

Foreign body aspiration leading to complete lung collapse due to left bronchus obstruction: A Case Report

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ABSTRACT

Foreign body aspiration (FBA) is a common life-threatening condition in pediatric emergency medicine that can lead to airway obstruction, asphyxia, and severe respiratory distress. An 18-month old female infant referred with the complaint of dry cough and wheezing with a sudden onset of dyspnea. At the time of admission, her oxygen saturation was 89%. Chest X-ray (CXR) showed a significant opacity in the left lung and the mediastinum shifting to the left side. Complete collapse seen in the left lung was associated with consolidation in the residual lung parenchyma. Rigid bronchoscopy revealed the corn kernels, which were taken out accordingly. The air trapped in the involved lung parenchyma was absorbed, and signs of shrinkage and collapse as consequences of the obstruction occurred in distal parts of the obstruction point. An emergent therapeutic decision is crucial in the early stages of management.

INTRODUCTION

Airway obstruction is a life-threatening complication with high morbidity and mortality rates in children. Apnea or severe respiratory distress that are the main challenges in pediatric care emergency medicine can be due to airway obstruction. Airway obstruction is categorized into upper and lower airway obstruction. Bronchial obstruction as a lower obstruction can be either localized or generalized. Local obstruction is due to a foreign body (FB) in infants and children's tracheobronchial tree. Generalized obstruction is caused by pneumonia with a slow resolution, which leads to a dense mucus, causing chronic cough [1-3]. Obstruction causes are exogenous or endogenous. Exogenous causes are due to objects, including peanuts or toys, that the patient may aspirate by mouth. Endogenous causes are like dense mucus and pus formed by respiratory infections or tumors inside the tracheobronchial tract or adjacent area, obstructing if not removed by coughing up or medical and surgical approaches [4]. Here we present a rare case of left bronchial obstruction and complete collapse of the left lung without any symptoms before admission in the pediatric ward.

CASE PRESENTATION

An 18-month old female, weighing 11 kg, was admitted to the pediatric ward with the complaint of acute respiratory distress, wheezing, dry cough, and dyspnea, which exacerbated progressively over 24 hours before the admission in August 2020.

Respiratory distress and asthenia were present 12 hours before the admission. Pregnancy and delivery were uneventful, and the patient had normal growth and development. There was no family history regarding respiratory infections or diseases. Parents did not mention swallowing or aspiration of any foreign objects. On admission, the patient was ill and toxic with dyspnea. Oxygen saturation level on room air was 89% with the respiratory rate (RR) of 32 breaths per minute (bpm) and heart rate (HR) of 120 beats per minute (bpm), body temperature (BT) of 36.9°C, and blood pressure (BP) of 80/60 mmHg. Chest percussion was dull on the left hemithorax alongside with decreased breath sound on auscultation on the same side. General examinations showed a soft abdomen without tenderness, swelling, abnormal bowel sounds, diarrhea, and vomiting. Neurological examination revealed symmetric and reactive pupils.

The primary diagnosis was pneumonia due to COVID-19, which was ruled out by negative polymerase chain reaction (PCR) analysis. Chest radiography revealed a significant opacity in the left hemithorax with the mediastinum shift to the left side. The complete collapse of the left lung and the residual lung's consolidation were other findings in the chest survey (Figure 1). Also, computed tomography (CT) scan (Somatom Emotion, Siemens, München, Germany) showed a complete white lung in the left hemithorax associated with compensative hyperinflation in the right lung (figure 2). In the coronal view,



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Figure 1 CXR showing a complete left hemithorax opacification (complete white-out) with mediastinal shift to the left hemithorax

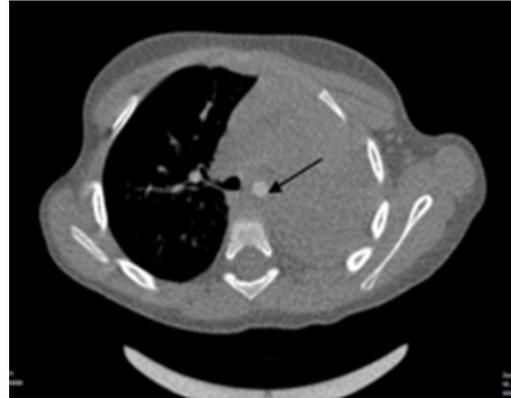


Figure 2 CT scan of the chest (Axial view) showing the complete collapse in the left lung and foreign body mass in the Lt. main bronchus (arrow)

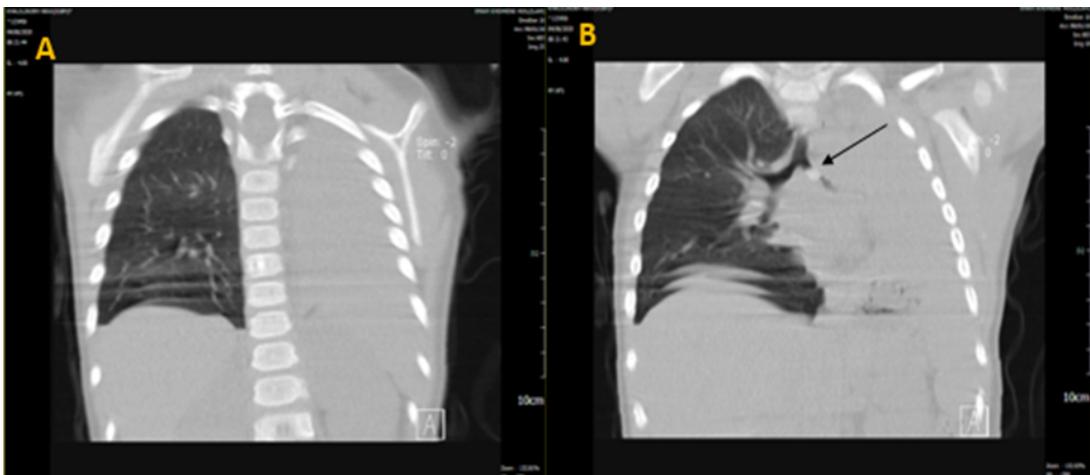


Figure 3 CT scan of the chest (Coronal view) showing the complete collapse in the left lung with the S sign apparatus due to complete collapse. Arrow indicates the foreign body mass in the left bronchus

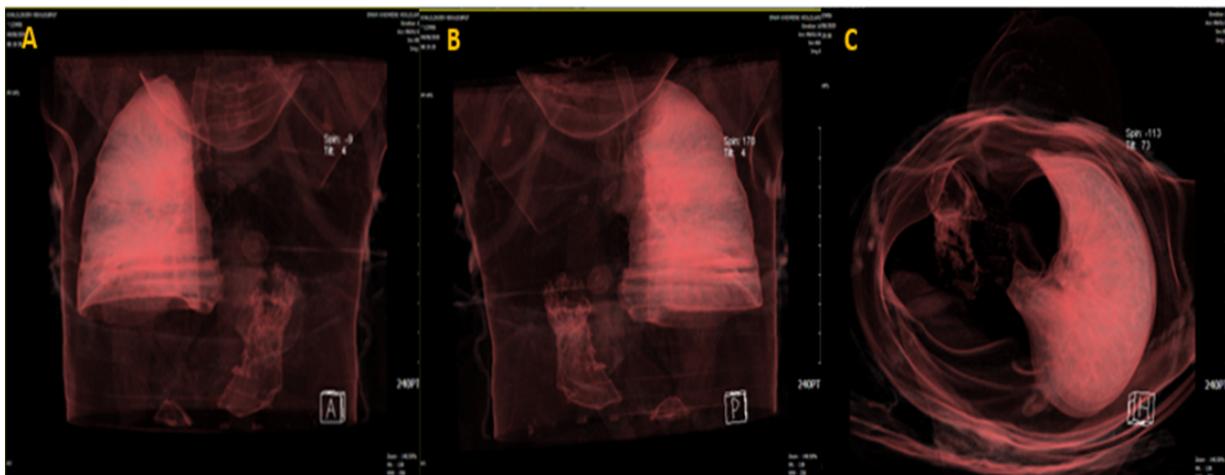


Figure 4 3D reconstruction of the thorax, A; anterior view, B; posterior view, C; inferior (Diaphragmatic) view. 3D reconstruction showing the complete collapse of the left lung

there was a 6×4.5 mm hyperdense area with a mean CT number of 231 (Hounsfield units) with defined borders in the proximal part of the left main bronchus alongside with the S sign of the relevant fissure at the distal part of the obstruction and as a clear marker of the lung collapse (figure 3). Three dimensional (3D) reconstruction of the thorax proved complete collapse

in the left lung (figure 4). Oxygen therapy was initially applied; rigid bronchoscopy (CV-150, Olympus, Shinjuku, Tokyo, Japan) was carried out afterward within 24 hours after the admission and revealed the corn kernels, which were taken out accordingly. No signs of complication were present following the condition.

DISCUSSION

Foreign body obstruction is a leading cause of referral to pediatric medical centers, and more than 60% are under three-year-old males [5]. Regarding its anatomy, running vertically, and being broader and shorter, the right bronchus is affected more by obstruction due to FB aspiration rather than left bronchus. Complete lung collapse following the obstruction with no symptoms or subsequent respiratory distress before the admission in the pediatric ward is considered the main finding. FBA usually presents with wheezing, unilateral reduction of vesicular murmurs, and persistent coughs[5]. Due to bronchial obstruction, the air trapped in the involved lung parenchyma was absorbed, and signs of shrinkage and collapse as consequences of the obstruction occurred in distal parts of the obstruction point. The mediastinal shift resulted from the proximal part of the bronchus' traction forces that caused distortion and dilation [6, 7]. In cases of quick resolution of the obstruction, the collapse could be reversible; otherwise, the accumulation of the secretions may lead to chronic infections and inflammations that results in the deterioration of the lung parenchyma [8, 9]. Therefore, it could disrupt the transportation of the lungs' secretions. The S sign will appear due to the complete collapse, which refers to the S shape of the residual fissure in the obstruction's distal part. In this case, complete bronchial obstruction of the left main bronchus by a solid FB led to the complete collapse in the left lung.

In conclusion, we should consider airway obstruction in any patient or well infant or child with suddenly developed respiratory distress. Guidelines suggest that every suspected case of FBA undergoes rigid bronchoscopy as both a diagnostic and therapeutic method [10]. An emergent therapeutic decision is crucial in the early stages of the management since any delay can result in severe respiratory distress and may cause a life-threatening condition..

CONCLUSION

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