

THE CLINICAL CHARACTERISTICS AND RADIOGRAPHIC FINDINGS IN PATIENTS WITH FOREIGN BODY ASPIRATION

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Summary

Introduction. Foreign body (FB) aspiration can lead to acute, life-threatening airway obstruction. Positive history of FB aspiration, clinical signs and symptoms with radiographic findings in a patient with suspected FB aspiration can help us to form diagnosis.

Material and methods. The retrospective analysis of clinical data of 67 patients, suspected of FB aspiration, that were hospitalized in the Department of Pediatric Otolaryngology of Medical University of Warsaw from January 2008 to January 2012, was performed. We analyzed demographic and clinical characteristics, type of X-ray, radiographic findings, type and location of FB in airways.

Conclusions. The positive history of FB aspiration is an indication to perform bronchoscopy. In every case when FB aspiration is suspected, bronchoscopy should be performed. Anteroposterior or lateral decubitus chest X-ray findings can be helpful in the early stage of forming diagnosis. However, the negative chest X-ray does not exclude FB in respiratory tract. Anteroposterior chest X-ray has low sensitivity in patients with radiolucent airway FB.

Key words: foreign body, aspiration, X-ray, bronchoscopy

INTRODUCTION

Foreign body (FB) aspiration can be a life-threatening situation or can lead to chronic, non-specific symptoms (4). Foreign body inhalation is a potentially life-threatening emergency and is the commonest cause of accidental death in children under one year old (15).

MATERIAL AND METHODS

We analyzed clinical data of 67 patients, suspected of FB aspiration, that were hospitalized in the Department of Pediatric Otolaryngology of Medical University of Warsaw from January 2008 to January 2012. Demographic and clinical characteristics, type of X-ray, radiographic findings, type and location of FB in airways were taken into account.

RESULTS

In our study there was male predominance (boys $n = 45$, girls $n = 22$). The median age was 2 years (the average age was 3,24 years, the age ranged from 10 months to 16 years).

History of FB aspiration was present in 89% of patients ($n = 60$). In all patients ($n = 67$) with suspected FB aspiration bronchoscopy was performed. Positive bronchoscopic findings were present in 84% of cases ($n = 56$).

The most common clinical symptoms were cough ($n = 26$, dyspnea ($n = 18$), wheezing ($n = 12$), and fever ($n = 80$). The findings on chest auscultation stated by

pediatrician were in most commonly asymmetric breath sounds ($n = 25$), wheezes ($n = 23$), ronchi ($n = 13$).

Posteroanterior chest X-ray was done in 80.6% of patients, whereas lateral decubitus chest X-ray in 30.1% of cases. Among patients that underwent lateral decubitus chest X-ray, most of them (85%) had previously PA chest X-ray. The most common radiological findings were emphysema (35%), mediastinal shift (14%), atelectasis (12%) and alveolar consolidations (10.5%). The normal chest X-ray was reported in 18% of patients. The sensitivity of PA chest X-ray was 67%, whereas the specificity was 46%. The sensitivity and specificity of lateral decubitus chest X-ray was subsequently 75% and 100%.

Right bronchus (50.8%, $n = 29$) was the most frequent location of extracted FB. Other locations were left bronchus (30%, $n = 17$), right and left bronchus ($n = 3$), lobar bronchi ($n = 3$), right/left bronchus and trachea ($n = 2$), trachea ($n = 1$).

Almost all of FBs were radiolucent in nature ($n = 56$). There was one radio-opaque FB which was a pin. The most common extracted FB was peanut ($n = 43$). Among other FBs were a piece of apple ($n = 4$), a piece of plastic ($n = 2$), and a toy block, rubber, pin, whistle, pumpkin seed, a piece of bark, bead ($n = 1$).

DISCUSSION

The diagnosis of a bronchial FB can be accurately made in 83.5% of the cases in the presence of a positive

history of possible aspiration, significant physical findings and supportive roentgenographic evidence (8). However, tracheobronchial foreign bodies should be strongly suspected in pediatric patients who present with suggestive history of aspiration, even when physical and radiographic evidence is absent (1, 3).

In our study there was male predominance (boys $n = 45$, girls $n = 22$), which correlates with literature data (3, 12).

The highest incidence of FB in respiratory tract occurs between 1 and 3 years, the peak incidence of FB aspiration in children is between the ages of 1 and 2 years. It is the result of their increasing activity and curiosity, lessening of close parental supervision and in that period of life children have tendency to put objects in their mouths (3, 4, 6, 10-12, 14, 15). The median age in our group of patients was 2 years.

The most commonly aspirated foreign bodies are organic ones (83.8%-87.1%) (2, 3), such as mostly peanuts, seeds, beans and hard candies (2, 3), while latex balloons and other toys (12) or magnets (14) are the most frequent non-organic objects. In our research the majority of FBs were organic, among which the most common FBs were peanuts (77%).

Some authors suggest that history of FB aspiration is positive in 80% of cases (15), whereas others report that a positive history suggestive of FB aspiration cannot be obtained in 15% of such cases and in nearly one-third of children aspirating FBs, the actual event is not witnessed (6). In our analysis, the event of aspiration was reported in almost 90% of patients.

The common clinical manifestations in patient with suspected FB aspiration are cough, wheezing, dyspnea, respiratory distress and fever (6, 11, 13, 14). Partial laryngeal obstruction by a FB may cause variable symptoms, such as hoarseness, aphonia, stridor, wheezing, dyspnea, cyanosis, and hemoptysis (4, 5). On the other hand, FBs situated more distally in the tracheobronchial tree commonly present with symptoms such as unilateral wheeze and/or decreased breath sounds (5).

In our study the most frequent FB location was the right bronchus (50.8%). The prevalent location of FB in the right bronchus is confirmed in literature (2-4, 12).

Radiological evaluation has widely been used in the diagnosis of FB aspiration. Posteroanterior (PA) and lateral chest radiographs are the most efficacious study in a child with airway FB. Alternatively, PA radiographs of the chest in inspiration and expiration are the most useful radiographs for demonstrating unilateral air trapping (12, 13). However, it is important to underline that normal chest roentgenograms can have 24% to 34% of patients with FB aspiration (7, 13). Some authors refer even to the half or two thirds of patients with inhaled foreign bodies that have normal chest radiograph (14, 15). In our study 18% of children had normal chest X-ray. Chest radiographs may confirm a radio-opaque foreign body, though most objects inhaled by children are radiolucent (11, 12).

Radiological findings suggestive of airway FB can be related to hyperinflation, mediastinal shift, atelectasis and pneumonia (11, 13, 15).

The most common are obstructive emphysema, atelectasis or pneumonia seen in a chest X-ray (6, 12), which is in accordance with our study.

Plastic foreign bodies are difficult to visualize on radiographic images (4, 5). Digital subtraction fluoroscopy can be helpful in diagnosis of radiolucent aspirated FBs in children (9).

Asymptomatic and long standing FBs may lead to complications such as recurrent pneumonia, bronchiectasis, atelectasis and even death (6, 14).

A history compatible with FB aspiration dictates diagnostic bronchoscopy, even if there is no radiologic confirmation (12, 13). The gold standard for diagnosis and management of aspirated FB is rigid bronchoscopy under general anesthesia (3, 14). Removal of one foreign body does not exclude the existence of another (3).

CONCLUSIONS

The positive history of FB aspiration is an indication to perform bronchoscopy. Rigid bronchoscopy is the procedure of choice for removal of aspirated foreign bodies. Bronchoscopy is indicated in every case when there is a suggestive history of FA aspiration even if the symptoms are minimal and imaging studies are negative. Anteroposterior or lateral decubitus chest X-ray findings can be helpful in the early stage of forming diagnosis. However, a normal chest X-ray does not exclude the presence of an airway foreign body. Anteroposterior chest X-ray has low sensitivity (67%) in patients with radiolucent airway FB, whereas lateral decubitus chest X-ray has a higher sensitivity (75%) and its specificity is 100%. □

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