CASE REPORT

Empyema thoracis from an inhaled peanut

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SUMMARY

A 77-year-old man with a history of pulmonary sarcoidosis was referred with persistent cough and reduced air entry on auscultation of the right lung base. He was an ex-smoker with a 40-pack-year history and his general practitioner was concerned about the possibility of bronchogenic carcinoma. A chest radiograph showed a right-sided pleural effusion with right mid-zone airspace opacification. Bronchoscopy revealed a peanut covered in mucus lodged in the right lower lobe bronchus. CT of the thorax demonstrated a multiloculated right pleural effusion with associated compressive atelectasis, consistent with chronic empyema. A chest drain was inserted but failed to fully clear the collection and the patient proceeded to a thoroscopic decortication of a pleural empyema secondary to the right lower lobe obstruction from an inhaled peanut. His postoperative recovery was uncomplicated.

BACKGROUND

This case highlights the pitfalls in diagnosing foreign body aspiration (FBA). The patient had no history of aspiration and could not recall eating peanuts but admitted to eating dried mixed fruits since quitting cigarettes 6 months previously, which contained some nuts in the mixture. He had no risk factors for aspiration.

Common risk factors for FBA in the adult population include impaired swallowing reflex, impaired consciousness (including excess 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 haemoptysis. Thus, the potential differential diagnoses and sequelae of FBA include unresolving pneumonia, lung abscess, empyema and bronchiectasis.

CASE PRESENTATION

A 77-year-old man was referred for bronchoscopy because of a 4-month history of persistent tracheal irritation and cough productive of yellow thick sputum. The patient was an ex-smoker and had a history of sarcoidosis, which was confirmed by mediastinal lymph node biopsy. He had a biological aortic valve replacement for critical aortic stenosis in 2011.

At admission, he was afebrile and normoxic but had dullness to percussion and decreased air entry with expiratory crackles in the right lower zone. A chest radiograph showed a right-sided pleural effusion with right mid-zone airspace opacification

(figure 1). Bronchoscopy demonstrated a foreign body in the right lower lobe bronchus which was removed endoscopically using a retrieval basket. This lesion was covered with mucus, but after washing, it was identified as a half-peanut. Following removal, the surrounding mucosa appeared abnormal but biopsies showed chronic inflammation with no evidence of malignancy.

After bronchoscopy, the patient became feverish. White cell count was $15.9 \times 10^9/L$ and C reactive protein was 160 mg/L (normal <5 mg/L). Blood cultures were positive for *Moraxella catarrhalis*.

Pleural aspiration under ultrasound guidance revealed cloudy straw-coloured fluid. Biochemical analysis demonstrated that the fluid was exudative with a pH of 6.92, consistent with empyema. An intercostal tube was inserted and 300 mL of cloudy straw-coloured fluid was drained freely, but thoracic CT demonstrated a multiloculated right pleural effusion with locules of gas, compressive atelectasis at the right lung base and pleural thickening (figure 2). The patient was referred for thoracic decortication.

OUTCOME AND FOLLOW-UP

After an uncomplicated thoroscopic decortication, the patient was discharged and was well at outpatient follow-up at 1 and 6 months. A chest radiograph showed resolution of the empyema with residual pleural thickening at the right lung base (figure 3).

DISCUSSION

Postobstructive pneumonitis as a consequence of FBA with secondary empyema is rare but well reported.¹ Indeed, FBA has generated numerous

Figure 1 Chest radiograph showing a right-sided pleural effusion with right mid-zone airspace opacification.

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Figure 2 Thoracic CT showing a multiloculated right pleural effusion with locules of gas, compressive atelectasis at the right lung base and pleural thickening.

case reports—a recent meta-analysis counted over 200 paediatric reports.² 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 oedema, airway perforation, postobstructive pneumonia, haemoptysis, 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.³ A bronchial mass on CT can be mistaken for a carcinoma. Peanuts have been reported to be more irritative to the mucosa than other organic substances, and along with nuts and grass are most likely to cause granulation.⁴ This demonstrates the importance of pathological examination in securing an accurate diagnosis. Many reports describe the rarer complications of FBA, including necessitans empyema, pneumomediastinum and subcutaneous emphysema.^{5 6}

Figure 3 Chest radiograph showing resolution of the empyema with residual pleural thickening at the right lung base.

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.⁴ 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 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 identify radiolucent items that may not show clearly on X-ray, in particular organic items such as food. Chest radiograph has a sensitivity of 70–82% and specificity of 44–74% for detecting FBA in published reports.⁴ 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.⁴

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 paediatrics, with many paediatricians 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.⁴

Flexible bronchoscopy is preferred to rigid bronchoscopy for the removal of FBA in most cases.^{4 8} However, rigid bronchoscopy allows the operator to maintain adequate ventilation, better visualisation and superior suctioning capabilities and should be available in the event of failed flexible bronchoscopy in foreign body retrieval.^{4 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 cryotherapeutic advancements, maximising the chances of successful retrieval.⁴ 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.

Learning points

- ▶ Foreign body aspiration in adults can occur in the absence of predisposing comorbidities and without a significant choking history.
- ▶ Foreign body aspiration has acute and chronic sequelae, including empyema thoracis.
- ▶ Chest radiography, thoracic CT and flexible bronchoscopy are the most useful tests for foreign body aspiration.

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Patient consent Obtained.

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