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Original Research Paper

TRACHEO-BRONCHIAL FOREIGN BODIES: OUR EXPERIENCES

Cardiology

KEYWORDS: : Foreign bodies, Rigid bronchoscopy, thoracotomy & bronchotomy

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ABSTRACT

Background: Tracheo-bronchial foreign bodies are commonly seen in the paediatric age group due to accidental inhalation which is associated with significant morbidity and mortality. Retained foreign bodies in the airway is a life threatening situation as accidental death may occur due to chocking. Methods: This retrospective study was carried out on 45 cases of tracheobronchial foreign bodies in the CTVS Department, Gauhati Medical College Hospital from August 2012 to September 2016. Each patient was analyzed for age, sex, clinical signs and symptoms and results of bronchoscopic removal and the need for thoracotomy and bronchotomy. Results: The most common age group is less than 5 years. Five patients underwent thoracotomy and bronchotomy for FB removal following failed bronchoscopic attempt. There were two deaths owing to aspiration and sepsis. Conclusion: Rigid bronchoscopy is very effective procedure for inhaled foreign body retrieval with fewer complications, but for impacted foreign bodies of long duration thoracotomy and bronchotomy may require.

INTRODUCTION:

Foreign body (FB) aspirations in childhood are frequently emergency conditions especially in less than 6 years age, comprising an important proportion of accidental deaths, though no age is really safe from aspiration of foreign bodies. The morbidity and mortality are often higher in this younger age group, presumably because of relatively narrow airway[4,12,18].It is estimated that almost 600 children under 15 years of age die per year in the USA following aspiration of foreign bodies[5] .In fact, choking on food has been the cause of between 2500 to 3900 deaths per year from 2005 to 2007 in the USA, when taking both children and adults into consideration. The diagnosis and the treatment of the problem requires awareness and highest degree of suspicion of signs and symptoms of foreign body aspiration as this condition can mimic other infective respiratory conditions[21] . Early diagnosis of foreign body aspiration is essential as delay in its recognition and treatment is related to significant pulmonary complications. In children with doubtful history and associated negative findings on physical and radiological examinations, the foreign body may remain undetected. In such cases, inflammation and granulation tissue may develop around the foreign body, and thus it is not uncommon for patients to be treated for other disorders such as persistent fever, asthma or recurrent pneumonia for a long period of time by paediatricians who are usually the first to see these patients resulting in delayed diagnosis and referral.[3,20,23]

The aspirated foreign body excites severe spasmodic cough, choking sensation, and wheezing. The violent coughing subsequently subsides temporarily as the object settles in at a segment of bronchus distal to the carina that their dimensions allow. The duration of the symptom-free period of retained foreign bodies in the air passages is dependent on the nature and size of the aspirated object. Metallic and plastic objects cause little immediate inflammation while vegetable seeds may produce severe tracheobronchitis with its attendant complications such as lung abscess and putrid bronchiectasis[11,15].A complication rate of 64% was reported to occur if diagnosis was made within 4–7 days and 95% if it was delayed for more than 30 days from the aspirating event[16].

Management of inhaled foreign body depends on the site of impaction of foreign body. Laryngeal and subglottic foreign bodies need urgent intervention in the form of tracheostomy or urgent bronchoscopy, whereas foreign bodies in the right or left main bronchus cause comparatively less airway problem[9,10,17,25]. Rigid bronchoscopy is the recommended procedure in children with suspected foreign bodies for both diagnosis and treatment.

General anaesthesia is always the technique of choice for the removal of a tracheobronchial foreign body in a fighting irritable child, distally lodged invisible foreign body and if prolonged bronchoscopy procedure is contemplated. The anaesthesiologist should be an experienced one to maintain satisfactory oxygen saturation with intermittent ventilation during the procedure as significant desaturation with prolonged attempt at FB retrieval may lead to arrhythmia and cardiac arrest. In that situation prompt restoration of airway is the key to save the life of the patient.

The purpose of this paper is to review the experiences of us with 45 cases of retained foreign bodies in the air passages with reference to clinical characteristics complications and their management outcome.

Materials and methods

This retrospective study was carried out on for 45 cases of tracheobronchial foreign bodies in the Department of Cardiothoracic Surgery, Gauhati Medical College Hospital, Guwahati from August 2011 to September 2016. Each patient was analyzed for age, sex, clinical signs and symptoms, time lag in reaching the hospital , type and variety of foreign body, nature of complication and location of the foreign body, results of bronchoscopic removal and the need for thoracotomy and bronchotomy in failed bronchoscopic retrieval cases. Few patients who attended late required CT Scan Thorax to have precise location of the foreign body in the airway.

After complete clinical evaluation, all patients with either a diagnosis of foreign body inhalation or a high index of suspicion of foreign body aspiration underwent rigid bronchoscopy under general anaesthesia. Two patients cough out foreign bodies during supportive therapy before bronchoscopic evaluations were carried out, but underwent bronchoscopy to see if any residual foreign bodies or parts of it were there.

Anaesthesia management

General anaesthesia at the experienced hand is always the technique of choice for the removal of a tracheobronchial foreign body. Special attention has been given in maintaining adequate oxygenation, controlled cardiorespiratory reflexes , rapid return of upper airway reflexes and prevention of pulmonary aspiration. Meticulous monitoring of SpO2, NIBP, ECG, EtCO2 done throughout the

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procedure. Induction and maintenance of anaesthesia were done with repeat dose of ketamine or by oxygen and halothane. Succinyl chloride 0.25-0.5 mgkg-1 was repeated whenever necessary with atropine sulphate 0.02 mgkg-1. Following the removal of the foreign body, a check bronchoscopy was done to ensure full clearance of foreign body and impact site for trauma, bleeding and granulation.Double lumen endotracheal tube is used in thoracotomy and bronchotomy cases. Inj. Dexamethasone (0.4-1 mgkg-1) IV, humidified oxygen and bronchodilators were given prophylactically in all the cases and nebulized racemic epinephrine was given wherever necessary to prevent post operative stridor and distress. Patients were monitored continuously by pulse oxymetry and ECG.

RESULTS

45 patients underwent rigid bronchoscopy for suspected foreign body aspiration in the Cardiothoracic Surgery Department of Gauhati Medical College Hospital within the study period. Of the 45 patients, 30 were male (66.6%) and 15 were female (33.3%).

The youngest patient in our study was 9months old while the oldest was 24 years. In our study, the most common age group was 0-5 years, accounting for 46.6% of the cases followed by 6-10 years (31.1%).(Table 1)

Table1: Incidence according to age

Age distribution in Years	No.	% Incidence
0-5	21	46.6
6-10	14	31.1
11-15	6	13.3
16-20	2	4.4
21-25	2	4.4
>26	0	0

35.5% of the patients in our study reached the hospital within 2 days of the choking episode. The earliest a patient took to reach the hospital was 10 hours while the longest time taken was 2 months. (Table 2)

Table 2: Time lapse between aspiration and reaching the hospital

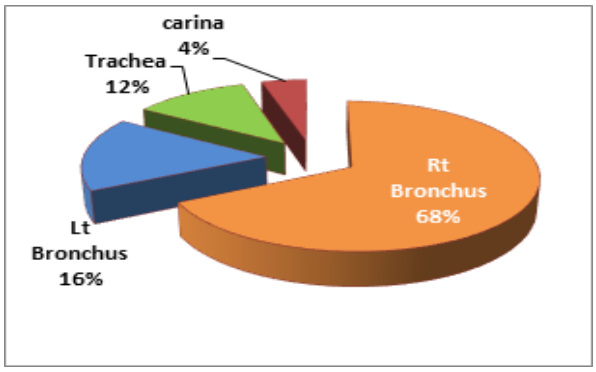
Duration in days	No of cases
< 1	5 (11.1%)
1-2	16 (35.5%)
3-7	11 (24.4%)
8-15	8 (17.7%)
16-30	3 (6.6%)
>30	2 (4.4%)

In this series, a definite history of foreign body aspiration was available in 38 cases (84.4%) while 7 cases (15.5%) presented without a definite history.

The top five clinical presentations were: cough (93.3), breathlessness (44.3%), wheeze (42.3%), stridor (34.6%) and breathlessness (34.6%). Some patients presented with combination of these symptoms. Prolonged cough defined as more than one week duration was noted in 26.7% of those presenting with cough. Decreased air entry (34.6%) and tachypnea (26.9%) are the most common physical findings, followed by no significant findings (23.1%). Clinical triad of decreased air entry, wheeze and cough was only noted in four cases (25.4%).

It was observed that 29 cases (68%) had the foreign body in the right main bronchus while 7 cases (16%) had the foreign body in the left main bronchus, the ratio of foreign bodies in the right and left bronchial trees thus being 4.1:1

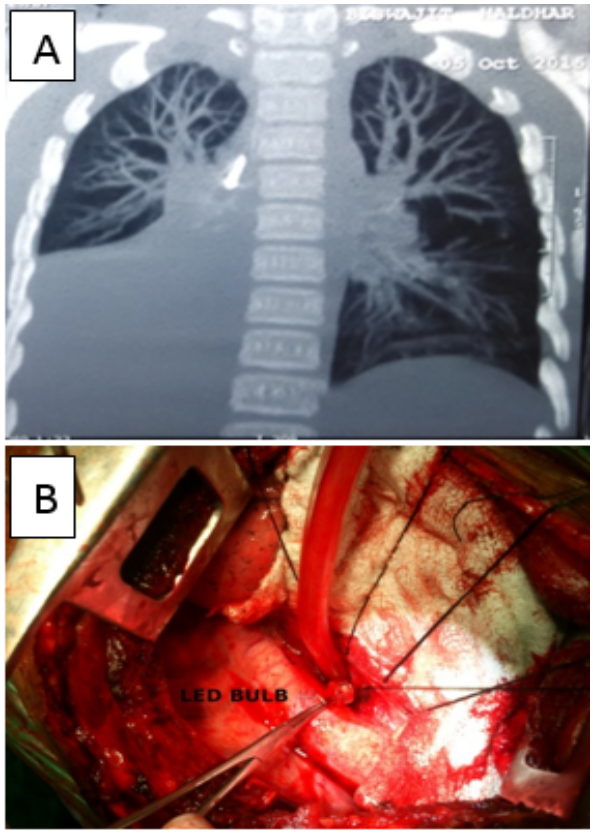
Figure 1: Distribution of FB by location



In our series, 53.3% of the foreign bodies in the tracheobronchial tree were of vegetative origin, most common amongst them being peanut (26.6%). 46.6% of the foreign bodies were of non-vegetative origin, most common amongst them being plastic whistle (17%)

Chest x-ray films including the neck were obtained in all the cases and all the radio opaque foreign bodies were visible. When the foreign body was of vegetable material or radiolucent, the diagnosis was usually based on secondary changes such as obstructive emphysema and atelectasis aided by the clinical diagnosis. Consolidation (30.8%) and atelectasis (19.2%) were the most common radiographic findings. A normal radiograph was noted in 23.1% of radiographs.

Figure 2: (A) CT Scan showing Foreign body in right bronchus, (B) LED bulb removed through bronchotomy



After radiographic localization of the foreign bodies, all the patients were subjected to rigid bronchoscopy for removal of the foreign body under general anesthesia. Two patients cough out foreign bodies during supportive therapy before bronchoscopic evaluations were carried out. Few patients who attended late required CT Scan Thorax to have precise location of the foreign body in the airway.

Bronchoscopic removal was successful in 38 (88.4%) cases. 5 cases had exploratory thoracotomy and bronchotomy for the removal of the foreign body because endoscopic removal failed in extracting all or part of the foreign bodies due to inflammatory reaction of the surrounding tissue where FB were lodged for more than a month. The complications recorded included Subglottic oedema, atelectasis, lung abscess, obstructive emphysema, and bronchiectasis. Two deaths were recorded, one each for aspiration and sepsis (4.4%).Duration of hospitalization ranges from one to 17 days, with a mean of three days.

DISCUSSION

Foreign body aspiration is one of the accidents with the highest incidence, morbidity and mortality in childhood. In our study, 46.6% of the foreign bodies were aspirated in the 0-6 year age group - an observation corroborated by various other authors - Me Guirt et al. (1988), Banerjee et al. (1988) and Wunsch et al. (1999). Our analysis of tracheobrochial foreign body also confirms the findings of other studies that majority of the children presenting with foreign body aspiration were under the age of 5 years[2,6,22]. This age group is particularly vulnerable because these children explore their world by introducing objects into their mouth and lack of adequate dentition and immature swallowing coordination predispose them to foreign body aspiration (Fernandez et al., 2000). Additionally crying and playing while eating and lack of parental supervision contributes to this hazard in this age group. There was a male predominance in our study, the male : female ratio being 2:1, and similar results have been reported by other authors - the male : female ratio being 1.4 : 1 (Cohen et al., 1980) and 1.7 : 1 (Hughes et al., 1996)[13,14,19]. Some author attributed it to the more adventurous and impulsive nature of young boys[7].

In the present study, the most common signs and symptoms were cough, breathlessness, wheeze and decreased air entry on the affected side. This classical diagnostic triad of bronchial foreign body - cough, wheeze and decreased breath sounds - was seen in most of the cases and has also been reported by other authors - Banerjee et al. (1988), Mc Guirt et al. (1988) and Inglis et al.(1992).

The incidence of foreign body in the right bronchus in our study is 68% compared to 16% in the left bronchus which is also found in study done by others[1,8,24].

The commonest foreign body found in our study is vegetative which comprises 53.3%.In other studies like Banerjee et al (1988) and Fernandez et al. (2000), they found 66.4% and 82% vegetative foreign bodies in their studies. In our study Bronchoscopic removal was successful in 38 (88.4%) cases as also successfully done by LeRoux in 1964, in 88% cases. While bronchotomy removal of foreign body was 12% in his series, we had in 11.6% cases required exploratory thoracotomy and bronchotomy for the removal of the foreign body(5 cases). In our series mortality is 4.4% which is comparable to other studies by Adebayo O . Adeyemo and Michael A. Bankole 6.4%, and Orji, F.T. & Akpeh J.O. 3% respectively.

CONCLUSION

Accidental inhalation of foreign bodies into the air passages is a common occurrence throughout life. Rigid bronchoscopy is very effective procedure for inhaled foreign body removal with fewer complications,but for impacted foreign bodies of long duration thoracotomy and bronchotomy may require. Since no single or combined variables can predict foreign body aspiration with full certainty, bronchoscopic exploration must be performed if tracheobronchial foreign body aspiration is suspected. Timely accurate diagnosis and treatment of tracheobronchial foreign bodies in children can avoid delay in treatment and effectively reduce complications and mortality.

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