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## CASE REPORT

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# The Whistling Cough in a Child: a Computed Tomographic Diagnosis

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### ABSTRACT

*Foreign body inhalation in children is not uncommon. Although the sensitivity of frontal chest radiography for radiopaque foreign bodies is high (84-95%), an inhaled radiolucent foreign body in the bronchus can still be missed. An inhaled hollow plastic object in the airway can be a diagnostic problem as it causes partial lung obstruction and may not be readily apparent on a plain radiograph. Moreover, delay in its recognition and removal can lead to chronic complications or even death. Due to its superior contrast resolution and cross-sectional capability, multidetector computed tomography is an ideal investigative tool to resolve such problems in this age-group. We report a child who presented with an atypical whistling cough due to an inhaled plastic whistle that was diagnosed by a multidetector computed tomography scan.*

*Key Words:* Child; Foreign bodies; Multidetector computed tomography

## 中文摘要

### 使用CT診斷一名有「哨聲」咳嗽的小童

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小孩吞入異物的情況經常會發生。儘管正位X光胸片對於高密度異物有高敏感度（84-95%），但仍然有機會漏掉支氣管內低密度異物。吞入塑膠中空的物件會引起部分肺阻塞，也容易在一般X光影像中不能察覺，繼而造成延遲診斷。延遲發現病因而導致未能及時移除異物可引發慢性併發病，甚至死亡。多排CT有出色的對比解像度及橫切面功能，對於誤吞異物的小孩來說是一種理想的檢查工具。本文報告一名因誤吞一個塑膠口哨而出現非典型的「哨聲」咳嗽的小童，最後憑多排CT為病人確診。

### INTRODUCTION

Foreign body inhalation in children is not uncommon and causes significant morbidity and mortality, although it is treatable and preventable. Delay in recognition

and removal can lead to chronic complications or even death. The successful diagnosis and treatment of this problem requires awareness and a high degree of suspicion, whenever there are symptoms or signs of

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Submitted: 29 Jul 2011; Accepted: 1 Nov 2011.

foreign body aspiration. Prevention, early recognition, and extraction of the foreign body are the mainstay of management.

We report a child with an inhaled radiolucent foreign body. The patient presented with a whistling cough but no abnormalities were detected on plain radiographs. The final diagnosis of foreign body inhalation was made by multidetector computed tomography (MDCT).

### CASE REPORT

A 3-year-old Malay boy suddenly developed a whistling cough that had been present for one day. The child was otherwise well, comfortable, and active. The mother noted that the whistling sound was getting louder and the cough was getting more frequent.

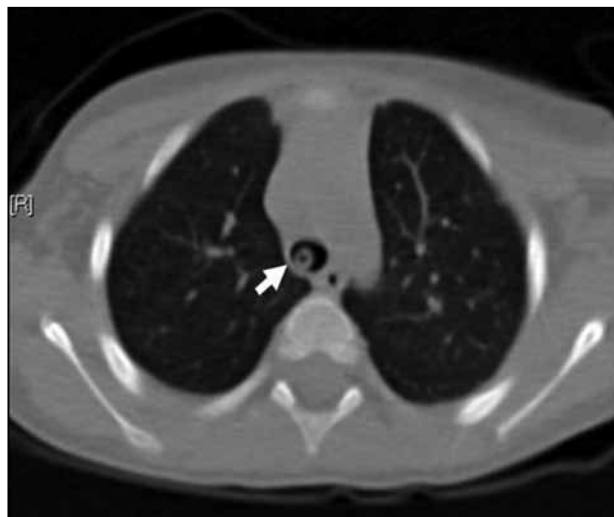
On examination, the child was comfortable and afebrile, and on physical examination there was no particular significant finding. The lungs were clear with good air entry bilaterally. Blood oxygen saturation was normal on room air. An erect chest X-ray, and supine abdominal and lateral neck radiographs were normal. Expiration and inspiration chest radiographs were also attempted but the child was not able to cooperative.

Inhalation of a radiolucent foreign body was suspected and the child was referred to the ear, nose and throat surgeon for further management. Flexible laryngoscopy was subsequently performed to the level of larynx and hypopharynx, but no foreign body was visualised. Non-contrast computed tomographic thorax (SOMATOM SENSATION 16; Siemens, Forchheim, Germany) revealed a tubular structure at the origin of the right main bronchus; there was no air trapping, collapse, consolidation, or pneumothorax (Figures 1 and 2).

Bronchoscopy and removal of the foreign body was performed under general anaesthesia. A 4-French rigid bronchoscope was used to remove a 1.5 x 0.8 cm tubular plastic whistle from the right main bronchus. It was similar to the type normally found in children's squeaker shoes (Figure 3). There was no intra- or post-operative complication. The child was treated with intravenous antibiotics and dexamethasone for three days, and discharged home well.

### DISCUSSION

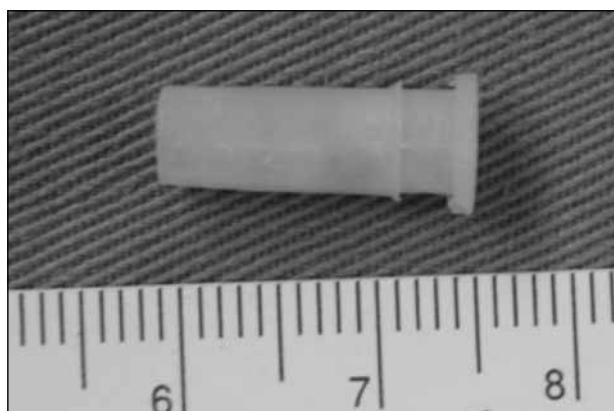
Foreign body aspiration into the tracheobronchial tree is a frequent and serious cause of respiratory problems in children. It is especially frequent in males below the age



**Figure 1.** An axial computed tomographic scan of the thorax showing a hollow and tubular foreign body just at the origin of the right main bronchus (white arrow).



**Figure 2.** A reconstructed coronal computed tomographic scan of the thorax showing a tubular structure (the whistle; white arrow) in the right main bronchus.



**Figure 3.** The plastic whistle that was removed by bronchoscopy.

of three years.<sup>1</sup> Children have an immature protective cough reflex compared to adults, and have narrower airways, and hence are prone to higher morbidity and mortality.<sup>2</sup> A peanut is the commonest inhaled foreign body.<sup>3</sup> Due to the well-known anatomic characteristics of airways, most foreign bodies are located in the right bronchial tree, as occurred in our patient.

Squeakers in baby shoes induce parents to buy them for children, who love playing with them. Whistles placed in these shoes are supposedly safe as they are confined to the base of the shoe and believed not to be accessible to the child. On rare occasions however, the whistle can become exposed and accessible to the child. Such whistles are made from plastic, are hollow, and can allow air to pass through them if they enter the lung, whilst still causing a cough and possible partial obstruction. In our case, there was no eyewitness to any event, such as an episode of choking. The whistling cough heard by the mother was presumably due to airway irritation and air passing through the device during coughing.

Plain chest radiography is the initial imaging modality for patients with suspected foreign body aspiration. In one series, positive radiological findings on plain radiographs were present in only 58% of cases.<sup>3</sup> In our patient, the chest X-ray was normal because the aspirated foreign body was radiolucent and did not cause significant obstruction. Chest radiographs taken in full inspiration and expiration can improve sensitivity, which, however, necessitates patient cooperation. When chest radiography is normal but the clinical suspicion of an aspirated foreign body persists, MDCT should be performed.

MDCT is a useful non-invasive radiological modality that can delineate the exact shape, location, volume, and form of a bronchial foreign body and assist surgeons in planning bronchoscopy and removal of the suspect aspirated foreign body.<sup>4</sup>

The superior sensitivity of MDCT and short time required for scanning can reduce the delay in diagnosis. In this patient, the foreign body was only seen in the lung setting with a window width (WW) of 1500 and

window length (WL) of -500. It was not well-visualised on the soft tissue setting (WW, 350; WL, 75). In our patient, thin-section axial MDCT with multiplanar reformatted (MPR) images in coronal and sagittal planes provided the exact location of the problem prior to bronchoscopy. Moreover, window manipulation and MPR played a very crucial role in the diagnosis. The weighted computed tomography dose index for this patient was 14.9 mGy.

MDCT virtual bronchoscopy is a useful tool in the evaluation of bronchial stenosis and obstruction caused by foreign body inhalation, which has the added advantage of looking beyond the stenosis but the exact cause of the obstructing pathology may not be well-visualised.<sup>5</sup> Bronchoscopy is still considered the gold standard and not only allows direct visualisation of the object and bronchial mucosal status, but also enables foreign body removal.<sup>6</sup>

In conclusion, we present a case of radiolucent foreign body inhalation in a three-year-old boy with an atypical symptom (whistling cough) and negative findings on conventional radiographs. This patient highlights the importance of a high index of suspicion and the superiority of MDCT for the diagnosis of foreign body inhalation. Collaboration between the attending physician, radiologist, and surgeon is crucial to making a prompt diagnosis and offering early treatment.

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