Incidence & Outcome of inhaled foreign body in Thi - Qar

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ABSTRACT

Objective: To assess the incidence, different clinical pictures & treatment of a patient with inhaled foreign body and to compare our study made at Al – Hussein Teaching Hospital with those done in other centers and hospitals in Iraq.

Patients: This is a prospective study of 100 patients with history of foreign body inhalation who attended the casualty of Al-Hussein Teaching Hospital in Nassiriyah from the first of August 2014 to the first of April 2015. Most of them had been dealt with by rigid bronchoscopy.

Methods: The case sheets of relevant patients who had been admitted to Al – Hussein Teaching with history of inhaled foreign body were reviewed to collect information like sex, age, types of inhaled foreign bodies, clinical features of patients, operative notes, etc…..

Results: All patients were admitted into Al-Hussein Teaching Hospital and the procedure of rigid bronchoscopy was prepared for all of them regardless the age and sex. Fortunately, 3% of patients could be discharged before carrying out the rigid bronchoscopy due to spontaneous expectoration of foreign body during their admission while the rest had undergone the procedure without complications and unfortunately 2% of our patients needed thoracotomy. The procedure of rigid bronchoscopy of a significant percentage of patients had been postponed after admission into the hospital for several days because of severe chest infection (pneumonia) and the patient had been put on heavy injectable antibiotics & steroids until improvement of the clinical picture of the patient and resolving of the lung consolidation before carrying out the rigid bronchoscopy under general anesthesia. This is true for those with history of inhaled foreign body several days, weeks or months ago but not for those with recent history of inhaled foreign body. Patients presented with different clinical features. Various radiological findings had been noticed and many kinds of foreign bodies could be removed. No mortality was recorded.

Conclusions: Every effort should be made to remove the inhaled foreign body to relieve dyspnea, prevent complications and probably save life.

Introduction

Foreign body inhalation can be a life-threatening emergency. An inhaled solid or semisolid object may lodge in the larynx or trachea. If the object is large enough to cause nearly complete obstruction of the airway, asphyxia may rapidly cause death. Lesser degrees of obstruction or passage of the obstructive object beyond the carina can result in less severe signs and symptoms. Chronic debilitating symptoms with recurrent infections might occur with delayed extraction, or the patient may remain asymptomatic. The actual aspiration event can usually be identified, although it is often not immediately appreciated. The aspirated object might even escape detection. Most often, the aspirated object is food, but a broad spectrum of aspirated items has been documented over the years. Commonly retrieved objects include seeds, nuts, bone fragments, nails, small toys, coins, pins, medical instrument fragments, and dental appliances. [(1)] [(2)]Geographic differences in the spectrum of objects commonly found in a particular environment and variations in dietary and eating habits affect the relative frequency with which various objects are aspirated. [(3)]Near-total obstruction of the larynx or trachea can cause immediate asphyxia and death.Should the object pass beyond the carina, its location would depend on the patient's age and physical position at the time of the aspiration. Because the angles made by the mainstem bronchi with the trachea are identical until age 15 years, foreign bodies are found on either side with equal frequency in persons in this age group. With normal growth and development, the adult right and left mainstem bronchi diverge from the trachea with very different angles, with the right mainstem bronchus being more acute and therefore making a relatively straight path from larynx to bronchus. Objects that descend beyond the trachea are more often found in the right endobronchial tree than in the left.[(4)]Once aspirated, objects may subsequently change position or migrate distally, particularly after unsuccessful attempts to remove the object or if the object fragments. The object itself might cause obstruction. Vegetable material may swell over hours or days, worsening the obstruction. Cough, wheeze, stridor, dyspnea, cyanosis, and even asphyxia might ensue. Organic foreign bodies, such as oily nuts (commonly peanuts), induce inflammation and edema.Local inflammation, edema, cellular infiltration, ulceration, and granulation tissue formation may contribute to airway obstruction while making bronchoscopic identification and removal of the object more difficult. The airway becomes more likely to bleed with manipulation; the object is more likely to be obscured and becomes more difficult to dislodge. Mediastinitis or tracheoesophageal fistulas may result. Distal to the obstruction, air trapping may occur, leading to local emphysema, atelectasis, hypoxic vasoconstriction, post obstructive pneumonia, and the possibility of volume loss, necrotizing pneumonia or abscess, suppurative pneumonia, or bronchiectasis.[(5)]

History

A history of a choking episode is not always obtained or may have initially been ignored or misdiagnosed. Most patients or parents can identify a specific episode of choking; however, presentation is often delayed by more than a week. The latency period prior to the onset of symptoms may last months or years if the foreign body is inert bone or inorganic material. Patients may have been empirically treated for other conditions, even when a choking episode was witnessed. Patients with chronic symptoms may have been erroneously diagnosed as having asthma or chronic bronchitis. Young children and patients with neurologic or psychiatric disorders are at increased risk for aspiration but might not be able to describe symptoms or to report choking episodes. A large object lodges in the larynx or trachea, causing nearly complete airway obstruction. Respiratory distress, aphonia, cyanosis, loss of consciousness, and death occur in quick succession unless the object is dislodged. When the degree of obstruction is less severe or when the aspirated object descends beyond the carina, the presentation is less dramatic.[6]

Presenting symptoms

Patients may be asymptomatic or may be undergoing testing for other diagnoses

Cough

- Choking
- Excessive drooling
- Anxiousness
- Loss of voice
- Hoarse voice
- Difficulty breathing
- Fever
- Rapid breathing [7]

Aim of study

To present the incidence, different clinical pictures & treatment of a patient with inhaled foreign body and to compare our study made at Al – Hussein Teaching Hospital with those done in other centers and hospitals in Iraq.

Patients and Methods

This is a prospective study of 100 patients who attended the casualty of Al-Hussein Teaching Hospital in Nassiriyah. Most of them had been dealt with by rigid bronchoscopy from the first of August 2014 to the first of April 2015. On admission, a quick but informative history was taken from the parents or other close relatives of the patient including sex, age, type of inhaled foreign body, the main complaint of the patient, etc…..This was followed by physical examination of the patient by assessment of conscious level& respiratory system of patient. Agitation, cyanosis & stridor are bad signs and should be detected and treated early. Tachypnea and lesser degrees of dyspnea are seen more commonly and needed less

prompt intervention.A chest x-ray was done for all patients with suspected foreign body inhalation and first dose drugs like antibiotics and steroids may be given to the patient in the emergency department to treat infection and to decrease the oedema and inflammation of tracheo-bronchial tree and improve the clinical picture of the patient.All patients were admitted into Al-Hussein Teaching Hospital and the procedure of rigid bronchoscopy was prepared for all of them regardless the age and sex. Fortunately, some patients could be discharged before carrying out the rigid bronchoscopy due to spontaneous expectoration of foreign body during their admission while the rest had undergone the procedure without complications. A minority of patients needed a thoracotomy to extract the impacted foreign body which could not be removed by the ordinary ways. The procedure of rigid bronchoscopy of a significant percentage of patients had been postponed after admission into the hospital for several days because of severe chest infection (pneumonia) and the patient had been put on heavy injectable antibiotics & steroids until improvement of the clinical picture of the patient and resolving of the lung consolidation before carrying out the rigid bronchoscopy under general anesthesia. This is true for those with history of inhaled foreign body several days, weeks or months ago but not for those with history of very recent inhaled foreign body. Verbal consent was taken from the patient's familiy and official endorsement had been gained from the Thi – Qar health directorate.

Results

Table.1 (Age distribution) :The youngest patient in this study was(7 months) old and the oldest one was 28 years old. The highest incidence was among patients below 5 years &decreased after the age of 10 years and was uncommon over the age of 20 years.

Age of patients	No. of patients	Percentage
7 months – 5 Years	30	30%
(5 -10) years	25	25%
(10 –15) years	20	20%
(15 –20) years	20	20%
(20 –30) years	5	5%
Total	100	100%

Figure.1 (Sex of the patients):The incidence was slightly higher among males than females.

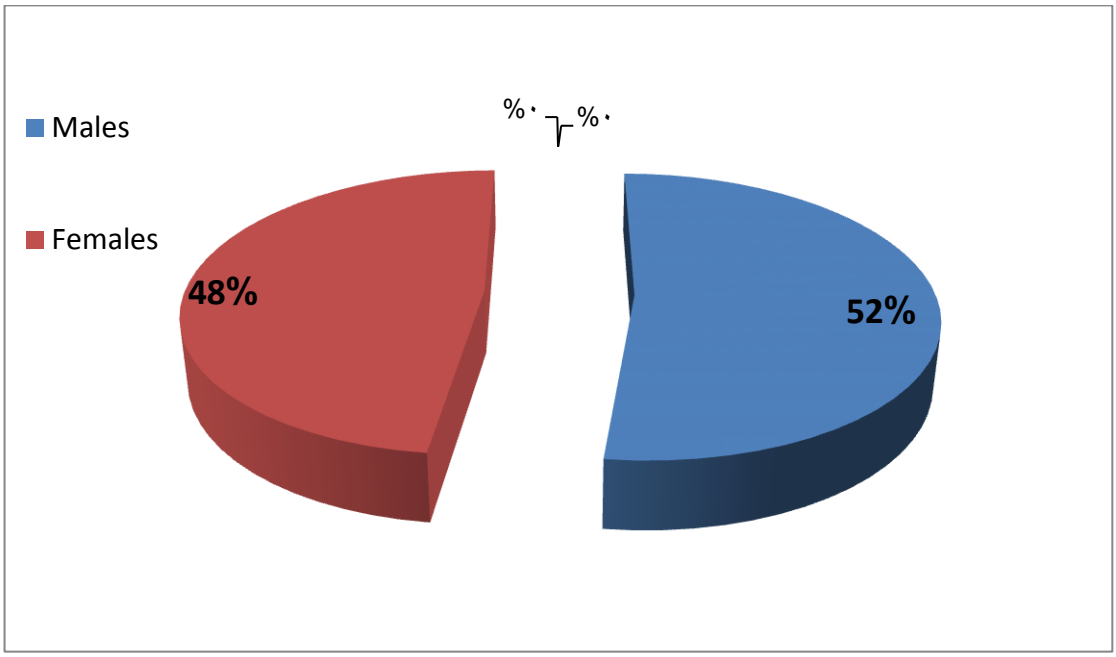

Table .2 (Types of inhaled foreign bodies) : The commonest inhaled foreign body was pin & sun flower seeds followed by nut. Other rare foreign bodies like ear ring could be recorded.

Types of foreign bodies	No. of the patients	percentage
Pin	25	40%
Nut	10	10%
Sun flower seeds	25	10%
Whistle	8	8%
Melon seeds	6	6%
Negative	6	6%
Regular round metalic piece (small metalic ball)	4	4%
Irregular Piece of plastic	3	3%
Mucous plug	3	3%
Screw	2	2%
Spring	2	2%
Cooked beans	2	2%
Piece of bones	2	2%
Ear rings	1	1%
Piece of bread	1	1%
Total	100	100%

Table.3 (Presentation of the patients) : The most common presentation was cough and dyspnea but rarely hemoptysis.

Presentation	No. of the patients	percentage
Cough	70	70%
Dyspnea	55	55%
Stridor	20	20%
Signs and symptoms of chest infection (delayed presentation)	15	15%
Hemoptysis	2	2%

Figure.2 (History of foreign body inhalation): Patients had usually a history of foreign body inhalation but a significant number (30%) of them came with no history of foreign body inhalation.

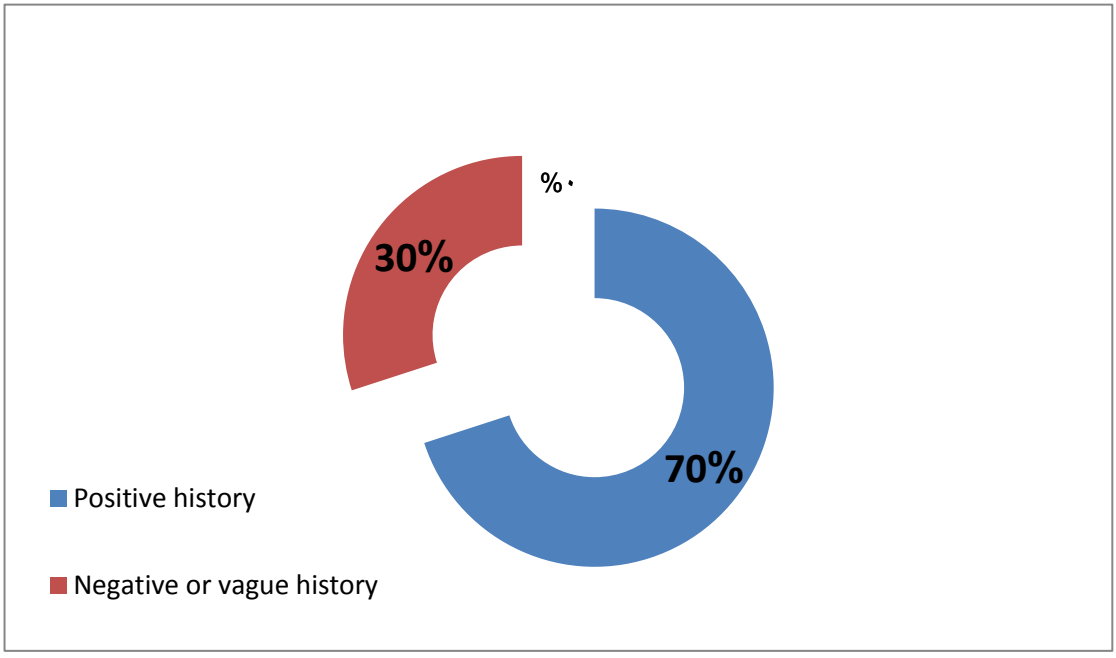

Table.4 (Radiological findings) : Metallic objects like pins could be seen obviously but organic & plastic objects could not be seen on x – ray. Complications of lodgement of foreign body inside the trachea – bronchial tree could be recognized on chest x – ray as lobar or lung collapse, lung or lobar over inflation & lung consolidation.

Radiological findings	No. of patients	Percentage
Identification of metallic or dense foreign body	35	50%
Whole Lung or lobar collapse	20	20%
Lung or lobar over inflation	20	20%
Lung consolidation	10	10%
Normal chest x-ray	40	40%

Table.5 (Distribution of foreign bodies according to site of impaction of foreign body): The most common site of impaction of foreign body among our patients was in the left bronchial tree followed by the right bronchial tree, the trachea and lastly the larynx.

Location of foreign body	No. of patients	Percentage
Larynx	5	5%
Trachea	25	25%
Left bronchial tree	40	40%
Right bronchial tree	30	30%
Total	100	100%

Table.6 (Investigations) : All patients with suspected foreign body inhalation had been exposed to chest x – ray and blood investigations could be carried out for a significant number of them before the procedure of rigid bronchoscopy.

Investigation	No. of patients	Percentage
Chest x-ray	100	100%
Blood investigations	30	30%
Chest CT- scan	2	2%

Figure.3 (Timing of rigid bronchoscopy) : All patients with suspected foreign body inhalation had been exposed to rigid bronchoscopy within 72 hours. 10% of the patients had been exposed to this procedure on emergency basis and 20% of cases had been dealt with on less urgent basis.

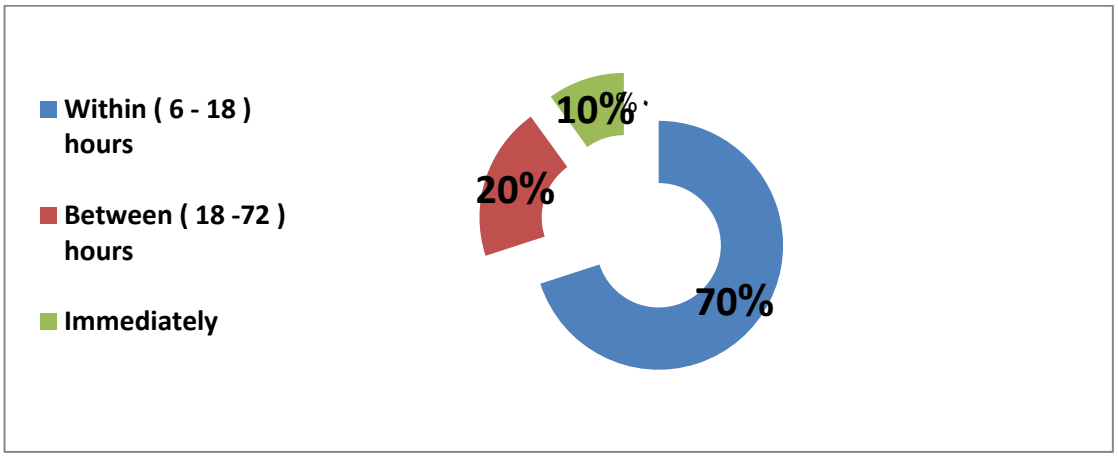

Table.7 (Treatment) : The inhaled foreign body could be removed by rigid bronchoscopy in most cases and only two of our patients (2 %) needed a thoracotomy.

Treatment	No. of the patients	Percentage
Rigid bronchoscopy	95	95%
Spontaneous Expectoration	3	3%
Thoracotomy	2	2%
Total	100	100%

Discussion

Foreign body inhalation is still common in our country and in southern regions;. In this study we compare our results with results obtained from study done in Al Basrah at (2007-2008)[8]. Diagnosis is usually based on history, clinical examination, and radiologic findings. The reasons for diagnostic delay include neglecting the importance of detailing historical facts, confusing the diagnosis with other common conditions, and relying on a normal roentgenographic appearance. It is necessary to question every person who has been in contact with the baby to elicit the history of choking or gagging and coughing that may have escaped notice or been overlooked by older persons. When these symptoms are elicited, the case should be regarded as one of foreign

body aspiration and bronchoscopic procedure is mandatory.

The most presenting signs and symptoms of children admitted to the casualties are cough and dyspnea due to irritation and obstruction of tracheo-bronchial trees.

Foreign bodies in the bronchial tree are often overlooked in the casualty department, especially in young children. The difficulty arises because children are poor witnesses and they present with a wide variety of complaints which include wheezing, coughing, shortness of breath, features of respiratory tract infection. Unless the inhalation is actually witnessed the younger child may not recall any untoward episode. In many cases, by the time the child is brought to hospital, coughing has subsided and mistakenly it might be assumed that a foreign body is not present. It must be emphasized that the absence of a cough does not exclude a foreign body inhalation.In our study, the incidence is slightly more common among males than females, which may be explained by the overactivity of the males in comparison with females. Results of our study are consistent and close to Basrah's study [8].The common affected age group was that below 5 years accounting for (30%) of the total number of patients.This is similar to Basrah study[8] in which the most common affected age group is that between (1-4) years and accounts for (59%).However the foreign body inhalation may occur at any age. This is due to the fact that children have the natural propensity of gaining knowledge by putting things into their mouth, their inability to masticate from a lack of posterior dentition, and inadequate control of deglutition and the habit of talking, crying, shouting, laughing or playing during meals and the tendency of parents to thump their children for acts of naughtiness at feeding time, all may predispose to foreign body inhalation accidents.

History is a major parameter for diagnosis of foreign body inhalation. Of the 100 patients in our study, 70 patients had a definite history of foreign body inhalation. This is consistent with the study done in Basrah by Dr. Munaf Mohammed[8].

The most common inhaled foreign body in our study was the pin &sun flower seeds which accounted for (25%) of the cases for each of them. This differs completely from Basrah study[8] in which the watermelon seed was the most common inhaled foreign body (49.8%). This may be due to the differences in dietary habits between governorates and because rigid bronchoscope was not available in Nassiriyah till the first of June 2014 and a lot of doctors in our city do not know that this device is present in our city and they refer patients with inhaled foreign bodies directly to other governorates and this gives a wrong impression about the types of inhaled foreign bodies in our study. In addition, the season during which the study was done plays a major role in determining the type of inhaled foreign body and this explains the high percentage ofwatermelon seed in the Basrah study [8] because eating watermelon is very common during summer in our country while it's less common durng winter due to the fact that watermelon is not available during winter season. Presentation of the patients with proved foreign bodies' inhalation depends on the

duration of the accident and site of the foreign body lodgment. The majority of the patients presented with history of choking and coughs (70%). In cases of tracheal foreign bodies choking was prolonged and accompanied by stridor.

Delayed intervention of patients with inhaled foreign body may lead to chest infection (pneumonia) and possibly irreversible lung changes. As a result, any suspicion of foreign body inhalation should be dealt with seriously and a negative rigid bronchoscopy is better than missing a foreign body.

An X-Ray film of the chest should be obtained before bronchoscopy. No matter how many X-Ray films have been performed, a final one must be performed to check the presence and position of the foreign body immediately before bronchoscopy. Radiopaque foreign bodies provide no problem in diagnosis, but radio lucent ones can be suspected only from the secondary effects on the lung. If a child is well and co-operative, a plain chest X-ray may show the characteristic changes of obstructive emphysema (air trapping beyond a partially obstructed bronchus). If the foreign body is left untreated, mediastinal shift, pneumothorax, pneumonia, or bronchiectasis may ensue. A significant percentage of inhaled foreign bodies in our study were fortunately radio-opaque accounting for about 35% and normal chest x-ray in about 40%. This is inconsistent with Dr. Munaf Mohammed's study [8]where the x-ray was normal in about 53.55% as most of the inhaled foreign bodies were radiolucent. Oblique view chest radiography can be used to demonstrate trachea, carina and the main bronchi above the cardiac silhouette, the presence of faintly opaque foreign body can be seen as an interruption of bronchial air column. The lateral decubitus chest film is helpful and convenient in detecting air trapped "obstructive emphysema" in infants and young children of whom satisfactory chest films are difficult to obtain. Chest CT - scan has been used to diagnose occult tracheobronchial foreign bodies and was done for 2 of our patients.

The most common site of lodgment of inhaled foreign body was left main bronchus accounting for 40% in our study. This does not agree with that of Basrah's study [8]where foreign body inhalation was mainly in the right main bronchus and this was true for (41%) of cases. This difference could be explained by the fact that the most common type of inhaled foreign body in our study was the pin which becomes lodged usually in the left main bronchus rather than the right main bronchus.Patients with foreign body inhalation are in a critical situation which needs observation before, during and after the bronchoscopy procedure. Adequate preparation of the patient and instruments in use are important so that the procedure will be safe and successful. The mere suspicion of a foreign body inhalation is a justification for rigid bronchoscopy and as early as possible to avoid the risk of asphyxia or any other serious complications. The procedure should be performed in a well-equipped room with preferably specialized anaesthesiologists and paediatric experience, in attendance. Most experienced anaesthesiologists prefer

inhalational rather than intravenous induction of anaesthesia and a ventilating bronchoscope rather than intubation. The most suitable sized bronchoscope is then selected together with the grasping forceps and proper sucker are prepared and checked. In the theatre, the patients should be properly monitored. Well trained nursing staff, proper instruments, a tracheostomy set, endotracheal tubes of different sizes, facilities for quick endotracheal intubation, a patent vein and suitable drugs for dealing with respiratory and cardiac emergencies should be available. In our study, 95% of the patients were exposed to rigid bronchoscopy 10% immediately,20% within (18-72) hours and 70% within (6-18) hours while of patients 3% did not need any intervention due to spontaneous expectoration and thoracotomy was rarely indicated (2%). This agrees with the study made by Dr. Munaf Mohammed[8] in which rigid bronchoscopy was done for about 98% of cases.

Conclusions

1. The mere suspicion of foreign body inhalation is a justification for bronchoscopy, negative bronchoscopy is far better than to leave an endotracheal foreign body with subsequent morbidity & possible mortality.

2. A foreign body could be found in even in patients with negative history of foreign body inhalation; so rigid bronchoscopy may be justified even in those with negative history of foreign body inhalation.

3. Chest x ray may be of value to detect the foreign body or it's complications on the lung.

4. Tracheo-bronchial foreign bodies may suddenly change their position causing total air way obstruction and death.

Recommendation

1-Small objects should be kept out of reach of kids who are too young to obey instructions.

2-Children too young to chew and swallow carefully should not be given small pieces of candy, nuts or similar food.

3-Good educational programs explaining the preventive measures and the risks of foreign body inhalation.

4-Clinicians should be aware about the pattern of presentation and the risk of foreign body inhalation .

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