

Intracarinial Foreign Body: An Unusual Location in a 13-Month-Old Child, About a Case Report and Literature Review

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Abstract

Case Report

Inhalation of the foreign body is a frequent cause of morbidity and mortality in the pediatric population, particularly between six months and three years. Carinary localization remains very rare and less frequently diagnosed on bronchoscopy. Clinical symptoms differ depending on the seat and degree of the obstruction, ranging from inspiratory dyspnea with cyanosis to persistent or recurrent pneumonia. Imaging, in particular the thoracic scanner, plays an essential role in the positive and topographical diagnosis and bronchoscopy remains the reference examination for therapeutic purposes. We report the case of a 13-month-old infant, admitted to the pediatric emergency department with laryngitis and cough that had been evolving for 6 days, the thoracic CT scan showed a plastic foreign body located in the carina, with discussion of the primordial role of the CT scan in its detection.

Keywords: Foreign body inhalation, Carinary localization, topographical diagnosis and bronchoscopy.

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INTRODUCTION

Foreign body inhalation is a common emergency in pediatric ERs but can be life-threatening. It is responsible for a significant proportion of cases of respiratory distress in children (Tahir *et al.*, 2009). In the various articles in the literature, an inhaled foreign body is more likely to enter the right main bronchus than the left, because it is wider and more vertical (Cotton, 2006). (Landsman IS, *et al.*, (2006). The location of a foreign body in the carina is rarely observed.

Bronchoscopy is the means of diagnosis and therapy indicated when inhalation of a foreign body is suspected, especially in children. It is considered as the reference examination for the identification and precise localization of the foreign body (Swanson, 2004).

Radiological diagnosis can be difficult, and chest x-ray or chest CT findings are frequently normal or may show uncharacteristic abnormalities (Koşucu *et al.*, 2004a).

We report the case of a 13-month-old child who came to the pediatric emergency department with laryngitis and cough lasting for 6 days, and in whom the thoracic scan revealed a plastic foreign body in the

carina, with a discussion on the crucial role of the scan in its detection.

OBSERVATION

The patient is a 13-month-old child with no significant medical history, and who was vaccinated according to the national vaccination program. The child was brought to the pediatric emergency department with symptoms of laryngitis, cough, and stridor that had been present for three days. Upon questioning the family, they reported a suspicion of foreign body inhalation but without specifying its nature. On physical examination, the child's skin was normal in color with no signs of cyanosis. The respiratory rate was 47 cycles per minute without signs of respiratory distress, although there was minimal inspiratory dyspnea. The breath sounds were present in both lung fields, and the heart rate was normal. A chest X-ray was normal, and the laboratory results were unremarkable.

A nasofibroscopy was performed to explore the laryngitis, which was found to be normal. Given the ambiguity of the presentation and the suspicion of foreign body inhalation, a thoracic CT scan was ordered. The scan was performed with thin slices before and after contrast injection to explore the bronchial tree and detect any possible vascular malformation that

could explain the dyspnea. The thoracic CT scan showed a linear, arc-shaped image at the level of the carina, with an estimated density of 40 Hounsfield units and partial obstruction generating an artifact that

suggested a foreign body in a rare location. (Figure 1 and 2) The rest of the bronchial tree was patent, and the lung parenchyma and vascular trunks were normal.

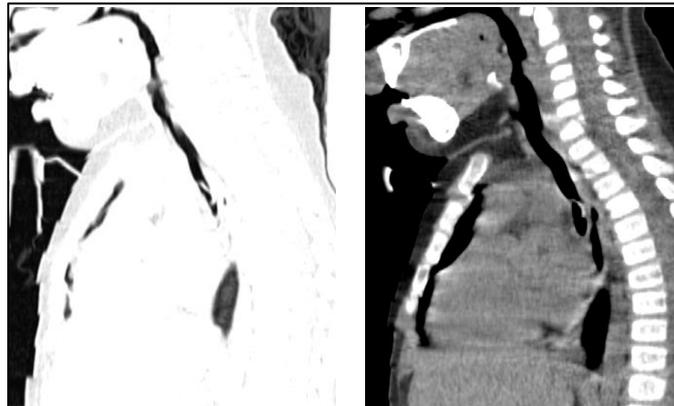


Figure 1: Chest CT without injection parenchymal and mediastinal window, sagittal section showing an intra carinal foreign body (arrow)

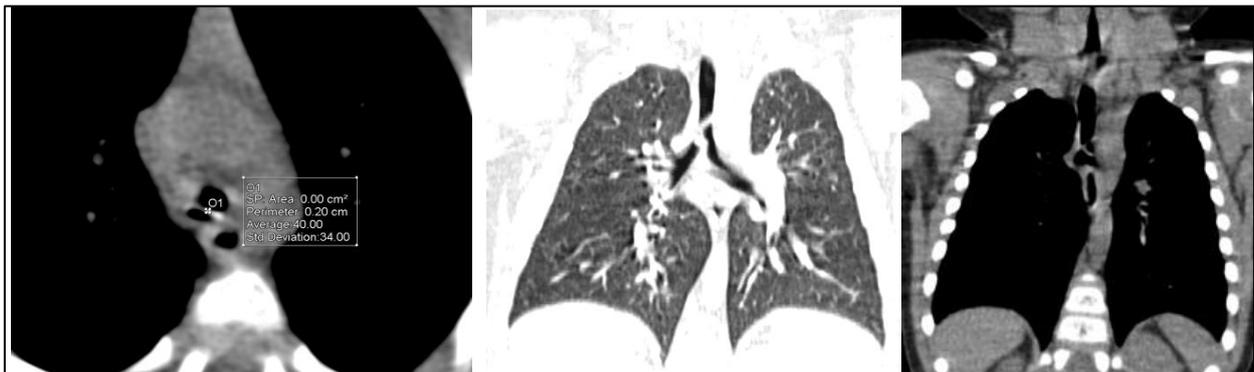


Figure 2: Chest CT scan in coronal section showing an intra carinal foreign body with a density close to tissue density

A bronchoscopy was performed on the same day, and a small, flat, non-organic plastic foreign body

was found at the level of the carina and was successfully removed without complications (Figure 3).

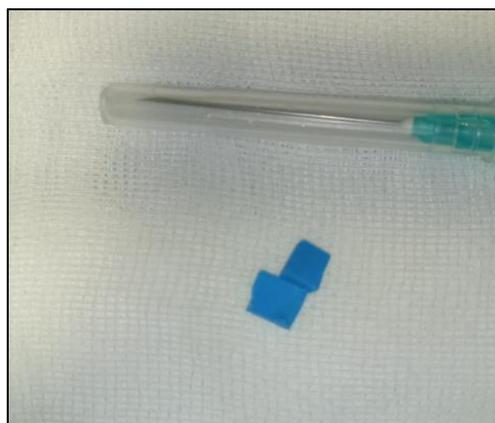


Figure 3: Image of the foreign body after extraction by bronchoscopy. Piece of a plastic toy (arrow)

DISCUSSION

Foreign body aspiration is a common cause of morbidity and mortality in children, which can occur at any age but most commonly occurs in children aged 6 months to 3 years (Applegate *et al.*, 2001) (Koşucu *et*

al., 2004b). Age is a significant factor in the diagnosis of suspected cases, as the patient may present with late symptoms in 50% of cases, with atypical signs in children under 3 years (Tokar *et al.*, 2004).

The clinical presentation varies depending on the degree and location of the obstruction. It is easily diagnosed if the child presents with sudden choking, cyanosis, and inspiratory dyspnea. However, children may have no history of foreign body aspiration or may have atypical symptoms, such as laryngitis, wheezing, decreased breath sounds in one lung field, or repeated wheezing dyspnea.

In very late cases, one may observe a picture of persistent or recurrent pneumonia and persistent cough, or even a pulmonary abscess (Koşucu *et al.*, 2004c) (Tokar *et al.*, 2004).

The preferred location of an inhaled foreign body is the right main bronchus or one of its lobular branches, as it is wider and more vertical than the left. However, this opinion has been challenged by others who argue that in young children (under the age of 3), an inhaled object has at least an equal chance of entering the left main bronchus as the right (Van Looij *et al.*, 2003) (Cohen *et al.*, 1980).

On the other hand, a popular pediatric manual states that, contrary to popular belief, inhaled foreign bodies in young children are evenly distributed on both sides of the bronchial tree (Robinson ;(2003)) The carinal location, as in our reported case, remains rare and is less frequently diagnosed on bronchoscopy series in the pediatric population (Boufersaoui *et al.*, 2013) (Mehta & Sarin, 2007). Bronchoscopy remains the diagnostic and therapeutic reference examination in cases of foreign body inhalation, and should be performed urgently if the patient's life is in danger.

The diagnosis of foreign body inhalation can be confirmed by radiographic findings, showing direct signs such as a visible radio-opaque foreign body on chest x-ray or a tissue density image in an intrabronchial CT scan, as well as indirect signs such as unilateral air trapping involving a lung segment or lobe or signs suggestive of pneumonia in cases diagnosed late (Hong *et al.*, 2013) (Woo *et al.*, 2018) (Koşucu *et al.*, 2004c). In our case, the lung parenchyma was normal as early exploration was done within two to three days of inhalation and the small size of the foreign body which was partially obstructive. Radiological examinations, particularly CT scans, can show serious complications in some cases such as subcutaneous emphysema, massive pneumothorax, pneumomediastinum, and pneumonia complicated by lung abscess (Mehta & Sarin, 2007).

A small caliber foreign body does not show indirect signs, so the concern is to search for it intrabronchially and differentiate it from an image of mucus or mucoid impaction. In our case, we had two challenges: the first was the location at the carina, which is very rare compared to other locations and was reported in only 5.4% to 29% (Gómez-Ramos *et al.*,

2022) (Latti R.G., 2015) (Boufersaoui *et al.*, 2013). The second challenge was to differentiate the foreign body from intrabronchial mucus, and this was done thanks to the arciform artifact generated by the foreign body and the pseudotissue density on the CT scan.

It has been found that the CT scan plays a crucial role in the diagnosis of foreign bodies and the accuracy of their location with a sensitivity of 100% and a specificity of 66.7% (Liu *et al.*, 2021). Kasemsiri *et al.*, have proven that CT scan can reduce the risks of misdiagnosis or missed diagnosis so that children can be diagnosed as soon and accurately as possible (Kasemsiri *et al.*, 2017). Another study showed that the correlation between exploration and extraction of foreign bodies under bronchoscopy compared to results after image reconstruction reached an accuracy rate of 95% (Liu *et al.*, 2021)

The presented case showed that the CT scan was decisive in the diagnosis of the foreign body and the precision of the exact location despite the reported rarity of this location.

CONCLUSION

Foreign body inhalation is a frequent cause of morbidity and mortality in the pediatric population. Carina localization remains rare and the clinical picture is variable, ranging from inspiratory dyspnea to persistent or recurrent pneumonia.

Imaging plays an essential role in the positive and topographical diagnosis and bronchoscopy remains the reference diagnostic and therapeutic examination.

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