



Clinical Study of Tracheobronchial Foreign Body

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Abstract: Tracheobronchial foreign body aspiration is a common childhood emergency which is a leading cause of death. Foreign bodies in trachea and bronchus have been extracted by rigid bronchoscopy under general anaesthesia. This study aim is to study cases of foreign body aspiration and its management with available institutional facilities and deduce standard operating protocol in management. The present study performed with 30 patients was undertaken at KIMS, Krishna Hospital and MRC, Karad with patients attending ENT OPD and causality with the involvement of paediatrics department. If the patient is in acute respiratory distress, emergency bronchoscopy is warranted, otherwise an adequate procedure with adequate preparation with a skilled anesthesiologist should be considered.

INTRODUCTION

Foreign body aspiration is life endangering emergency. F.B. may lodge anywhere in the aerodigestive tract but when lodged in the airway, it carries serious risks. It is more common in children as they have tendency to explore the world by introducing everything in their mouth (Clerf, 1952; Tandon *et al.*, 1973). Clinical features depend upon size, property and site of impaction of foreign body in tracheobronchial tree. Arachidic bronchitis is a severe form of bronchitis resulting from aspiration of peanut kernel. It is also known as peanut bronchitis. A positive history of aspiration, cough, wheeze, respiratory distress and decreased air entry are features in favour of an aspirated foreign body. Diagnosing foreign body aspiration is a challenge as it presents with variety of symptoms, mimicking bronchial asthma, recurrent pneumonia and upper respiratory tract infection. Radiology plays an important role in detecting the foreign body which in addition to history and clinical

findings, added as a collaborative evidence of foreign body aspiration. Rigid Bronchoscopy is gold standard treatment in managing cases of foreign body aspiration. Prompt management is essential to avoid complications.

Aim and objectives

Aim: To study cases of foreign body aspiration and its management with available institutional facilities and deduce standard operating protocol in management.

Objectives: To study the clinical features, diagnostic role of radiology and management in cases of foreign body aspiration and its complications. To design an algorithm in cases of foreign body aspiration requiring emergency management.

Literature review: Gustav Killian is known as “Father of Bronchoscopy”. In 1897 he performed first bronchoscopic removal of a foreign body, pork bone, from a 63 year old farmer using cocaine as local anaesthetic agent

(Zollner *et al.*, 1965). W.F. Manges was first to describe the mechanism of obstructive emphysema. Max Einhorn made great advancements by developing internal light source. Factors predisposing to foreign body aspiration include age, sex, socioeconomic status, property of foreign body, dental factors, medical factors, surgical factors and physical factors (Boyd *et al.*, 2009). Maximum incidence is seen in age group between 1-3 years (Kaur *et al.*, 2002). Incidence is more in boys as they are more active than girls (Atyac *et al.*, 1977). The majority of F.B. aspirations occurred among the lower socioeconomic class as they do not have knowledge about the risks of such accidents and children are frequently left under the supervision of an elder sibling. Dental procedures such as single-tooth cast, prefabricated restorations involving cementation. Site of foreign body depends upon physical position of the patient at the time of the aspiration (Cleveland, 1979). Penetration syndrome is sudden onset of choking and intractable cough with or without vomiting in a case of foreign body aspiration (Baharloo *et al.*, 1999; Swanson *et al.*, 2002). Zerella *et al.* (1998) reported that peanuts were the most commonly aspirated foreign bodies in the United States and Watermelon seeds and beads were commonly aspirated in the Middle East. Ciftci *et al.* (2003) reported that the right main bronchus is the most common site of lodgement, seen in 37% cases while in 26% of cases it is in left main bronchus. Radiology is a valuable diagnostic tool which provides supportive evidence to the clinical findings in a patient with suspected foreign body aspiration. Radiographic changes may occur immediately following aspiration or may become apparent as infection sets in. X-rays detect radio-opaque foreign body by virtue of their character. A non-opaque foreign body such as plastic or vegetative matter is much more difficult to diagnose radiologically (Mu *et al.*, 1990). If chest X-ray appears normal, an attempt should be made to repeat the x-ray during expiration as unobstructed lung empties and the other lung remains hyperinflated and localized hyperinflation might be detected (Cataneo *et al.*, 1997; Rothman and Boeckman, 1980). Lateral decubitus chest X-ray in children may also be useful as dependent lung collapses normally but remains inflated in bronchial obstruction. It may also reveals foreign bodies because of the greater edge wise density and the absence of other confusing shadows. Rigid Bronchoscopy is gold standard for diagnosing as well as procedure of choice in treating cases of foreign body aspiration. Elective Bronchoscopy must be performed for cases with no respiratory distress along with adequate administration of parenteral fluids, I. V. antibiotics, corticosteroids, bronchodilators, oxygen, especially when foreign body of vegetable origin is suspected (Banerjee *et al.*, 1988). The maximum allowable time for bronchoscopy in children should never exceed 20 min to avoid development of subglottic

oedema. Other methods like bronchotomy through a limited thoracotomy can be performed if failed to remove foreign body bronchoscopically (Soysal *et al.*, 2006).

MATERIALS AND METHODS

The present study was undertaken at KIMS, Krishna Hospital and MRC, Karad with patients attending ENT OPD and causality with the involvement of paediatrics department. During the period from 2nd May, 2014 to 31st January, 2016.

Post-operative: The patient was managed with bronchodilators, mucolytic expectorants, antibiotics and chest physiotherapy. Repeat chest X-ray was taken to see improvement in chest expansion. Patient was monitored for a period of three days post-operatively before being discharged from the hospital.

RESULTS AND DISCUSSION

In the present study (Table 1) the maximum age of child who presented with foreign body aspiration was 13 years and the minimum was 10 months. Out of 30 children, 20 (66.67%) belonged to age group between 1-3 years of which 17 were male and 3 were female. Out of 30 children, 25(83.3%) were male and 5(16.6%) were female, i.e., ratio of 5:1.

In the present study (Table 2), 25(83.3%) patient presented with history of cough, 19(3.3%) with history of F.B. aspiration, 11(36.6%) with breathlessness, 8(26.6%) with fever and only 1(3.3%) patient presented with haemoptysis.

In the present study (Table 3), most of the cases (30%) reached hospital within 2 days. Earliest time of presentation was 2 h and longest was 6 months.

In the present study (Table 4), out of 30 patients 21(70%) had obstructive emphysema followed by consolidation in 4(13.3%) cases. Normal X-ray was found in 3(10%) cases. None cases showed radio-opaque foreign body, atelectasis and bronchiectasis on the X-ray.

In Table 5, out of 30 cases, vegetative foreign body was found in 25 cases, non-vegetative was found in 1 and mucus plug in 2. While in 2 cases no foreign body was found. Peanuts were the commonest vegetative foreign body found in 14(46.6%) cases.

Foreign body aspiration causes significant morbidity and mortality in children. Most of the cases presented to hospital between 1 and 2 days 5. An algorithm for the diagnosis and management of foreign body aspiration has been suggested by Tokar *et al.* (2004), Alper (2001) and Gibson (1999). Algorithm emphasized the importance of radiology in diagnosis of foreign body aspiration (Tokar *et al.*, 2004). Alper (2001) values the history of witnessed choking in his algorithm and guides the

Table 1: Age and sex distribution

Age (Years)	Male	Female	No. of cases	Percentage
<1	2	1	3	10
1-3	17	3	20	66.6
4-6	4	0	4	13.3
7-9	1	1	2	6.6
10-12	0	0	0	0
>12	1	0	1	3.3
Total	25(83.3%)	5(16.6%)	30	100

Table 2: Clinical symptoms

Symptoms	No. of cases	Percentage
History of aspiration	19	63.3
Choking	4	13.3
Coughing	25	83.3
Breathlessness	11	36.6
Noisy breathing	9	30
Fever	8	26.6
Unresolved LRTI	4	13.3
Haemoptysis	1	3.33

Table 3: Duration

Duration (Days)	No. of cases	Percentage
<1	8	26.6
1-2	9	30
3-7	4	13.3
8-15	1	3.3
16-30	0	0
>30	8	26.6

Table 4: Radiological findings

Radiological findings	No. of cases	Percentage
Obstructive emphysema	21	70
Opaque foreign body	0	0
Atelectasis	0	0
Consolidation	4	13.3
Normal	3	10
Bronchiectasis	0	0
No-X-ray	2	6.67

Table 5: Types of foreign bodies aspirated

Types of foreign bodies	No. of cases	Percentage
Vegetative matter-Peanuts	14	46.6
Green Pea	2	6.67
Coconut	1	3.33
Groundnut kernel	2	6.67
Fruit seed	3	10
Chana	3	10
Non-vegetative matter-Pen cap	1	3.33
Miscellaneous-Mucus plug	2	6.6
Foreign body not found	2	6.6

otolaryngologist in management of such patients. From the experience gained through this study, an algorithm has been developed for the management of patients with aspirated foreign bodies. This algorithm will be presented to the clinical society of this hospital for implementation by the concerned specialty departments.

CONCLUSION

Tracheobronchial foreign bodies constitute a serious and potentially fatal situation usually occurring in children, the Peak age incidence being in the 1-3 years

age group. Cough, breathlessness, tachypnoea and reduced breath sounds on the affected side were the common symptoms and signs of airway obstruction. Positive radiological findings usually associated with an Airway foreign body is Obstructive emphysema. However, a negative radio-graph does not rule out the diagnosis of foreign body aspiration. A high index of clinical suspicion is necessary. Emergency bronchoscopy is warranted in case the patient is in acute respiratory distress, otherwise an elective procedure with adequate preparation along with an efficient anesthesiologist should be considered. Peanut was the commonest foreign body aspirated and the site of lodgement being the right main bronchus followed by the left main bronchus.

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