

Foreign body aspiration pneumonia in an intravenous drug user

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ABSTRACT

Heroin use is associated with several well described respiratory complications, including noncardiogenic pulmonary edema, aspiration pneumonitis, acute respiratory distress syndrome, pneumonia, lung abscess, septic pulmonary emboli, and atelectasis. We describe an interesting case of a young female patient, an intravenous heroin user who presented with progressive dyspnea, hypoxia, and left lung consolidation.

Key words: *Aspiration pneumonia, bronchoscopy, drug abuse, foreign body*

INTRODUCTION

Heroin use is associated with several well-described respiratory complications, including noncardiogenic pulmonary edema, aspiration pneumonitis, acute respiratory distress syndrome, pneumonia, lung abscess, septic pulmonary emboli, and atelectasis.^[1] Foreign body granulomatosis may develop when drug users inject solutions containing crushed oral tablets in which talc is used as filler and can be complicated by pulmonary fibrosis. The effects are distinct from pulmonary edema, which may occur acutely with heroin injection.^[1] We describe an interesting case of a young female patient, an intravenous heroin user who presented with progressive dyspnea, hypoxia, and left lung consolidation.

CASE REPORT

A 37-year-old young female patient presented with

progressive dyspnea, hypoxia, and left lung consolidation. She had presented to our emergency department, with a 3-day history of shortness of breath, fever, and nonproductive cough. Her past medical history included recently diagnosed and untreated Hepatitis C, related to prolonged intravenous heroin abuse. She was on methadone de-addiction program but was continuing to occasionally using heroin, the last time a week prior to admission. She was also an active smoker, with a 20 pack-year history.

On clinical examination she appeared malnourished and dehydrated, with multiple skin tattoos and burn marks on the left forearm. Temperature was 38.2°C, respiratory rate 30/Min, blood pressure 90/50 mmHg, pulse rate 120 beats/min, oxygen saturation was 95% on room air. Heart sounds were dual, with no added sounds or murmurs. There were no crackles or wheezes audible on auscultation but air entry was markedly reduced on the left side. Routine laboratory investigations showed a hemoglobin of 99 g/L, white cell count $23.7 \times 10^9/L$ with a neutrophil count of $22.75 \times 10^9/L$, and lymphocytes of $0.79 \times 10^9/L$, CRP 206 mg/L, Alanine transaminase (ALT) 26 U/L, Aspartate transaminase (AST) 18 U/L, urea 3.5 mmol/L, creatinine 42 $\mu\text{mol/L}$. Chest X-ray (CXR) showed complete left-sided consolidation with no mediastinal shift [Figures 1 and 2]. Venous access was obtained via central cannulation of the internal jugular vein and she was resuscitated with 2 L of normal saline, started on ticarcillin/caluvulanate 3.1 g

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6 hourly and referred to intensive care unit for admission with a presumptive diagnosis of severe community-acquired pneumonia.

Despite adequate fluid resuscitation, the patient remained hypotensive with decreasing urine output, and noradrenalin infusion was initiated to improve blood pressure. She was intubated for worsening tachypnea and fatigue. Prior to intubation, chest computed tomography (CT) was performed, which confirmed consolidation of both the lobes on the left side; interestingly, no foreign body was described on the initial CT report, but detected on review after bronchoscopy [Figures 3 and 4]. Serology was drawn to assess for Hepatitis, HIV, and atypical infection. The antibiotic regime was augmented with the addition of vancomycin and azithromycin.

In view of the history of intravenous drug abuse a transthoracic echocardiogram was performed, which demonstrated mild tricuspid regurgitation, no vegetations,

and normal cardiac function. The patient was ventilated on synchronized intermittent mandatory ventilation volume control mode, with a tidal volume of 6 mL/kg, Peak end expiratory pressure (PEEP) of 10 and FiO₂ of 0.5. There was only a minimal endotracheal aspirate and a repeat CXR showed the persistence of the left lobe consolidation with no improvement inspite of mechanical ventilation. Flexible bronchoscopy was performed on day 2 to obtain diagnostic specimens and to look for any airway obstruction by mucous plugging. Bronchoscopy unexpectedly revealed a nearly completely obstructed left main bronchus by a foreign body, which resembled an earring. The foreign body was pulled out using a biopsy forceps. The foreign body became lodged in the endotracheal tube (ETT) necessitating removal of the ETT and foreign body en masse and reintubating the patient with a new ETT. On closer examination of the foreign body was a 25G hypodermic needle [Figure 5]. Subsequent CXR showed clearing of consolidation and the patient was extubated on day 4 and transferred to

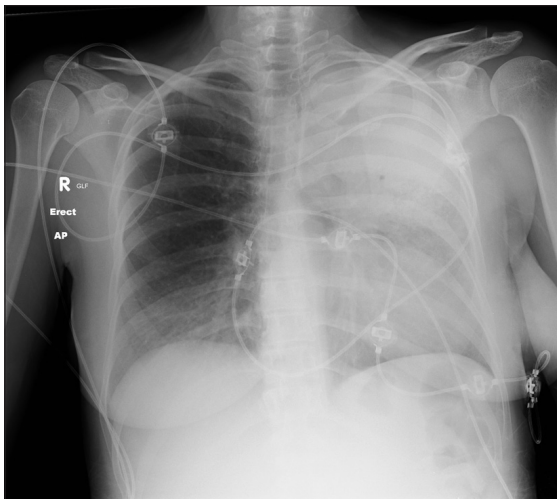


Figure 1: Chest X-ray on presentation to emergency department

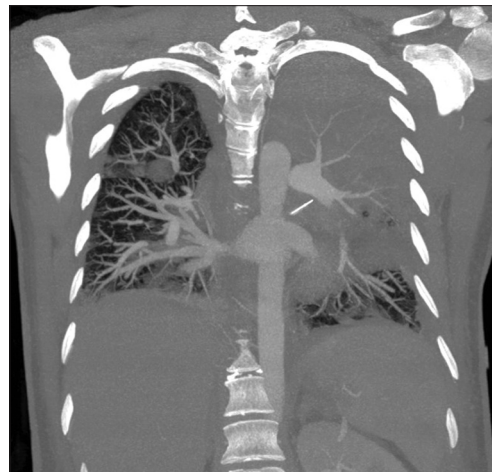


Figure 2: CT reconstruction picture showing foreign body obstructing the left main bronchus

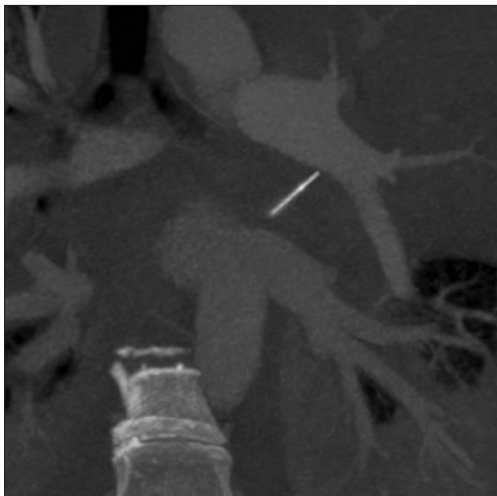


Figure 3: An enlarged image of the previous CT scan

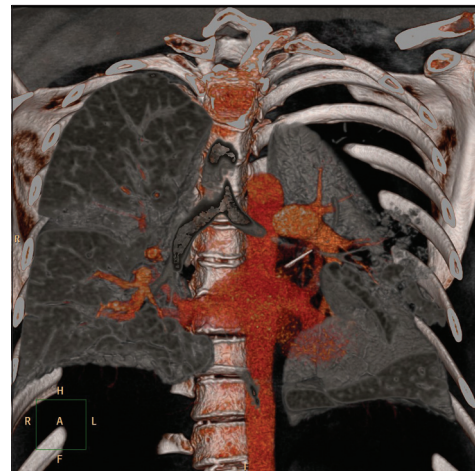


Figure 4: A reconstructed CT image of the same foreign body in the bronchus

medical ward for further management. Sputum culture during bronchoscopy also yielded *Pseudomonas aeruginosa*, which was sensitive to ticarcillin/caluvulanate. Antibiotics were de-escalated, and the patient was discharged on day 6 with oral antibiotics [Figure 6]. On questioning, it became apparent that she inhaled drugs from the same table she kept her drug paraphernalia. It seemed that while snorting drugs, she inadvertently inhaled the hypodermic needle.

DISCUSSION

Tracheobronchial foreign body (TFB) is rare in adults. Diagnosis is difficult and requires a high index of suspicion. Radiographic imaging can be helpful if the object aspirated is radiopaque or if there are signs of hyperexpansion on expiration. Negative-imaging studies, however, do not exclude the presence of a foreign body in the airway.

Acute pneumonia in patients with a history of IV drug abuse has a broad list of differential diagnoses:

1. Community-acquired pneumonia
2. HIV-associated pneumonia
3. Right-sided endocarditis with septic pulmonary emboli
4. Aspiration pneumonia.

Pneumonia caused by foreign body aspiration is uncommon in healthy adult population. Retrospective studies have suggested that the leading causes of TFB aspiration in adults are altered mental status from alcohol or sedative use, trauma with a decreased level of consciousness, impaired airway reflexes associated with neurologic disease, and dental procedures.^[2] Aspiration of organic material, such as nuts, seeds, vegetable, and bone, have been described in adults.^[2] Untreated or unrecognized TFB aspiration can result in obstructive pneumonitis, atelectasis, lung abscess, empyema, bronchiectasis, hemoptysis, stricture, and polyp formation.^[3] Rare cases of pneumomediastinum or pneumothorax have been reported.^[4] Due to anatomy of the bronchial tree and gravity, the majority of bronchial foreign bodies end up in the right basal bronchus. Correspondingly, the least common sites of impacted foreign bodies the left upper bronchus.^[3]

Chest radiography has poor sensitivity in diagnosing foreign body. The percentage of negative radiographs in patients with suspected TFB aspiration varies between 5% and 30% in children and between 8% and 80% in adults.^[5] This variation is probably because the sensitivity of CXR in identifying and localizing an aspirated foreign body is largely dependent on the physical properties of the aspirated material, as the majority of the foreign bodies in

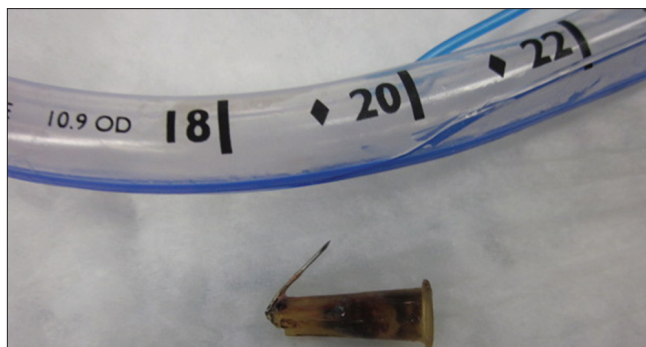


Figure 5: Extracted foreign body



Figure 6: Predischarge chest X-ray of the patient

adults are not radiopaque. In our case report, no foreign body was identified on CXR. A review of the literature showed a recent study looking at the utility of emergency CXR in suspected TFB aspiration the presence of a foreign body in the tracheobronchial tree was identified only in only 22.6% of patients, where no foreign body could be identified, the frequency of other radiographic abnormalities were reported as follows: Atelectasis (22.6%), pneumonia (19.6%), pulmonary hyperinflation (3.2%), and pneumomediastinum (3.2%). CXR was negative in 32.3% of patients.^[6]

While a chest CT (CCT) may be more sensitive than chest radiography, it is not always specific. Thus, a negative CCT should never obviate the need for direct visualization of the airways. Limitations with CCT are based on slice thickness relative to the size of the foreign body and the degree of motion artifact.^[7] The most reliable CCT finding for TFB aspiration would be the demonstration of the foreign body in the lumen of the tracheobronchial tree. Other CCT findings while less specific may include reactive lymphadenopathy, parenchymal changes in the affected lobe, and thickening of the bronchial wall. Associated findings are volume loss, hyperlucency with air trapping, and bronchiectasis in the affected lobe.^[5]

Bronchoscopy has a diagnostic and therapeutic role in the treatment of pneumonia. Prompt removal of the foreign body is necessary to avoid complications. Both rigid and flexible bronchoscopies have been utilized in the removal of foreign bodies. Various instruments are available for foreign body extractions, including forceps, snares, and suction catheters, and all these can be introduced through the bronchoscope side channel. Flexible bronchoscopy has a great value in guiding treatment in cases where the patient cannot expectorate sputum or those in whom treatment failed.^[8] The definitive treatment for TFB aspiration is airway control followed by prompt removal of the object, with either flexible or rigid bronchoscopy. In recent years, flexible bronchoscopy has been demonstrated to be both safe and >90% effective in the removal of foreign bodies. It is therefore reasonable that this method be considered first to both confirm suspected cases of TFB aspiration and to facilitate foreign body removal.

In our case, finding of foreign body was unexpected as neither history nor initial imaging suggested possibility of its presence, and the localization was atypical. The case reinforces the importance of bronchoscopy in the evaluation of pneumonia.

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