Metallic Foreign Body or an illusion?

Sanchit Mohan, Pavankumar Biraris, Maheema Bhaskar, Sandeep Tandon

Department of Pulmonary Oncology, TATA Memorial Hospital, Mumbai, India

Abstract

The aspiration of Foreign Bodies (FB) into the tracheobronchial region is a relatively rare occurrence in adults compared to children, but it can pose a significant risk to life. Fecal Biomarkers (FBs) have the potential to originate from organic sources such as vegetable material, chicken or fish bone, as well as synthetic materials, including plastic or metallic substances like pins, dental implants, and needles. In the adult population, instances of choking are commonly accompanied by a subsequent and enduring cough. A male patient, aged 70, with a confirmed diagnosis of squamous cell cancer (cT4N2M0) affecting the Right Upper Lobe (RUL) of the lung, underwent treatment with a chemotherapy regimen consisting of carboplatin and gemcitabine. A further evaluation using Computerized Tomography (CT) scanning revealed a partial response in the RUL mass, along with the incidental discovery of a FB with a metal density in the Left Main Bronchus (LMB) measuring 640 Hounsfield Units (HU). The individual exhibited no symptoms and did not have any previous indications of FB aspiration. The subsequent bronchoscopic assessment revealed the presence of a circular and smooth FB in the LMB, specifically identified as a tablet. This FB was effectively extracted using a rigid bronchoscope. Following the surgery, the patient recalled an incident in which they experienced a pronounced cough while eating an antacid tablet (gelusil) a few days prior. Antacid tablets are composed of aluminum and magnesium hydroxide, both of which exhibit a density similar to that of metallic substances when observed by CT scanning. In conclusion, antacid tablets are widely utilized as non-prescription treatments. If these pills are aspirated, they may exhibit characteristics on CT scans that resemble a metallic substance. It is advisable for clinicians to consider the presence of aspirated antacid pills as a potential cause when assessing airway metallic FB.

Correspondence: Sanchit Mohan, Department of Pulmonary Oncology, TATA Memorial Hospital, Mumbai, India.
E-mail: sanchit.agarwal1992@gmail.com

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Introduction

Foreign Body (FB) aspiration is a prevalent cause of intraluminal airway blockage in children, with adults accounting for 25% of cases. The aspiration of FB is not commonly observed among adults. It constitutes around 0.16-0.33% of bronchoscopic procedures performed on adults and is frequently disregarded as a potential etiology of airway blockage. FB can be classified into two categories: biological and metal. The prevailing foodborne pathogen observed in adults is commonly associated with meat and bone consumption, whereas in children, peanut consumption is more frequently implicated. The individual exhibits a cough subsequent to experiencing a choking incident. If the initial episode remains undetected, it has the potential to imitate chronic illnesses such as Chronic Obstructive Pulmonary Disease (COPD), asthma, and obstructive pneumonia. In the absence of a definitive diagnosis, the presence of a retained FB might potentially result in the development of recurrent pneumonia, bronchiectasis, recurrent hemoptysis, pneumothorax, lung abscesses, and pneumomediastinum. Therefore, it is imperative to promptly perform the extraction of FB in order to mitigate symptoms and avert potential problems.

Case Report

The patient under consideration is a 70-year-old male who has been diagnosed with squamous cell cancer (cT4N2M0) affecting the Right Upper Lobe (RUL) of the lung. The prescribed treatment for this condition involved the administration of chemotherapy, specifically carboplatin and gemcitabine. A further evaluation using Computerized Tomography (CT) scanning revealed a partial response in the RUL mass, along with the incidental discovery of a FB with a metal density in the Left Main Bronchus (LMB) measuring 640 Hounsfield Units (HU). The provided visual represen-

tation, labeled as Figure 1, is presented for academic analysis. The patient had a complete absence of symptoms and did not have any previous indications of FB aspiration. The patient exhibited clinical stability, as evidenced by a pulse rate of 80 beats per minute, blood pressure of 110/70 mmHg, respiratory rate of 16 per minute, and oxygen saturation (SpO_2) of 98% when breathing ambient air. During the process of auscultation, it was observed that the air input was equal bilaterally. The results of all routine blood testing fell within the established normal ranges. A decision was made to proceed with rigid bronchoscopy based on the findings of a CT scan indicating the presence of a metallic FB. The scan revealed a circular and smooth FB located in the left main bronchus, as depicted in Figure 2. The removal of FB was effectively accomplished with the utilization of a rigid bronchoscope, employing teeth forceps. Following the surgery, the patient recollected an incident involving a pronounced coughing attack while ingesting an antacid tablet (gelusil) a few days prior. A comprehensive CT scan was conducted on the antacid tablet, yielding results that verified the presence of a metallic composition in the tablets. Antacid tablets are composed of aluminum and magnesium hydroxide, both of which exhibit a density similar to that of metallic objects when observed by CT scanning. The provided image, labeled as Figure 3, is presented for analysis and discussion.

Discussion

Evaluation of suspected FB aspiration is most aided by a patient's medical history.[1] Classically, "penetration syndrome" is characterized as a choking episode followed by an intractable cough that is more prevalent in children than in adults.[2] Only 30% of patients over the age of 65 are likely to recall aspiration events before bronchoscopy.[3] In adults, risk factors for FB aspiration include compromised airway defense, decreased level of consciousness due to alcohol intoxication, use of sedatives and hypnotics, dysphagia caused by stroke, Parkinson's disease, and esophageal motility disorders.[4] There have been reports of various forms of FB, with organic material (popcorn, vegetables, nuts, and sunflower seeds) accounting for 60% to 81% of reported cases.[5] Non-organic FB include pins, pen caps, and toy particulates, which make up between 6.5% and 25% of cases.[6]

Ninety-two percent of FB aspirations performed via flexible bronchoscopy are successful. Nevertheless, rigid bronchoscopy is required in a significant number of instances, particularly in children.[7] There is evidence that mortality and morbidity are lower in flexible bronchoscopy than in rigid bronchoscopy (1% and 12%), possibly because general anesthesia is avoided. Therefore, flexible bronchoscopy-guided FB retrieval is the preferred method. Few indications necessitate rigid bronchoscopy-guided FB retrieval, such as FB impacted in excessive granulation tissue or excessive tissue scarring, a large FB that cannot be grasped by flexible forceps, sharp FB, asphyxiating FB, FB with smooth margins, and multiple failed attempts by flexible bronchoscopy to retrieve FB.[7] Due to the fact that CT thorax suggested a larger metallic FB and its location in the main bronchus, rigid bronchoscopy guided FB retrieval with tooth forceps, which revealed a tablet (pill).

Due to the vertical orientation of the right main bronchus, the most common site of FB impaction is the right bronchial tree, specifically the right lower lobe and right bronchus intermedium.[8] In the present case, however, the patient manifested with FB in the main left bronchus.

The tablet is the most commonly sold medical product in the United States. Seven percent of all FB aspirations involve pharmaceuticals.[8] Antacid tablets/pills are the most commonly available over-the-counter medication. Tablet/pill aspiration is under-recognized, and thus, the literature does not accurately reflect its incidence. Most medicinal tablets are radiolucent on chest imaging and may no longer be visible on bronchoscopic examination due to absorption by the bronchial tree, making diagnosis difficult.[8] However, our patient presented with a radiopaque antacid medication that had not been absorbed by the airway.

Numerous case reports have been published describing the effects of medications on the airways.[8] Rodriguez *et al.*[9] and Kwak *et al.*[10] reported instances in which iron-containing tablets caused severe airway fibrosis. Tamburrini *et al.*[11] reported a case in which multivitamin soft gel capsules caused bronchial mucosal injury as a result of the toxic effects of magnesium, calcium, iodine, molybdenum, zinc, selenium, and copper. The antacid tablet did not cause any bronchial mucosal injury in our patient. Aluminum and

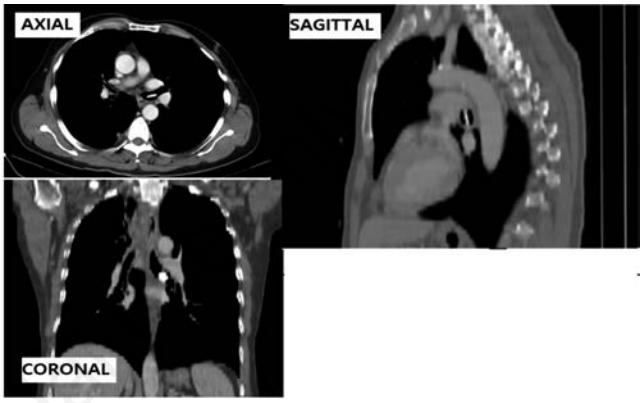

Figure 1. Computed Tomography (CT) images of Foreign Body (FB).

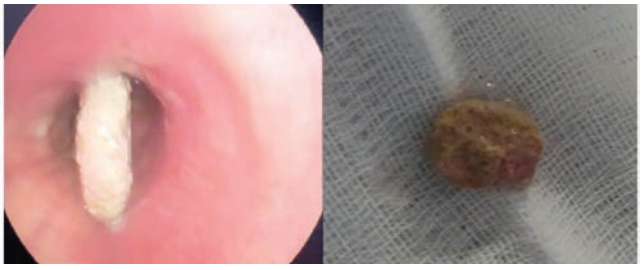

Figure 2. Bronchoscopic retrieval of Foreign Body (FB).

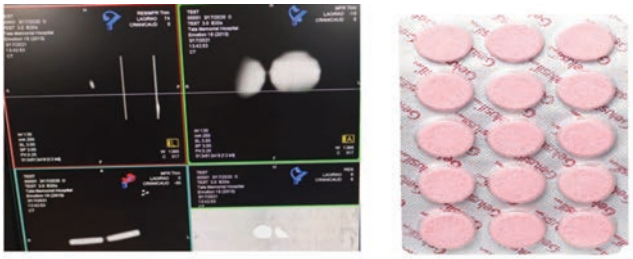

Figure 3. Computed Tomography (CT) image of antacid tablets.

magnesium hydroxide, which are found in antacid tablets and pills, probably do not cause harm to the bronchial mucosa.

This is likely the first case report of FB aspiration of pharmaceutical tablets manifesting as metallic FB.

Conclusions

Antacid tablets are among the most frequently self-prescribed medications. Since an antacid tablet is composed of aluminium and magnesium hydroxide, it can imitate a metal on CT. Therefore, a thorough exposure history, including medications, should be elicited.

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