
Foreign Bodies Inhalations at Althawra Central Hospital (Prospective Audit)

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Abstract:

Objective: The aim of the present study was:

1. To assess the incidence of foreign body inhalations at EL-Beda city in relation to different demographic factors.
2. To evaluate the common clinical presentations of foreign body inhalations.
3. To correlate the clinical presentations radiological as well as intraoperative endoscopic findings.
4. Postulate the possible morbidities and mortalities resulting as sequelae of the foreign bodies inhalations or rigid bronchoscopic procedures for removal which were used of these foreign bodies. Such study is meant to highlight and solve the difficulties encountered in diagnosis, management, anaesthesia and prognosis after removal.

Material and methods: Prospective study of patients of different age groups (2–35 years) who were received as cases of foreign bodies inhalations and underwent bronchoscopy for foreign bodies removal, in the period between September 2005 to May 2008.

Results: Forty-four percent (44 %) of the patients were less than 5 years of age. In most cases (88%) there was definitive history of foreign body aspiration. Most of cases were of low socio-economic standard with low educational background. The foreign bodies most frequently encountered were metallic pins or seeds.

Conclusion: Foreign bodies extraction via rigid bronchoscopy has highly successful cure rate with low morbidity and non-existent mortality, however it must be born in mind that the bronchoscopy is not free from complications and the risk of bronchoscopy should never be underrated. In cases with protracted chest infection without any suggestive history of foreign body inhalation, diagnostic bronchoscopy was also indicated. Finding one foreign body does not preclude the presence of another. The foreign body inhalation is serious condition some times be fatal.

Key word: Foreign body inhalation, bronchoscopy, foreign body airway.

Introduction:

Foreign body inhalation is a very serious and life threatening emergency which quit frequently encountered.

Food choking is the sixth leading cause of accidental death in overall population and leading cause of accident death in the home for children under one year of age¹ foreign body aspirations cause death in over 300 children per year in the U.S.A.²

Though recent improvements in instrumentation and anesthetic techniques have made it safer to remove foreign bodies, it is still associated with occasional fatalities.^{3,4}

The real challenges are in prevention, advice, early recognition, resuscitation and transportation so that mortalities are totally avoided.⁵ In an attempt to study the problem of brochoscopy in infants and children for foreign body removal, we audited our data on

foreign body inhalation prospectively in consecutive patients which form basis of this report.

Patients and Methods:

Sixteen patients who under went brochoscopy for foreign bodies removal in Althawra central hospital, in the period between September 2005 to May 2008 are included in the study.

All patients were subject of the following procedures:

- Complete history taking.
- Clinical examination including general, chest and E N T examination.
- Radiological examination including plain X-ray for neck and chest. (Posteroanterior and lateral views)
- Rigid brochoscopy (Karl storz), under general anaesthesia.

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- Preoperative monitoring, Oxygen therapy and appropriate antibiotics.
- Storz ventilating rigid bronchoscope and special forceps of different size and shape were used (Fig. I).



Fig. I: Instruments.

The anesthetic technique varied with the condition of the patient. The technique of brochoscopy was in these phases.⁵

- Localization of foreign body with good illumination and suction.
- Removal of foreign body using special forceps.
- Checking the air way for patency.

Results:

As shown in (Table I) there were 10 males and 6 females. The age distribution showed that 56% of cases were ≤ 5 years of age. Regarding the seasonal presentation, there was significant seasonal variation ($P < 0.05$), the most of the cases were presented between October and November (Fig. II).

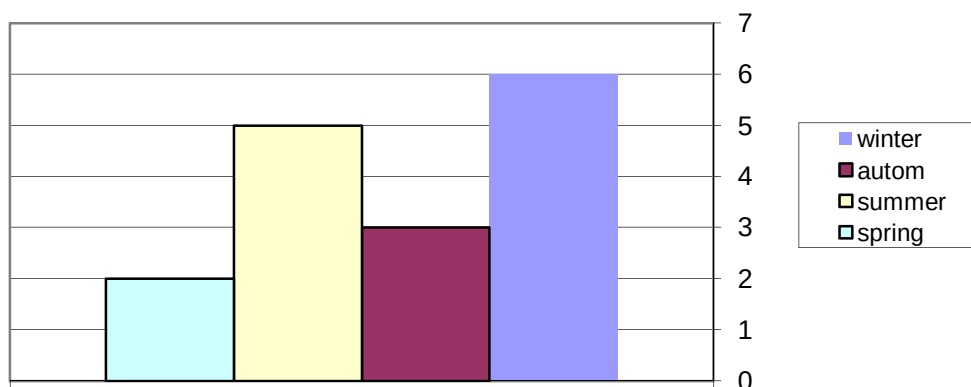


figure-2 : cases distripution according to the sesons

As demonstrated in (Table II), in large number of cases (94%) the patients has a definitive history of aspirated foreign body with sudden onset of symptoms or both and diagnosis is shown in (Table III). In 94% of the cases, the diagnosis was made with in one week. There was one case (6%) where the diagnosis was made after 10 days. The cause of delay of this case was due to wrong diagnosis were the patient was treated as bronchopneumonia. The most frequent initial symptoms were choking, cough, and respiratory distress. Two patients were referred for chest infections not

responding to treatment. (Table IV, V, and VI) illustrates the possible signs found by both general and chest examination. (Table VII) summarize the radiological findings before bronchoscopy, where obstructive emphysema was the commonest specific finding.

Five patients were the foreign body shadow was seen in chest x-ray. The foreign bodies most frequently encountered were needles (25%) metallic objects (19%), hard seeds (12.5%) and peanut (6.25%) (Fig. III). Thirteen out of sixteen patients actually had a foreign body in the bronchus (Table VIII and IX).



Figure III: Types of the extracted foreign bodies.

The mainstay of treatment was bronchoscopy. Bronchoscopy was done in most cases within 24 hours after admission and clinical diagnosis. The most common sites for foreign bodies impaction (Table – IX) were the right main bronchus (37.5%). Followed by left main bronchus and larynx, (18.75%) for each one. problems were encountered during bronchoscopy where foreign body was in larynx or upper trachea, or located in both sides of bronchial tree or lobar bronchi. The mortality and morbidity are shown in (Table X), one of cases, male child of age 9 years, received by pediatric department with severe respiratory distress, patient dead after one hour from his admission before ENT consultation as result of upper air obstruction by foreign body.

Complications following bronchoscopy were minimal. In three cases a slight bleeding from bronchial tree which subsided spontaneously and transient cough which settled down had been seen. Only one patient developed mild subglottic oedema with croupy cough and were

improved by oxygen inhalation and steroid injection. Two patients needed another bronchoscopy 1-3 days later. In one of them, rebronchoscopy was because of no improvement of air entry of left side after removal of large amount of food particles (rice / vegetable piece Etc) from right main bronchus, and other pieces of foreign bodies were found impacted in the left main bronchus which were missed in the first bronchoscopy. In the other case absence of foreign body was not definitive because of marked mucosal reaction with oedema, purulent discharge and granulation tissue of bronchial tree, therefore rebronchoscopy was considered after 3 days of intensive medical treatment where foreign body was removed.

One of the cases, the foreign body was metallic sharp pin and impacted to small lobar right bronchi where it's difficult to be removed by rigid bronchoscopy, and patient referred to EL-Koifia chest centre, where foreign body removed by flexible fibro optic bronchoscope.

Table I: Sex distribution.

Sex	Males	Females	Total
No.	10	6	16
Percent	62.5	37.5	100

Table II: History of foreign body inhalation.

	Positive history	Negative history
No.	15	1
Percent	93.75	6.25

Table III: Duration of illness.

	No.	Percent
With in hours	14	87.5
With in days	1	6.25
With in weeks	1	6.25
With in months	0	0
Total	16	100

Table IV: Presenting symptoms.

Symptomes.	No. of patients
Choking attack	6
Irritable, intractable cough	5
Reinspiratory distress	5
Reccurant attacks of cyanosis	3
Chest infection not responding to treatment.	2

Table V: General examination related findings.

Clinical feature	No. of cases
Cyanosis	8
Pallor	4
Fatigability	13
Sweating	8
Fever	1
Stridor	5

Table VI: Chest examination related findings.

Clinical feature	No. of patients
A) by inspection	
- Retractions :	
1- suprasternal	5
2- intercostals	3
3- epigastric	3
- decreased chest movement at affected side	5
B) by palpation	
- restricted chest movement at affected side.	5
C) by percussion :	
- hyper resonant due to emphysematous chest changes.	
- dullness due to consolidation or pleural effusion.	
D) by auscultation :	
- diminished air entry	10
- harsh vesicular breathing sound.	10
- bronchial breathing sound.	1
- ronchi.	10
- crepitus.	2

Table VII: Radiological findings.

Radiological feature	No. of patients
- Foreign body shadow	6
- Obstructive emphysema	5
- Lung collapse	1
- Chest infection related findings	1
- combinations	1
- Normal X-ray	2

Table VIII: Types of the foreign body.

Type of foreign body	No.	%
Peanut	1	6.25
Seeds	3	18.75
Food particles	1	6.25
Plastic objects	1	6.25
Metallic objects	7	43.75
No foreign body	3	18.75
Total	16	100

Table X: Site of foreign body impaction.

Site	No.	%
- Right main bronchus	7	43.75
- Left main bronchus	4	25
- Trachea	3	18.75
- Carina	0	0
- Lobar bronchi	1	6.25
- Multiple	1	6.25
Total	16	100

Discussion:

Inhalation of foreign body into the respiratory tract in children is an emergency.³ Barrington and cotton reported that aspirated foreign bodies are responsible for about 2000 deaths per year in children in the U.S.A, and cause considerable additional morbidity.^{5,6} Our audit highlights the extent of the problem in Al-Thowra central hospital and meant to solve the difficulties encountered in diagnosis, management, anaesthesia and prognosis after removal. 56% of cases were ≤ 5 years of age. The youngest was two years and the oldest was 35 years. Our findings are against the findings of Mesalaty and Henaidy,⁵ Barrington et al,⁶ Kim et al,⁷ and Narasimhan et al⁸ who showed that $\geq 78\%$ of cases were children less than 4 years of age.⁹ On the other hand, Daniilid et al found that the majority of children were between 5 months and 5 years. The circumstances under which a foreign body was inhaled in our series involved either eating or playing, and this was in agreement with the findings of mesalaty and Henaidy.⁵ Many factors could explain the higher incidence of foreign body aspiration in children as compared to the adult age group, such as, in complete development of mental status, in complete development of chewing mechanism, unproper teething process, in complete development of cough reflex, higher anatomical position of the larynx, lack of proper tone of normal anatomical as well as physiological sphincters of upper alimentary

Table XI: Post rigid bronchoscopy complications.

complication	No.	%
1) Mucosal injury	2	12.5
2) Subglottic oedema	2	12.5
3) Larynotrcheo bronchospasm	2	12.5
4) Air way obstruction	0	0
5) Pneumothorax	0	0
6) Pleural effusion	0	0
7) Surgical emphysema	0	0
8) mediastinal emphysema	0	0
9) retronchoscopy	2	12.5
10) Tracheostomy	0	0
11) Chest infection	1	6.25
12) massive bleeding	0	0
13) Death	0	0

tract with high tendency of regurgitations, emotional excitation as crying, laughing, shouting, and playing, poor maternal educational status, parental carelessness, and poor socio economic situations.

Jackson and Jackson stated that carelessness in one form or another account for most foreign body accidents.¹⁰ Carelessness can take the form of putting small, inedible, easy to be aspirated substances in the mouth like, seeds and pins, haphazard preparation of food, giving of unsuitable toys to the children, giving of peanuts or other nuts to children below age of 6 years, and hasty eating and drinking. Bahgat¹¹ advised, for prevention of aspiration of foreign bodies, the following: Children under 6 years of age should not be given seeds, peanuts or other nuts, small objects liable to be aspirated should be kept out of reach to children, the proper selection of toys according to each age group, and children should not be emotionally excited during eating or drinking.

In our study 10cases (62.5%) were males and 6cases (37.5%) were females with significant higher incidence among males. This is in favour to many other studies,^{6-8,11-14} which confirm the same result, and in contrary to one study which was performed at Tripoli central hospital which confirmed the higher incidence among females as compared to males.⁵

However no significant explanation was available for sex difference in this age. In our study 15 cases (93.75%) were presented with positive history of foreign body aspiration. The history was almost always that of sudden onset of repeated irritable cough, with dyspnea, and cyanosis in a child who was completely normal while eating or playing. This history was the most suggestive indication of aspiration and also pointing to the necessity for bronchoscopy. This is due to the fact that, after the initial symptoms, the foreign body comes to be impacted at certain sites and the patient appears completely normal from clinical as well as radiological evaluation and in such cases, the history is the only indicator of aspiration.

By reviewing of literature, Kim et al⁷ and Strom¹³ found a positive history of aspiration in 80% of their cases respectively. In contrary to this chatterji and Chatterji¹⁵ stated that if a history is forth coming it may be helpful but it is surprisingly often absent.

It's important for the first physician to suspect foreign body aspiration if there is history of sudden onset of respiratory symptoms.^{2-4,16-18} In our study the most of cases were diagnosed within hours. Two cases were delayed in the diagnosis. The factors that may cause delay in diagnosis and treatment were, parental negligence and mis diagnosis on the first examination either clinically or endoscopically,⁵ particularly after the initial acute phase of dyspnea where the foreign body is thought to be coughed out.

Kim et al,⁷ also found that in 17% of cases the diagnosis was not made for 30 days or more. Law and Kosloske¹² found that the interval between the time of aspiration and time of admission varied from 30 minutes to one year. Radiological examination is an essential part for investigation of foreign body inhalation. It should include in aspiratory and expiratory films and fluoroscopy.¹¹ A radio opaque foreign body as metallic objects or bones, is readily identified, but radiolucent one can be suspected only from the secondary effects it produces on the lungs e.g: lung atelectasis, obstructive emphysema or chest infection. In this presenting study, plain x-ray of neck and chest were taken in inspiration and expiration in most of the cases. However, in children and distressed patients was difficult to take a separate films. Our study showed that, in 6

cases (37.5%), the foreign bodies were radio opaque, 5 cases (31.25%) showed obstructive emphysema and one case (6.25%) had lung collapse. On the other hand in 2 cases (12.5%) there were no suggestive radiological findings indicating the foreign body inhalation. Our radiological findings were in contrary to findings of many other workers.^{7,9,11,13} Therefore, we stress that a negative radiological examination does not exclude a foreign body.

Narasimhan et al⁸ mentioned that, it is important to note the rarer radiological features like presence of mediastinal emphysema, and pnenmothorax as presenting feature of foreign body in the toronchus.

Such a findings were not present in our series, and in a review of 343 patients of foreign body bronchus not single patient with mediastinal or or subcutaneous emphysema was reported.¹⁶

It is unwise to delay bronchoscope in hope that foreign body will be coughed out. In our study, 87.5% of cases bronchoscopy was done with in 24 hours after admission.

This little delay produced no respiratory distress at all and we believe that bronchoscopy is more safe and effective in presence of efficient anaesthetist bronchoscopist, and equipments. Ballenger,¹⁹ was also agreement that most bronchial foreign bodies don't present a need for urgent intervention, and one may take time to prepare the patient optimally and to gather those items of equipment that might be particularly useful in the problem at hand. Similarly, Strome¹³ has reported that in most cases, 24 hours interval, a safety zone can be observed prior to endoscopy.

Only tracheal foreign body associated with intermittent dyspnoea and / or cyanotic episodes need urgent removal. Bronchoscopy must be done with a back up of intensive care facilities, as some children need postoperative ventilation. This may be because of the already induced chemical pneumonia due to fat in the vegetable and nuts foreign bodies.⁸ Patients with inhaled foreign body are often seriously ill and cooperation between the endoscopist and anaesthetist is mandatory.⁵

Holinger²⁰ stated that the impulse to seize the foreign body as soon as it's recognized must be strongly resisted. A careful study of foreign

body must be made before any attempt at extraction.

Morbidity and mortality of bronchoscopy varies with the kind of foreign body aspirated and clinical condition of the patient. The type of foreign bodies removed from tracheo-bronchial tree varies from one country to the other. In our series, the metallic objects were the most frequently encountered. This is in contrary to many other studies.^{5,6,9,12}

In our study, the most common site of foreign body impaction was the right main bronchus, followed by left main bronchus and trachea. This is in agreement with Birrell,²¹ and many other workers.^{5-7,13,14}

Bahgat,¹¹ stated that finding one foreign body does not exclude the presence of another, so after removal of foreign body, it's necessary to examine the whole tracheobronchial tree for the possibility of residual or other foreign body. Some times rebronchoscopy may be

required, in our series for two case, the rebronchoscopy was done. This is usually due to missing of left bronchus foreign bodies after remove of right bronchus one. This fact in the agreement with mesalaty⁵ who showed possibility of this missing due to multipisty of foreign bodies, or due to local chronic inflammatory changes which mask the foreign body. In our series, no tracheostomy was required during bronchoscopy. Although, Daniilidi et al,⁹ Carroed out bronchoscopy in 73 cases, and in four cases where tracheostomy was obligated to be done.

The factors that minimized the incidence of subglottic oedema in our study were, the extreme gentleness of manipulations during introducing of the brondoscope and removal of foreign body. Bronchial trauma, hypoxia, bleeding and deaths, have been reported by Johnson et al²² and rarely thoracotomy is needed to remove foreign bodies from bronchus.^{7,12}

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