

# Role of Fibre Optic Bronchoscopy in Foreign Body Inhalation in Children

Baba Aijaz Khaliq<sup>1</sup>, Owais Makdoomi<sup>2</sup>, Zubair Ah Lone<sup>3</sup>, Javed Iqbal<sup>4</sup>, Showkat Ahmad Showkat<sup>5</sup>

<sup>1</sup>Senior Resident, Department of ENT and HNS

<sup>2</sup>Resident, Department of ENT and HNS

<sup>3</sup>Resident, Department of ENT and HNS

<sup>4</sup>Assistant Professor, Department Of Pediatrics SKIMS

<sup>5</sup>Assistant Professor, Department of ENT and HNS

**Abstract:** Foreign body (FB) inhalation is the most common cause of accidental death in children under the age of one year [1]. The majority of inhaled FB's are food items [2-4]. Prevention and rapid diagnosis can save lives [5-7]. The clinical presentation and radiological findings may vary; can change with time; can be interpreted differently by different examiners and/or may even be normal [8-11]. Inhalation of an FB can result in sudden suffocation, choking, and paroxysms of coughing, followed by tachypnea and dyspnea. The indications for bronchoscopy in cases of suspected FB inhalation are not well defined. Usually, a clear history of sudden suffocation, a choking event combined with abnormal chest examination, or radiologic findings are accepted as reliable criteria justifying the performance of bronchoscopy. A dilemma arises when a child with a suspected inhalation event presents with a normal physical examination or a normal chest radiograph.

**Keywords:** Foreign body, fibre optic bronchoscopy, rigid bronchoscopy, respiratory distress, emergency care

## 1. Aims and Objectives

Main aim of this study was to reduce the following:

- Unnecessary rigid bronchoscopy and risks associated with this procedure (rigid bronchoscopy is associated with high chances of death).
- Unnecessary anesthetic complications, as we all know children are prone to such risks.
- Unnecessary surgical burden.
- Mental trauma to patients, parents and caretakers.

## 2. Introduction

Foreign body aspiration (FBA) is the most common emergency presenting in the emergency department, which requires prompt recognition and early treatment to prevent serious and sometimes fatal consequences [12-14]. Foreign body inhalations accounted for 7% of accidental deaths in children less than 4 year of age in USA, in year 1986 [15]. About 75% to 85% of all FBA's occur in children younger than 15 years of age; however, most are younger than 3 years of age [13]. Boys are affected more frequently than girls [16]. Prevention of aspiration is most important and caregivers must be educated to keep small objects away from children. When diagnosis is delayed because of an initially silent foreign body aspiration, complications ranging from recurrent hemoptysis to irreversible damage of the obstructed airways or parenchyma, which often necessitates surgical intervention and resection [17].

In the past, bronchial endoscopy called for the use of the rigid bronchoscope and was consequently used very infrequently in children [18]. The advent of thin and ultra-

thin fibre-optic bronchoscopes has considerably extended the use of this procedure [19], even in the neonatal field [20].

In children though aspiration of foreign bodies occurs in all age groups, most patients in this study were below 3 years of age, which is similar to that reported in other series [21,22]. Psychology of tasting everything, lack of molar teeth to crush the nuts, the anatomic relation of larynx, crying and playing while eating and lack of parental supervision contributes to this hazard.

Vegetative foreign bodies are more common cause of aspiration in many studies [23] and are more dangerous as they swell up with bronchial secretions causing increased obstruction.

## 3. Material and Methods

A prospective study was carried among the children admitted in the emergency department of otorhinolaryngology in GMC SMHS Hospital from August, 2016 to April, 2017. GMC, SMHS Hospital in collaboration with SKIMS Hospital analysed the use of fibre optic bronchoscopy in children who were suspected of having a foreign body inhalation (either by parents or care takers), but with either negative radiological examination, or negative clinical examination, or both.

These children were brought to the department with a history of foreign body inhalation. All the children with history of either positive or suspected foreign body inhalation were included in this study. Almost 65 patients were included in this study. Any of the patients who were symptomatic both clinically and radiologically were excluded from this study because emergency rigid

bronchoscopy was done. Out of 65 patients included in this study, 23 patients were excluded as rigid bronchoscopy was done as these patients were both symptomatically and radiologically as well as clinically positive for inhalation. Rest of the 42 who were included in this study were sent to SKIMS for fibre optic bronchoscopy after proper counseling with parents and care takers and after taking proper consent. All these 42 patients included in this study underwent fibre optic bronchoscopy at SKIMS hospital and were accompanied by trained residents. Out of these 42 patients who underwent fibre optic bronchoscopy in SKIMS were later referred back to SMHS hospital to our department of ENT and HNS. As all these children were accompanied by residents. Out of these 42 children, 19 were positive with inhaled foreign body and 13 were negative for foreign body on fibre optic bronchoscopy. All these 19 children later underwent rigid bronchoscopy and foreign body was successfully removed.

#### 4. Results

The table below represents total patients included in this study and outcome of fibre optic bronchoscopy which was performed at SKIMS. Out of the 65 patients in total only 42 patients were included in the study in whom fibre optic bronchoscopy was performed and 23 patients were excluded from the study due to having performed rigid bronchoscopy.

Total no of patients	Rigid bronchoscopy	Fibre-optic bronchoscopy	
		Positive	Negative
65	23	42	
	Excluded from study	19(45.2)%	13(30.9)%

The table above, showing fibre-optic bronchoscopy is a very sensitive tool for diagnosing inhaled foreign bodies in patients, who have suspected inhalation history with negative radiological or clinical examination.

#### 5. Conclusion

This study and various other comparative studies suggest that fibre optic bronchoscopy has high sensitivity as well as high specificity in diagnosing inhaled foreign bodies. It has not only high positive predictive value in diagnosing suspected inhaled foreign bodies but also having high negative predictive value in excluding inhaled foreign bodies. Thus this tool helps reducing unnecessary surgeries (bronchoscopy), risks associated with it and also reducing anesthesia and anesthetic complications. It also gives mental relief to parents once it comes negative for foreign body and reduces mental trauma to parents and caretakers. This study thus concludes that fibre optic bronchoscopy should be done in all patients with suspected foreign body inhalation who either are asymptomatic clinically or lack radiological support. Fibre optic bronchoscopy not only helps in visualizing inhaled foreign bodies in suspected inhalation cases but also helps in ruling out inhalation in patients where parents are suspicious of foreign body inhalation but patient are either asymptomatic or lack clinical and radiological support.

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### Author Profile



**Dr. Owais Makhdoomi** is a Second Year Post Graduate Resident in Government Medical College, Srinagar. Currently he is receiving extensive training as a second year resident in the Department of ENT and HNS, SMHS Hospital, Srinagar. His specialization is in Otorhinolaryngology. Owais completed his MBBS in the year 2014 from Kashmir University. After his Post graduation Owais would like to pursue his career as a fellow in base of skull and neck surgeries. Owais is keen in serving people deprived of adequate health care in India and abroad

