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Foreign Body in Children's Airways: a Five -Year Study

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ABSTRACT

Background: *Foreign body aspiration continues to be a major problem and one of the most important reasons for mortality and morbidity particularly sudden death among children. Therefore, this study was conducted to evaluate the clinical and paraclinical features and also the treatment of children who admitted in this center as the result of foreign body aspiration and underwent bronchoscopy to remove aspirated material.*

Materials and Methods: *This was a cross sectional study conducted on children under the age of 15 who admitted and registered in NRITLD with the diagnosis of foreign body aspiration and underwent bronchoscopy. Children were analyzed based on their age, gender, primary diagnosis, characteristic of the foreign body, the interval between aspiration and starting treatment, radiological findings, and the severity of airway injuries.*

Results: *Forty-seven children under the age 15 were evaluated in this study in a five-year period between 1998 and 2004. Sixty-three percent of them were boy and 37% were girl. Thirty (63%) children were found to be younger than 3 years old. Moreover in 63% of the cases the primary diagnosis before referring to this center was not foreign body aspiration. Hence, as the result of misdiagnosis and delay, 50% of children had injuries in their airways. The most common aspirated foreign body was organic materials (82%) and the most common radiological finding was hyperinflation in the chest x-ray.*

Conclusion: *This study showed that early diagnosis and treatment of foreign body is a critical factor to prevent further airway complications in children. According to the results of this study ragid bronchoscopy is the most effective procedure for treatment of foreign body aspiration in children.* ***(Tanaffos 2005; 4(15): 49-52)***

Key words: *Aspiration, Foreign body, Airway, Children*

INTRODUCTION

Foreign body airway aspiration continues to be a major reason for children morbidity and mortality (1, 2, 3, 4).Socio-economical factors as well as cultural factors are involved in both features and number of aspirations. According to the "United States National Safety Council" report the foreign body aspiration was responsible for 5% of deaths in children less than four years old in the United States in 1995 (4,5). Clinical manifestations of the aspirated foreign body depend on the size and the site of involvement and it can be revealed in a wide range from an asymptomatic patient to one with severe respiratory failure (1, 2, 3, 4, 5). Several studies showed that 72-85% of children had a history of choking.

The most common way of diagnosis in these patients is chest radiography. In 80% of cases, it may demonstrate hyperinflation, atelectasis or secondary pneumonia (4 ,6,7, 8, 9, 10).

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In addition, several studies suggested that rigid bronchoscopy is the best way to treat these patients (1, 2, 3, 4, 11, 12).

The aim of this study was to evaluate the children referred to this center because of foreign body aspiration regarding their age, gender, primary diagnosis, characteristic of the foreign body, the interval between the aspiration and starting treatment, radiological findings, and the severity of airway injuries.

MATERIALS AND METHODS

This was a cross sectional study performed on children under the age of 15 who admitted and registered in NRITLD with the diagnosis of foreign body aspiration during a five year period between 1998 and 1994 and underwent rigid bronchoscopy. Children were analyzed based on their age, gender, primary diagnosis, characteristic of the foreign body, the interval between aspiration and treatment, radiological findings and the severity of airway injuries. All statistical analyses were performed using SPSS software (version 11.05).

RESULTS

Forty-seven children under the age of 15 were enrolled in this study in a five-year period. Sixty-three percent of them were boy and 37% were girl. Thirty (63%) children were found to be younger than 3 and 77% were younger than 5 years old. Sixty-three percent of the cases were evaluated by a physician before referring to this center and were misdiagnosed and mistreated with different drugs without any improvement. Hence, as the result of misdiagnosis and delay, 50% of children had injuries in their airways. The diseases misdiagnosed in our patients were pneumonia in 20 cases, asthma in 5, bronchectasis in 2, and bronchiolitis in 3 cases.

The most common aspirated foreign body was organic materials (82%). From those 58% (27 cases) were seeds and 22% (10 cases) were peanuts. Figure 1 shows different kinds of materials aspirated by children in this study.

The most common involved site of the lung was the main bronchus (63%) and in 34% of cases the defect was located in the right bronchus. Figure 2 shows the prevalence of different involved sites in our patients.

The study revealed that the most common radiological finding was hyperinflation (42%) in chest x-ray. In 12% of cases, the chest x-ray had normal pattern. Table 1 shows different patterns of chest x-ray among our cases.

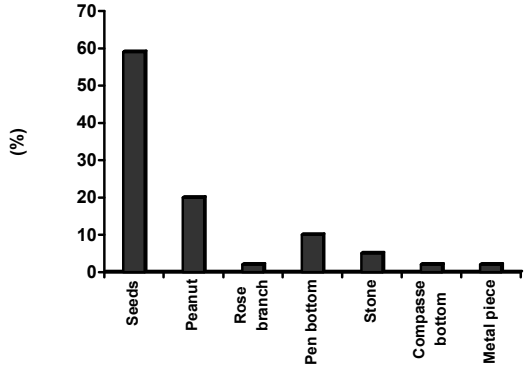

Figure 1. Aspirated materials in the patients

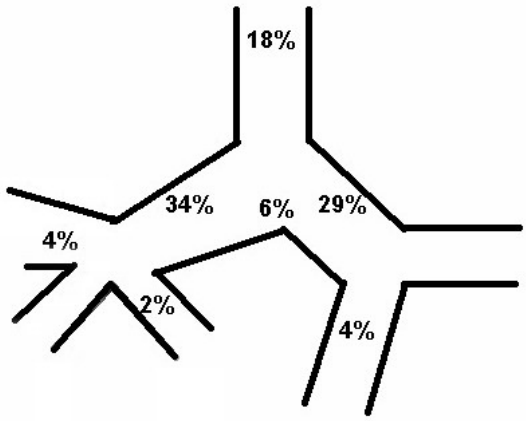

Figure 2. Trapped site by foreign body

Table 1. Chest x- ray pattern of patients

Radiological pattern	Number	Percentage
Hyperinflation	21	42
Atelectasis	13	27
Opacity	4	8
Infiltration	3	6
Normal	6	12

DISCUSSION

Children are in great risk of foreign body aspiration because of their curiosity to discover their surroundings and their habit to put materials in their mouth. Besides, they often run or cry while they are eating or putting a material in their mouth. In addition, their ingestion mechanism is not developed (1,4).

Rate of aspiration is higher in boys because they are more curious than girls. This ratio is approximately 2 to 1 in many studies (4, 9, 10, 11). Our study showed that 63% of our cases were boy and 27% were girl. Therefore, we had same ratio in our study as other similar studies, and the aspiration rate in boys was twice compared with girls (5, 6, 7, 8, 9, 11, 12).

Sixty-three percent of children were misdiagnosed and mistreated before referring to this center. A similar study was conducted in the United States showed that 59% of children were misdiagnosed and mistreated before the final diagnosis of foreign body aspiration. They were primarily treated with impression of asthma, pneumonia, laryngitis or bronchiolitis (1,13).

In this study, organic materials were the most common aspirated materials (82%).

Other studies in the United States and France demonstrated that the most common aspirated materials were organic such as peanuts and seeds (4, 5, 6).

Data analysis revealed that the time interval between aspiration and removing with bronchoscopy was longer in our cases than other studies. Only 5 chilren treated with broncoscope in the first 24 hour after aspiration, 13 children treated during the first week, 15 in the first month while others were treated by bronchoscope after one month. Interestingly, there was a 12-year-old boy who was diagnosed and treated in our center successfully after 6 years of aspiration. A study in the United States showed that 53% of the aspirated children were treated in the first 24 hours, 20% in the first week, 6% in the first month, and 22% after one month were treated using bronchoscopy (4). This gap can be explained by insufficient parents care.

The most common site of trapped aspirated materials was in the right bronchus (34%) and then in the left bronchus (29%). Other studies reported similar results (4, 5, 7, 12, 14, 15). In our study, atelectasis and hyperinflation were the most common radiological findings. These findings depend on the material and also to the severity of obstruction caused by aspiration (1,3). Other studies also reported a same radiological findings (1, 3, 4, 16).

All aspirated materials were successfully removed by rigid bronchoscopy and thoracotomy was not performed. All cases have been routinely followed up after performing bronchoscopy and are in good condition. In other studies, the rate of thoracotomy after aspiration was about 2-4% (4, 15, 16).

Delay in diagnosis can cause airway injuries and several complications in children. In our study, about 49% of cases had an airway injury such as granulation formation, hemorrhage and bronchial stenosis while other studies reported a 5-20% complication rate in their cases (4, 17).

CONCLUSION

Based on this study, the rate of foreign body aspiration is twice in boys. Organic materials are the most common aspirated materials. Furthermore, early diagnosis and treatment of foreign body aspiration are essential factors to prevent further complications. Additionally, bronchoscopy is the most effective procedure to remove the aspirated materials.

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