

Research Article

Role of fiberoptic flexible bronchoscopy in foreign body retrieval



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Abstract

Background: Foreign body aspiration is more common in children; it is also a life-threatening situation that can occur at any age. Patients may have no symptoms, but others may present with a choking event and sometimes inspiratory stridor. **Aim of the work:** The aim of the work is to evaluate the safety and efficacy of flexible bronchoscopy in foreign body retrieval. **Patients and methods:** The study included 30 patients with foreign body (FB) aspiration who were recruited from chest departments from AL Kasr El Einy and Minia university hospitals in the period between October 2020 to July 2023. Data collected included baseline demographics (age, sex, history of foreign body aspiration or fits). **Results:** included 30 patients who had FB aspiration, their age ranged between 1.5 – 29 years with mean value of 8.417 ± 8.079 . Females represented 26.7% , while 73.3% were males. Our results showed that regarding the type of used bronchoscopy, all of FB were removed by flexible fiberoptic bronchoscope (FOB) (100%). Most of FB (70%) were removed by Crocodile forceps while the remaining 30% were removed by Dormia basket. **Conclusion:** Flexible bronchoscopy is an effective and safe treatment modality for foreign inhalation.

Key words: flexible bronchoscopy, foreign body inhalation.

Introduction

Foreign body inhalation into the airway is common in pediatric. However, in adults, it is uncommon and may occur due to iatrogenic or traumatic cause ⁽¹⁾.

Food particles and broken teeth parts are the commonest types of aspirated foreign bodies, which may impact in the right or left main bronchus ⁽²⁾.

Penetration syndrome is a common presentation of FB inhalation and consisted of acute onset of choking, cough, and vomiting, which may be associated with wheeze, dyspnea ⁽³⁾.

The clinical presentation is variable, it depends on the size of the FB, and

impaction site ranging from no symptoms to sudden asphyxia and loss of life when a huge FB obstructing the trachea ⁽⁴⁾.

Chest x-ray has low sensitivity in the diagnosis of FB inhalation, particularly when the FB is radiolucent. Computed Tomography sensitivity is high and can identify the site of obstruction and can identify the endobronchial FB (even objects with low density), and it can also provide the identification of post-obstructive collapse and hyperlucent regions. Virtual bronchoscopies are very useful in the anatomic detection of FB and planning for FB retrieval ⁽⁴⁾.

When FB inhalation is suspected, either flexible or rigid bronchoscopy can be done,

and there is controversy about which one is the optimal procedure. Several bronchoscopists thought that rigid bronchoscopy is the best treatment modality, as it is effective and safe. In most institutes, a rigid bronchoscopy done for FB retrieval, after that flexible bronchoscopy was done to ensure that there is not another FB lodged more distally⁽⁵⁾.

Aim of study:

Evaluate safety and efficacy of flexible bronchoscopy in foreign body retrieval.

Patients & Methods

This prospective cross sectional study will include 30 patients with foreign body who recruited from chest, departments from AL Kasr El Einy and Minia university hospitals in the period between october2020 to July 2023.

Inclusion criteria: patients suspected with foreign body aspiration.

Exclusion criteria: contraindications of FOB

1. Uncorrected coagulopathy. If INR is more than 1.5.
2. Severe refractory oxygen desaturation.
3. Hypoventilation with hypercapnia (type 2 respiratory failure).
4. Hemodynamic instability.

Methods:

All Patients will be assessed before bronchoscopy procedure, as regards the:

- 1- Complete history taking from patients or there representative.
- 2- Symptomatic; dyspnea, hemoptysis, cough and others.
- 3- Chest radiograph. (chest x-ray or HRCT).
- 4- Laboratory investigations (CBC- INR – PC urea create – FBS).
- 5- Full clinical examination.

All procedures will be carried out with flexible fiberoptic bronchoscopy under general anesthesia:

Patient preparation:

Patients were kept fasting for 6-8 hours before fiberoptic bronchoscopy.

Procedure:

According to the age and weight of patients, two types of fibro bronchoscopes

were used include Pentax EB-1170 K (external diameter: 2.8 mm, working channel: 1.2 mm) and Pentax EB-1830T3 (6 mm, 2.8 mm). Other instruments included biopsy forceps, video workstation, monitors, oxygen delivery system and emergency instruments.

Written consents were obtained from the patients or their representatives before bronchoscopy. fasting 6h before procedure. Flexible bronchoscopy was performed under general anesthesia using endotracheal tube (ETT). Atropine was administered (0.01–0.03 mg/kg) 20–30 min and midazolam (0.1–0.2 mg/kg) was given 5–10 min before the procedure. After general anesthesia, the shaft of the bronchoscope was well lubricated with 2% lidocaine gel and is advanced into the ETT under direct vision, Biopsy forceps, dormie basket and cryoextraction were used to remove the FB.

Results

30 patients with suspected foreign body aspiration were included in this study their age ranged between 1.5 – 29 years with mean value of 8.417 ± 8.079 . Eight patients (26.7%) were females and 22 (73.3%) were males.

The study showed that among our studied 30 patients who had FB aspiration, their duration of symptoms ranged between 3 days – 10 years with mean value of 223.833 ± 699.492 . The main manifestation was cough in all cases (100%) followed by wheeze in 76% then dyspnea in 33.3% of cases and expectoration in 20% of cases.

This study showed that radiological findings of the studied FB aspiration population illustrated FB in 66.7% of patients followed by loss of lung volume in 13.3% and bronchiectasis changes 6.7%. Radiological study did not show any abnormalities in 13.3% of patients.

FB aspiration was located in Rt main bronchus in 36.7% of patient followed by Lt lower bronchus in 23.3% and Lt main bronchus in 13.3% while the site of FB was in Lt upper bronchus, Rt intermediate bronchus, trachea and at carina in 6.7% for each. FB aspiration was in chicken bone in

26.7% of patient followed by peanut in 23.3%, scarf pin in 16.7%, pen cap in 13.3%, plastic peace in 10%, metallic material in 6.7% and bean in 3.3%.

Our results showed that regarding the type of used bronchoscopy, all of FB were removed by flexible fiberoptic bronchoscope (100%). Most of FB (70%) were

removed by Crocodile forceps while the remaining 30% were removed by Dormia basket. Regarding complications, 13.3% developed laryngeal edema, while hemoptysis and RD occurred in 6.7% for each. All FB were successfully removed and all patients were improved after FB removal.

Table (1): Demographic data of the studied FB aspiration population

		N= 30
Sex	Male	22 (73.3%)
	Female	8 (26.7%)
Age (years)	Range	1.5 – 29
	Median [IQR]	4.5 [8]
	Mean ± SD	8.417 ± 8.079

Table (2): Clinical data of the studied FB aspiration population

		N= 30
Duration of illness (years)	Range	3 days – 10 years
	Median [IQR]	45 [110]
	Mean ± SD	223.833 ± 699.492
Symptoms	Cough	30 (100%)
	Wheeze	23 (76.7%)
	Dyspnea	10 (33.3%)
	Expectoration	6 (20%)
	Hemoptysis	0 (0%)
Chest auscultation	Crackles	4 (13.3%)
	Diminished Air entry	7 (23.3%)
Comorbidity	Past history of fits/DLC	2 (6.7%)
	Past history of FB aspiration	9 (30%)

Table (3): radiological findings of the studied FB aspiration population

		N= 30	
		N	%
Radiological findings	NAD	4	13.3%
	Loss of lung volume	4	13.3%
	FB detection	20	66.7%
	Bronchiectasis changes	2	6.7%

Table (4): the site of FB in the studied aspiration population

		N= 30	
		N	%
Site of FB	FB in Lt main bronchus	4	13.3%
	FB in Rt main bronchus	11	36.7%
	FB in Lt lower bronchus	7	23.3%
	FB in Lt upper bronchus	2	6.7%
	FB in trachea	2	6.7%
	FB in Rt intermediate bronchus	2	6.7%
	FB at carina	2	6.7%

Table (5): Clinical outcome of the studied FB aspiration population

		N= 30	
		N	%
Complications	No	22	73.3%
	Hemoptysis	2	6.7%
	Laryngeal edema	4	13.3%
	Respiratory distress	2	6.7%
Improvement of symptoms	Yes	30	100%
	No	0	0%

Discussion

The present study showed that among our studied 30 patients who had FB aspiration, their duration of symptoms ranged between 3 days – 10 years with mean value of 223.833 ± 699.492 . The main manifestation was cough in all cases (100%) followed by wheeze in 76% then dyspnea in 33.3% of cases and expectoration in 20% of cases. Chest auscultation revealed diminished air entry in 23.3% of and crackles in 13.3% of patients. 30% of them give past history of FB aspiration.

The study results were in concomitant with study of Ma et al.,⁽⁶⁾ as they found that the most frequent symptoms were cough (37, 64.9%) followed by hemoptysis (23, 40.3%), wheezing (20, 35.1%), fever (16, 28.1%), vomiting (13, 22.8%), and dyspnea (6, 10.5%).

In Dong et al., study⁽⁷⁾, the commonest symptoms in children with foreign body inhalation were choking, breathlessness, cough, and wheeze, while adults were asymptomatic or had mild symptoms such as chronic cough, exertional dyspnea, and hemoptysis. However, in adults with FB

inhalation, the lack of a good history and conclusive symptoms lead to misdiagnosis or delayed diagnosis as reported by Lin et al.,⁽⁸⁾ Oke et al.,⁽⁹⁾.

The current study showed that radiological findings of the studied FB aspiration population illustrated FB in 66.7% of patient followed by loss of lung volume in 13.3% and bronchiectasis changes 6.7%. radiological study did not show any abnormalities in 13.3% of patients.

While, in the study of Elhamady et al.,⁽¹⁰⁾, as regard radiological findings, the most common finding was radio opaque object found in 74 patients (74%). Absence of any finding and normal radiography observed in twenty-two patients (22%), followed by esophageal stenosis in four patients (4%). Mediastinitis observed only in two cases (2%), which occur after mediastinal abscess due to neglected inhaled artificial teeth remnant.

Whereas, Ünal et al.,⁽¹¹⁾ found that air trapping was detected on the radiographs of 11 (55%) patients, non-resolving pneumonia were observed on the radiographs of

three (15%) patients, and normal chest X-ray was in nine (45%) patients.

In the study in our hands, FB aspiration was located in Rt main bronchus in 36.7% of patient followed by Lt lower bronchus in 23.3% and Lt main bronchus in 13.3% while the site of FB was in Lt upper bronchus, Rt intermediate bronchus, trachea and at carina in 6.7% for each. FB aspiration was in chicken bone in 26.7% of patient followed by peanut in 23.3%, scarf pin in 16.7%, pen cap in 13.3%, plastic peace in 10%, metallic material in 6.7% and bean in 3.3%.

Our results were supported by study of Chousein, ⁽¹²⁾ as they observed that thirty-three (58.9%) of aspirated foreign body were detected and removed from the right bronchial tree, 18(32.1%) in the left bronchial tree and 3(5.3%) in the trachea. Twenty-three (45.0%) of the extracted FB were classified as organic (mainly solid and semi-solid foods), 23 (45.0%) as inorganic and 5(10.0%) unspecified after pathological examination. Inorganic objects were of metallic material (such as pins, screws) in 13 patients, and nonmetallic objects (such as bottle cap, speech, dental prosthesis) in 10 patients.

Conclusion

Fiberoptic flexible bronchoscopy is effective and safe modality in extraction of airway FB. With well prepared institute and skilled staff, flexible fiberoptic bronchoscopy could be considered as the first option for the extraction of airway foreign bodies with minimal complications.

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