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Case Report

Chronic cough and uncontrolled asthma: Ending a three year clinical course with successful foreign body removal [☆]

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ABSTRACT

Acute foreign body aspiration can cause severe damage to the respiratory system, leading to laceration and even death due to asphyxia. However, a foreign body that has been aspirated could go unnoticed acutely and lead to persistent shortness of breath symptoms. Most of the patients will be able to recall the acute aspiration event, but others do not. On the latter, a more meticulous approach will lead to the diagnosis and subsequent effective management. We hereby present the case of a 52-year-old male with history of partly controlled severe asthma and chronic persistent cough with bloody sputum. Upon evaluation, he was found with a right-sided pneumonia and pertinent history remarkable for several episodes of bronchitis in the past 3 years. These circumstances and subsequent images led to the successful finding and removal of a chronic foreign body aspirated 3 years prior to evaluation. A procedure led to almost complete resolution of symptoms of cough and asthma.

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Introduction

Chronic cough is one of the most common complaints in patients, due to its distressing and uncomfortable signs. Cough mechanism relates to a temporary reconfiguration in the breathing cycle. Its main goal is lung protection from inhalation of noxious agents and particles aspiration. Cough is divided in 3 phases, which one encompasses an inspiratory phase, compressive phase, and an expulsive phase that plays

a major role in aspirated material expulsion. Constant airway irritation and stimulation leads to an afferent signal to phrenic nerve and subsequent medullary cough center activation. It is important to note that chronic cough encompasses multiple etiologies that could be divided into intrathoracic and extrathoracic. Intrathoracic etiologies as can be seen in pathologies originating from trachea, bronchi, esophagus, and pleura. Therefore, this symptom is a challenging one to assess. A major group of patients with asthma will have chronic cough, making it a more difficult to treat and controlled. Multiple guidelines exist for an adequate approach and concurrent systematic individualized therapeutic options, by most of the time includes empiric therapy to several etiologies at the same time. There are several red flag symptoms

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Fig. 1 – Initial posterior anterior upright chest x-ray shows right base airspace opacity with total effacement of the right hemidiaphragm and retrocardiac region. Right side pleural effusion with ectasia and atherosclerotic disease of the thoracic aorta.

when evaluating this population, which includes hemoptysis and recurrent pneumonia. These patients should be evaluated with computed tomography, sputum cytology, and flexible bronchoscopy for better visualization of the airway. Flexible bronchoscopy since its first discovery had become an essential part in foreign body removal and a lifesaving procedure in the pediatric population especially. Chronic cough and uncontrolled asthma despite optimal therapy are indications to performed bronchoscopy and respectively ruled out foreign body aspiration, even in patients without clear history of aspiration in the past.

Case presentation

A 52-year-old man with past medical history of gastroesophageal reflux disease, partly controlled severe asthma on triple therapy with long acting antimuscarinic agents, long acting beta agonist agents, inhaled corticosteroids, and chronic persistent cough presented to the emergency department (ED) with bloody sputum without shortness of breath, chest pain, or palpitations. Initial evaluation at ED showed evidence of a right lower lobe infiltrate (Fig. 1). The patient was admitted for treatment of pneumonia. He also recognized recurrent episodes of bronchitis, and fever in the last 48 hours. In a similar fashion, he presented 3 months prior to the ED with cough and subjective fever. Patchy densities were seen at the right lower lung base chest imaging at that time, for which he was discharged home in azithromycin therapy.

On examination, vital signs were stable with oxygen saturation at room air of 95%. Chest auscultation revealed mildly decreased breath sounds and rhonchi in the right lower lung field. The remainder of the examination was normal. A chemistry panel was unremarkable, Complete Blood Panel (CBC) found without leukocytosis of $9.4 \times 10^3/\mu\text{l}$ with significant neutrophilia of 88%. Chest images found with a right-sided infiltrative process. Subsequent chest computer tomography (CT) showed a right basilar lung consolidation with air bronchograms and hyperdense filling defect in the right lower lobe bronchus (Figs. 2a and b). In addition, endobronchial hyperdense defect with adjacent pleural fluid was seen (Fig. 2c). Upon record review a chest CT 3 years prior to admission had evidence of a right-sided infiltrate believed to be secondary to pneumonia that was treated at that time as well. This presentation, the third medical evaluation in 3 years, suggested a right-sided recurrent pneumonia. Upon further questioning he recalled having felt “shocked” when eating a chicken bone 3 years ago. Pulmonary function test 3 years before was consistent with mild obstructive ventilator impairment not responsive to bronchodilator therapy, with a normal diffusion capacity, and severe air trapping (Fig. 3a).

In view of hemoptysis and persistent right lower lobe infiltrate, a flexible bronchoscopy was performed; it revealed significant erythema with a foreign body visualized in the right lower lobe with granulation tissue (Fig. 2e). Careful airway management was done with an endoscopic biopsy forceps allowing passage to interest area and subsequent retrieval of the foreign body (FB). A 1.8 cm FB was retrieved (Fig. 2f). Purulent secretions were noticed in the airway after foreign body removal, no organism was identified on washings. Bronchial cytology washing showing light pink turbid fluid with 18% polymorphonuclear cells, 58% lymphocytes, and 22% of macrophages seen with an approximate cell count of 143/cm. Foreign body cytology showed bony material with inflammatory tissue associated, no suggestion of malignancy.

Discussion

Chronic cough, persistent asthma not responsive to standard therapy and a detailed clinical history was the key to suggest a foreign body aspiration [1]. Chronic cough is the most common symptom and is present in two-thirds of patients with foreign body aspiration [2]. Aspiration has several predisposing factors, such as altered mental status which could be seen in alcoholic patients, neuromuscular disease, head trauma, disorders as well [3]. Most of the time patients will be able to recall the event, but others not. For that purpose, it is important to suspect this etiology in patients not responding to current therapeutic guidelines of asthma and cough [4].

Foreign bodies may result in serious complications if left unrecognized. These complications include but not necessarily limited to recurrent pneumonia, lung abscess, bronchopleuralcutaneous fistulas, atelectasis, and bronchiectasis with mucus impaction [5]. However, in the case of chronic aspiration, bronchoscopy may show features of tissue reaction to the foreign body, by which object could be found incarcerated and difficult to be seen [6,7]. Granulation reactions could

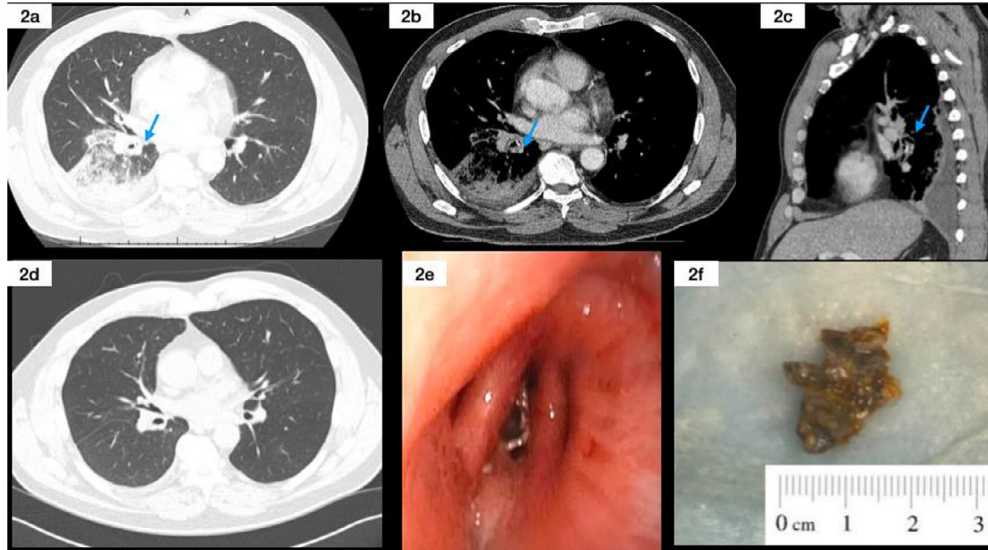


Fig. 2 – (a) Chest computer tomography (CT) without contrast showing a right lower lobe consolidation with associated pleural effusion, with an intraluminal hyperdense structure visualized. **(b)** Chest CT axial lung view with better visualization of hyperdense structure. **(c)** Chest CT with demarcated associated parapneumonic exudative effusion. **(d)** Chest CT scan 3 months follow-up after successful FB removal, showing complete resolution of pneumonic process. **(e)** Flexible bronchoscopy view of a FB in the right lower lobe. **(f)** Foreign body “chicken bone” measuring approximately 1.8 cm in diameter.

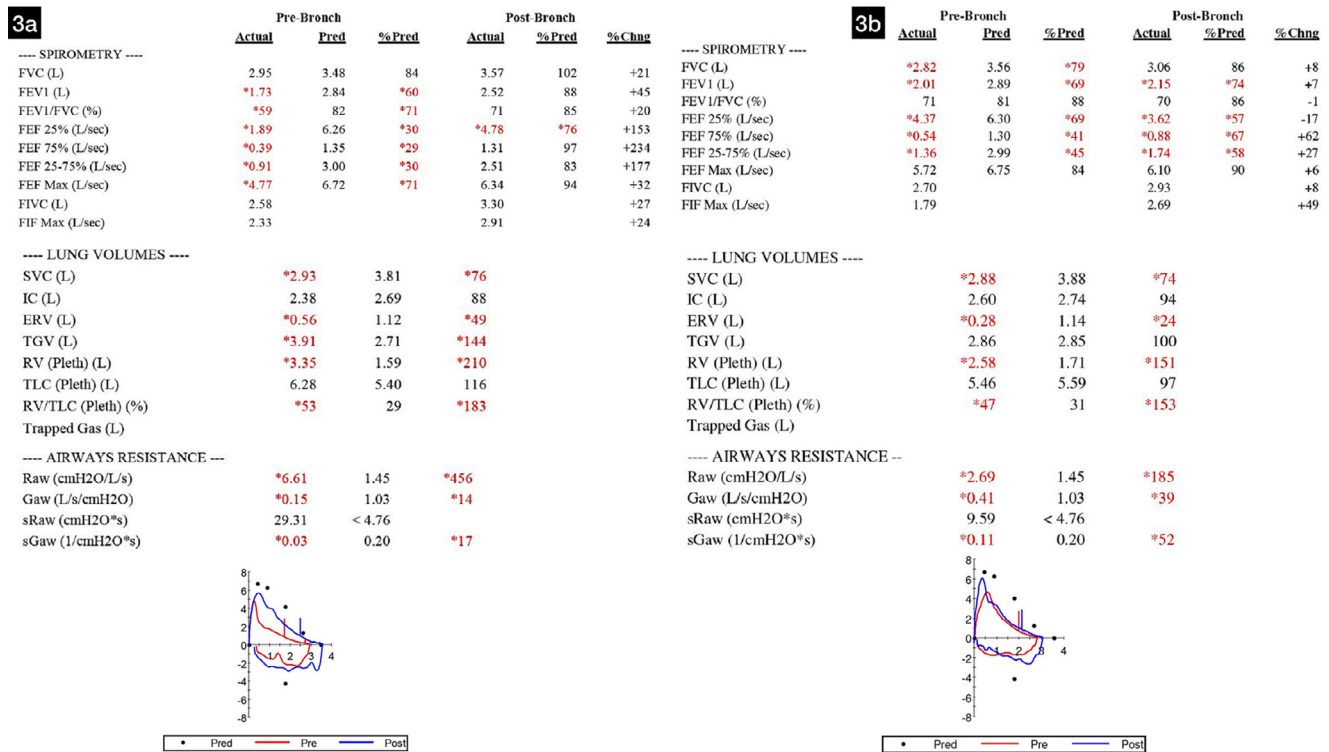


Fig. 3 – Pulmonary function test (PFTs) pre and post foreign body removal. Image A shows spirometry with moderate obstructive ventilatory impairment with response to bronchodilators, air trapping with an increased airway resistance. Response to bronchodilator therapy is seen as well. Image B shows spirometry 3 months after foreign body removal with improvement of obstructive ventilatory pattern, improved pre bronchodilators FEV1 with improved air trapping and airway resistance without response to bronchodilator therapy.

eventually lead to airway strictures, and subsequently airway distortion, which could present with unilateral wheezes in physical examination [8]. Aspiration of such FB is more common into the right lung, but they can occur in other scenarios, in the left lung [9]. The fact that in our case the FB was not highly epithelialized led to a successful bronchoscopy retrieval approach rather than surgical. There are several case reports in literature of successful retrieval of a FB been aspirated more than 10 years prior, making epithelialization an important concept [10]. Severe epithelialization could lead to chest CT findings suggesting bronchogenic carcinoma, in patients with chronic FB aspiration.

After successful retrieval of the foreign body, the patient came to our clinics for follow-up with complete resolution of consolidation and almost complete resolution of cough and asthma improving significantly (Fig. 2d). Follow-up pulmonary function test (Fig. 3b) was performed which showed significant improvement of prebronchodilators obstructive ventilator impairment, improved air trapping, normal diffusion capacity without response to bronchodilators therapy 3 months after foreign body removal. Patient currently with well controlled asthma without any recent asthma exacerbations or cough recurrence. The key point of this article is to point out the importance of ruling out foreign body aspiration in patients with difficult to treat asthma already in optimal therapy. It is important to point out the risk factors of foreign body aspiration, as well that small percentage of the patients will not recall the event. Clinical history is also of paramount important in scenarios as the one this patient had.

Patient consent

Written informed consent taken from patient for publication of the case.

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