



Management of Tracheo Bronchial Foreign Bodies in Children

– A Retrospective Study of series of 50 cases

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Introduction

Foreign body aspiration in the airway of children is a life threatening clinical situation responsible for many deaths each year, with children less than two years of age being most commonly affected ^[1].

The peak incidence of inhaled foreign bodies in early childhood is because of two reasons:

- 1) The exploring nature of the young child who is often edentulous and has a tendency to place any object in the mouth, the solid objects entering the pharynx elicits a startle response permitting the foreign body to enter the open larynx during forced inspiration ^[2].
- 2) High incidence of upper respiratory tract infection makes the young children mouth breathers. Also due to the presence of coughing, the inhalation of food particles may easily occur with sharp intake of breath following a bout of cough ^[3].

The course of illness after a foreign body lodges in the air passage depends on the characteristics of the foreign body and its length of stay. The unsuspected longstanding foreign bodies may lead to complications such as pneumonia, bronchiectasis, atelectasis, and even death.

Many advances have been made since Chevalior Jackson described the technique of the removal of foreign bodies from the airway and with the advent of ventilating bronchoscope has greatly improved the illumination and thus facilitates the endoscopist to remove foreign bodies easily^[4].

Materials and Methods:

In this retrospective study of 50 pediatric cases of foreign body removal done between May 2010 to May 2011, the record's of each patient was examined for the age, sex, nature, site of the foreign body, interval between inhalation or the symptoms to admission in the hospital, presenting symptoms and signs, appearance of chest roentgenograms at the time of admission and results of bronchoscopy were noted.

Patients presenting with definitive history of foreign body aspiration, or recent onset of cough, or breathlessness, with suspicion of foreign body aspiration, rigid bronchoscopy was performed. In some patients with chronic or subtle symptoms with no history of foreign body aspiration, or patients with symptoms unresponsive to bronchodilator therapy, or history consistent with aspiration but no physical or x-ray signs, flexible bronchoscopy was performed to rule out any other lung pathology. On diagnosis of foreign body the child was shifted immediately to operation theatre for foreign body removal using rigid bronchoscope under general anesthesia, with induction by propofol, relaxation and apnoea with scoline, oxygenation with jet ventilation. On visualization of the foreign body it is grasped with forceps and removed. Foreign bodies in sub glottis and trachea had to be removed at earliest as they caused respiratory emergency. Central foreign bodies were pushed down to either bronchi before removal. We routinely give intravenous steroids along with antibiotics to decrease post operative sub glottis edema.

In one case tracheotomy was done to remove tamarind seed as it has swelled due to its hygroscopic action and successful decannulation was done on fifth post operative day. We repeat chest X – ray after forty eight hours. Most of our patients were discharged on third post operative day.

Observations

Our study is based on removal of foreign bodies in 50 pediatric patients. The period of study was one year. The most common age group was 9 months to 2 years, boys were 30 and girls were 20. Table 1 shows the comparative study of age group of patients with that of J. Srppnath et al.

Table 1: Age Group

Age in years	J. Srppnath et al	Our Study
0 – 2	64%	54%
2 - 4	20%	32%
4 – 5	6%	6%
5 - 15	8%	8%
Above 15	2%	0%

Time taken to report at hospital:

Most of our children came immediately after aspiration probably due to the positive history of aspiration. The time taken between aspiration and removal of foreign body has been compared with that of J. Srppnath et al as shown in Table II.

In one patient prolene suture was removed after 6 months operated from tracheo- oesophageal fistula. History of aspiration was present in 31 cases.

Table II: Time taken between aspiration and removal of foreign body:

Days	J. Srppnath et al	Our Study
0 – 1	14%	12%
1 – 7	28%	46%
7 – 15	32%	16%
15 – 30	25%	14%
Over 30	1%	12%

Symptoms with which presented:

Fever was present in long standing cases. This has been compared with that of J. Srppnath et al as shown in Table III.

Table III: Symptoms with which presented:

Symptoms	J. Srppnath et al	Our Study
History of aspiration	60%	62%
Cough	50%	72%
Respiratory distress	42%	68%
Wheezing	56%	54%
Fever	24%	44%

Common Signs:

Diminished air entry and wheeze were the most common signs. In 3 cases there was stridor. The signs we observed has been compared with that of J. Srppnath et al and shown in Table IV.

Table IV: Signs

Signs	J. Srppnath et al	Our Study
Diminished air entry	72%	72%
Wheeze	45%	54%
Stridor	4%	6%

Radiological Findings:

Obstructive emphysema (fig I) was the most common radiological finding. Collapse (fig II), Radio opaque foreign bodies was seen in 2 cases (fig III, IV) Normal X – Ray chest does not rule out the possibilities of foreign body.

The radiological findings has been compared with J. Srppnath et al and shown in Table V.

Table V: Radiology

Radiology	J. Srppnath et al	Our Study
Obstructive emphysema	54%	58%
Collapse	12%	8%
Consolidation	20%	6%
Radio opaque FB	2%	4%
Bronchopneumonia	-	14%
Lung abscess	2%	-
Lower lobe collapse	6%	-
Normal	4%	10%



Fig I



Fig II



Fig III



Fig IV

Site of foreign body:

There was equal distribution of lodgement in both right and left main bronchus. In 1 case there was a subglottic lodgement of foreign body and 3 cases in trachea. These findings were compared with that of J. Srppnath et al and shown in Table VI.

Table VI: Site of foreign body

Site of foreign body	J. Srppnath et al	Our Study
Right Bronchus	56%	46%
Left Bronchus	30%	46%
Lower lobe of lung	4%	-
Sub glottis	4%	2%
Trachea	6%	6%

Types of foreign bodies:

The majority of foreign bodies in our series were groundnut seed, but we also encountered different types of foreign bodies as shown in Table VII.

Table VII:

Types of Foreign Bodies	Number of cases
Groundnut	34
Betelnut	4
Plastic pen cap	1
Custard apple seed	1
Prolene Suture	1
Tamarind seed	1
Ginger piece	1
Garlic	1
Black Gram	1
Meat piece	1
Steel nail	1
Lemon seed	1
Water melon seed	1
Hair pin	1

The vegetative foreign bodies and non vegetative foreign bodies are shown below.

Vegetative Foreign Bodies



Betelnut



Peanut



Watermelon seed



Custard apple seed

Non Vegetative Foreign Bodies



Hair pin



Screw



Pen cap

Complications:

In our series of 50 cases we have not encountered any complications due to bronchoscopy.

Review of Literature:

Foreign bodies in the bronchi are a common problem seen by E.N.T. surgeons. The high frequency of this problem in children in our series concurs with the observations of other authors [7, 8, 9]. The child has difficulty in swallowing hard foodstuffs such as nuts and seeds, and has inadequately developed protective respiratory reflexes [10], making it more vulnerable than adults to the inhalation of foreign bodies into the respiratory passage.

The male predominance in this series is in agreement with the published reports [2, 7, 8]. A possible explanation for this is offered by Gupta et al [8] who state that "boys by nature are more curious and inquisitive than girls."

The high predominance of organic foreign bodies in this series is in keeping with published reports [2, 7, 8]. This, coupled with the high frequency in children under the age of 3 years makes it advisable not to offer nuts and seeds to small children, who are liable to aspirate them into the respiratory passage.

We encountered 2 patients with metallic foreign bodies and 1 plastic pen cap. Merchant et al [11] reported 4 cases of plastic foreign bodies in the bronchus.

The age of the child seems to determine the relative frequencies of organic and inorganic foreign bodies, probably because infants of this age tend to put anything that they can grasp into their mouth. However, older infants and children have a higher frequency of organic foreign bodies, many of which are edible. These older infants and children can discriminate between edible and non-edible material. There are incidents of elder sibling thrusting foreign bodies in the younger sibling's oral cavity. Contrary to what is commonly believed [9] the frequency of foreign bodies in the right and left bronchus was very similar in this series. This has also been reported by other workers [2, 8, 11, 12]. Only 12% of patients presented within 24 hours and about 46% came between the 2nd and the 7th day, while 14% of patients and 28% of them presented within 24 hours and between 2nd day and 7th day in the study by J. Srppnath et al.

Only 62% of the patients had history of inhalation of a foreign body, while in the study of J. Srppnath et al 60% and 76% in the study of Merchant et al. Thus pediatrician must therefore, always keep the foreign body in mind when dealing with a respiratory case ^[9, 13].

Fever was present in 44% of cases of organic foreign bodies; this confirms the observation of Jackson and Jackson ^[9] that organic foreign bodies are liable to evoke violent laryngo-tracheal bronchitis and to predispose to lung infection.

The commonest radiological finding was obstructive emphysema (58% cases). This is in conformity with other reports ^[9, 11] Further, X-rays of the chest were completely normal in 10% cases while it was 19% in the study of Merchant et al ^[11]. This would indicate that even a normal X-ray of the chest does not negate the diagnosis of a foreign body in the respiratory passage. In 21 cases flexible bronchoscopy was performed to find out the cause of breathlessness not responding to medical management and foreign body was diagnosed and the patient underwent rigid bronchoscopy without further delay for foreign body removal. Just localization of the foreign body during fiberoptic bronchoscopy allows subsequent rigid bronchoscopy to be shorter in duration with fewer complications. Foreign body aspiration should always be considered in the aetiology of recurrent pulmonary infections, fibrotic changes such scar formation and bronchiectasis all of which may necessitate a surgical resection. Removal of the foreign body in such cases can achieve the resolution of the parenchymal or bronchial pathology and prevent unnecessary surgery ^[15]. A good thumb rule used in the assessment of airway foreign body is that diagnostic bronchoscopy should be performed if any of the three diagnostic tools (history, physical examination, or radiography) is considered positive ^[14].

Tracheotomy was performed in 1 case of tamarind seed in our series while in 4 cases of 342 cases in study by Singh J K et al ^[1], indications being long standing subglottic foreign bodies, sharp subglottic foreign bodies and foreign bodies that were larger than glottis chink. There were no complications during bronchoscopy, similar to lower complication of bronchoscopy studied by Gursu Kiyan et al ^[16].

Chevalier Jackson's ^[9] advice (1950) about the need for educating the parents and doctors about foreign bodies in the respiratory tract is as valid today as it was when it was pronounced.

Conclusion:

Otolaryngologist must proceed for bronchoscopy even if there is mere suspicion of foreign body. Flexible bronchoscopy if available will aid in diagnosis of long standing foreign body and its removal can be done immediately without delay. There should not be any compromise on the availability of various types of instruments for bronchoscopy. Tracheotomy is indicated if foreign body cannot be removed through glottis. A team work of anesthetist, endoscopist, and assistants is essential to ensure safety of procedure which prevents most of intra-operative and post-operative complications.

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