

## A 3-Year-Old Male Patient with A History of Fever, Cough, and Abdominal Pain

Maryam Hassanzad <sup>1</sup>, Korosh Fakhimi Derakhshan <sup>2</sup>

<sup>1</sup> Pediatric Respiratory Diseases Research Center (PRDRC), National Research Institute of Tuberculosis and Lung Disease (NRITLD), Shahid Beheshti University of Medical Sciences, Tehran, Iran, <sup>2</sup> Pediatric Disease Research Center, Guilan University of Medical Sciences, Rasht, Iran

Correspondence to: Fakhimi Derakhshan K

Address: Pediatric Disease Research Center, Guilan University of Medical Sciences, Rasht, Iran

Email address: koorosh.fakhimi@gmail.com

### WHAT IS YOUR DIAGNOSIS?

A 3-year-old male patient, presented with complaints of cough with fever, and vomiting for 4 days. He has experienced occasional fevers and abdominal pain for the past two months, which have not improved despite medical treatment. In the patient's examination, he had a fever and reduced pulmonary sound on the right side. The patient consulted a pediatric resident for the abovementioned complaints and was advised to do a chest X-ray. It showed a right mid and lower zone opacification. Computerized tomography (CT) of the thorax (Figures 1) revealed a mass-like collapse consolidation in the right lung associated with loculated pleural effusion. Puncture of pleural fluid was performed for the patient. The appearance of pleural fluid was purulent and the related lab data were as follows: WBC: many (PMN: 89%, LYMPH: 9%), BS<20, Protein: 3.6, LDH>15000, and general biochemistry were BS:125, LDH:490, and total protein: 8. The patient was fitted with a chest tube and started on antibiotic treatment with meropenem and vancomycin. Despite the antibiotic treatment and having a chest tube, the patient did not stop the fever and cough.

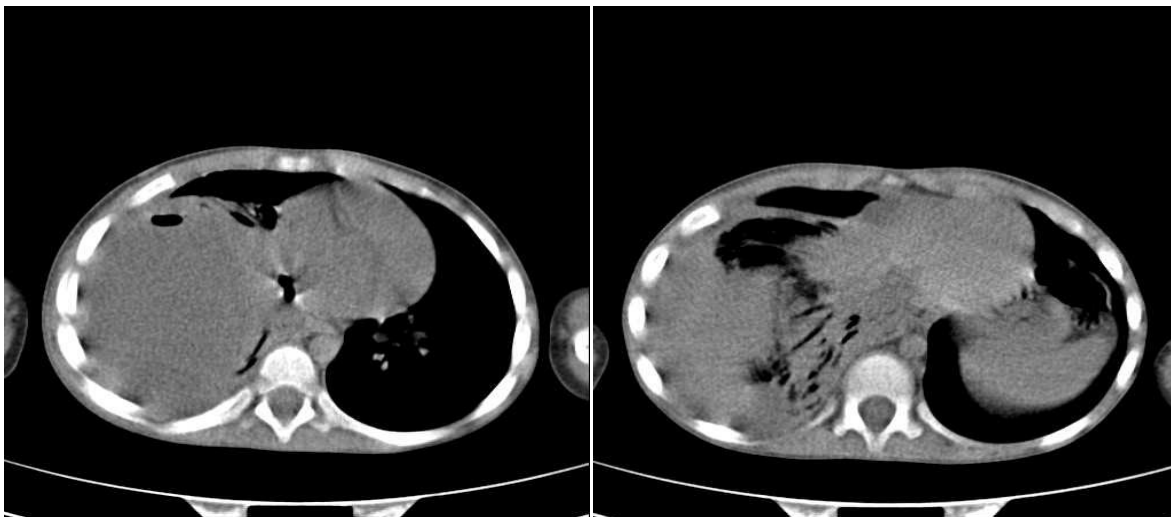


Figure 1. Mass-like collapse consolidation in the right lung associated with loculated pleural effusion

## Answer

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# Empyema from an Inhaled Peanut

This case highlights the pitfalls in diagnosing foreign body aspiration (FBA). The patient had no history of aspiration and could not recall eating peanuts. He had no risk factors for aspiration.

Common risk factors for FBA in the adult population include impaired swallowing reflex, impaired consciousness (including excessive alcohol consumption), neurological dysfunction, or trauma. FBA may mimic another diagnosis such as bronchial carcinoma. The classic triad of cough, monophonic wheeze, and unilateral decreased air entry is not universal. Patients may present later with symptoms such as fever, persistent cough, or hemoptysis. Thus, the potential differential diagnoses and sequelae of FBA include unresolved pneumonia, lung abscess, empyema, and bronchiectasis. Thus, a rigid bronchoscopy was performed for the patient, and a foreign body (peanut) was removed from the lower lobe of the right lung. After bronchoscopy and removal of the foreign body, the cough and fever of the patient were discontinued.

## DISCUSSION

This case illustrates that foreign body aspiration should be considered in complicated lung infections, and the value of taking a careful history, even if the aspiration occurred months previously. Late-diagnosed bronchial foreign bodies can lead to irreversible changes in the bronchi and the lungs. Delayed diagnosis of foreign body aspiration is common in developing countries, resulting in lobar collapse and bronchiectasis (1). As a consequence of FBA with secondary empyema, post-obstructive pneumonitis is rare but well-reported (2). Indeed, FBA has generated numerous case reports—a recent meta-analysis counted over 200 pediatric reports (3).

Aspiration can have lethal consequences but is a preventable and often fully reversible syndrome to which children are most susceptible. FBA can cause respiratory distress or arrest, airway edema, airway perforation, post-obstructive pneumonia, hemoptysis, airway stenosis, abscess formation, empyema, bronchiectasis, or mucoid impaction. Prolonged retention of the foreign body can cause an inflammatory reaction in the surrounding mucosa, sometimes mistaken for a carcinoma (4). A bronchial mass on CT can be mistaken for a carcinoma.

Peanuts have been found to irritate the mucosa more than other organic substances, and, along with nuts and grass, they are most likely to cause granulation (5). This demonstrates the importance of pathological examination in securing an accurate diagnosis. Many reports describe the rarer complications of FBA, including empyema necessitans, pneumomediastinum, and subcutaneous emphysema (6). Children are more likely to aspirate toy parts, small balls or balloons, and small food items such as nuts, peas, and beans. Adults are more likely to aspirate bone fragments, dental prostheses, and tablets, and tend to have predisposing comorbidities (3).

As FBA is often unsuspected in adults, the time to diagnosis and treatment is often longer. In our case, the peanut was lodged in the right lower lobe bronchus for potentially 2 years, but cases of even up to 30 years have been reported, with a mean of 25 months (7). Thoracic CT is superior to chest radiography in identifying foreign bodies as it allows a better view of

the airways. It can also detect radiolucent items that may not be visible on X-ray, particularly organic materials like food. Chest radiograph has a sensitivity of 70–82% and a specificity of 44–74% for detecting FBA in published reports (3).

The other initial signs of FBA on plain film are air trapping and atelectasis, which can be unreliable and potentially missed. CT can also demonstrate the complications of FBA such as bronchiectasis, and can guide more difficult foreign body retrieval (3). One drawback of using CT is that small foreign bodies can be potentially missed if thick sections are present. The radiation dose associated with CT also precludes routine use in pediatrics, with many pediatricians opting to proceed to bronchoscopy if there is a high index of suspicion for FBA. The use of MRI and virtual bronchoscopy is uncommon, but further developments in the field may see their use increase (3).

Flexible bronchoscopy is preferred to rigid bronchoscopy for the removal of FBA in most cases (8). However, rigid bronchoscopy allows the operator to maintain adequate ventilation, better visualization, and superior suctioning capabilities and should be available in the event of failed flexible bronchoscopy in foreign body retrieval (8). Flexible bronchoscopy has rapidly developed and multiple attachments and accessories are now available such as baskets, claws, forceps, and prongs with additional laser and cryo-therapeutic advancements, maximizing the chances of successful retrieval (3).

Thoracotomy for FB retrieval is now generally a last resort. It is imperative to consider FBA as a differential diagnosis of persistent cough in patients of all ages, even in the absence of a corresponding history. The development of a bronchopleural fistula with empyema is a rare presentation of foreign body aspiration in infants and children but emphasizes the point that foreign body aspiration must be considered in all cases of unusual lung diseases (9).

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