA. This increased incidence has been attributed to several factors among younger children, including their tendency to put small objects into their mouths; often cry, shout, run, and play with objects in their mouths; and they do not have molars to chew certain foods adequately. Thus this supports our finding that in our study 28 (70%) children belonged to the age group of 1-3 years. Similarly various authors^(13,14,16,17) have found an age group similar to

our study except Shafi et al⁽¹⁵⁾ who found prevalence of foreign body aspiration to be higher in children more than 5 years of age.

Not all patients give a typical history of choking while eating as this was present in only 9 (22.5%) patients in our study. Most of our patients presented with dyspnoea (32.5%) which was also seen in a study by Shafi et al⁽¹⁵⁾ followed by choking. Thus the clinician should be aware of FBA as a possible diagnosis in children with acute history of respiratory symptoms in an otherwise normal child.

Patients with FBA can present with varied symptoms which can be confused with symptoms of diseases of respiratory origin like bronchitis, bronchial asthma and bronchiolitis. We found asymmetrical in breath sounds followed by wheezing as the most common features on pulmonary auscultation in FBA.

We have compared the recent literature on reported on FBA from various parts of the world with our study in table no 8.

Table 8- Comparison of our studies with other similar studies.

Author and year	Study population	Male: female	Age of presentation	Commonest complaint	Commonest feature	Site	Foreign body
Andrea et al 2008 (13)	69 (8m-12 yrs)	Male (62.3%)	< 3 years (75.4%)	Cough	Abnormal auscultation	RMB	Peanut/ Beans
Qadri et al 2009 (14)	66	Male (78%)	<5 yrs (82%)	-----	Prolonged expiration	RMB	Betal nut
Shafi et al 2012 (15)	50 (1-7 yrs)	Male (56%)	>3 years	Dyspnoea	Asymmetrical air entry	RMB	Betal nut
Modi et al 2012 (16)	105 (2m-13yrs)	Male (65.77%)	1-3 yrs (73.33%)	Choking	-----	RMB	Ground nut
Budensab et al 2012 (17)	115 (0-12 yrs)	Male (65%)	1.5 yrs	Cough	-----	RMB	Peanut
Our study 2013	40 (1-14 yrs)	Males (75%)	1-3 yrs	Dyspnoea	Asymmetrical in breath sounds	RMB	Ground-nut

As seen in our study we found groundnut (40%) is the most common aspirated foreign body, this is an organic material and we believe it to be the commonest as in the region this study was conducted this forms an important part of the daily diet and also is cultivated on a large scale.

The angle made by the main stem bronchus with the trachea was similar upto

the age of 15 years resulting in foreign body to lodge on either side with equal frequency. But in study we found that 72.5% children had the foreign body lodged in the right bronchus.

Complications occurred in 18 children and pneumonia being the most common as seen in 7 of our patients who developed pneumonia after bronchoscopy. We had a mortality rate of 5 % whereas two

patients died due to cardiac arrest before they could be taken up for the procedure.

CONCLUSION

Foreign body aspiration is a dramatic event with potentially lethal sequelae. Clinician should have a high degree of suspicion of FBA in children presenting with sudden onset wheeze and without any significant past history. Delay in diagnosis may be life threatening. Thus early rigid bronchoscopy may be life saving with fewer complications. Education of parents to keep infants away from small objects will help in reducing the incidence of the problem.

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