CASE REPORT

A light bulb moment: an unusual cause of foreign body aspiration in children

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SUMMARY

A 15-month-old girl developed persistent cough with no associated history of foreign body aspiration. Chest X-ray showed a U-shaped radiopaque foreign body, which was initially thought to be a hairpin, in the right main bronchus. Rigid bronchoscopy was performed and the foreign body turned out to be a light-emitting diode (LED) bulb. In this article, we report our experience of LED bulb aspiration in children, with the view to raise the awareness of clinicians about this potentially life-threatening emergency.

BACKGROUND

Foreign body aspiration is a potentially fatal yet commonly missed paediatric emergency. Food substances including peanuts and fruit seeds have been reported to be the most commonly aspirated objects among Chinese children.^{1 2} Since aspiration occurs most frequently in toddlers between 1 and 3 years old,³ it is always a challenging task to get a detailed history and to delineate exactly what had been aspirated. Even with the aid of modern imaging technologies, the radiological findings can still be misleading. In this article, we present a rare case of a light-emitting diode (LED) bulb aspiration in children.

CASE PRESENTATION

Our patient was a 15-month-old girl with good past health. She developed a non-productive cough for 1 week with no running nose or fever. No history of foreign body aspiration was noticed by the caretakers. She was initially managed as simple upper respiratory tract infection with cough suppressants prescribed by her primary physician. However, she developed increasing shortness of breath 3 days later despite good compliance with the prescribed medication, and thus presented to the emergency department. On arrival, the right chest was found to be hyperresonant with reduced breath sounds. Chest X-ray showed a 2 cm U-shaped radiopaque foreign body located at the distal trachea and going into the right main bronchus. The right lung was hyperinflated with mediastinal shift towards the left side (figure 1A, B). On further clarification, the child's grandmother revealed that she had recently lost one of her hairpins, which was similar in shape and size to the object seen on the chest X-ray. Emergency rigid bronchoscopy was arranged in view of the clinical diagnosis of foreign body aspiration. Endoscopically, two metal wires were seen inside the right main bronchus. After removal of one of the metal wires using

Figure 1 Chest X-ray showing a foreign body ((A) posteroanterior view, (B) lateral view).

forceps, it was found that there was a semitransparent plastic substance attached to the remaining wire. The plastic substance was lodged in the right main bronchus and completely obliterated its lumen, resulting in a ball valve effect. The whole foreign body was then removed in one piece using forceps to grasp the metal wire. Suctioning of intraluminal secretion was performed until clear and luminal patency confirmed

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Figure 2 (A and B) Foreign body (LED bulb) after removal. LED, light-emitting diode.

before the end of the procedure. The foreign body was subsequently identified as an LED bulb that had possibly been attached to one of the patient's toys (figure 2A, B). Postoperatively, the patient recovered well with daily chest physiotherapy, and was discharged home 2 days later with a 2-week course of oral augmentin.

DISCUSSION

Foreign body aspiration can be a serious respiratory emergency requiring immediate medical attention. It accounts for up to 7% of accidental deaths in children younger than 3 years old, which makes it one of the leading causes of all sudden deaths in toddlers.^{4 5} Prompt diagnosis is vital, as delayed treatment can result in mortality as well as increased risk of complication, including pneumonia, broncho-oesophageal fistula and bronchiectasis.⁶ However, it is always easier said than done to obtain an accurate and instant diagnosis from this group of patients, since the clinical picture can sometimes be confusing or misleading.

A previous study by Baharloo *et al*⁷ revealed that 80% of paediatric patients suffering from foreign body aspiration were younger than 3 years of age. Patients between 1 and 3 years of age are particularly at risk because they have a strong tendency to put objects into their mouth as a means of exploring the unknown world. In addition, the absence of molars means that they have to use their incisors as the only tool while eating, resulting in food being chewed incompletely before swallowing.⁸ Together with the fact that their upper airway protective reflex is still under development,⁹ it is no surprise that toddlers are so prone to foreign body aspiration. The difficulty in getting a clear history from this group of patients and occasionally the absence of symptoms also makes the condition easily overlooked. Even in the presence of caretakers, only two-thirds of patients had been witnessed ingesting a foreign body, as observed in a previous study,¹⁰ and identification of the type of object aspirated can be misleading due to recall bias, as illustrated in our patient.

Organic food substances are the most frequently aspirated objects, followed by plastic and metal parts from toys.¹¹ Only 60% of these patients produce positive chest X-ray findings.¹² An LED bulb is a rare cause for tracheobronchial aspiration and only two cases have been previously reported in the literature.¹³ In recent years, LED bulbs have gained exponential popularity in the toy industry owing to their numerous physical advantages over older technology, including much improved energy efficiency, low heat generation, long life span and shock resistance.

Yet most of the studies only focused on the optical safety of LEDs,¹⁴ with few concern about their aspiration risk. With the increasing use of LED bulbs in all sorts of commercial products, the potential consequence of their aspiration should not be underestimated and clinicians should bear this in mind. The chest X-ray features can also be confusing since the plastic component of the LED bulb is radiolucent, allowing the bulb to mimic a purely metal wire, with its ball valve effect underrated.

In conclusion, foreign body aspiration in children remains a diagnostic challenge for clinicians. A high index of suspicion is therefore extremely important in patients suspected of the condition. Medical health workers should be aware of the possibility of LED bulb aspiration.

Learning points

- ▶ Foreign body aspiration in an infant can be subtle.
- ▶ Clinical history may be misleading.
- ▶ An LED bulb has to be considered as a source, although rare, of foreign body aspiration.

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Competing interests None declared.

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