Case Report

Extraction of Foreign Body in Left Main Bronchus with Flexible Optical Bronchoscopy in Asymptomatic Needle Aspiration Patient: A Case Report

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Abstract

Background: Foreign body aspiration is one of the most common respiratory and airway emergencies. The incidence is higher in children and obstruction occurrences are common. The late complications might be fatal when ignored. Bronchoscopy as a gold standard modality in diagnosing and treating this condition, now is widely available, and the emerging flexible optic bronchoscopy (FOB) is more commonly used.

Case: A ten-year-old girl with a history of needle aspiration arrived at the ER with an asymptomatic condition. Further investigations reveal leucocytosis and a metal-needle-shaped foreign body found approximately in the left main bronchus via chest x-ray and CT scan. Bronchoscopy with FOB was performed under general anesthesia and LMA and successfully evacuated the needle although the pin had infiltrated the mucosal wall.

Discussion: Asymptomatic foreign body aspiration is nearly at the same rate as symptomatic one. Management of difficulties and complications increases the longer the foreign body infiltrates the respiratory tract. Early diagnosis with chest x-ray and CT scan is necessary. Prompt and urgent evacuation of the foreign body is required. The use of FOB is associated with a higher success rate and lower complications. FOB is the best modality choice in this case.

Conclusion: The foreign body in the respiratory tract may be asymptomatic. Early and proper diagnosis must be worked out as early management of asymptomatic foreign body aspiration. Early FOB can be used as a modality of choice in this case, preventing further damage to the respiratory tract.

Keywords: aspiration**,** bronchoscopy, foreign body evacuation

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INTRODUCTION

The foreign body in the respiratory tract is one of the most common respiratory and airway emergencies. The incidence is higher in children, and because of the direct or impending airway obstruction, the morbidity and mortality rates are high if not treated promptly.[1] Therefore, early diagnosis of foreign body aspiration is important and following an early evacuation is urgently needed to prevent complications of foreign body aspiration in the respiratory tract. The foreign body in the respiratory tract can cause morbidity and mortality, especially among children. Previous retrospective studies show a mortality rate of 2.5% in patients with foreign body aspiration.

The most common sign of foreign body aspiration reported is cough. In a retrospective study of 173 patients with foreign body aspiration who underwent bronchoscopy, cough was reported in 75.72%, dyspnoea in 11.56%, wheezing in 6.26%, cyanosis in 2.31%, choking in 1.73%, stridor in 1.16%, and recurrent lung infection in 1.16% of cases. In many cases of foreign body aspiration in pediatric patients, no signs or symptoms are reported. It counts nearly 50% of cases in the retrospective study. Plain X-ray used as early diagnostic tools in asymptomatic patients with suspected foreign body aspiration.[2]

The asymptomatic aspiration cases should be of concern, as late complications such as pneumonia, bronchiectasis, lung abscess and lung atelectasis can occur in case of undiagnosed or abandoned foreign body aspiration. It may also cause bronchial stenosis and obstructive emphysema. Retrospective studies also show that the risk is related to

misdiagnosed cases and the risk increases as the longer foreign body infiltrates the respiratory tract.[3]

Asymptomatic aspiration of the foreign body leads to old inhaled or latent foreign body in the thoracic cavity. Most of these old inhaled foreign bodies rise to bronchiectasis and lung abscesses. A prior study showed that asymptomatic foreign body aspiration led to a bronchiectasis event and is still observed. Another study reported pleural effusion, obstructive emphysema, necrotizing pneumonia, and organizing pneumonia appeared as the sequelae of foreign body aspiration.[4]

The gold standard modality in diagnosing and treating foreign body aspiration is bronchoscopy. Flexible optic bronchoscopy (FOB) is the treatment of choice because of its non-invasive and non-traumatic nature. Recent studies show FOB is safe and effective in foreign body evacuation either in the proximal or distal respiratory tract.[5]

CASE

A ten-year-old girl arrived at the emergency room with a history of needle aspiration 6 hours before admission. The patient did not show any symptoms. Physical examination showed no abnormalities. Laboratory tests showed leukocytosis (12.800/uL) and posterior-anterior chest x-ray showed a high-metal density foreign body in the left paravertebral in thoracal 6-7 level, approximately in the left main bronchus (Figure 1).

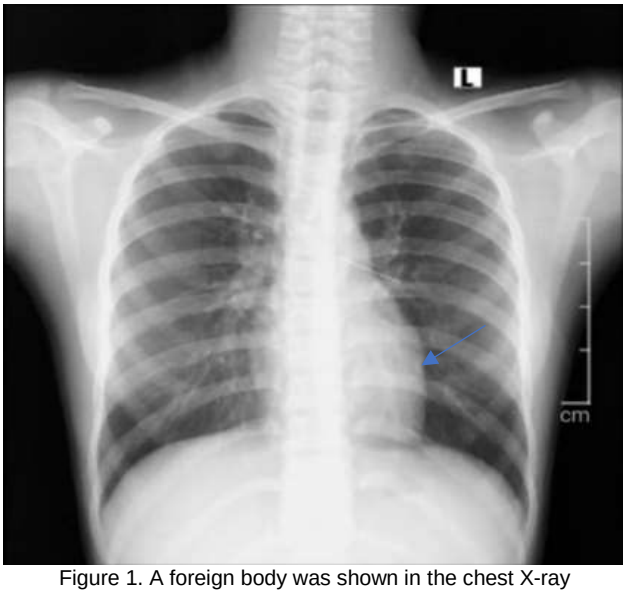

Figure 1. A foreign body was shown in the chest X-ray

The patient then underwent a chest CT-Scan which revealed a foreign body with metal density in needle shape in the left main bronchus (Figure 2).

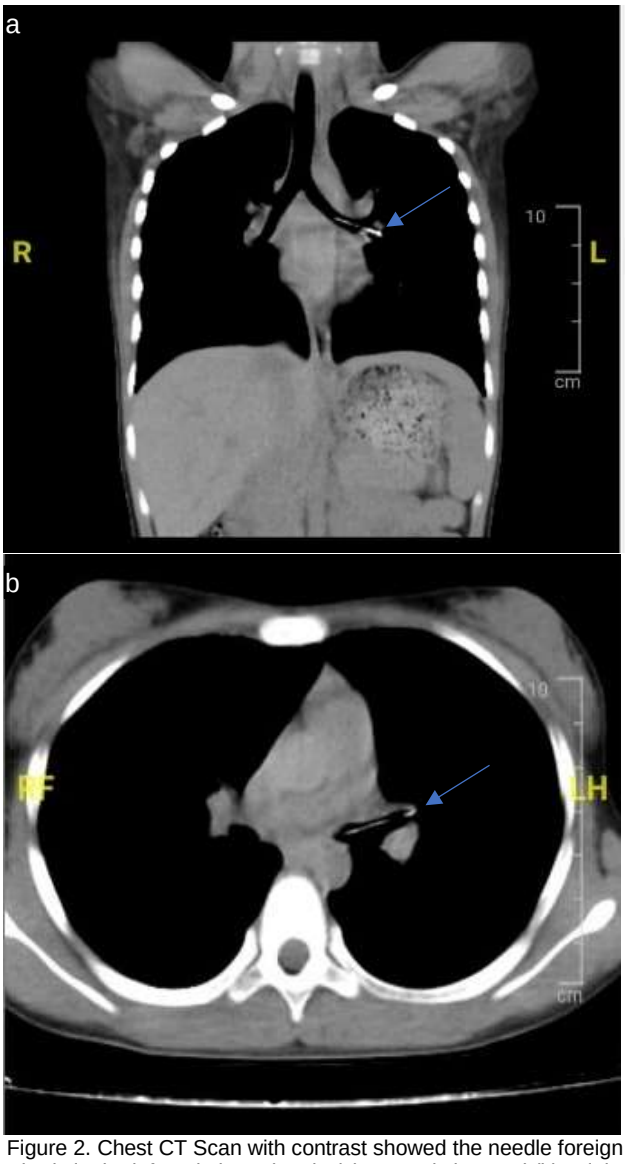

Figure 2. Chest CT Scan with contrast showed the needle foreign body in the left main bronchus in (a) coronal view and (b) axial view.

The patient was given an intravenous fluid, prophylaxis antibiotic and Nonsteroidal anti-inflammatory drugs (NSAIDs). Then the patient was planned to undergo bronchoscopy with anesthesia and thoracic surgery as a backup team. Before bronchoscopy, general anesthesia was performed with a laryngeal mask airway (LMA) application. Bronchoscopy was done by using Flexible Optical Bronchoscopy (FOB), with flexible forceps biopsy. A bronchoscope was introduced to the respiratory tract through the LMA

lumen, and the identified needle infiltrated the mucosal wall of the left main bronchus (Figure 3).

After being identified, the foreign body was extracted and evacuated with forceps (Figure 3). The foreign body was extracted through the LMA lumen and extracted from the body together while extubating LMA.

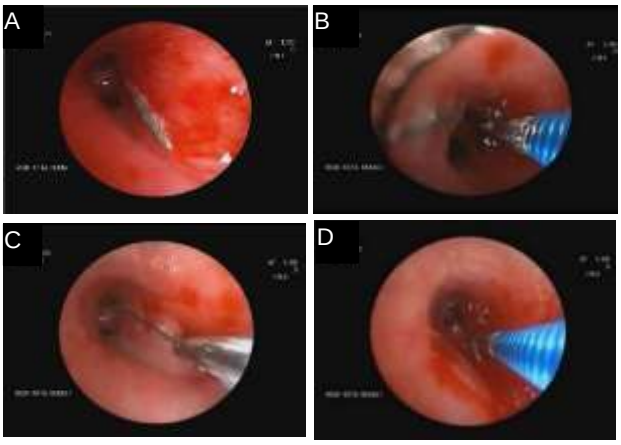

Figure 3. (A) The foreign body was shown through the bronchoscope, infiltrating the mucosal wall. (B) Forceps bronchoscopy was introduced to the left main bronchus. (C) The foreign body was extracted by forceps. (D)The foreign body was evacuated carefully with the forceps.

The procedure was completed in 2 hours and the bleeding was minimal. The patient was stable after the procedure and evaluated in the ward. After 24 hours of stable evaluation, the patient was discharged.

Figure 4. A needle was successfully evacuated

DISCUSSION

The most common signs and symptoms of foreign body aspiration are cough, choking and dyspnoea. The chest physical examination may show wheezing or asymmetrical breathing sounds.[6] According to a previous study, cough as the single complaint can be found in 61% of symptomatic patients, 19% complaining of cough and fever, and 16,5% with cough and wheezing. The rarest findings are chest pain and hemoptysis.[5]

Atelectasis, pneumothorax, and air trapping also can be found in several cases of foreign body aspiration. Recent studies show most common radiological features include consolidation or collapse emphysema in 47,97% of patients, flattening diaphragm in 9,83%, atelectasis in 9,83%, pneumonia in 12,14% and normal findings in 20,23%.[3] In this case, the chest X-ray of our patient visualized the foreign body.

The prior study reported that a patient who inhaled a rubber bullet which was extracted after a year, developed pneumonia with multiple areas of bronchiectasis and consolidations.[4]

Some cases with asymptomatic and normal chest X-rays need a prompt diagnosis with bronchoscopy as a gold standard, but a chest CT scan is also a diagnostic choice in most cases. Although early diagnosis with a plain chest x-ray is recommended, if normal findings in highly suspicious cases occur, a chest CT scan and bronchoscopy should be ordered.[7]

A study by Pitiot et al shows 86% of pediatric patients with foreign body findings in CT scan showed evidence of foreign body in bronchoscopy. This study also showed that a CT scan was a non-invasive and reliable modality compared to high-risk endoscopy as a diagnostic tool. The sensibility of CT scan is approximately as high as 98%.[8]

Early rapid diagnostic and treatment with bronchoscopy for life-saving conditions are emergently required. The use of rigid bronchoscopy (RB) is avoided nowadays, especially in pediatric patients due to its invasiveness and higher risk of serious complications than FOB. Flexible

bronchoscopy is the most common method used to evaluate the respiratory tract anatomically and functionally for diagnostic and/or therapeutic purposes. The complication rate of FOB is significantly lower than RB and the foreign body evacuation success rate is as high as 92%.[9]

A study conducted by Ma et al shows that 42 out of 57 patients with foreign body aspiration (73,7%) were successfully treated with FOB. Bronchoscopy rigid was successfully performed in 13 patients (22,8%) who failed FOB and the other 2 patients who failed both had to undergo thoracotomy.[10]

Another study by Yuksel et al shows FOB successfully extracted respiratory tract foreign bodies in 93% of subjects (29 out of 31 cases). The other two patients were unable to be treated because of the granulation tissue surrounding the foreign body due to a chronic history of the disease. The use of catheters in FOB cases varies between subjects depending on the subjects' age and body weight.[5]

All subjects underwent general anesthesia with NO_2 inhalation, propofol injection and neuromuscular blockers. Location distribution of the foreign body was in the right main bronchus in 23% of patients, lower right bronchus in 19% of patients, middle right lobes in 3% of patients, upper right lobes in 6% of patients, left main bronchus in 23% of patients, lower left bronchus in 12% of patients, upper left bronchus in 10% patients, and trachea in 3% of patients. Another study also shows in pediatric patients aged between 2 months old to 12 years old shows that from 173 patients with bronchoscopy confirmed foreign bodies, the most common location was in the right main bronchus (64.74%), left main bronchus (25.43%) and 9.83% in carina.[5]

Paediatric patients have a narrower respiratory tract which leads to a high incidence of respiratory tract obstruction even in small-sized foreign body aspirations. Anatomical narrowing in the children's tracheobronchial trees makes the proximal airway the most common location of obstruction. Based on a retrospective study, 96% of foreign body found in this area. In under 15 age children, the left-sided location of the foreign body is more common than the right one because the more symmetrically main bronchus and the aorta development affect the trachea and left main bronchus.[1] The most common foreign body reported in a study are nuts (69%). The wide use of needle pins in our country made them one of the most common foreign bodies found in the respiratory tract.[5]

Postoperative complications include persistent cough, laryngospasm, bronchospasm, hemoptysis, and postoperative fever.[5] Another study shows mechanical ventilation is needed in 11.56% of patients and the mortality rate was 2.31% and 2.89% of patients who failed with bronchoscopy will need thoracotomy.[3]

LIMITATIONS

Performing flexible bronchoscopy increases the risk of foreign body evacuation failure compared to rigid bronchoscopy. Rigid bronchoscopy is a traditional choice modality and has some benefits including good airway control and better capability in large-volume suction. Rigid bronchoscopy is preferable in sharp foreign bodies of central airway obstruction. Another advantage of rigid bronchoscopy is removing foreign bodies located in deeper or thinner bronchial trees. Flexible bronchoscopy in younger children is associated with adverse events related to narrowed trachea and bronchial, also asphyxia caused by airway stenosis related to the use of an inappropriate bronchoscope.

CONCLUSION

Foreign body aspiration can be asymptomatic. High suspicion must be made in patient with a clear history of foreign body aspiration. Early radiological evaluation with chest X-ray should be ordered immediately and a CT scan can be used further as a fast and reliable diagnostic tool. Bronchoscopy as the gold standard treatment is required as soon as the diagnosis is established. Early FOB with general anesthesia may serve as a reliable tool with significantly lower complications in the evacuation of foreign bodies in the respiratory tract, preventing further damage to the respiratory tract.

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