

Spontaneous Expulsion of a Bronchial Foreign Body

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ABSTRACT

Foreign body aspirations represent a life-threatening emergency and continue to pose challenges to the otorhinolaryngology team. The mainstay of treatment remains bronchoscopy, and early removal should be performed to prevent complications. Spontaneous expulsion of an airway foreign body is a rare entity with few cases reported. Additionally, its occurrence and associated complications are still unclear. Besides, an expelled foreign body can be swallowed, migrate to another location, or lodge in a subglottic area. We are reporting an unusual case of a young man who accidentally inhaled a thumb pin. However, the foreign body was expelled without any complications after he suddenly had a severe bout of cough.

KEYWORDS: Aspiration, bronchoscopy, foreign body bronchus, spontaneous expulsion

INTRODUCTION

Foreign body (FB) aspiration is an airway incidence that causes significant morbidity and mortality. Compared with FBs in the upper digestive tract, laryngeal dislodgement sites are rare due to the protective mechanism reflex of the larynx. Spontaneous expulsion of aspirated FBs is even rarer [1]. Even though it can save the patient and relieve the condition, it may impose more dangerous complications, such as subglottic lodgement of the expelled FB, which may lead to acute upper airway obstruction and subsequent death [2].

CASE PRESENTATION

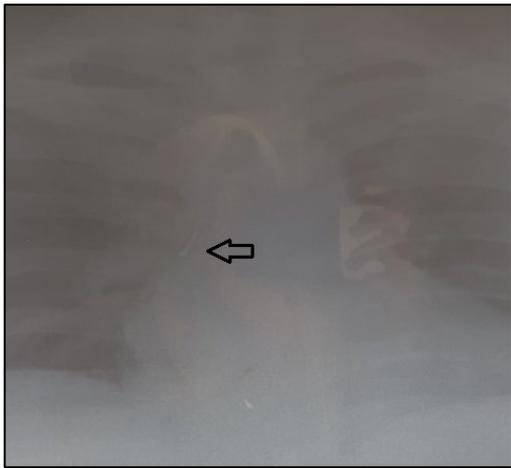
A 22-year-old male complained of a thumb pin aspiration while he was using it as a toothpick. He experienced a vigorous cough for a few minutes before it was spontaneously stopped, and he was completely well after that. There was no associated dyspnoea,

stridor, wheezing, haemoptysis, vomiting, odynophagia, chest pain and abdominal pain.

Physical examination showed no abnormality. Laryngeal and neck examinations were unremarkable. Lung auscultation revealed bilateral equal air entry. Chest radiograph (CXR) showed a short, thin radiopaque FB lodged in the right main bronchus (Figure 1). He did not show any sign of airway compromise.

Anti-tetanus medication was given prior to his admission into the Emergency Department. He was admitted and nursed in an acute cubicle bed with monitoring of his oxygen saturation, which was maintained above 98%. Emergency rigid bronchoscopy removal under general anaesthesia was planned. While the operation theatre was being prepared, the patient started having continuous bouts of vigorous cough. He coughed out a red, rounded-head thumb pin with a rusty, sharp metal part measuring 16 mm in length; the head measured 5 mm (Figure 2 and Figure 3).





(a)



(b)

Figure 1 Chest radiograph PA (a) and lateral view (b) showed a radiopaque shadow (consistent with thumb pin) in right main bronchus without lung changes



Figure 2 The foreign body (thumb pin). It has a blunt rounded head with a sharp pointed end and rusted metal area

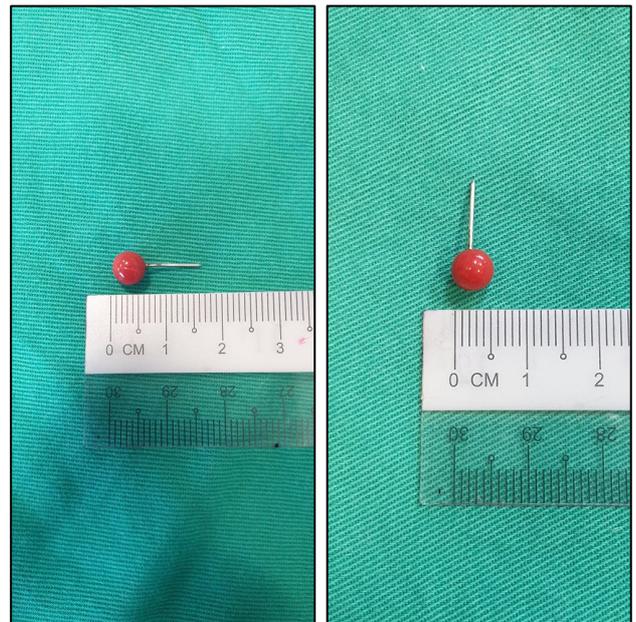


Figure 3 Spontaneously expelled foreign body (rusted thumb pin) measures approximately 16 mm in length, 1 mm at the tip and 5 mm at the round red-colour head

There was no stridor, dyspnoea, wheezing, hoarseness or haemoptysis post-expulsion of the FB. The patient was kept for 24 hours under observation to watch out for upper airway obstruction. A repeat CXR was normal, and he was discharged well on the next day.

DISCUSSION

FB aspiration is a serious, and life-threatening condition that mainly occurs in younger children but may also happen to adults [3]. It is common in children, mostly male between the ages of one and three years [1]. This condition is uncommon compared with FB ingestion because the larynx itself plays an important sphincteric function that protects the airway [4]. The main symptoms of aspiration are choking and coughing. Airway patency is at risk and must be secured before bronchoscopic removal of FBs [5]. As this is a dangerous medical emergency, spontaneous expulsion should not be expected. Furthermore, an expelled FB can be swallowed into the alimentary tract or migrate to another location [6].

A vigorous cough reflex may cause forceful expiration of air whose speeds reach 100 miles per hour, which might help to expel the FB out of the airway [2]. However, spontaneous expulsion of bronchial FBs is very rare [7]. In addition, its occurrence and

complications are still unclear [6]. The incidence of spontaneous expulsion of FB from the airway is only between 2% and 4% [7].

There are only eight cases reported about the spontaneous expulsion of sharp, metallic FBs published in the literature [7]. Tabook reported 3 cases of spontaneous FB expulsion; two FBs (a toy lamp and a scarf pin) were spontaneously expelled from the bronchus, and a stone from the alimentary tract [2]. Other cases of spontaneous FB expulsion were reported separately from India and Tanzania, involving a sharpener blade, a sewing machine needle and a sharp metallic pin [7-9].

Common signs and symptoms are choking, coughing, wheezing, hoarseness, respiratory distress, decreased air entry and rhonchi [9]. Other symptoms include cyanosis, fever and stridor, in chronic cases, patients might present with recurrent pneumonia or bronchiectasis [9,10]. Patients might also be symptomless [11]. Besides clinical history, radiological examination using radiograph is important for diagnosing airway FBs [11]. Standard posteroanterior and lateral view of chest x-ray are the modalities of choice in demonstrating the presence and location of FBs and any complication, such as air trapping, atelectatic lung fields and pneumonic changes [5]. However, negative imaging studies do not exclude the presence of FBs in the airway [3]. In up to 20% of cases with suspected airway FBs, the chest x-ray can be normal. In fact, bronchoscopy evaluation is needed in highly suspicious airway FB cases [11].

The right bronchus is shorter, wider and more vertical than the left bronchus. Due to these anatomical differences, it is easier for FBs to be lodged into, and removed from, the right bronchial system. According to a review of FB locations, 71.5% of total cases are in the right main bronchus, followed by the left main bronchus (22.8%) and the trachea (5.7%) [11]. In our case, the thumb pin was lodged into the right main bronchus and was expelled out spontaneously after bouts of vigorous coughing. Most reported cases involve spontaneous expulsion from the left bronchial system [1,2]. The longer an FB resides in the airway, the more likely it is to migrate distally towards smaller branches of the bronchus, hence making the removal more difficult [3].

There is always a possibility of spontaneous FB expulsion, regardless of the object size, site and shape [8]. Sharp and irregularly shaped objects easily stick to the mucosa and are thus less likely to migrate [9]. Metallic FBs lead to chemical reactions resulting in oedema and further impaction of the FBs [10]. Organic materials can cause more severe inflammation and fluid absorption, resulting in airway obstruction [9, 10]. However, inorganic materials cause less inflammatory reaction; therefore, they are more likely to mobilise than are organic ones [6].

In our case, the FB had a rounded head and a sharp metal pin. It could have been impacted and buried into the bronchial mucosal, thus triggering the inflammatory reaction (bronchitis). There were no significant bronchial obstructions or lung complications, such as collapse or consolidation, due to the small size and short duration history of the FB. We did not start antibiotics or steroids because our patient came with a short history of inhalation, and we planned an emergency removal. Some believe that spontaneous expulsion occurs due to the relief of mucosa oedema after starting intravenous antibiotics and steroids [1]. This process leads to the movement an FB within the bronchus, which triggers severe bouts of coughing that are strong enough to expel the FB [1].

Most published cases that patients with bronchial FB would have severe bouts of coughing prior to expulsion with high expiratory flow [1,8-10]. In one case, the patient turned onto the FB side and then started to have continuous vigorous coughing [8]. The movement of the FB within the bronchus triggered the vigorous coughing, which caused it to be expelled from the left main bronchus towards the oral cavity [1]. Similarly, in our patient he experienced multiple bouts of cough, and the FB was expelled spontaneously. The complex cough reflex arc, which involves the afferent, central and efferent pathways, explains the mechanism that happened. It was initiated by the irritation of the cough receptors that responded to chemical or mechanical stimuli. In this case, it was probably due to mechanical receptors only, which can be stimulated by touch or displacement of the FB itself [12].

During the spontaneous expulsion process from the tracheobronchial tree, there is a risk of the FB becoming lodged in the subglottic area, especially in

children. This situation is a life-threatening emergency that requires urgent intervention. The patient should be placed under close observation while preparing for a rigid bronchoscopy and after the spontaneous expulsion [2]. Our patient did not experience any respiratory distress after the dislodgement.

CONCLUSION

Lodgement of FBs in the airway remains a morbidity and mortality threat in younger children; however, it may also occur in adults who insert FBs into the mouth for certain purposes. Although rare, spontaneous expulsion is possible, irrespective of the size, shape and nature of the FB. This is because of the natural protective airway reflex mechanism in the body. However, it should not be expected or seen as an ideal experience. During spontaneous FB expulsion, there is high risk of respiratory obstruction due to FB lodgement in the subglottic area. Vigilant observation is imperative for a patient with a bronchial FB, and proper planning should be initiated for immediate removal to prevent further airway complications.

Conflict of Interest

Authors declare none.

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Authors' Contribution

ACMA searched for the literature review while AMB prepared for drafting. AHA contributed to critical revision; IM was involved in critical review and also approved the final version.

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