

## Case Report

# Pulmonary abscess with atypical topography – computed tomography assessment before and after treatment

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### Abstract

**Introduction:** We present a clinical case of a patient with neurological sequelae, dementia, gastrostomy and tracheostomy with a metal canula, who developed a lung abscess in an atypical topography, in the anterior segment of the left upper lobe, being attended to in the emergency department.

**Case presentation:** A 79-year-old man who was bedridden and with neurological sequelae resulting from a hemorrhagic stroke, with gastrostomy and tracheostomy with a metal canula, was attended for daily fever and increased secretion through the canula, and a diagnosis of bronchoaspiration pneumonia was made. The chest X-ray was unremarkable with an evaluation impaired by the patient's posture. The chest CT showed a characteristic image of an abscess in the topography of the anterior segment of the upper lobe. Improvement in the patient's clinical condition was accompanied by an improvement in the CT imaging results. And the other exams carried out did not show any other associated lung disease.

**Discussion:** Chest X-ray is still the initial method for studying infectious lung lesions, and CT is indicated in cases where the appearance of the lesion is not well defined, if doubts persist, whether the patient is immunosuppressed or oncological. CT can provide better definition of abscess imaging findings and is particularly useful for visualizing cavities not well delineated by X-ray, especially when a malignant neoplastic tumor lesion is suspected or when there is an associated pleural collection.

**Key words:** pneumonia; abscess; CT.

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### Introduction

Aspiration of oropharyngeal secretions persists as the most frequent cause of aspiration pneumonia and can lead to the development of lobar or segmental pneumonia, bronchopneumonia, lung abscess, and empyema [1]. The most affected segments in aspiration pneumonia are the posterior segment of the right superior lobe, apicoposterior segment of the left superior lobe and lower lobes of the superior segment [2] if the patient is in the supine position during the event of aspiration. This is because they are gravity-dependent lung segments, as well as basal segments of the lower lobes, notably the right lower lobe, if the patient has their head elevated or is standing. Moreira *et al.* studied 252 cases of lung abscesses and found that almost all were single abscesses, and in 85.3% of the cases, the lung abscesses were in the posterior segments of the upper lobe or upper lower lobe [2]. Aspiration pneumonia is associated with higher mortality than other forms of community-acquired pneumonia (29.4% versus 11.6%), which implies that greater vigilance in relation to the identification of risk factors and early

diagnosis is needed [3,4]. The causes of death reported in patients after an episode of aspiration pneumonia include the presence of comorbidities, such as association with neoplasms and cardiac or neurological diseases [5]. Clinicians should pay greater attention to patients with neurological disorders to identify preventive measures regarding the risk of aspiration and swallowing disorders to prevent morbidity and mortality associated with aspiration [6].

### Case report

A 79-year-old man with neurological sequelae resulting from hemorrhagic stroke, dementia, gastrostomy, and tracheostomy performed in room air presented with daily fever and increased amounts of secreted fluids in tracheostomy, with a clinical diagnosis of broncho-aspiration pneumonia. Chest X-ray was inexpressive due to the patient's posture, which was a result of the neurological sequelae. Imaging findings on chest computed tomography (CT) were characteristic of an abscess in the anterior segment of the upper left lobe (Figure 1). Fine septation was also

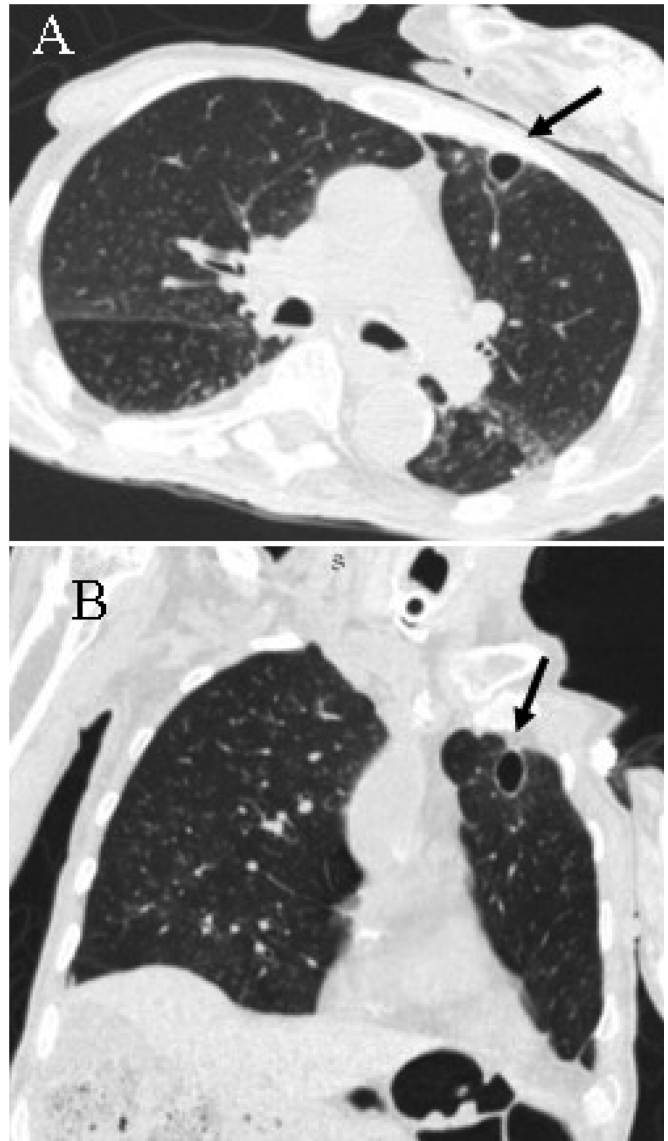
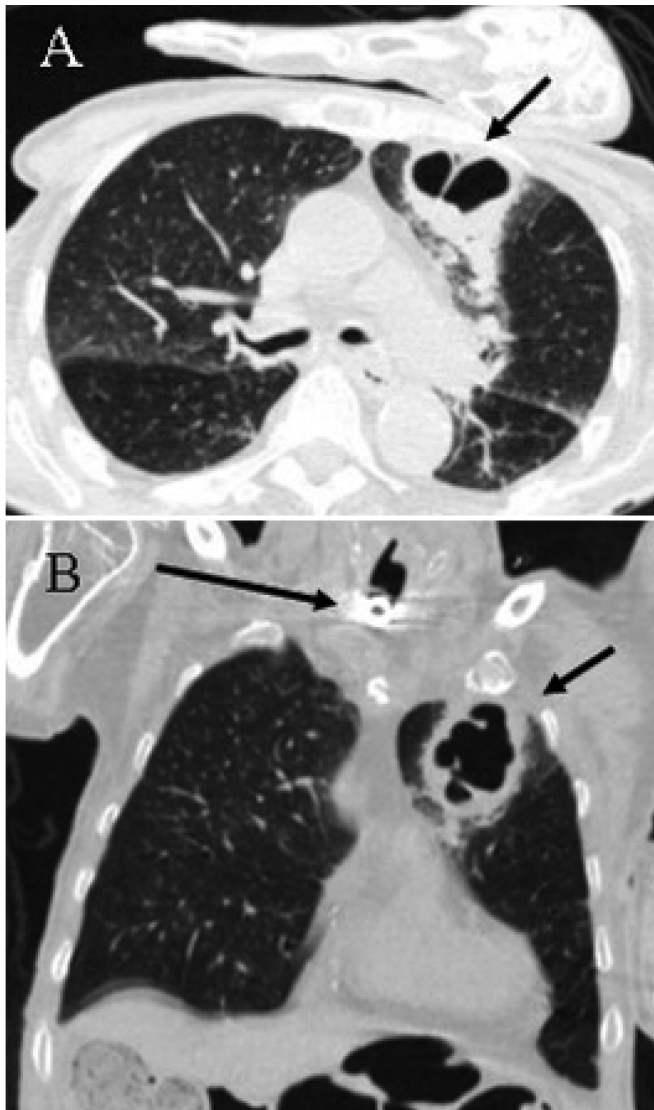
observed, suggesting an inflammatory/infectious process. Other clinical conditions were not identified. *M. tuberculosis* was excluded through sputum and bronchoalveolar lavage. *Streptococcus pneumoniae* bacteria were isolated from bronchoalveolar lavage [7]. The patient responded well to clinical treatment with amoxicillin 1 g IV every 8 hours for 14 days, followed by oral amoxicillin, associated with chest physiotherapy and changes in decubitus with clinical improvement. Follow-up CT showed a marked reduction in the size of the abscess cavity and resolution of the adjacent lung consolidation (Figure 2).

The causal agent can be suspected based on the clinical context. An acute, more exuberant condition indicates infection with an aerobic germ, whereas a chronic, more prolonged condition is more consistent with the etiology of infection with an anaerobic germ.

Improvement in the patient's clinical condition was accompanied by an improvement in the CT imaging results, which ruled out the possibility of any other associated disease. The complications that CT can be used to visualize in these patients include other abscesses, fungi, excavated neoplasia, inflammatory or infectious disease (such as tuberculosis or Wegener's granulomatosis), and this approach can also be used to

**Figure 1.** First chest CT exam. **A:** axial scan; **B:** coronal reconstruction, showing a cavity with septation. Thick and regular walls, indicating a lung abscess in the anterior segment left upper lobe (arrows) amid consolidations, and the metal tracheostomy tube (long arrow).

**Figure 2.** Second chest CT, same plane axial scan and coronal reconstruction as in Figure 1, showing only a small, thin-walled air cavity remaining (arrow).



better demonstrate the abscess and anatomy when surgical treatment is required [2].

## Discussion

Chest x-ray remains an important method for obtaining the most characteristic image of a rounded lesion. Such lesions are usually single and with regular walls that may present septations or fluid levels and can be visualized in both views. These findings are present in approximately 75% of cases. Infectious lung lesions are usually studied by initial imaging with X-ray, and CT imaging is indicated in ambiguous cases and in immunosuppressed and oncological patients. When X-ray aspects are subtle or equivocal, CT exams frequently enable recognition of the disease process [3]. CT can provide better definition of the abscess image findings and is particularly useful for visualizing cavities not well delineated by X-ray, especially when a malignant neoplastic tumor lesion is suspected or there is an associated pleural collection. Due to the characteristics of the image, CT may rule out other etiologies.

In recent years, diagnostic imaging methods have been more valued in the clinical context. Given the improvement in the quality of images, these complementary exams have been increasingly requested by medical teams from various specialties to aid in the final diagnosis. CT has greater importance, mainly in the chest, because it enables the study of the entire rib cage and differentiates the various structures of the thorax [8]. In relation to the lung parenchyma, the quality of the CT scans is similar to the findings obtained using histopathological exams, and in some cases, the aspect of the disease as indicated in the image enables the final diagnosis.

Aspiration secretions may occur in patients with neurological sequelae, and bacterial pneumonia may result when aspirated bacteria are not effectively cleared by mucociliary clearance. This can happen when clearance mechanisms are impaired or overwhelmed by large volumes of aspirated secretions, and when cough and host immune defenses are not effective [9-11]. Our patient also has a metal tracheostomy tube that contributed to the alteration of the lung microbiome.

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