



Bronchoscopy as a therapeutic and diagnostic tool- a 10 year retrospective study- Sur Hospital experience

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Abstract

A ten year retrospective study with the treatment of 48 patients (83 % children) who were admitted for suspected foreign body aspiration in the department of otorhinolaryngology and Head and Neck Surgery is reviewed. The object of this study was to show the clinical manifestations, the radiological findings, the nature and distribution in the tracheobronchial tree and complications due to long standing foreign bodies in the bronchial tree. Males (25) were more commonly involved as compared to females (23). Right main bronchus was involved in 7 patients (29%), left main bronchus in 8 patients (33%) and trachea in 9 patients (38%). The most common foreign bodies found were Sunflower seed (25%), watermelon seed (17%), and abhaya scarf pin (17%). The most frequent clinical manifestation was cough (46%) and most of the chest radiological finding did not detect any abnormality (52%). In conclusion, in spite of an obvious foreign body in the tracheobronchial tree many cases are not diagnosed because sudden choking at the time of aspiration in children may not be noticed.

Introduction

Foreign body aspiration poses a big diagnostic and therapeutic challenge to otorhinolaryngologists around the globe (1). The major issue involves the accurate diagnosis, speedy and safe retrieval of the foreign body. The accurate diagnosis may allude even the sophisticated physician because often the initial choking incidents are not witnessed and the delayed symptoms may mimic other common conditions, such as asthma, pneumonia, or upper respiratory tract infections (1, 2). The retrieval of foreign body has been facilitated by technical improvements with the rod lens telescope, video endoscopy, a broad range of a variety of sized forceps and safe anesthesia. In spite of these advances, more than 3000 documented deaths occur per year because of foreign bodies and an untold number of patients survive miraculously. Inhalation of foreign bodies is seen more commonly seen in paediatric age group and nearly 94% of them occur in infant and children (3, 4). The highest incidence occurs between the age of 1-3 years (1, 5) and it is rare in adults. Patients often present in the emergency with acute onset respiratory distress and occasionally in a cyanosed state. At the other end of the spectrum is the patient who walks in with nothing more than a history of aspiration and on investigation is found to have a foreign body in his bronchus (6). The symptoms and signs produced depend upon the nature, size, location and time since lodgment of the foreign body in the tracheobronchial tree. A large foreign body occluding the upper airway may lead to sudden death whereas a small foreign body lodged in the bronchial tree may present with less severe symptoms (6, 7). Early diagnosis and treatment are imperative to prevent mortality as well as

complications. Foreign body aspiration is associated with cough and sometimes this maybe the only symptom. To diagnose a foreign body, a high index of suspicion is very important and a diagnosis in time can save the patient from an unnecessary surgical procedure. Presently bronchoscopy is considered the gold standard in the diagnosis and treatment of foreign body aspiration. Any disorder which is associated with infiltration, inflammation, constriction, or compression of the airways can cause cough. Development of sudden cough with or without wheezing and decreased breath sounds should always suggest the possibility of a foreign body aspiration. Foreign body aspiration manifests with a wide range of clinical presentations and often these are not accompanied by any reliable witness to supply clinical history especially in children. Since imaging modalities are often not adequate in making a diagnosis, foreign body aspiration can go unrecognized for a long time, during which time these patients may have been given medications for other disorders. Unrecognized foreign body aspiration if present over a long period of time can lead to complications such as unresolving pneumonia, lung abscess, recurrent haemoptysis, and bronchiectasis (8). It can cause complete destruction of a distal lobe and even the lung, which may subsequently need surgical resection since, late removal of a foreign body does not improve structural damage. Chronic persistent cough in older people can also be due to aspirated foreign body. Therefore early diagnosis of foreign body aspiration is necessary to prevent these complications.

Material and methods

All patients of suspected foreign body aspiration admitted in the Department of Otorhinolaryngology and Head and Neck Surgery, Sur hospital between January 2001 and February 2011 were studied. In the radiographs taken before the removal of foreign body, the foreign body opacity and radiological lung volume (normal, hyperinflation, volume reduction, or total atelectasis) was analyzed. We also noted the procedure to remove the foreign body, the nature and site of the foreign body, as well as any complication. The removal of foreign body was performed under general anesthesia by rigid bronchoscope of proper size, which was determined by the following formula (in millimeters):-

Size of the bronchoscope (< 6 years of age) = Age in years + 3.5/ 3

Size of the bronchoscope (> 6 years of age) = Age in years +4.5/ 4

Appropriate airway control was maintained throughout the procedure. After establishing the diagnosis of a foreign body, it was removed by foreign body forceps. Some of the vegetable foreign bodies were removed as fragmented pieces, so the procedure was longer and more difficult. Following the removal of foreign body, secretions were suctioned, the bronchial tree examined carefully tracheobronchial toileting and lavage done if necessary and the bronchoscope removed. In all cases, steroids were used during or before removal of the bronchoscope.

Results

48 patients with foreign body in the tracheobronchial tree or radiological abnormalities were admitted in the Department of Otorhinolaryngology and Head & Neck Surgery, Sur Hospital from January 2001 to February 2011. Twenty five patients were males (52 %) and 23 patients females (48%). Age of the patients ranged from 8 months to 70 years (Table 1). The initial clinical symptoms included choking (27%), coughing (46%), dyspnoea (27%), fever (10%), wheezing (25%), cyanosis (6%), clear suspicion of foreign body aspiration (48%) and no symptoms in (20%) patients. The majority of foreign bodies were Sunflower seed 6 (25%), melon seed 4 (17%), and scarf pins 4 (17%) (Table 3). In 9 cases (19%) the foreign body were radiopaque and in 25 cases (52%) the radiograph appeared normal. Atelectasis was the most frequent finding in 10 (35%) patients (Table 2). The time over which the foreign body stayed in the tracheobronchial tree ranged from hours to few days and complications were relatively none (Table 4) although some cases had subglottic inflammation/ tracheobronchitis/ mild pneumonia. Out of 48 cases, 18 patients came directly to ENT department with clear history of foreign body aspiration and 23 patients were without a history of aspiration. Bronchoscopy was conducted in these because the patients were treated for consolidation, collapse, croup, wheezing, or persistent cough in the department of pediatrics who did not respond to conservative treatment and 7 patients were referred from general medicine with prolonged cough/ pneumonic consolidation and 2 cases from general surgery - one of whom was buried under sand debris with persistent wheeze and cough while under treatment as inpatient who accidentally aspirated canine tooth and another case of post RTA Head injury with persistent stridor. In 7 patients (29%) foreign body was found in the right bronchus, in 8 patients (33%) in the left bronchus and in 9 patients (38%) in the trachea. The bronchoscopy procedure lasted from 30 minutes to 50 minutes. Retained vegetable foreign bodies required more time for removal. There were no mortality and one child required tracheotomy as removal was attempted elsewhere and the child developed increasing stridor and respiratory distress and cyanosis.

Discussion

Foreign bodies lodged in the aerodigestive tract are a common surgical emergency presenting to the Accident & Emergency department in many centers and contribute significantly to high morbidity and occasionally mortality [1]. Children aged between 1 and 3 years are commonly affected [1, 5]. In the present study, the majority of patients were children aged two years and below which is in agreement with other studies [1, 5]. Several factors contribute to high incidence of tracheobronchial tract foreign bodies in this age group including social factors (e.g. carelessness of parents, children's habit of putting objects in their mouth, crying/playing during eating) and anatomical factors (e.g. absent of molar teeth, inadequate control of deglutition) have been mentioned [8, 9]. In our study, males were slightly more affected than females which is in agreement with other studies [10, 11]. The reasons for the male preponderance in our study may be attributed to the overactive nature of male babies as compared to the females. Among the 48 patients, 28 were between 0 and 5 years, 12 were between 6 and 12 years age and 8 were above 12 years. Foreign bodies were rarely observed in adults. We had 2 young adult patients with abhaya scarf pin aspiration and another patient-47 year elderly man who had history of cough with respiratory difficulty and a radiopaque shadow on chest X-ray, was treated for fracture ribs following smothering by heap of sand and mud while he was digging the earth but showed no improvement. Diagnostic rigid bronchoscopy was done where a teeth foreign body was removed from the right intermediate bronchus. Sunflower seed, melon seed, pista shell, scarf pin were the most commonly found foreign bodies (table 3) The high rate of normal radiograph findings (52%) and the low frequency of radiopaque foreign body (19%) are in agreement with previous reports . If a conventional radiograph appears normal, an attempt should be made to take it during expiration where a localized hyperinflation might be detected.

Table 1: Age distribution of patients.

Age in years	No. of patients
0-2	22
3-4	3
5-6	3
7-8	3
9-10	6
11-20	6
>20	5

Table 2: Radiographic findings

Findings	No. of patients
Consolidation	2
Radiopaque foreign bodies	9
Atelectasis	10
Normal appearing lungs	23
Hyperinflation	4

Table 3: Type of foreign body.

Foreign body types	Number
Sunflower seed	6
Melon seed	4
Abhaya scarf pin	4
Pista shell	2
Peanut, blue bead, black stone, chicken Bone, metallic nut, canine teeth, Pepsi can flap, plastic bead with hole	1 each

Table 4: Time of foreign body remained in tracheobronchial tree

Time	No. of patients
0-2 days	20
3-4 days	1
5-30 days	1

Table 5: Site of foreign bodies

Site	No. of patients
Right bronchus	7
Left bronchus	8
Subglottis & trachea	9

Table 6: Symptomatology

Symptoms	No. of patients
Choking	13
Cough	22
Respiratory distress	13
Aspiration	21
Stridor	9
Cyanosis	3

Conclusion

The incidence of foreign body aspiration is seen in a bimodal age group i.e. below 3 years of age but seen up to 4-5 years and then in the sixth or the seventh decade of life. Since the signs and symptoms of foreign body aspiration are very non specific it may lead to a delay in the diagnosis and treatment. This delay can lead to sequel like bronchiectasis, recurrent infections, recurrent haemoptysis, chronic lung disease etc. Therefore a high index of suspicion is important in the diagnosis of foreign body aspiration. Whenever there is sudden onset of symptoms like cough, wheezing, etc. in children and adults, foreign body aspiration should be ruled out as a diagnosis. Since aerodigestive tract foreign bodies are preventable surgical condition, preventive measures should be directed at the high risk group (children) whereby parents should be educated to keep a close eye on their children and keep objects which can be foreign bodies away from children's reach.

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