CASE REPORTS

COMPLICATIONS OF TRACHEOBRONCHIAL FOREIGN BODY ASPIRATION IN CHILDREN: REPORT OF 5 CASES AND REVIEW OF THE LITERATURE

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Foreign body aspiration (FBA) is one of leading causes of death in children, especially among those younger than 3 years of age. The inhalation of a foreign body may cause a wide variety of symptoms, and early diagnosis is highly associated with the successful removal of the inhaled foreign material. Despite the great advances in endoscopic procedures and anesthesia, a large number of difficulties and complications still result from foreign body aspiration. We describe 5 cases of serious acute complications following aspiration of foreign bodies that became lodged in the tracheobronchial tree, including pneumomediastinum, pneumothorax, total atelectasis, foreign body dislodgment, and need for thoracotomy in children admitted into our intensive care unit in 1999 and 2000; these were all situations that could have been prevented with early recognition and prompt therapeutic intervention.


Foreign body aspiration (FBA) is a very common occurrence in children, especially among those younger than 3 years of age (79%), with a higher incidence in boys (63%). Sometimes, FBA can be life threatening, acting as a significant cause of fatal home accidents in children younger than 6 years and causing more than 300 deaths per year in the United States. This higher occurrence in children has also been confirmed in a retrospective Brazilian study.

Usually, there is a suggestive history of choking, although the classic clinical presentation, with coughing, wheezing, and diminished air inflow, is seen in less than 40% of the patients; other symptoms include cyanoses, fever, and stridor. Sometimes, FBA can be completely asymptomatic. The evolution of FBA can lead to variable degrees of respiratory distress, atelectasis, chronic coughing, recurrent pneumonia, and even death.

Most frequently, aspirated objects are food, which is involved in 75% of the cases; other organic materials, such as bones, teeth, and plants, 7%; nonorganic materials, such as metals and plastics, 13%; rocks, 1%; and toys or parts of toys, 1%. Aspiration of foreign bodies that become lodged in the tracheobronchial tree comprise a small subset of FBA cases. The location of lodging of the foreign bodies has been shown to be 48% to 49% in the right lung; 39% to 44%, in the left lung; and only 4% to 13% between the larynx and trachea. In isolated cases, foreign bodies have been shown to migrate and change location.

Diagnosis of FBA begins with patient history, and clinical exploration and can be strengthened by radiographic findings. The most common indicators are air trapping, signs of infection, atelectasis, or radiopaque foreign bodies. However, these findings can also occur in a patient without FBA. In addition, 24% of the patients with an endoscopically confirmed foreign body do not present with any abnormality at radiography. Thus, although it may help, thorax radiography is not sufficiently sensitive or specific for the diagnosis of FBA. Hence, its important to note that children with these characteristic symptoms should undergo prompt bronchoscopy, regard-
of radiographic findings\textsuperscript{1,10}.

Nowadays, bronchoscopy is essential if FBA is suspected, first to confirm the diagnosis and also because it can be used for therapeutic treatment in the same stage. Before the advent of bronchoscopic techniques, the mortality rate for FBA was around 50\% of the cases\textsuperscript{11}. Now, with bronchoscopy available and advances in anesthesiology and surgical procedures, both mortality and morbidity have markedly diminished\textsuperscript{1,12,13}.

The complications of FBA can be divided in two groups: complications related to the foreign body itself and complications following the bronchoscopic procedure.

Foreign body aspiration and its evolution can lead to complications such as pneumomediastinum, pneumothorax, hydropneumothorax, bronchial stenosis, abscess, atelectasis, pneumonia, bronchiectasis, foreign body dislodgment, and bronchoesophagus.\textsuperscript{6,7,14-18} The presence of these complications in children is about 22\% to 33\%, and the most common is pneumonia\textsuperscript{19,20}.

Furthermore, the patient can develop complications resulting from the bronchoscopy. Usually, the foreign body is successfully removed with bronchoscopy in a simple and safe way.\textsuperscript{9} However, complications may occur in 6\% to 8\% of the procedures and can be significant ones, such as pneumomediastinum, trachea laceration, vocal cords laceration, sub-glottic edema, and necessity for thoracotomy, bronchotomy, or lobectomy.\textsuperscript{5,8,10}

REPORTS

**Case 1** – A 9-month-old girl, previously healthy, presented with a history of 1 day with fever, productive coughing and short breath. She had already been diagnosed as having pneumonia and was already taking antibiotics, but had returned to the hospital because of worsening of the respiratory distress. Presenting with respiratory failure, she was intubated at admission, and her thorax radiography revealed atelectasis of right lung and the presence of foreign body in the right side. On the following day, bronchoscopy did not show the foreign body in the right side, but found a rock in the left bronchus, indicating that it had migrated from right, as seen at the radiography, to the left. The foreign body was successfully extracted.

**Case 2** – A 5-year-old boy, previously healthy, presented with fever, productive coughing and short breath that had commenced 5 days before; he reported “he had swallowed a toy’s lamp”. Thorax radiography revealed the foreign body. During bronchoscopy, the foreign body was found at the right main bronchus, but the first attempt to remove the lamp was unsuccessful—it broke into pieces and just part of it was extracted. The boy presented with pneumomediastinum and was transferred to the intensive care unit, where he improved after a period under mechanical ventilation and treatment with antibiotics and corticosteroids. He was sent home and returned after 2 weeks for another bronchoscopy that showed a foreign body in the right inferior lobe, which could not be removed; 15 days later, he underwent a thoracotomy, and the foreign body was extracted.

**Case 3** – A 5-year-old boy, previously healthy, presented with a history of foreign body aspiration 1 day before admission. The child had no symptoms in the first 3 hours at home, but suddenly developed severe respiratory distress. In the emergency room, he arrived in cardiopulmonary arrest and was promptly intubated and reanimated. Thorax radiography showed total atelectasis in the right side. Bronchoscopy was performed, and an olive seed was removed from right main bronchus.
Case 5 – A 3-year-old boy, previ- ously healthy, with a history of 8 days of hoarseness and 4 days of stridor and short breath, presented with respiratory failure at admission. He was receiving inalatory Beta 2 adrenergic agonist agents before the correct diagnosis, leading to an increase in morbidity.

Concerning the type of objects aspirated, 3 of the cases involved rarely aspirated foreign bodies—a toy’s lamp, a rock, and a coil, which historically have comprised only 1% of the cases of FBA. The fact that these foreign bodies were not common ones for FBA cases did not correlate with a better evolution, since these 3 patients required intubation and ventilatory support.

The importance of the involvement of a skilled pediatric surgeon was highlighted by case 4. The first bronchoscopy was performed by a surgeon who was not accustomed to treating children. In addition to not accomplishing the complete removal of the foreign body, the bronchoscopy was characterized by intense manipulation that led to a severe complication–total rupture of the bronchus and the necessity for a thoracotomy.

CONCLUSION

Foreign body aspiration by children is a serious and life-threatening situation that requires special attention of parents and health-care providers. The symptoms are nonspecific, and the chest radiograph findings are frequently normal or display abnormalities uncharacteristic for FBA. Hence, children with suspicious history or symptoms should undergo prompt bronchoscopy regardless of the radiologic findings. To reduce morbidity and avoid more serious complications, attention must be given to early recognition of FBA, as well as to prompt identification of complications caused by the bronchoscopy.

Aspiração de corpo estranho em via áerea é uma das principais causas de morte em crianças, especialmente nas menores que 3 anos de idade. A aspiração do corpo estranho pode causar um amplo espectro de sintomas, e o diagnóstico precoce é altamente associado com o sucesso da retirada do material inalado. Apesar dos grandes avanços nos procedimentos endoscópicos e anestésicos, um grande número de dificuldades e complicações ainda estão presentes nesta situação clínica. Neste estudo, descrevemos 5 casos de sérias complicações agudas, incluindo pneumomediastinio, pneumotórax, atelectasia total, migração do corpo estranho e necessidade de toracotomia, em crianças admitidas em nosso Centro de Terapia Intensiva em 1999 e 2000, situações essas que poderiam ser prevenidas com reconhecimento precoce e rápida intervenção terapêutica.

REFERENCES


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