

## **Foreign Body Aspiration Presenting as Life-Threatening Bronchial Asthma**

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**A two-year-old male, a known case of bronchial asthma was admitted as a case of exacerbation of asthma. He did not improve with standard treatment and required invasive ventilator support twice during his admission. The chest x-rays only showed hyperinflation but CT scan of the thorax revealed a foreign body (a piece of Betel nut) lodged in the right main bronchus. It was removed under bronchoscopic guidance.**

**A foreign body may not be radio-opaque and therefore may not be visible in chest x-ray. The possibility of foreign body aspiration should always be considered in children presenting with an exacerbation of bronchial asthma.**

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Foreign body aspiration is common in age groups of 1-3 years and is more common in males (male:female ratio 2:1)<sup>1</sup>. In this age group, the chances of impaction in the left bronchial tree are the same as in right bronchial tree as both bronchi have the same diameter and branch at the same angle from the trachea<sup>2</sup>. In adults, the right main bronchus is wider and more in line with the trachea compared to the left<sup>3</sup>.

Foreign body aspiration is a life-threatening emergency that requires prompt removal of the foreign body, but sometimes the diagnosis may be delayed because of an atypical history or misleading clinical and radiologic findings<sup>3</sup>.

The aim of this report is to present a case of foreign body aspiration in a two-year-old; the diagnosis was delayed because the patient was a known case of bronchial asthma.

## THE CASE

A two-year-old male patient was a known case of bronchial asthma since the age of four months. The frequency of his asthma attacks was five to seven per year, and he was on inhaled Salbutamol as required. Four months prior to the current episode, he had been admitted because of the exacerbation of his bronchial asthma.

The patient presented to the emergency department with three days history of fever, cough and difficulty of breathing. His mother had given him Salbutamol one puff twice for 3 days but without improvement.

On physical examination, the patient was in distress, had decreased air entry bilaterally and was wheezing. Investigations revealed an increased white cell count of  $14.34 \times 10^9/L$  and C-reactive protein (CRP) level of 27.2mg/L. The chest x-ray revealed hyperinflation, more on right side than on the left. The patient was admitted to the pediatric ward with a diagnosis of acute exacerbation of bronchial asthma. He was managed with oxygen therapy, intravenous co-amoxiclav, salbutamol, ipratropium bromide and paracetamol.

The patient developed an episode of severe respiratory distress and his level of consciousness decreased. Auscultation of the chest revealed a bilateral silent chest and blood gas analysis showed pH of 7.0 and Pa CO<sub>2</sub> of 83 mmHg. Orotracheal intubation was performed immediately; the patient received ventilatory support and he was transferred to the intensive care unit. Intravenous hydrocortisone was added to the medications. By the next day, the patient improved and was weaned off the ventilator and extubated. A repeat chest x-ray was still showing hyperinflation more on right side compared to left, see figure 1.

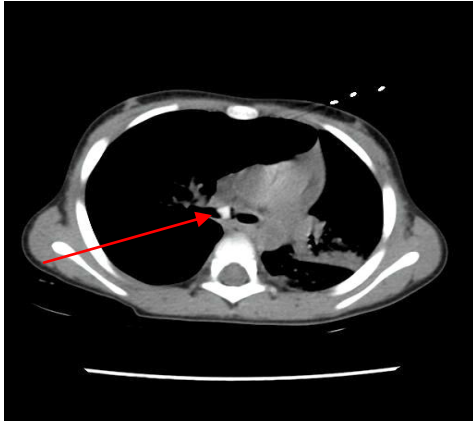


**Figure 1: Chest X-ray with Hyperinflation More on the Right Side**

After extubation, he was maintained on room air during the day but his O<sub>2</sub> saturation dropped to 86% during sleep. He also had several episodes of cough and expiratory wheezing.

On the third day, the patient became hysterical while a blood sample was being taken and he developed tachypnea, hypoxia and generalized tonic clonic seizures. The patient was re-

intubated and transferred to the ICU where he received ventilatory support. A CT scan of the thorax revealed a foreign body in the right main bronchus, see figure 2.



**Figure 2: CT Scan Showing the Impacted Foreign Body in the Right Main Bronchus and Hyper Inflated Right Lung (Arrow)**

The foreign body was removed under bronchoscopic guidance and proved to be a piece of betel nut, see figure 3. Thereafter, the patient improved rapidly, weaned from mechanical ventilation and remained hemodynamically stable and had no more episodes of respiratory distress or hypoxia. Subsequent chest x-ray did not show hyperinflation, see figure 4.



**Figure 3: Foreign Body (Betel nut)**



**Figure 4: Chest X-ray after Removal of the Foreign Body**

## DISCUSSION

Foreign body aspiration could present with atypical history or misleading clinical and radiologic findings<sup>3</sup>.

Foreign body could lead to respiratory distress, aphonia, cyanosis, unconsciousness and death in quick succession unless the object is dislodged. Foreign objects lodged over a long period could precipitate infections of the lungs, air trapping may occur distal to the obstruction, leading to local emphysema and atelectasis<sup>1,4</sup>. The likelihood of complications increases after 24-48 hours, making expeditious removal of the foreign body imperative. In addition, prolonged foreign body impaction in the airways increases morbidity because of the intense inflammatory response especially with food particles<sup>5</sup>.

The diagnosis of foreign body aspiration depends mainly on the history of aspiration, and a high index of suspicion especially in patients with sudden onset of a wheeze without a previous history of asthma. The suspicion of a foreign body should be greater if the wheeze is unilateral and if unilateral hyperinflation could be seen on chest x-ray<sup>6</sup>. Furthermore, a foreign body may be lodged in one of the main bronchus and has a ball-valve effect<sup>7</sup>.

In this patient, the possibility of foreign body aspiration was not considered at presentation as the patient was a known case of bronchial asthma and presented with bilateral wheezing. In addition, the act of aspiration was not witnessed. The hyperinflation seen on chest x-ray was assumed to be caused by exacerbation of bronchial asthma.

The chest x-ray could be misleading in cases of foreign body aspiration because it is normal in about 30% of the patients<sup>8</sup>. CT scan is helpful in patients with persistent symptoms or to detect suspected radiolucent foreign bodies<sup>8,9</sup>.

Areca nut (betel nut) is commonly used psychoactive substance, such as tobacco, alcohol and caffeine; its use is particularly widespread in Central, Southern and South-east Asian countries. It is commonly chewed in the form of a “quid” which is a combination of areca nut, betel leaf, lime and tobacco. The main psychoactive component in the nut is arecoline which is an alkaloid that has muscarinic cholinergic properties<sup>10</sup>.

## CONCLUSION

**The absence of history of foreign body aspiration does not rule out the presence of a foreign body. The possibility of foreign body aspiration should always be considered in children presenting with an exacerbation of bronchial asthma which is not relieved by standard treatment. A foreign body might not be radio-opaque and therefore might not be visible on the chest x-ray but differential inflation of a lung could be a pointer towards the diagnosis. CT scan would provide definitive diagnosis in most cases of foreign body aspiration.**

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## REFERENCES

1. Sumanth T, Bokare BD, Mahore DM, et al. Management of Tracheobronchial Foreign Bodies: A Retrospective and Prospective Study. *Indian J Otolaryngol Head Neck Surg* 2014; 66(Suppl 1):60-4.
2. Chiu CY, Wong KS, Lai SH, et al. Factors Predicting Early Diagnosis of Foreign Body Aspiration in Children. *Pediatr Emerg Care* 2005; 21(3):161-4.
3. Barrett KE, Barman SM, Boitano S, et al. Pulmonary Function. In: Barrett KE, Barman SM, Boitano S, et al, eds. *Ganong's Review of Medical Physiology*. 23th edition. New York: McGraw-Hill, 2009: 587-607.
4. Boufersaoui A, Smati L, Benhalla KN, et al. Foreign Body Aspiration in Children: Experience from 2624 Patients. *Int J Pediatr Otorhinolaryngol* 2013; 77(10):1683-8.
5. Sersar SI, Rizk WH, Bilal M, et al. Inhaled Foreign Bodies: Presentation, Management and Value of History and Plain Chest Radiography in Delayed Presentation. *Otolaryngol Head Neck Surg* 2006; 134(1):92-9.
6. Mortellaro VE, Iqbal C, Fu R, et al. Predictors of Radiolucent Foreign Body Aspiration. *J Pediatr Surg* 2013; 48(9):1867-70.
7. Chung PH, Wong KK, Lan LC, et al. Peanut Aspiration: An Avoidable Life-Threatening Condition. *Hong Kong Med J* 2012; 18(4):340-2.
8. Bhat KV, Hegde JS, Nagalotimath US, et al. Evaluation of Computed Tomography Virtual Bronchoscopy in Paediatric Tracheobronchial Foreign Body Aspiration. *J Laryngol Otol* 2010; 124(8):875-9.
9. Manach Y, Pierrot S, Couloigner V, et al. Diagnostic Performance of Multidetector Computed Tomography for Foreign Body Aspiration in Children. *Int J Pediatr Otorhinolaryngol* 2013; 77(5):808-12.
10. Auluck A, Hislop G, Poh C, et al. Areca Nut and Betel Quid Chewing among South Asian Immigrants to Western Countries and Its Implications for Oral Cancer Screening. *Rural Remote Health* 2009; 9(2):1118.