

# FOREIGN BODIES IN TRACHEOBRONCHIAL TREE: A THREE YEAR EXPERIENCE IN A TERTIARY CARE HEALTH CENTRE

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## ABSTRACT

**Background:** Aspiration of foreign bodies (FB) in tracheobronchial tree remains a continuous challenge to otorhinolaryngologists, major issues being their accurate diagnosis and timely as well as safe removal. Diagnostic and therapeutic bronchoscopy remains the gold standard in their management. **Objective:** The objective of this study was to identify clinical & demographic features of the patients, types of foreign bodies and the use of rigid bronchoscopy in their management. **Patients and Methods.** This was a three year descriptive study, carried out in the Department of Otorhinolaryngology, Sheikh Zayed Hospital, Rahim Yar Khan, from 1<sup>st</sup> January 2007 to 31<sup>st</sup> December 2009. All patients underwent physical and radiological assessment and those with the highest level of suspicion of having foreign bodies in tracheobronchial tree, underwent diagnostic and therapeutic bronchoscopy. **Results:** Rigid bronchoscopy was done in sixty six patients, of which 52 (78 %) were male. Fifty two out of sixty two (82%) patients were less than five years of age. Forty two patients were admitted within twenty four hours after aspiration. The most common clinical findings were prolonged expiration (42%), reduced air entry on affected side (24%), sternal retraction (20%), abnormal auscultation (40%), wheezing (62%) and fever (58%). FBs were found in 62 (94%) patients. 42(68%) had FBs in right bronchi and 20 (32%) in left bronchi. Beetle nuts (39%) and peanuts (24%) were the most common FBs. **Conclusion:** Patients especially children, with resistant or recurrent lower respiratory tract infections and those with high degree of suspicion must undergo bronchoscopic evaluation. Rigid bronchoscopy is a very effective procedure to safely remove FBs from proximal divisions of main bronchi.

**Key words:** Foreign bodies (FBs), bronchoscopy, tracheobronchial tree.

## INTRODUCTION

Accidental inhalation of foreign bodies (FB) in respiratory tract is not an uncommon occurrence in any age group, but it is more frequent in younger age group.<sup>1</sup> Normally, sphincteric mechanism of laryngeal inlet (which mainly consists of epiglottis, aryepiglottic folds, true and false vocal cords) prevents the aspiration of food, inorganic material and fluids in to the tracheobronchial passage. However, sometimes incoordination in this system leads to aspiration of material causing life threatening situations.<sup>2</sup> The accurate diagnosis may be delayed even by the trained physician especially in children, because often the initial choking episode is not witnessed and the delayed residual symptoms may mimic other common conditions such as asthma, recurrent pneumonia or upper respiratory infection.<sup>3</sup> The symptoms and signs produced depend upon the nature, size, location and time since the lodgment of the foreign body in the tracheobronchial tree. A large foreign

body completely occluding the larynx or tracheal lumen may lead to sudden death, whereas a small foreign body lodged in the bronchial tree may remain silent for long. Early diagnosis and treatment are imperative to prevent mortality, as well as to prevent the lesser but still significant complications of recurrent acute respiratory distress, chronic and recurrent pneumonia and pulmonary abscess. Aspiration of FBs may lead to sudden asphyxia and death, or may cause chronic recurrent chest infections. Frequency of aspiration of FB is most commonly seen in children 3-5 years of age, hence special attention should be given to this age group to prevent aspiration. Rigid bronchoscopy still remains the gold standard for the removal of foreign bodies from the tracheobronchial tree.<sup>4</sup> The advent of modern ventilating bronchoscopes and improvement in illumination and visualization provided by Hopkins telescope-guided optical forceps and the advances in anesthesia techniques, have further reduced the mortality and morbidity by making the endoscopic procedure simple and effective.<sup>1</sup> With the modern bronchoscopic equipment, thoracotomy with bronchotomy and segmental resection of the lung as part of the management of bronchial foreign bodies has been much reduced. This study was designed to identify the clinical & demographic features of the patients of suspected foreign bodies, types of foreign bodies and utility of rigid bronchoscopy in their management.

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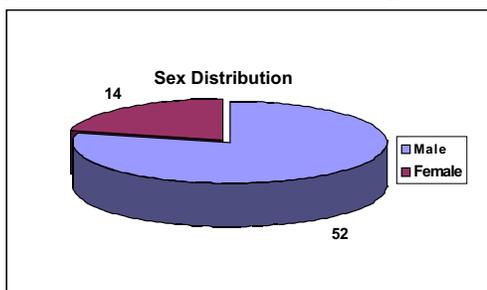
## PATIENTS AND METHODS

This descriptive study was carried out on consecutive sixty six patients, admitted in the department of Otorhinolaryngology, Sheikh Zayed Medical College/Hospital from 1<sup>st</sup> January, 2007 to 31<sup>st</sup> December, 2009. Patients were either directly admitted from emergency department or were referred from other wards, especially from Pediatrics Department. All patients with established history or high degree of suspicion (signs of persistent cough not responding to medical treatment, decreased air entry on affected side as evident on auscultation) were prepared for general anesthesia. Routine investigations like blood tests and chest x-rays were taken. All patients underwent rigid bronchoscopy under general anesthesia. Rigid kal storz ventilating bronchoscopes varying in size from 3-6 mm with fiberoptic illumination and various kinds of foreign body extraction forceps were used to remove the foreign bodies. Age, sex, duration between aspiration and reaching the hospital, symptoms and signs, types of foreign bodies, findings during bronchoscopy and complications were noted down in each case, so as to tabulate the results. Analysis of results was done manually as well as by using SPSS version 10.

## RESULTS

In our study, 66 patients were admitted in three years. Fifty one patients (77%) were admitted through emergency department and fifteen patients (23%) were referred for diagnostic bronchoscopic evaluation from pediatrics department due to resistant chest infections. Out of 66, fifty two (78%) patients were male and fourteen patients (22%) were female (Figure: I). FBs were found in 62(94%) patients out of which fifty two patients (83%) were below five years of age, eight patients (13%) were between five and ten years and two patients (3%) were above ten years. (Figure II)

**Figure: I** Sex distribution of patients



Forty patients were admitted within twenty four hours after aspiration, eleven patients between 1-2 days, ten patients between 3 to 10 days and five patients were admitted after ten days of aspiration.

**Table: I**  
Duration to presentation

Duration (days)	No of cases
<1	40
1-2	11
3-10	10
10-15	3
>15	2

Out of sixty two patients, forty (68%) had foreign bodies in right bronchus and twenty (32%) in left bronchus (Figure II). The frequency of type of FBs is shown in Table (II). More than half were beetle nuts and pea nuts.

**Figure: II**  
Radiograph of two years old child whose left bronchus was completely occluded with piece of beetle nut.



**Table: II**  
Types of foreign bodies.

Types of FBs	Number	Percentage
Beetle nuts	18	29.00%
Pea nuts	15	24.19%
Stone pieces	07	11.29%
Whistle reeds	06	9.60%
Date seeds	05	08.06%
Iron nail	04	06.45%
Melon seeds	04	06.45%
Copper wire	01	01.61%
Plastic button	01	01.61%
Bullet	01	01.61%
<b>Total</b>	<b>62</b>	<b>100%</b>

In sixty cases, foreign bodies were successfully removed with rigid bronchoscope. Degree of inflammatory response around FBs was found to be directly proportional to the time between aspiration and bronchoscopy, and nature of FBs material. In two cases (3%), postoperative pneumothorax developed and two cases (3%) were referred for thoracotomy due to breaking of seeds and impaction in multiple distal bronchioles. Fifty four (87%) patients were discharged after an average of forty eight hours after bronchoscopy, while eight patients (12.90%) remained admitted from three to seven days.

## DISCUSSION

Accidental inhalation of a foreign body into the air passages is well reported.<sup>2,3</sup> Normally, very strong 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 fluids. However, none of these mechanisms is perfect, and foreign bodies frequently get lodged in the airways of children.<sup>1</sup> In the United States, approximately 500- 2000 deaths occur each year from foreign body aspiration<sup>2-3</sup>. Although the exact figures are not available in Pakistan, but deaths due to FBs inhalation are much higher than the Western countries.<sup>5</sup> Younger children are at the highest risk for accidental foreign body aspiration<sup>2</sup>. Some children have the habit of keeping organic or metallic objects in mouth. Aspiration usually takes place during talking, crying or weeping when rapid inspiratory flow of air pulls the Fb down the respiratory tract.<sup>3</sup> Sudden start of respiratory distress in a previously healthy child strongly favors the possibility of FB aspiration.<sup>4</sup> In our study, parents of forty two (80%) children out of fifty two were not aware about FB aspiration. All children who were referred from pediatrics department had resistant chest infections which were not responding to treatments. Most of these children were earlier diagnosed as cases of asthmatic bronchitis or lobar pneumonia. After aspiration of FBs, outcome usually depends on the size, nature, level at which it becomes arrested and duration since aspiration. Big objects can occlude the larynx or can become lodged in tracheal lumen causing sudden death, but usually FBs become

impacted in lower bronchial air way. Physical findings usually include, cough, tachypnea, diminished breath sounds, wheezing, strider, dyspnea, cyanosis, and suprasternal retractions or any combination of these<sup>3</sup>. However, the absence of any of these findings does not exclude the possibility of foreign body aspiration. In our study, absence of breath sounds in affected area of lungs occurred in thirty (58%) children, however, the presence of normal bilateral breath sounds does not exclude the diagnosis.<sup>8</sup> Since most of these are organic in nature, radiological findings may not be conclusive. In our series of cases, out of sixty two patients, radiological findings were positive in thirty four (55%) patients, in ten (16%) patients presence of FBs was doubtful, and in remaining eighteen (29%) patients, we did bronchoscopy due to recurrent resistant infections of lower respiratory tract. Although foreign body aspiration most commonly occurs in children, it has been seen in adults as well. Two patients in our study were above fifteen years of age. All children who were referred from pediatrics department were earlier treated for resistant lower respiratory tract infections. High level of suspicion of FB aspiration should arise when, on history, sudden attack of respiratory distress with cough starts in previously healthy child. Despite advances in radiological techniques, the diagnosis of foreign body aspiration can be difficult at times especially when plastic object or organic objects partially occlude bronchi.<sup>9</sup> High degree of suspicion should arise with even doubtful history and especially if chest infections are not recovering after multiple treatments<sup>10</sup>. In our study, forty five (72.58%) parents became aware (on an average) within half an hour of aspiration, while in the remaining seventeen patients (27.42%) this period ranged up to five months.

## CONCLUSION

As mostly children are involved, a very high degree of suspicion should arise in the mind of the physician, specially if respiratory problems have started suddenly. Rigid bronchoscopy, if performed by an experienced hand, is effective in removing FB especially in first and second bronchial divisions. Prevention of aspiration of foreign bodies is better than cure. Parents should be made aware about the hazards of this habit of their children through media, so that its incidences should be minimized. Parents should also be made aware about the increased possibility of foreign body aspiration in healthy children who develop sudden respiratory distress.

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Prophet Mohammed ﷺ Says:

**"The ink of the scholar is more holy than the blood of the martyr."**