CASE REPORT

A history of recurrent wheezing can delay the diagnosis of foreign body aspiration in a paediatric emergency department

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SUMMARY

Foreign body aspiration (FBA) into the airways is a potentially life-threatening event, and more frequent in children younger than 3 years of age; it can mimic other diseases by its frequently non-specific clinical and radiological presentation. The commonest misdiagnoses in children are asthma and recurrent respiratory tract infections with wheezing. This often makes it particularly difficult for a timely and proper diagnosis, especially when there is a silent history of FBA (not a rare occurrence in the age group at highest risk). We report a case of a 2-year-old boy who arrived at the emergency department at the Hospital of Ferrara, with dyspnoea, fever and wheezing, which had started 12 h after aspiration of a pistachio. The asymptomatic period after the pistachio aspiration, a history of recurrent wheezing during respiratory infections and the non-specificity of clinical and radiological findings, delayed the right diagnosis of FBA.

BACKGROUND

Foreign body aspiration (FBA) into the airways is a potentially life-threatening event, and more frequent in children younger than 3 years of age; it is often characterised by non-specific clinical and radiological findings. It can, therefore, mimic other diseases such as asthma and recurrent respiratory tract infections with wheezing. A frequent history of recurrent respiratory tract infections with wheezing and the non-specificity of clinical and radiological findings can delay the diagnosis of FBA in children.

CASE PRESENTATION

We report a case of a 2-year-old boy with a history of recurrent wheezing during respiratory infections. He arrived at the paediatric emergency ward of the hospital "Sant'Anna" in Ferrara, for worsening dyspnoea and fever, which had begun 12 h earlier. The parents reported that the boy had started coughing and vomiting after eating pistachios the previous evening, without dyspnoea or further coughing during the night. The dyspnoea and fever started the subsequent morning.

On examination, the child appeared sick with perioral cyanosis and subdiaphragmatic and jugular retractions. Pulse oxygen saturation was 75% on room air and respiratory rate was 60–65 breaths/min. The physical examination of chest showed bilaterally reduced air entry with wheezing. Abdomen examination was normal; there was no

lymphadenopathy and no skin alterations; and no signs of trauma in the head or in other parts of the body were evident. Aerosol with epinephrine was given, followed by salbutamol and ipratropium bromide. After aerosol-therapy, the reduction of wheezing enabled detection of an asymmetry on air entry into the chest objectively, with air flow significantly reduced in the right hemithorax. Chest X-ray confirmed complete opacification of the right hemithorax with hyperinflation of the left lung (figure 1).

Initially, parainfectious wheezing was hypothesised, as the patient had a history of recurrent wheezing during respiratory tract infections and also due to the presence of fever and non-localised wheezing. The serious nature of the thoracic auscultation findings, coupled with the events of the previous evening after the ingestion of pistachios and the chest X-ray report, led us to consider what turned out to be the correct diagnosis of foreign body (pistachio) inhalation. Besides, in all the previous medical examinations during parainfectious wheezing, the patient had never presented such low levels of oxygen saturation or such an acute degree of dyspnoea. Owing to the severity of the clinical conditions and the strong suspicion of FBA, which would require rapid intervention by bronchoscopy (which is diagnostic and therapeutic), the child was not investigated by CT or checked for viral infections, but was promptly transferred to another hospital where the foreign body was removed. The rigid bronchoscopy required more than 30 min

Figure 1 Chest X-ray findings of complete opacification of the right hemithorax with hyperinflation of the left lung.

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to clear the main bronchus and the other subsequent bronchi of the right hemithorax of a dense mixture of pistachios. Apparently, the child had inhaled a mixture of partially chewed nuts, and not simply a single nut; this was probably the result of the pistachios being eaten and later vomited, and subsequently aspirated in the process.

OUTCOME AND FOLLOW-UP

The outcome of the child was very good: after the acute episode the child was dismissed from the hospital with Montelukast therapy prescription. Montelukast was suspended after 3 months, during which the child did not present new episodes of parainfectious wheezing. We advised the family to better monitor the child during meals, and in particular to ration the quantity of nuts given to him.

DISCUSSION

FBA into the airways is a potentially life-threatening event, and is more frequent in children under 3 years of age (about 20% of cases occur in this age group).¹ In 2005, there were more than 4600 deaths from FBA in the USA.² Children aged between 1 and 3 years have a higher risk of FBA because of the immature coordination of the muscles used in swallowing, and the propensity of this age group to explore the world and to sample objects using their mouths.³ The causative objects in most cases are organic, particularly nuts. Among inorganic foreign bodies (FBs), some studies report that the commonest FBs are magnets, which can be particularly destructive. In a great number of FBA patients, the causative FBs are objects not produced for use by children, objects such as pins, nails, screws and even floats.¹

The clinical manifestations may vary from minimal symptoms to severe respiratory distress, sometimes even death. The commonest are coughing, choking, dyspnoea and unilateral wheezing or reduced air penetration sounds. However, in most cases (as in our patient), respiratory symptoms immediately after the aspiration of the FB are described as followed by an asymptomatic period of variable duration with subsequent reappearance of respiratory symptoms and signs of variable severity. The re-emergence of symptoms such as cough, wheezing or dyspnoea, can be interpreted as acute pneumonia, asthma exacerbation, bronchiolitis or croup. Sometimes, the asymptomatic period is longer and/or the clinical manifestations are not specific, such as recurrent respiratory infections and/or wheezing. The patient may therefore be wrongly diagnosed and treated as asthmatic.^{1 3 4} A recent case series reports three cases of FBA in preschool children without an aspiration history but only with asthma-like symptoms, which persisted despite appropriate asthma treatment.⁵

Chest examination may show focal wheezing or decreased unilateral air entry, but may also be characterised by generalised wheezing or even by a clear chest.⁴

Chest X-ray findings observed in FBA patients are characterised by air trapping, atelectasis, pneumothorax, consolidation/homogenous opacity and, sometimes, evidence of a radiopaque foreign body. Unfortunately, with the exception of the latter, the other radiographic findings are not pathognomonic for FBA.^{1 3} Besides, it is hard to establish the exact location and shape of an FB using only chest X-ray. A recent large study on 1501 patients, 584 with FBs, showed three-dimensional CT to have the highest sensitivity and specificity for diagnosis of FBA. The authors calculated sensitivity, specificity, positive predictive value and negative predictive value of CT, finding values of 99.83%, 99.89%, 99.83% and 99.89%, respectively (vs a reported chest X-ray sensitivity and specificity

of 68% and 67%, respectively).⁶ A delayed (more than 24 h) diagnosis of FBA is reported in almost 40% of cases. In a recent retrospective study, Rodríguez *et al*⁷ evaluated 56 patients with FBA and described the following most common complications: pneumonia (18 cases), granuloma (15 cases) and mucosal erosion (9 cases). Another case series reported pneumonia and bronchopneumonia as the commonest FBA complications.¹ A case report signals the FBA as a possible nidus for aspergilloma formation within an ulcer of the adjacent bronchial mucosa, even in immunocompetent children.⁸ The gold-standard technique to remove a FB from the airways uses the ventilating rigid bronchoscopy under general anaesthesia. The combination with telescopic magnification provides superior visualisation and ensures adequate ventilation. After removal of the FB, it is important to re-examine all airways for the possible simultaneous existence of other FBs.³ A recent Chinese study on 3149 patients who underwent ventilating rigid bronchoscopy for FBA reports a 9% (n=284) overall rate of severe postoperative complications related to severe hypoxaemia, laryngeal oedema, laryngospasm, pneumothorax, total segmental atelectasis and death, with incidences of 3.2%, 0.9%, 1.3%, 0.3%, 0.3% and 0.1%, respectively.⁹

In our case, the initial clinical presentation (diffuse bronchospasm without acceptable air entrance sounds in the thorax) and the patient's history of wheezing, led to postponement of the right diagnosis. The partial resolution of wheezing after aerosol evidenced the unilateral altered respiratory sounds. Chest X-ray findings and the recent clinical history relative to pistachio ingestion symptoms allowed us to confirm the diagnosis.

Our case report adds confirmatory evidence to the importance of considering FBA in patients (especially if under the age of 3 years) with unilateral persistent wheezing, resistant to conventional therapy, even in the absence of history compatible with FBA.

Learning points

- ▶ Foreign body aspiration (FBA) is not rare, in particular in the age group of under 3-year-olds, and is an urgent airway condition not always easy to diagnose.
- ▶ The frequent presence of non-specific clinical and radiological findings, which can mimic other diseases, often makes timely and proper diagnosis particularly difficult, especially when there is a silent history of FBA (not a rare occurrence in the age group at highest risk). The most common misdiagnoses in children are asthma and recurrent respiratory tract infections with wheezing.
- ▶ A delayed diagnosis can cause complications such as pneumonia, granuloma and mucosal erosion.

Competing interests None declared.

Patient consent Obtained.

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