

Where is the missing chicken bone? A case of foreign body cystic bronchiectasis

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Abstract

Aspiration of foreign body among adult usually occur in geriatric populations and those with impaired airway reflexes from a neurologic abnormality, altered mental status resulting from sedative or alcohol use, or trauma with decreased levels of consciousness. Symptoms are usually acute requiring prompt intervention. Longstanding neglected foreign body aspiration can cause irreversible damage to the lung parenchyma and respiratory tract with residual respiratory sequelae. Here we present a rare case of a healthy lady who experience chronic productive cough and recurrent chest infections due to neglected foreign body aspiration leading to irreversible cystic bronchiectasis of the lung.

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Introduction

Foreign body aspiration (FBA) may present with various clinical symptoms depends on the location of where the foreign body lodged as well as either total or partial occlusion. In acute setting of FBA or obstruction of the larynx, there will be a brief episode of choking and gagging which later developed into inspiratory stridor with bouts of coughing, associated with hoarseness, aphonia and cyanosis once the foreign body passes through the vocal cords into the subglottic and tracheal region. The moment foreign body dislodges further into the bronchi, in case of smaller size, these symptoms might resolve with a relatively

asymptomatic period. (Dikensoy *et al.*, 2002; Jawarkar *et al.*, 2016).

Chronic and neglected FBA in adult later may mimic other lung diseases like chronic obstructive pulmonary disease (COPD), asthma, or obstructive pneumonia, leading to incorrect diagnosis of disease (Swanson *et al.*, 2003). Overlooked FBAs are frequently diagnosed from bronchoscopy or computed tomography (CT) imaging of thorax intended for investigation of chronic productive cough, recurrent pneumonia, haemoptysis, or in routine chest radiograph (CXR) in asymptomatic individually who came for health screening (Al-Majed *et al.*, 1997; Castillo-Latorre *et al.*, 2021; Dikensoy *et al.*, 2002; James *et al.*, 2006; Jawarkar *et al.*,

2016; Palasamudram Shekar *et al.*, 2018; Wu *et al.*, 2012).

Case Presentation

A 41-year-old lady who presented with chronic cough was initially diagnosed with bronchitis in private centre for the past 10 years. She was started on several types of metered dose inhalation (MDI) therapy. There was multiple history of hospitalizations due to pneumonia where the symptoms improved on regular nebulization of bronchodilator medication and intravenous antibiotics. Apart from that, there was no record of intubation which

require intensive care in the past. Patient later presented with worsening respiratory symptoms for 1 month at a private centre. Chest radiograph shows right middle lobe collapse with right lower zone bronchiectasis (Figure 1). Thus, contrast-enhanced computed tomography (CECT) thorax was done and revealed a large intraluminal calcified lesion within the right lower lobe bronchus. Associated localized cystic bronchiectasis at the right middle and lower lobes as well as superimposed lung infection is also observed. Upon further questioning, she admitted previous history of aspiration while eating chicken about 10 years ago.

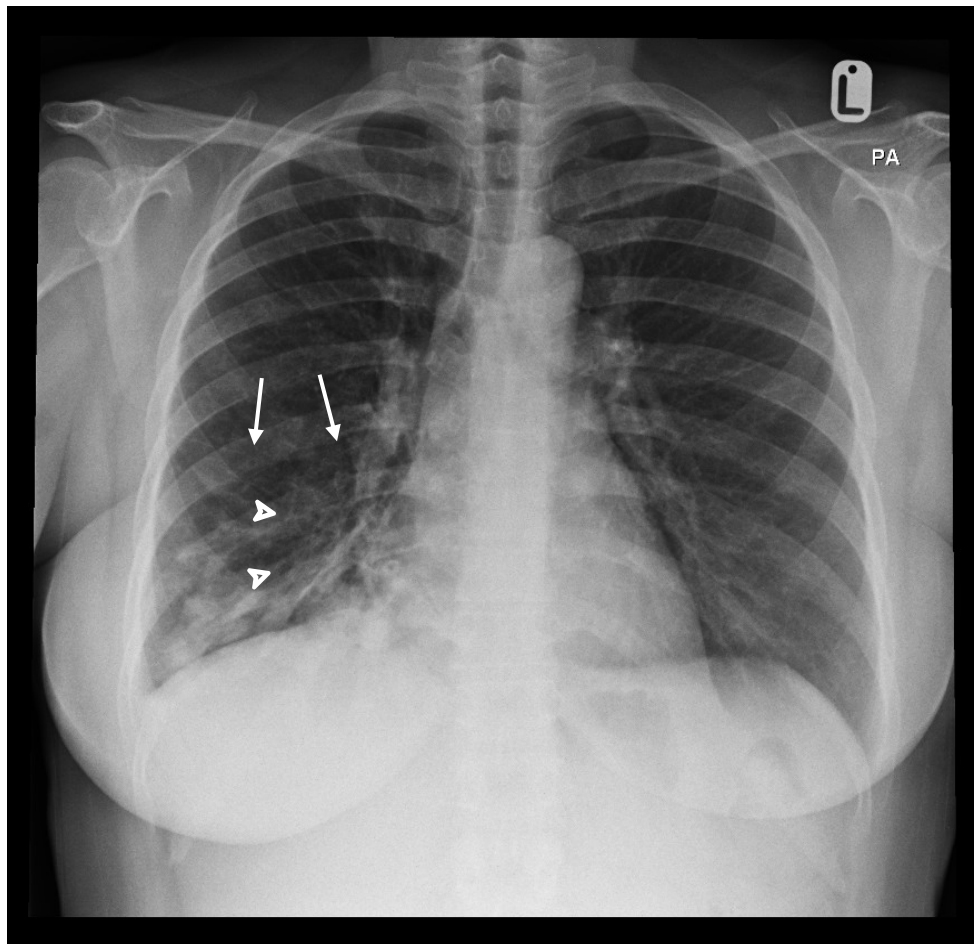


Figure 1. Frontal chest radiograph shows air space opacities at right middle and lower zones with obliteration of right cardiac border in keeping with consolidation. The right transverse fissure is retracted inferiorly (arrow) suggestive of right middle lobe collapse. Bronchiectasis is noted at right lower zone (arrowhead).

Later, she came to our centre for removal of foreign body, most probably chicken bone. Repeated CECT thorax was performed for re-assessment prior to foreign body removal and revealed overall reduced right lung volume with collapsed consolidation of the right middle and lower lobe. A calcified and corticated foreign body akin to bone is seen impacted within the right lower lobe bronchus (Figure 2). The adjacent bronchial wall is irregular and thickened.

Multiple saccular dilatations of bronchi are seen distally in the right middle and lower lobes giving rise to 'bunch of grapes' appearances (Figure 3a). Air fluid level is observed within most of these saccular dilatations (Figure 3b). Minimal right pleural effusion is noted.

Multiple enlarged lobulated mediastinal lymph nodes are also present (Figure 4).

Hence, correlating with clinical history, the diagnosis of an impacted foreign body (chicken bone) within the right lower lobe bronchus causing progressive cystic bronchiectasis of the right middle and lower lobes with superimposed lung infection and lymphadenopathies was made.

The patient underwent rigid bronchoscopy and removal of impacted foreign body. Bronchoscopy findings revealed a calcified chicken bone lodged in the right bronchus intermedius which is then successfully retrieved. Pus and secretions are also observed within the right bronchus intermedius which is then cleared by bronchoalveolar lavage. No complication during and following the procedure. Fluid from bronchoalveolar lavage sent for gram stain, bacterial and fungal culture and also acid-fast bacilli (AFB) stain yield negative result.

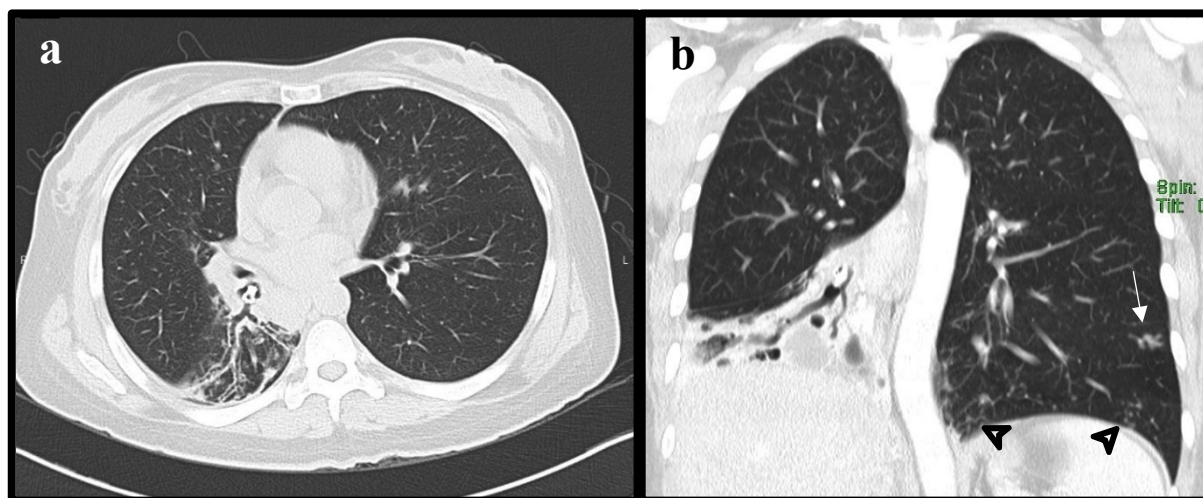


Figure 2. CT thorax with lung window in axial (a) and coronal (b) view shows a calcified and corticated foreign body (chicken bone) impacted within the right lower lobe bronchus. Scattered small solid lung nodules (arrow) and tree in bud appearance (arrowhead) at left lower lobe likely due to lung infection.

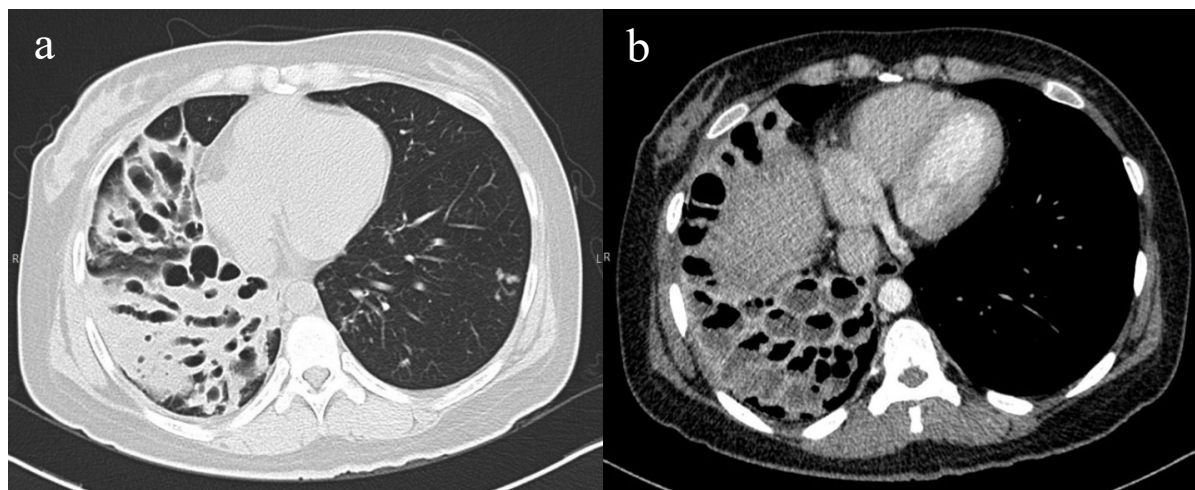


Figure 3. Axial contrast-enhanced CT thorax in (a) lung window and (b) mediastinal window demonstrate multiple cystic bronchiectasis in the right middle and lower lobes. (b) Air fluid level is observed within most of these saccular dilations.

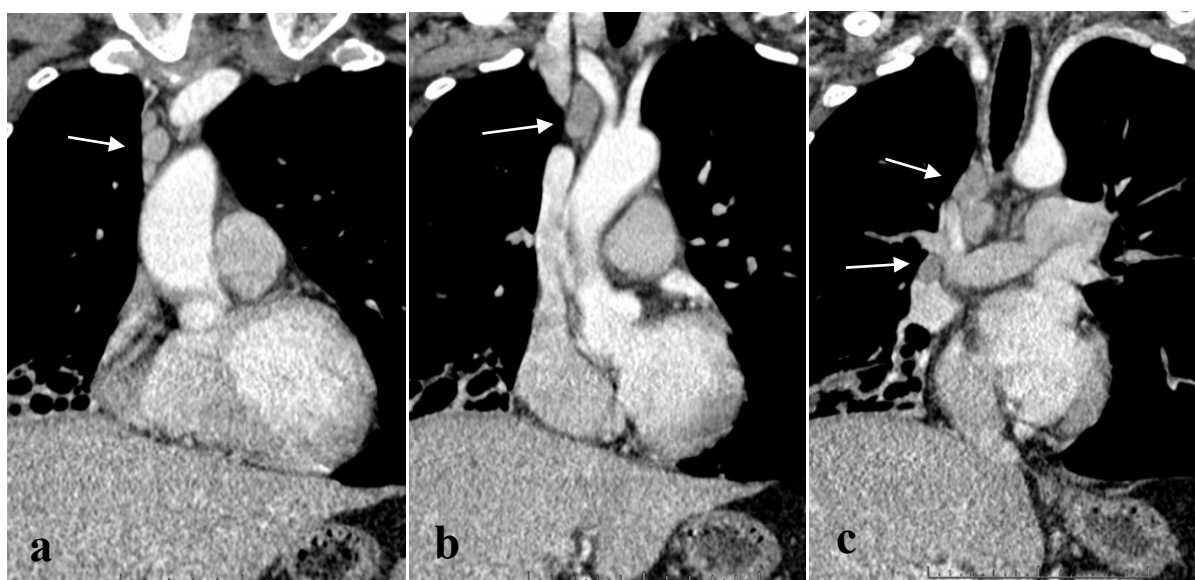


Figure 4. Multiple enlarged lobulated mediastinal lymph nodes at level 2R, 3A, 4R, and 7.

Discussion

Bronchiectasis is a progressive respiratory disease characterized by permanent abnormal dilatation of bronchial tree. Bronchiectasis is characteristically categorised according to morphological appearance and three types have been described, which also represent a spectrum of severity. In cylindrical bronchiectasis, bronchi have smooth tubular configuration with uniform calibre and do not taper distally which giving parallel walls

appearance. Varicose bronchiectasis is often seen with fibrosis and has irregular contours with beaded appearances where dilated bronchi have interspersed sites of relative narrowing. Cystic bronchiectasis is the most severe form and exhibits saccular dilatation

of bronchi that extend to the pleural surface, often with air-fluid levels. (Juliusson & Gudmundsson, 2019). According to one study, the relative prevalence of bronchiectatic changes based on types revealed that cylindrical bronchiectasis is the most common with prevalence of 47%,

followed by cystic type with prevalence of 45.1%. Varicose bronchiectasis type is relatively uncommon with prevalence of 9.9% (Habesoglu *et al.*, 2011).

Its pathogenesis is a consequence of an initial insult to the airway followed by a vicious cycle of repeated infection and inflammation with combination of ineffective mucociliary clearance causing further damages to the airways and progressive destruction of lung tissues. Widened airways with scarred and thickened walls later cause mucus stasis which harbour pathogens leading to recurrent infections and inflammatory processes. As time progresses, mucous plug formation from retained secretion causes further airway obstruction, obliteration and destruction resulting in more advanced bronchiectasis.

A myriad of conditions has been reported and documented as causes of adult bronchiectasis. It can further be categorized into idiopathic, impaired host defences, post infective, hypersensitivity such as in allergic bronchopulmonary aspergillosis (ABPA) or autoimmune, mechanical obstruction, congenital malformation, and others. In one study, it is reported that most of bronchiectasis sample being studied is idiopathic which is up to 40%. Among those cases which aetiologies are identified; the most common cause of bronchiectasis is post infective, frequently by bacterial pneumonia or tuberculosis, which accounts for 20% of cases. Other commonly identified aetiologies include COPD related (15%), connective tissue disease related such as rheumatoid arthritis, Sjögren syndrome and systemic sclerosis (10%), immunodeficiency related (5.8%) and asthma related (3.3%). (Lonni *et al.*, 2015). Another study reported FBA as a cause of bronchiectasis in 5.6% of 1003 resections carried out for bronchiectasis in South African population (Le Roux *et al.*, 1986).

Aspirated foreign body can be organic or inorganic material with organic material being the most common foreign body extracted. Amongst organic foreign body aspirated are nuts or seeds, corn kernel,

vegetable matter and bones while regular inorganic foreign body retrieved are dental material, denture fragments, plastic pieces, pills or even nasal ring as reported in one article. (Al-Majed *et al.*, 1997; Castillo-Latorre *et al.*, 2021; Dikensoy *et al.*, 2002; James *et al.*, 2006; Jawarkar *et al.*, 2016; Palasamudram Shekar *et al.*, 2018; Swanson *et al.*, 2003). Clinical presentation for FBA varies according to the level of obstruction and depends on either acute or chronic occurrence. In neglected or overlooked FBA, the impacted foreign body usually small and tend to lodge distally within the bronchi, leading to chronic respiratory symptoms. In this case, clinical presentations might be due to complication of aspirated foreign body such as bronchiectasis or obstructive pneumonia, which consist of prolonged productive cough, haemoptysis and recurrent pneumonia that is not fully responded to adequate antibiotic; or it can be completely asymptomatic (Al-Majed *et al.*, 1997; Jawarkar *et al.*, 2016; Palasamudram Shekar *et al.*, 2018; Wu *et al.*, 2012).

Diagnosis of aspirated foreign body rely mostly on high clinical suspicion. Standard radiological imaging such as frontal and lateral chest radiograph or occasionally a lateral soft tissue neck radiograph should be performed for suspected FBA. The initial chest radiograph findings might be normal since most of foreign bodies are radiolucent; however, some clues on suspicious foreign body might be demonstrated later such as presence of atelectasis, air trapping, pulmonary infiltrates, and mediastinal shift, especially when associated with ipsilateral decreased breath sounds (Dikensoy *et al.*, 2002). Diagnosis of FBA by solely chest radiograph is challenging, as one study shows that only 32% of the foreign body identified on chest radiograph (Swanson *et al.*, 2003). On some occasions, the foreign body is only detected on other imaging intended for other respiratory conditions such as bronchiectasis, obstructive pneumonia, or chronic productive cough. Bronchiectasis is among frequently observed lung changes in chronic foreign body retention with high resolution computed tomography (HRCT) thorax is a gold standard. Bronchial dilatation is

evaluated in relation to the accompanying pulmonary artery, where a broncho–arterial ratio exceeding 1:1 and lack of normal bronchial tapering over 2 cm in length, distal from an airway bifurcation should be considered abnormal. Other findings associated with bronchiectasis include bronchial wall thickening, mucus plugging and tree-in-bud opacities. (Juliusson & Gudmundsson, 2019).

The use of rigid and flexible bronchoscopy is the preferred instrument for further evaluation and removal of foreign body. Bronchiectasis due to retained foreign body is usually localised and requires surgical resection for curative treatment. Complete resolution of bronchiectasis following removal of foreign body by using flexible bronchoscopy has been reported in one of the literatures (Mansour *et al.*, 1998). In cases with localised bronchiectasis or unresolving pneumonia, flexible bronchoscopy should always be considered for the possibility of a longstanding foreign body to prevent from an unnecessary surgical procedure. Proper training and experience are crucial to optimise the outcome and minimising the risk of complications in tracheobronchial foreign body removal. (Dikensoy *et al.*, 2002).

Conclusion

Diagnosis of FBA is challenging especially in healthy adult with trivial or no history of choking prior. Nevertheless, in cases of bronchiectasis, recurrent pulmonary infection, lung abscess, middle lobe syndrome and chronic productive cough where other common and possible aetiologies are excluded, longstanding FBA should always be considered as one of the possible aetiologies. Proper and adequate imaging is crucial in aiding the diagnosis besides comprehensive clinical assessments. Further evaluation and removal of the foreign body by utilising bronchoscopy in such cases can reduce disease burden and improve quality of life as the resolution of the parenchymal or bronchial pathology can

be achieved and unnecessary surgery can be avoided.

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