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CASE REPORT

Foreign body aspiration: always an element in the differential diagnosis of infants

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Abstract

Objective: To describe the atypical development of a severe case of foreign body aspiration involving a pediatric patient.

Introduction: Foreign body aspiration is an important cause of morbidity and mortality in the pediatric age group. Cases range from asymptomatic to patients developing acute respiratory failure. Although difficult to identify, cases suspected with foreign body aspiration must be investigated thoroughly. **Case report:** A one-year-old male infant was brought to our service after presenting with dyspnea for 48 hours and unmeasured fever. During the interview, the possibility of foreign body aspiration was considered. A chest X-ray was performed, with no findings. The patient was sent to a referral hospital for further investigation. During transport, the patient developed respiratory failure. Upon arrival, initial stabilization measures were taken, and the patient underwent a second chest X-ray, which showed opacification of the left hemithorax with mediastinal deviation, along with atelectasis of the left lung and hyperinflation of the right lung. The patient was intubated and emergency bronchoscopy was performed, which revealed a foreign body (corn) in the left bronchus. After removal, a new radiograph was taken and the condition resolved completely. The patient remained hospitalized for treatment of pneumonia caused by complications from the presence of the foreign body.

Conclusion: This report aims to emphasize the possible complications ensuing from foreign body aspiration and the need to consider it even when radiological findings are not compatible, as was initially the case. Moreover, as a public health measure, we seek to reinforce prevention measures in order to decrease the number of cases such as the one described in this report.

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INTRODUCTION

Accidents involving children represent a serious problem for healthcare systems all over the world. Data from the World Health Organization show that they account for approximately 830,000 deaths per year. In Brazil, foreign body aspiration (FBA) ranks among the accidents involving children with the highest morbidity rates. Thus, FBA requires immediate recognition as well as early treatment^{1,2}.

Offering certain foods to young children such as peanuts, beans, popcorn, and corn, increases the risk of aspiration, since they often swallow these foods without chewing them. Aspiration often occurs when children laugh, play, or are scared by events occurring around them^{3,4}.

Most foreign bodies are organic in nature, with corn, beans, and peanuts appearing as the most commonly aspirated grains in pediatric patients. It is important to remember, however, that any material may become a foreign body (FB) in the respiratory system^{3,4}.

FBA occurs predominantly in males between the ages of one and three years, with more than 50% of aspirations occurring in children younger than four years¹⁻⁵. Until three years of age, children cannot control the mastication and swallowing of food, since they do not have molar teeth yet, an important element in the processing of solid food. Other mechanisms increase the risk of FBA, such as failure in the laryngeal closure reflex and the preference of individuals of this age for carrying objects in their mouths^{1,4,6,7}.

FBA is known for its broad spectrum of manifestations, which means diagnosis may be challenging, especially in young children and in the absence of witnesses. Many patients are treated for weeks and months due to recurrent respiratory illnesses before FBA is suspected^{2,5,6}.

CASE REPORT

Y.O.P, a male one-year-old from Caucaia - CE, was brought to our service by his mother, who reported he ate raw popcorn on February 6, 2019, and has since presented recurrent episodes of dyspnea. Two days later, the patient developed an unmeasured fever and persistent dyspnea. She sought medical attention in her home town. A chest X-ray was performed, but no alterations were noted. Given the mother's account, the hypothesis of foreign body aspiration was considered and the patient was transferred to a referral hospital to undergo a bronchoscopy on February 8, 2020. On admission, the patient worsened suddenly with a drop in oxygen saturation to 70%. He was moaning and presented with nasal flaring. The patient was started on bronchodilators, intravenous steroid therapy, antibiotic therapy with clindamycin, and oxygen therapy. He did not improve significantly. A new chest X-ray showed opacification of the left hemithorax with mediastinal deviation, indicative of atelectasis in the left lung, and a hyperinflated right lung. The patient's symptoms and radiological images confirmed the suspicions of FBA. Due to the severity of the

condition, the patient was transferred to the Intensive Care Unit (ICU) on February 8, 2019.

In the ICU, the patient was intubated and underwent an emergency bronchoscopy in which a foreign body was seen in the left bronchus. The foreign body was successfully removed and identified as a grain of corn. The patient improved after the procedure. Radiographs taken after the removal of the FB showed good chest expansibility and resolution of atelectasis. The patient was extubated on the following day.

The infant remained hospitalized awaiting the end of antibiotic therapy, which consisted of seven days on clindamycin and four days on cephalothin. He was discharged without respiratory distress and in a stable clinical condition on February 15, 2019.

DISCUSSION

Classically, FBA progresses in three stages. The first is impaction of the foreign body, resulting in acute cough, asphyxia, stridor, respiratory distress, and potentially cyanosis. Our patient presented first with dyspnea, as also described in other reports. In the second stage, patients usually have no symptoms right after the implantation of the FB at a stationary site in the tracheobronchial tree, and experience a decrease in respiratory tract reflexes over time. The third stage involves complications from the chronic presence of a foreign body, which may include recurrent pneumonia, chronic cough, unilateral wheezing, or symptoms mimicking asthma⁷⁻⁹. Our patient developed symptoms from the outset and did not have an asymptomatic stage. He developed clinical complications, probably including aspiration pneumonia. An element that caught our attention in this case was the rapid progression to respiratory failure and the prompt referral of the patient to a tertiary service with bronchoscopy, which allowed for better treatment. Further delays in diagnosis may result in bronchiectasis and permanent damage to lung tissue¹⁰.

Physical examination includes an examination of the ear, mouth, and lungs. The most common clinical findings include cough and unilateral chest findings such as wheezing, reduced breath sounds, and prolonged expiration. Altered vital signs are rare, but tachypnea and hypoxemia may be present⁵. The patient's symptoms corroborated the lung examination findings, which consisted of an important decrease in left lung sounds and, albeit uncommon, hypoxemia and signs of significant respiratory distress due to FBA. A normal physical examination and a convincing clinical history should not delay referral to a tertiary care center for specialized evaluation, since FBA patients often present with unremarkable findings in physical examination^{5,6}.

In spite of presenting relatively low positivity rates, imaging scans must be ordered to elucidate cases of FBA. Several studies have shown that up to 25% of children with foreign bodies confirmed by bronchoscopy may present normal chest X-ray images. However, imaging can be useful in the diagnosis of FBA and subsequent complications. Unilateral hyperinflation,

air trapping, atelectasis, or infiltration are classically associated with FBA^{1,7,11}. Initially, our patient had no radiographic alterations, but due to strong clinical suspicion, he was referred to a tertiary hospital. There, within less than 12 hours he developed important alterations in X-ray scans, showing the significance of early diagnosis and rapid progression in some cases.

Finding the point of obstruction is important in defining therapeutic approach and possible complications. The larynx and trachea have the lowest prevalence, except in children ages less than one year. Younger children present with the most dangerous outcomes, namely complete obstruction and rupture. The bronchi appear as the most common site of implantation, in 80-90% of FBA cases. In this age group, the right main bronchus is more vertical and has a larger diameter, which favors the implantation of a foreign body on its topography^{4,5,6,9}. Despite anatomical preferences, the foreign body seen in our patient was implanted in the left bronchus.

The diagnosis of this condition presents some difficulties, since each cough and/or breath pushes the foreign body into the periphery of the lungs. As it moves deeper inside, initial symptoms disappear, and chest X-ray and bronchoscopy scans may show negative results. A few days later, however, aspiration pneumonia, bronchocutaneous fistula, bronchiectasis, or other severe and potentially fatal complications may appear^{5,11}.

In 2001, the Ministry of Health implemented the National Policy for the Reduction of Accidents and Violence, a suite of actions devised to decrease morbidity and mortality stemmed from events in these categories².

Prevention is a key element to decrease morbidity and mortality associated with FBA. More efforts must be made to ensure adequate prevention on the part of caregivers, which requires educational programs directed at parents, both in the prevention of habits that predispose to accidents in this age group, and in teaching basic techniques for upper airway clearance^{1,2,4,12}.

The Brazilian Society of Pediatrics published a booklet in 2014 containing advice to parents and family members about how to prevent their children from choking and aspirating foreign bodies. Tips about food and eating include not leaving pieces of food on the plate; being mindful of high-risk foods; ensuring that children eat at the table in a seated position; not feeding them while they are running, walking, playing, or laughing; and not letting them lie down with food in their mouths. Tips about the environment around them include keeping some items (balloons, coins, marbles, toys with small parts, buttons, small round batteries from electronic devices, pens with removable lids) out of the reach of children under four years of age; not buying toys with small parts; and keeping small objects out of their reach.

CONCLUSION

This report intended to emphasize the importance of recording the patient's clinical history, which is one of the main elements for identifying FBA. As seen in the literature, symptoms may vary and cases of FBA with severe complications have been reported. However, early identification and rapid introduction of treatment yielded good clinical outcomes.

Prevention is required in order to reduce the incidence of choking and foreign body aspiration, both still prevalent in pediatric age groups.

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