



TRACHEOBRONCHIAL FOREIGN BODIES IN CHILDREN: A CLINICAL STUDY

Paediatrics

Hirendra Birua

MCh, Associate Professor, Department of Pediatric Surgery, Rajendra Institute of Medical Science, Ranchi-834009(Jharkhand).

Abhishek Ranjan

MCh, Senior Resident, Department of Pediatric Surgery, Rajendra Institute of Medical Science, Ranchi-834009, Jharkhand. - (Corresponding author)

ABSTRACT

Children under the age of three, are particularly the most vulnerable for aspiration of foreign bodies. Foreign bodies in airway may lead to life threatening situation due to obstruction caused in the respiratory passages. Several factors leading to high incidence of aero-digestive tract foreign bodies in this age group include social factors such as lack of parental supervision, children's habit of putting objects in their mouth and crying or playing during eating. Some anatomical factors such as absence of molar teeth, inadequate control of deglutition is also responsible. The most common foreign bodies described are peanut, pin, etc. The aims of this study is to provide information on our experiences of tracheobronchial foreign bodies (TFBs) in children at a tertiary care hospital.

KEYWORDS:

Aspiration, bronchus, children, diagnosis, treatment

Introduction

Tracheobronchial foreign body (TFB) is a respiratory emergency and can prove fatal. Accidental aspiration of a foreign body is seen most commonly among the children under 3 years of age with the male preponderance (2:1)^{1,4}. Most of the children of this age group try to explore their world via oral route and tend to put everything in to their mouth. Owing to their insufficient airway protection reflex, poor chewing ability, and harmful habits of exploring objects with mouth as well as eating while crying or playing, makes them vulnerable to aspiration in to the respiratory tract. Sudden onset respiratory distress in otherwise normal child should raise the suspicion of TFB. Many a times the aspiration event may not have been witnessed. TFB may lead to serious complications such as airway inflammation, hemoptysis, bronchiectasis, pulmonary atelectasis, and even asphyxia and death^{2,3}. TFB is the fourth leading cause of accidental death of children aged less than 3 years⁵.

Time lag between the aspiration and expert attention is very important with regard to overall morbidity and mortality. The problem becomes complicated because of unavailability of definite history of aspiration. So, it becomes necessary on the part of attending physician, to deal with such cases with a high index of suspicion, with the best of his clinical knowledge in time or the patients may go out of hands because of severe respiratory distress or other fatal complications. Chest radiography, computed tomography (CT), and rigid bronchoscopy are commonly used in the diagnosis of FB aspiration⁶. Management of foreign body (FB) aspiration depends on the type and location of FB. Flexible or rigid bronchoscopy is the main methods used to remove FBs in the airway⁷. Tracheotomy may have to be performed on rare occasions, for example, if the FB is too large to pass through glottis, or is sharply pointed and risks perforating the airway⁸.

This study was undertaken to discuss the clinical scenario of aspirated foreign bodies with regional variations, if any, with special reference to in the diagnosis and treatment of TFBs.

Aim & Objective

To study the clinical scenario and our experiences of Tracheobronchial foreign bodies (TFBs) in the region.

Material and Method

The present study is a retrospective data review of last one year (May 2016 to May 2017) at a Tertiary Health Care Centre of the state. Hospital documents of all the paediatric patients diagnosed to have foreign body aspiration were reviewed and chart analysed.

Result

A total of 61 patients were included for the study with male to female ratio of 8:1. Maximum number of foreign body ingestion was observed around 3 years with age ranging from 0-5 years. The objective break-up of the foreign bodies was as follows (Table 1, Table 2 and Table 3):

Table 1: Age and sex distribution of respiratory tract foreign bodies

Age in years	Sex		TOTAL	Percentage
	Male	Female		
0-5	46	7	53	86.9
6-10	4	1	5	8.2
11-15	2	1	3	4.9

Table 2: Site of foreign bodies in digestive tract

Site	Number of patients	Percentage
Trachea	2	3.3
Main bronchus	10	16.4
Right bronchus	40	65.6
Left bronchus	9	14.7

Table 3: Nature of foreign bodies

Nature of foreign bodies	Number of patients	Percentage
Peanut	28	45.9
Bengal gram	23	37.7
Whistle	3	4.9
Custard apple seed	2	3.3
Cap of pen	1	1.6
Safety pin	1	1.6
Hard plastic body	1	1.6
Metallic solid objects	2	3.3

We have observed that 86.9% of our TFB were in the age less than 5 years. The most common site of FB impaction was in the right main bronchus (n=40, 65.6%). Peanut and Bengal gram constituted the most common objects (83.6%) aspirated.

Youngest patient of foreign body aspiration was 4 months of age. This baby boy presented to emergency with severe respiratory difficulty and was being managed as bronchiolitis; soon the baby needed ventilatory support. Differential air entry was the prominent clinical finding, which was substantiated by radiograph showing hyperinflated right lung fields. Though there was no definite history, upon high index of suspicion the baby was taken up for diagnostic flexible bronchoscopy. A peanut was detected in the right main bronchus, which was retrieved by rigid bronchoscopy using optical forceps. This baby was apparently fed peanut by his elder sibling.

Another young boy was brought to us with two days history of sudden loss of voice, irritability and noisy respiration. He was being treated for upper respiratory tract infection elsewhere. Radiograph of neck revealed a safety pin in the upper respiratory tract region (Figure 1). The patient was subjected to direct laryngoscopy under sedation and a safety pin was seen impacted in the glottis, which was removed using a Magill forceps.

An 8-year girl child was brought with the history of change in the voice following an accidental fall at home. Radiography of neck and chest did not reveal any abnormality. After counselling the parents, she was taken up for direct laryngoscopy, which revealed a hard-plastic flat body (Figure 2); impacted in the glottis region and was removed using a Magill forceps.

Figure 1: Safety pin



Figure 2: Plastic body



Discussion

Children under the age of 3 years carry the highest risk, as they are inclined to explore every object with their mouth. Children are naturally susceptible to be involved in foreign body aspiration due to lack of molar teeth, the tendency to oral exploration, to play during the time of ingestion and the poor coordination of swallowing⁹. Some foreign bodies are very typical of certain geographical socio-cultural areas. Hijab wearing Muslim populations have high incidence of safety pin aspiration, which is kept in the mouth in the process of fixing the hijab. In India, Peanut and Bengal gram are consumed very commonly by people of all the ages, thus aspiration of these objects is frequently observed. Correct diagnosis is of paramount importance in treating inhaled FBs. Out of 61 patients, 55 had a clear history of FB aspiration, which contributed to early diagnosis and management. Three patients (5%), presented with recurrent episode of respiratory infection and asthma like symptoms in Paediatric Medicine department. They underwent diagnostic bronchoscopy in our department and were found to have foreign body impaction in the respiratory tract.

The most common presentations of a foreign body in the airway were dyspnoea and cough, which are similar to study by Kim et al¹⁰. Among the signs, rhonchi and other attenuated sounds was most common. There are no pathognomonic signs of a retained foreign body; however, the presence of a triad of inspiratory stridor, wheezing, and decreased air entry in a child at play with a history of sudden cessation of breath is highly suggestive of an airway foreign body¹¹.

If the foreign body is radio-opaque, diagnosis is obvious on chest X-ray. But, a radiolucent foreign body with the absence of history of aspiration becomes a great diagnostic dilemma requiring high index of suspicion. In our study, the majority of the foreign bodies were radiolucent. A radio-opaque foreign body was found in only three cases. Radiological findings in the chest X-ray were seen in the form of collapse (8 cases), collapse with consolidation (3 cases), consolidation (1 cases) and obstructive emphysema (15 cases). Chest X-ray tests were applied to all patients who did have a history of FB aspiration. However, a negative finding on chest X-rays cannot rule out TFB diagnosis¹². It has been reported that a chest CT scan shows a greater diagnostic sensitivity and specificity for TFBs than a chest X-ray test¹³.

Patients with TFB that is located at unilateral bronchioles causing atypical clinical symptoms are more likely to be misdiagnosed as airway infection or other diseases. The reasons for misdiagnosis mainly include:

- 1) Lack of a definite history of FB aspiration
- 2) Negative findings on X-rays
- 3) Lack of experience on TFBs.

Review of the literature shows that the majority of foreign bodies occur in the right bronchus compared with the left and the incidence is lower in the larynx and trachea. Our study also shows the predominant site as right bronchus similar to other studies¹⁰.

In our study, vegetative foreign bodies were the commonest type of foreign body aspirated (86.9%). Only 13% foreign bodies were inorganic. Ground nut was the most common foreign body amongst the vegetative foreign body. The second most common was Bengal gram.

The most common Non-vegetative foreign body seen was whistle (plastic) followed by plastic pen parts. Swanson et al.¹⁴, Black et al.¹⁵, are also reported groundnut as the commonest foreign body in the bronchus.

The optimal treatment of FB is prompt removal, which ensures the maximum safety and minimum trauma to the patient. Removal of FB in the aero-digestive tract under direct visualisation through the rigid endoscope is the safest and the most reliable method, especially with recent improvements in endoscopic illumination and anaesthesia techniques. The flexible endoscope can also be used when the bronchi are too narrow for insertion of a rigid bronchoscope¹⁶.

In this study, all of the patients, except four, who were admitted under emergency conditions underwent general anaesthesia before surgery. General anaesthesia without muscle relaxation blocks autonomous breathing and thus avoids airway spasm. No anaesthesia-related complications were reported in the study. A bronchoscope was advanced to the trachea when the glottis was open¹⁷. Chest auscultation was performed frequently during surgery. Loss of breath sounds, sharp reduction of blood oxygen and aggravated dyspnoea are signs of pneumothorax, which needs to be immediately treated. For huge FBs, direct removal via bronchoscopy is not recommended; otherwise, it may lead to serious iatrogenic trauma. Such patients need tracheostomy for the removal of FB. The first 24 hours after operation is a high-risk period that needs more attention, as long-term hypoxemia may cause cell oedema, respiratory arrest, cardiac arrhythmia, or even sudden death.

Conclusion

FBs in an airway are an acute emergency. TFBs present most frequently in children aged between 1 year and 3 years. Early diagnosis and prompt treatment of TFBs under general anaesthesia are of significance in reducing complications and mortality in affected children. Rigid bronchoscopy, especially, and flexible bronchoscopy in few selected cases are the treatments of choice for tracheobronchial FBs. Right main bronchus is the commonest site of lodgement of inhaled FB. Seed of dry fruits is the commonest FB inhaled.

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