Spontaneous expectoration of bronchial foreign body: a case report

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(Received April 4, 2007; Accepted June 19, 2007)

A nine-year-old girl with mental retardation accidentally swallowed an axle of a toy car and was urgently hospitalized with the diagnosis of left bronchial foreign body. While various monitors were installed and removal of the foreign body by a ventilating rigid bronchoscope was in preparation, the patient suddenly coughed and vomited, with the foreign body found in the vomit. When examining infant cases of air way foreign body, attention tends to be focused on the diagnosis and treatment. However, patients are at risk of aggravating difficulty in breathing or suffocation as long as foreign bodies are present in the air way. It is important to monitor carefully for changes in the breathing and to prepare for unexpected events.

Key words: Foreign body, spontaneous expectoration

INTRODUCTION

Air way foreign body is a life-threatening condition, and its diagnosis and treatment can sometimes be difficult. We report a case of bronchial foreign body involving a toy in which the foreign body was spontaneously expectorated while its removal was prepared.

CASE DESCRIPTION

Patient

A nine-year-old girl, who was brought to an Emergency Center midnight of April 11, 2006, because she gestured to her mother as if she had swallowed something accidentally (Table 1). No pulmonary symptoms were apparent. However, chest radiography led to the diagnosis of left bronchial foreign body, and the patient was introduced to the Emergency Room of our hospital.

History

Mental retardation.

Family History

Nothing remarkable.

Physical Findings

Height 127.0 cm, body weight 30.0 kg, body temperature 36.3℃ , blood pressure 116/68 mmHg, pulse rate 120/minute, respiration rate 40/minute, percutaneous oxygen saturation (SpO_2) under room air 99%, no retractive breathing, facial color good, no cyanosis of the lips, no trauma in the oral cavity, normal heart sounds with no murmurs, lung fields clear, no difference between left and right breath sounds, abdomen soft, no hepatomegaly or splenomegaly, and no body surface deformity.

Blood Examinations

No notable findings (Table 2). Blood gas analysis was not performed.

Chest Radiography Findings

Except for the marking of the foreign body recognized in the left mid-to-lower lung fields, no notable abnormal findings were apparent (Fig. 1).

Course

On admission to the hospital, SpO_2 was 99% under room air, the patient showed no forced breathing, and no difference was noted between the left and right breath sounds. Chest radiography performed at our hospital revealed that the location of the foreign body had not changed. The patient's breathing was stable, and no respiratory symptom was apparent. Because it was far deep into the night, and securing an otolaryngologist skilled in removal of bronchial foreign bodies was difficult, we planned to remove the foreign body in the daytime working hours with a ventilating rigid bronchoscope.

With the monitors installed for heart beat, breathing and SpO_2 and the breathing under observation, preparation was underway for removal of foreign body with a ventilating rigid bronchoscope. Suddenly, the patient coughed and vomited, and the foreign

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body was found in the vomit. The foreign body was an axel, 40 mm ×2 mm ×2 mm, of a toy car (Fig. 2). After the foreign body was expectorated, no symptoms or findings suggestive of air way trauma were found, and the breathing was stable. Thus, the patient was discharged on the following day (Table 1).

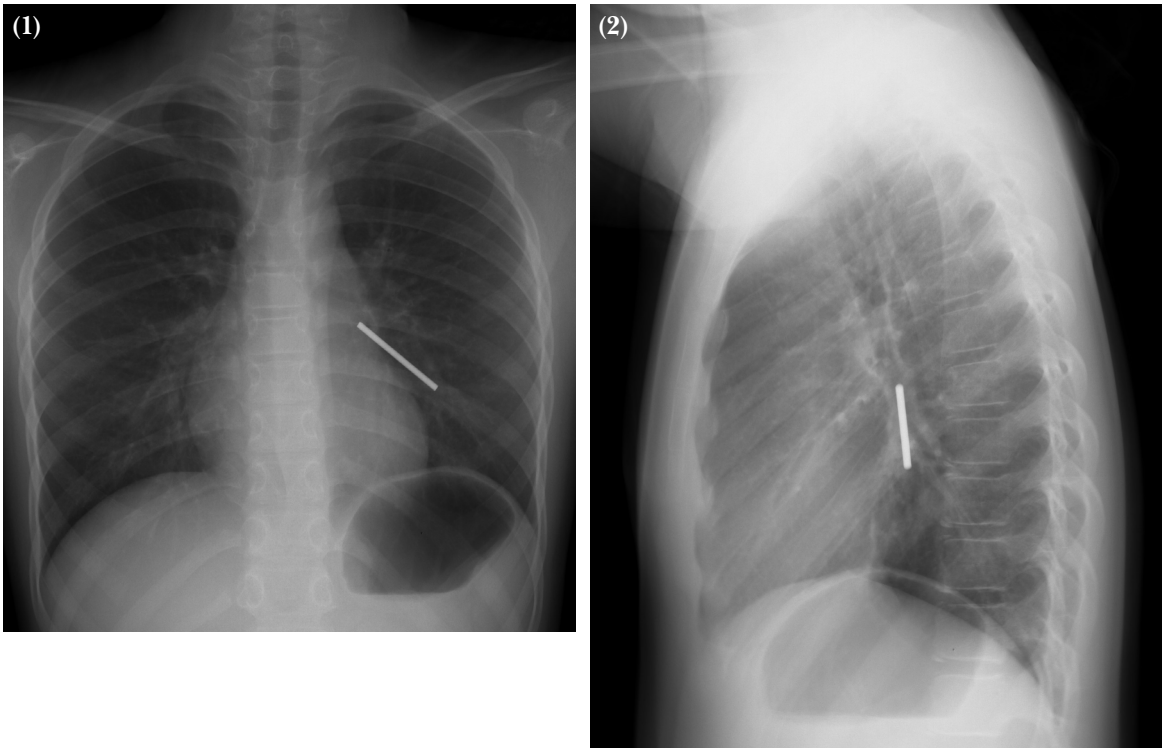

Fig. 1 Chest radiography
The foreign body is visible in the left mid-to-lower lung fields in the posteroanterior view (1) and lateral view (2).

Fig. 2 Expectorated foreign body
An axel of a toy car (40 mm ×2 mm ×2 mm).

Table 1. Summary of the course

April 12, 2006	20:00	Coughing began.
	23:00	The patient was brought to the Emergency Center.
		Air way foreign body was diagnosed by chest radiography.
April 13, 2006	2:00	The patient was brought to the Emergency Room of our hospital.
	3:00	Urgent hospitalization
	10:00	The foreign body was expectorated in vomit.

Table 2. Blood examinations

Complete blood count		Chemistry			
WBC	8300/μL	CK	76 U/L	Na	139 mEq/L
RBC	5.03×106 /μL	AST	23 U/L	K	4.0 mEq/L
Hb	13.8 g/dL	ALT	13 U/L	Cl	101 mEq/L
Hct	41.2%	LDH	196 U/L	CRP	<0.09 mg/dL
Plt	27.8×104 /μL	Cr	0.3 mg/dL		

DISCUSSION

Children are always at risk of air way foreign body. Its incidence is particularly high in infants below the age of three, accounting for over 60% of the overall incidence for all age groups [1-3]. Accidental ingestion of foreign body is not uncommon in children with severe motor and intellectual disabilities [4. 5]. The most frequent cause is foods (in particular, beans), followed by toy parts. Because accidental ingestion is not always witnessed, the diagnosis can be difficult with infants who are unable to appeal, occasionally leading to various complications (Table 3). In order to exterminate the occurrence of air way foreign body in infants, educational programs have been given actively at open-to-public seminars, health examinations and vaccinations for children. Unfortunately, air way foreign body still occurs today [7].

In general, detailed description of history is thought to be most important in diagnosing air way foreign body and, together with physical findings and imaging diagnosis (chiefly chest radiography, with CT, MRI and nuclear medical examinations as supplemental diagnostic methods), the diagnosis is made. Treatment is to remove foreign bodies using a ventilating rigid bronchoscope. Spontaneous expectoration of air way foreign body, as seen in the present case, is not common in the clinical setting (Table 4) [8-11].

Table 3. Complications of air way foreign body

Acute phase	Chronic phase
air way infections	air way stenosis due to granuloma
pulmonary emphysema	Formation
Atelectasis	subglottic edema
mediastinal emphysema	Bronchiectasis
air way rupture	pulmonary abscess
cardiopulmonary arrest	direct invasion of other organs

Table 4. Previously reported spontaneously expectorated foreign bodies

Dieter et al. [8] (seven cases)	
	Bullet fragment, shrapnel, surgical clips and sponges, wax, bronchial stone, tumor fragment
Komune et al. [9] (three cases)	
	peanuts in all cases
Doutsu et al. [10] (one case)	
	fish bones
Nakajima et al. [11] (one case)	
	seeds of four-o'clock

It should be pointed out that when examining children with air way foreign bodies, physicians are inclined to be preoccupied with the diagnosis and treatment. However, as long as the foreign body is present in the air way, children are at risk of aggravation of difficulty in breathing or suffocation. Thus, it is most important to be fully alert for any change in the breathing. Specifically, monitors for heart beats, respiration and SpO_2 should be installed, and the course should be observed in a room where the physician and nurse can readily observe the patient's systemic conditions. In addition, air way foreign body caused by relatively large toys, as in the present case, are associated with greater risks of air way damages or suffocation. An emergency cart and other tools should be prepared to respond immediately to unexpected events. Finally, foreign bodies should be removed as quickly as possible.

We believe that the present case will be a good lesson to all of us in pediatric practice. Finally, we should also add that removal of foreign bodies with a ventilating rigid bronchoscope requires close collaboration of a skilled anesthesiologist and an otolaryngologist, and a quick treatment by a team effort is essential.

ACKNOWLEDGMENTS

An abstract of the present study was presented at the 39th Annual Meeting of the Japanese Society for Pediatric Pulmonology (December, 2006, Tokyo).

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