ORIGINAL ARTICLE

Case Series of Foreign Body Aspiration in Paediatric Institute, Hospital Kuala Lumpur

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SUMMARY

A retrospective case series was conducted to determine the clinical characteristics and bronchoscopy findings of children with foreign body aspiration in Paediatric Institute, Hospital Kuala Lumpur. Ten boys and two girls were included (range 2-177 months; median 26 months old). They commonly presented with cough (12 / 100%) and difficulty in breathing (9 / 75%). All patients had unilateral auscultatory findings and the commonest radiographic findings were unilateral hyperinflation (7 / 58.3%). The majority of foreign bodies removed was organic (8 / 66.6%) and more frequently found in the left bronchial tree (7 / 58.3%). Major complications were pneumonia (11 / 91.6%) and airway oedema (11 / 91.6%). Eight patients had delayed diagnosis due to parents unawareness (6 / 50%) and missed diagnosis (2 / 16.7%)

KEY WORDS:
Foreign body aspiration, Missed diagnosis, Bronchoscopy

INTRODUCTION

Foreign body aspiration is a worldwide challenging clinical problem that can result in life-threatening complications. It must be removed as soon as possible in all cases. In the United States, mechanical suffocation was responsible for 5% of accidental death in children under the age of four1. Mostly, foreign body aspiration is manifested by choking while eating, coughing, localised wheezing and unilateral or bilateral decreased breath sounds. In children, however, the symptoms could go unnoticed for months or years, leading to severe sequelae. Chest radiographs are normal in approximately one third of patients2. Abnormal radiographic findings that suggest the presence of pulmonary aspiration include mediastinal shift, obstructive emphysema, pneumomediastinum, atelectasis, consolidation and radio-opaque foreign body.

Rigid bronchoscopy is the procedure of choice for removal of aspirated foreign bodies. Flexible bronchoscopy may be used to localize the foreign body before removal by rigid bronchoscopy. These procedures must be accomplished by expert bronchoscopists and anaesthesiologists due to the risks like bronchospasm, pneumothorax and heart arrhythmias3. The aim of this case series is to determine the clinical characteristics and bronchoscopy findings in children with foreign body aspiration in Paediatric Institute, Hospital Kuala Lumpur.

MATERIALS AND METHODS

This is a retrospective study of foreign body aspiration in Paediatric Respiratory Unit, Paediatric Institute, Kuala Lumpur Hospital. We reviewed medical records of confirmed cases from January 2003 until April 2010. However, patients who were referred directly to Paediatric surgery and Otorhinolaryngology without paediatric respiratory involvement were excluded. Data extracted included age, gender, ethnic, family size, caregiver of the child, symptoms, signs, radiological findings, indications for referral, time interval between clinical presentation and diagnosis, types and locations of foreign body in the airway, complications of foreign body aspiration and complications arising from the bronchoscopy procedures.

RESULTS

Twelve children with confirmed foreign body aspiration were included. Majority were boys with peak incidence in the first 3 years of life. They ranged from two month to 177 month olds with median age of 26 months. Table I shows the characteristics of the twelve patients. All cases were either referred directly to paediatric respiratory unit or through other units like Otorhinolaryngology and Paediatric surgical unit. Ten (83.3%) cases were referred for suspicion of foreign body and the other two cases for unresolved pneumonia.

The common clinical presentations were cough (12 / 100%), difficulty in breathing (9 / 75%) and fever (8 / 66.6%). Less common symptoms were cyanosis, vomiting and noisy breathing (3 / 25% respectively). History of choking episodes was elicited in the initial of presentation in four cases (4 / 33.3%) and another four cases were explored retrospectively after the diagnosis was confirmed. The time interval between presentation and diagnosis ranged from 1-60 days. Interestingly, patient with history of choking and cyanosis tend to be diagnosed early (<7 days). Those with late presentation (>7days) were due to parents' unawareness (6 / 50%) and missed diagnosis by referring doctor (2 / 16.7%). The parent's unawareness was mainly due to their child were not taken care by themselves during daytime. The median for time interval between the presenting symptoms to the bronchoscopy was 20 days (ranged 1-60 days).

All patients had unilateral auscultatory findings of which 11 (91.7%) had unilateral reduced breath sounds, ten patients were tachypnoeic (83.3%), nine (75%) required supplemental oxygen, seven (58.3%) had unilateral crepitations, three

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Table I: Clinical Characteristics of the patients

Characteristics	Number of Patients (%)
Gender	
M/F	10/2 (83.3/16.7)
Age Distribution(months)	
1-36	8 (66.7)
37-60	2 (16.7)
>60	2 (16.7)
Ethnic	
Malay	9 (75.0)
Chinese	2 (16.7)
Indian	1 (8.3)
Family size-no of siblings	
≤ 2	7 (58.3)
3-4	3 (25.0)
≥5	2 (16.7)
Caregiver	
Mother	5 (41.7)
Father	1 (8.3)
Grandmother	3 (25)
Nursery	1 (8.3)
Baby sitter	2 (16.7)

Table II: Clinical Characteristics of the patients

Foreign body	Number of cases (%)
Peanut	9 (75)
Coconut flesh	2 (16.6)
Sunflower seed	1 (8.3)
Pencil cap	1 (8.3)
Metal toys part	1 (8.3)
Hair pin clip	1 (8.3)

Table III: Complications related to airway foreign body or extraction procedure

Complications	Number of cases (%)
Foreign body related	
a) Pneumonia	11 (91.7)
b) Airway Oedema	11 (91.7)
c) Respiratory distress	9 (75.0)
d) Bronchiectasis	4 (33.3)
e) Bronchitis	3 (25.0)
f) Granuloma formation	2 (16.7)
g) Tracheitis	1 (8.3)
h) Pneumothorax	1 (8.3)
Foreign body extraction-relatedz	
a) Repeat removal	3 (25.0)
b) Pneumonic infiltrates	1 (8.3)

(25%) had unilateral rhonchi and one (8.3%) patient presented with stridor. The radiographic findings were unilateral hyperinflation (7/58.3%), unilateral atelactasis (2/16.7%), consolidation (3/25%) and radio-opaque foreign body (2/16.7%).

In most cases, the foreign bodies were organic in nature (9/75%) as shown in Table II. Foreign bodies were found in the left bronchial tree (7/58.3%), four (33.3%) in the right bronchial tree and one (8.3%) in the pharynx. Complications noted in this study were either related to the foreign body itself or the removal procedures as shown in Table III.

DISCUSSION

This case series of foreign body aspiration confirms the finding of previous studies that the highest incidence of foreign body inhalation occurs amongst children under three year olds [3,4,5,6,7,8]. In this study, 66.7% of the patients were under three year olds. This peak incidence in early childhood is, of course related to the fact that children are in the habit of putting objects into their mouth, absence of molars to chew some types of food, crying or running with objects inside their mouth and lack of coordinating mechanism of swallowing [3,5]. Boys are usually more involved in foreign body aspiration which might be explained by their more adventurous personality and sharper curiosity compared to girls. The male-to-female ratio in this study (5:1) was higher compared to other case series [3,4,5,8]. This probably suggests that Malaysian girls' personalities are less adventurous compared to western girls. In this case series, history of choking episodes can be elicited from the beginning of presentation in one thirds of cases while the other one thirds was obtained retrospectively. This is lower compared with those reported in other studies which ranged between 75 to 85%. The delay in obtaining history of choking in this series was due to unawareness of the caregiver (6 cases) and missed diagnosis by referring doctor (2 cases). All patients with history of choking in this study were diagnosed earlier (< 7 days). Unilateral auscultatory finding is an outstanding physical finding in this case series which was less remarkable in previous studies [4,7,9,10]. The pick up rate of auscultatory finding in this study was higher, likely being influenced by the experience of paediatric respiratory team rather than surgeons in other case series. Concerning the radiological findings and type of foreign bodies, this case series did not differ from the literature [3,5,6,7], which showed air trapping, atelectasis and consolidation as the commonest findings and, less frequently, the perception of a radio-opaque object. The foreign bodies were mostly organic, which is in agreement with the majority of the published series [3,5,6,7,10]. In this study, the left main bronchus was the most frequent location of tracheobronchial foreign body. The classical literature shows that foreign body inhalation is more common in the right bronchial tree. However, few studies show the predominance of foreign body in the left main bronchus [3,11]. This is probably due to the fact that foreign body in the left bronchial tree is hardly expelled out spontaneously. There was a study found that most children's carina was positioned to the left of the mid trachea[12]. The variability in the position of the carina with respect to the mid trachea may explain why foreign body frequently found on the left bronchus among children. However, the position of carina to the mid trachea was not documented in the bronchoscopy finding in this study.

In this case series, we were successful in extracting all endoscopically visualised foreign bodies. Few studies consider that the delayed diagnosis has a remarkable effect on the frequency of complications, probably higher than any other factors[3,7]. The prolonged presence of foreign body in the airway leads to bronchial reaction and secondary infection. Most bronchoscopic extractions of foreign bodies, if performed appropriately, result in minimal complications

and negligible or no mortality related to the bronchoscopy itself [3,4,5,6,7]. Similarly, there were no significant complications and no deaths related to bronchoscopic extraction in our centre in this case series. All patients who required repeat removal was due to failure of foreign body removal from referring centre. Flexible bronchoscopy was used by pulmonologists in this case series in localizing the foreign body. Subsequently, rigid bronchoscopy was used by the surgeons to remove the foreign body. Generally, paediatric pulmonologists and paediatric surgeons or otolaryngologists work as a team in extracting foreign body aspiration in our centre. However, there were few emergency cases where not all member of the team can be gathered in this procedure.

CONCLUSION

Foreign body aspiration should be suspected in children, especially in young boys, with history of choking and unilateral physical and radiological findings. Two thirds of the cases in this study presented late (>7days) suggesting that improvement of awareness among parents and doctors is required. Organic materials are the commonest foreign body found in the airway. The old notion that foreign bodies are lodged preferentially in the right bronchial tree is not always true in children. With removal of foreign body, outcome was generally good despite majority being diagnosed late in this study.

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