

FOREIGN BODIES ASPIRATION IN CHILDREN

A. Mahyar^{*1} and S. Tarlan²

1) Department of Pediatrics, Ghods Children Hospital, School of Medicine, Ghazvin University of Medical Sciences, Ghazvin, Iran

2) Department of Pediatrics Surgery, School of Medicine, Ghazvin University of Medical Sciences, Ghazvin, Iran

Abstract- Foreign body aspiration of airways is very dangerous and sometimes fatal. Early diagnosis and rapid management is vital. The goal of this study was to determine the clinical characteristics, radiologic findings and the results of bronchoscopic treatment of children due to foreign body aspiration of airways. Medical records of 101 bronchoscopic proven foreign body inhalators were reviewed in Ghods children hospital an affiliate to Ghazvin Medical University from 1995 to 2005. All of foreign bodies were removed with a rigid bronchoscope under general anesthesia. Patients were analyzed for age, sex, symptoms, clinical manifestation, radiologic findings and results of bronchoscopic removal. Data were analyzed with statistical methods. There were 66 (65.3%) boys and 35 (34.7%) girls. The male to female ratio was 1.8:1. Their ages ranged from 9 months to 12 years and the mean was 44.5 ± 37 months. 73 (72.3%) of children were less than 3 years old. A clinical history of foreign body inhalation was obtained in 58(57.4%). The most frequent symptoms and physical findings were cough 91(90%), wheezing 40(39.6%) and decreased of pulmonary sounds 37(36.6%). 24(23.8%) of children had abnormal chest radiography. 86(85.1%) of the foreign bodies were of vegetative origin. Roasted seeds, almond and walnut were the most common. In 51(50.4%) of the cases the foreign bodies were located in the right bronchial tree. The mortality was 1(0.9%). This study revealed that the most common signs and symptoms of foreign body aspiration are cough, wheezing and decreased breath sounds. For definitive diagnosis bronchoscopy is necessary.

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INTRODUCTION

Foreign body aspiration into airways is one of the common serious and life threatening problems in children. Despite the increase of parent's level of knowledge and preventive measures taken, it is considered as one of the important pathogenic factors and being still an important cause of childhood morbidity and mortality (1).

Normally and as a result of curiosity, children like to put objects in their mouth and this raises the chance of aspiration in young children (2). Although it seems that choking cases due to foreign body aspiration has been decreased, but statistically there has been no significant change in the rate of its prevalence. Different studies have revealed that the cause of 5% of mechanical choking in children under the age of 4 years is foreign body aspiration and the 84% of cases were under the age of 5 years and 73% under the 3 years (3-5). Aspirated materials are various. Some studies showed that the most common foreign bodies are herbal materials (4, 5). In respect to serious complication of foreign body aspiration the physician must start treatment after considering the history, clinical examination and taking chest

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*** Corresponding Author:**

Abolfazl Mahyar, Department of Pediatrics, Ghods Children Hospital, Valiasr Square, School of Medicine, Ghazvin University of Medical Sciences, Ghazvin, Iran
Tel: +98 281 3664934,
Fax: +98 21 281 3669944
E-mail: abolfazi473@yahoo.com

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radiography. The findings of foreign body aspiration are not always clear and this leads to complications and chronicity of the disease. For definitive diagnosis bronchoscopy is necessary (1). Considering the importance of early diagnosis and timely treatment of patients afflicted by foreign body aspiration, this study has been conducted in Ghods children hospital of Ghazvin.

MATERIALS AND METHODS

In this study medical records of 101 children afflicted with foreign body aspiration into the airways who were hospitalized in Ghods children hospital of Ghazvin an affiliate to Ghazvin Medical University between 1995-2005 (during 11 years), were evaluated. All of foreign bodies were removed by rigid bronchoscopy under general anesthesia. The information regarding age, sex, signs, clinical symptoms, history aspiration, radiographic findings and the results of bronchoscopy were extracted from medical documents. The results were analyzed using SPSS software and Chi Squared statistical test.

RESULTS

Of total 101 children afflicted with foreign body aspiration into the airway 66 (65.3%) were male and 35(34.7%) female. The ratio of male to female was 1.8/1. The most common age group was 1-2 years accounting for 41 (40.5%) cases (table1). The youngest infant was 9 months old while the oldest was 12 years. The age average was 44.5 ± 37 months. 73 (72.3%) of patients were under the age of 3 years. A definitely history of foreign body aspiration was available in 58 (57.3%) of children. The minimum and maximum interval between the starting of clinical manifestations and bronchoscopy was 1 day and 2 years with average 39 days, respectively. 20 patients (19.8%) underwent bronchoscopy 24 hours after aspiration. The most prevalent symptoms and clinical manifestations were cough in 91(90%) cases, wheezing in 40 (39.6%) cases and pulmonary sounds reduction in 37(36.6%) (Table 2). 24 (23.8%) of children had abnormal lung radiography. The most prevalent abnormal findings of lung radiography

were increased alveolar markings 12(50%) and pulmonary hyperinflation 10(41.6%) (figures 1, 2, 3, 4).The sites of lodgement of foreign bodies were in right bronchus 51 (50.4%), left bronchus 37 (36.6%), trachea 7(6.9%),carina 4(3.9%) and right and left main bronchus 2(1.9%) of cases. The most common foreign bodies were herbal in 86(85.1%) and non-herbal in (14.9%) of cases .The most common aspirated foreign body was roasted seed which was observed in 41(40.5%) of cases (table3). There was no any complication during bronchoscopy. The mortality rate following foreign aspiration was 1(0.9%) of cases.

Table 1. Frequency distribution of age in children with foreign body aspiration

Age (year)	Number	Percent
<1	10	9.1
1-2	42	40.5
2-3	21	20.7
3-4	6	5.9
4-5	2	1.9
5-6	2	1.9
6-7	4	3.9
7-8	2	1.9
8-9	4	3.9
9-10	2	1.9
10-11	2	1.9
11-12	4	3.9
Total	101	100

Table 2. Frequency distribution of signs and symptoms in children with foreign body aspiration

Signs and symptoms	Number	Percent
Cough	91	90
Wheezing	40	39.6
Decreased of breath sound	37	36.6
Dyspnea	32	31.6
Fever	31	30.6
Cyanosis	25	23.7
Respiratory distress	20	19.8
Stridor	7	6.9
Subcutaneous emphysema	1	0.9



Fig. 1. A 20 months old boy. Collapse of right lung following aspiration of bean into right bronchus.



Fig. 2. A 12 months old girl. Pneumonia of left lung following aspiration of roasted seed in left bronchus.



Fig. 3. A 14 months old boy. Hyperaeration of right lung following aspiration of almond into right bronchus.



Fig. 4. A 11 months old girl. Hyperaeration of left lung with mediastinal shift following aspiration of roasted seed into left bronchus.

Table 3. Type of foreign body in children with foreign body aspiration

Foreign body	Number	Percent
1 – vegetative	86	85.1
Roasted Seeds	41	40.5
Almond	21	11.8
Walnut	8	7.9
Apricot nucleus	5	4.9
Pistachio shell	5	4.9
Bean	4	3.9
Hazelnut	2	1.9
Almond shell	2	1.9
Lentil	2	1.9
Split peas	1	0.9
Orange nucleus	1	0.9
Wheat	1	0.9
Corn	1	0.9
Orange shell	1	0.9
2 – non-vegetative	15	14.9
Bottom of pen	5	4.9
Whistle	3	2.9
Rosary	3	2.9
Chicken bone	1	0.9
Screw	1	0.9
Cap of pencil	1	0.9
Glass	1	0.9
Total	101	100

DISCUSSION

This finding revealed that the most children afflicted with foreign body aspiration into airways had less than 3 years old and foreign body of herbal origin as roasted seed, almond and walnut were the most common aspirated objects. Foreign body aspiration is one of the most important cause of death in children so that 5% of mechanical choking in children under 4 years happen as a consequence of foreign body aspiration (1, 4). Our study revealed that the most common age group were 1-2 years old and 72.3% of children had less than 3 years old. Different studies in this regard have been done. Studies conducted in Brazil (4) and India (6) revealed that 66% and 60% of afflicted children were less than 3 years old respectively. Another studies showed that 85% of children had less than 3 years old (7, 8) and 78.1% less than 5 years old (9). There are different

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factors that influence on high prevalence of aspiration in young children. These factors are attempt of children to recognize their environment through putting objects in their mouth, the incompleteness of posterior teeth and the immaturity of neural muscular mechanism of swallowing (1, 2, 9). In our study aspiration was more common in boys than girls. This finding has been approved in other studies (6, 7, 9). This difference may be due that boys are more curious than girls about their environment. In our study, all of the patients had not a history of foreign body aspiration and this finding has been showed in other's studies (7, 8). Studies conducted by Kamaljit (6) and Shimpel (8) revealed that history of aspiration were in 76% and 18% of children respectively. Lack of aspiration history can not rule out the diagnosis of foreign body aspiration into airways since children move from one place to another and aspiration may occurs in a place where parents do not attend (6). Therefore in questionable cases bronchoscopy has indicated. In our study the most common signs and symptoms were coughing, wheezing and decreased of pulmonary sound. These findings are also reported in the studies of Kamaljit (6), Midula (7) and Hashemi (9). The occurrence of these symptoms specially in times where the patient has no history of aspiration sometimes results in misdiagnosis as bronchitis, asthma and pneumonia and the patients undergo treatment with antibiotics, bronchodilators, and corticosteroids which itself results in the changing of clinical manifestations and chronicity of the disease. In our study, the radiography of lung was abnormal in 23.8% of children while in other's studies abnormal radiography was in 62% (6) and 38% (9) of cases. Although radiography of lung is so helpful in diagnosis of the foreign body aspiration but unfortunately all of the foreign bodies are not opaque and small foreign body may not lead to the changing of radiographic results (6). Radiography is better to be carried out in the expiration phase (6). In our study, most foreign bodies were located in the right bronchus. The same finding has been attained in different studies (4, 6, 9). The reason of this is related to its special anatomical status. Most of foreign bodies in our study were herbal origins and the most common types were roast seed, almond and walnut. Studies in other countries revealed that 65% (4), 86%

(6) and 60% (7) of foreign bodies were herbal origins. Cassol (4) and Shimpel (8) showed that the most common foreign bodies were groundnut and roast seed. Mortality in our study occurred in an 11 month old infant following roast seed aspiration. The mortality rate in other studies are reported to be 2% (6) and 0.9% (10). The comparison of the finding of our study with others reveal that the findings are approximately similar and diagnosis of foreign bodies aspiration in children is still difficult. For example the clinical history and radiography of lung is not always helpful and for final diagnosis bronchoscopy is indicated. In conclusion, the diagnostic triad of foreign body aspiration are cough, wheezing and decreased breath sounds. The lack of clinical, radiological findings and history of aspiration do not exclude the diagnosis of foreign body aspiration. For definitive diagnosis the bronchoscopy is necessary.

Conflict of interests

We have no competing interests.

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