

## Magnetic resonance imaging for aspirated peanut in the bronchus

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### Abstract

Peanut inhalation in the right main bronchus of a 15-month-old boy was diagnosed using a  $T_1$ -weighted image produced by magnetic resonance imaging (MRI) because of the high fat content of the peanut. The  $T_1$ -weighted MRI image may also be useful in diagnosing other kinds of aspirated nuts with high lipid content as well as peanuts. This method does not involve any X-ray exposure.

**Key words:** Foreign body; Peanuts; Bronchi; Magnetic resonance imaging

### Introduction

Despite efforts to educate the public, aspiration of foreign bodies into the tracheobronchial tree still occurs in infants and small children (Puhakka *et al.*, 1989). Most cases of aspirated foreign body have a history of a definite event, either of aspiration or choking accompanied by paroxysms of coughing (Rothman and Boeckman, 1980). However, the problem is that the actual event is often recalled only after the diagnosis has been established (Rothman and Boeckman, 1980). Radiosensitive foreign bodies

are easy to diagnose when the physician considers the possibility of tracheobronchial obstruction due to a foreign body. However, radiosensitive foreign bodies in the tracheobronchial tree are unfortunately unusual and all over the world, the most common foreign body in the tracheobronchial tree in children is a peanut (Cohen *et al.*, 1980; Rothman and Boeckman, 1980; Mantel and Butenandt, 1986; Puhakka *et al.*, 1989). A recent report demonstrated that magnetic resonance imaging (MRI) is useful in detecting an aspirated peanut in the bronchial tree (O'Uchi *et al.*,

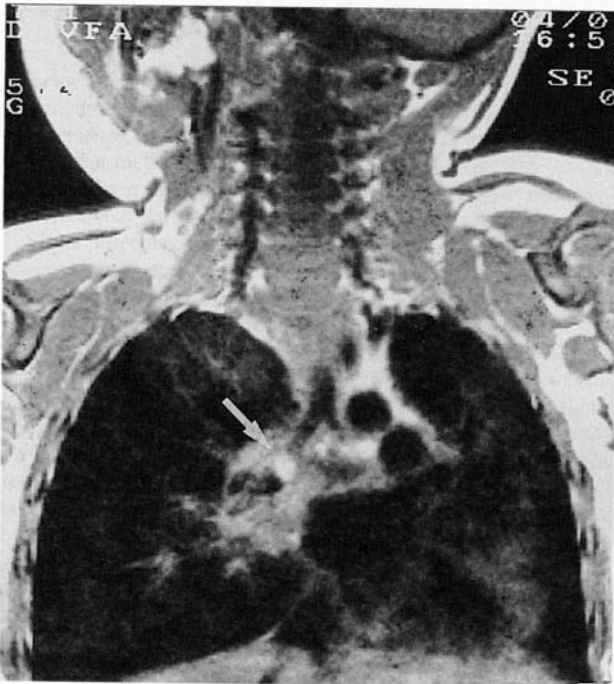


FIG. 1

$T_1$  weighted MRI image showing a high-intensity area (arrowed) in the right main bronchus suggestive of an aspirated piece of peanut.

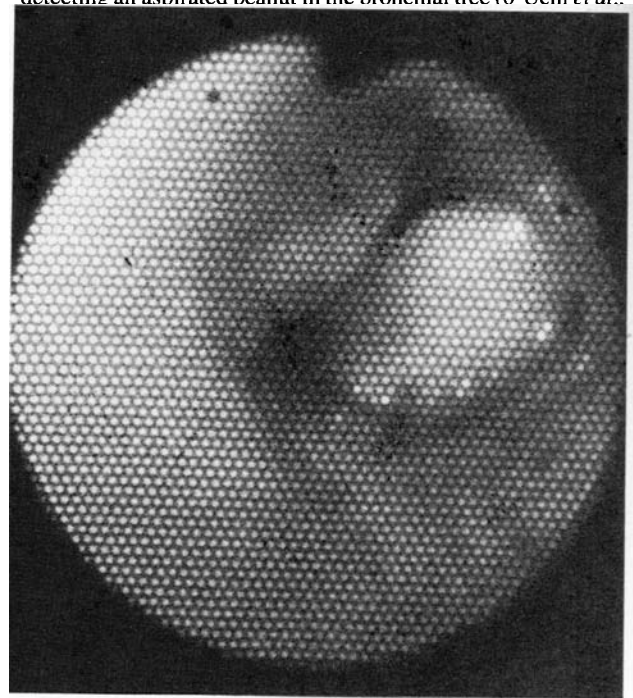


FIG. 2

Showing the flexible bronchofibrescope inserted through the rigid direct bronchoscope in order to extract a piece of peanut from the right main bronchus.

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TABLE I  
LIPID CONTENT IN NUTS (G/100 G)

Peanuts (Virginia type)		Brazil nuts	Hazelnuts	Walnuts	Almonds
Dry	Roasted	Roasted	Roasted	Roasted	Roasted
47.4	49.5	65.0	58.8	68.7	55.2

1992) and we also encountered a child with an aspirated peanut in the right main bronchus where MRI was very useful for diagnosis.

#### Case report

A 15-month-old boy was admitted on March 27, 1993 with a two-week history of fever and cough. The patient had been treated under the diagnosis of a common cold at another hospital prior to our hospital. He had a wheezing sound in the chest on admission and a plain radiograph of his chest revealed an infiltration shadow in the right low pulmonary field. Under diagnosis of pneumonia, cephazolin (1000 mg/day) was administered by drip phlebotoclysis. Although the fever had abated the day after admission, the expansion of the right lung had not improved. These conditions suggested the existence of an aspirated foreign body in the bronchus. Although a clear episode of aspiration was not noted, we performed a chest MRI of the patient on April 6 and the  $T_1$ -weighted image showed a high-intensity area in the right main bronchus (Figure 1). We diagnosed peanut inhalation and performed its extraction under rigid direct bronchoscopy on the same day. A piece of peanut was found in the right main bronchus (Figure 2) as indicated by MRI. The size of the extracted peanut was  $5 \times 5 \times 8$  mm.

#### Discussion

In most cases occult or radiolucent foreign bodies in the tracheobronchial tree are difficult to diagnose and foreign body aspiration is easily missed by the examining physician (Puhakka *et al.*, 1989). Imaging diagnosis of radiolucent foreign bodies has been tried in several ways. A typical hyperinflation picture in the expiratory chest X-ray is indirect proof of a foreign body in the bronchus. However, this finding is rather rare. Although new radiological imaging modalities (perfusion scintigraphy, computed tomography) are sometimes performed, these have not improved diagnostic accuracy (Puhakka *et al.*, 1989).

MRI has recently been applied to the diagnosis of foreign bodies (Specht *et al.*, 1992; Sugimura *et al.*, 1992). O'Uchi *et al.*, (1992) reported that MRI is very useful for demonstrating an aspirated peanut in the bronchus and our experience supports their opinion. MRI is useful when the foreign body is a peanut because of the fat content since fat-rich tissue is demonstrated as a high intensity on the  $T_1$ -weighted MRI image. Although a peanut is known to be the most common foreign body, other kinds of nuts with high lipid content are also possible (Cohen *et al.*, 1980; Rothman and Boeckman, 1980; Mantel and Butenandt, 1986;

Puhakka *et al.*, 1989). Table I shows the lipid content of commonly aspirated nuts (The Science and Technology Agency, Japan, 1990). The  $T_1$ -weighted MRI image may be useful in diagnosing these aspirated nuts. This method does not involve any X-ray exposure. The precise locality of the aspirated nut, obtained by MRI, is valuable information for extraction by rigid direct bronchoscopy.

#### References

- Cohen, S. R., Herbert, W. I., Lewis, B. L. Jr., Geller, K. A. (1980) Foreign bodies in the airway. Five years retrospective study with special reference to management. *Annals of Otolaryngology, Rhinology and Laryngology* **89**: 437–442.
- Mantel, K., Butenandt, I. (1986) Tracheobronchial foreign body aspiration in childhood. *European Journal of Pediatrics* **145**: 211–216.
- O'Uchi, T., Tokumaru, A., Mikami, I., Yamasoba, T., Kikuchi, S. (1992) Value of MR imaging in detecting a peanut causing bronchial obstruction. *American Journal of Roentgenology* **159**: 481–482.
- Puhakka, H., Svedstrom, E., Kero, P., Valli, P., Iisalo, E. (1989) Tracheobronchial foreign bodies. *American Journal of Diseases of Children* **143**: 543–545.
- Rothman, F. B., Boeckman, C. R. (1980) Foreign bodies in the larynx and tracheobronchial tree in children. A review of 225 cases. *Annals of Otolaryngology, Rhinology and Laryngology* **89**: 434–436.
- Specht, C. S., Varga, J. H., Jalali, M. M., Edelstein, J. P. (1992) Orbital wooden foreign body diagnosed by magnetic resonance imaging. Dry wood can be isodense with air and orbital fat computed tomography. *Survey of Ophthalmology* **36**: 341–344.
- Sugimura, H., Tamura, S., Kakitsubata, Y., Kakitsubata, S., Uwada O., Kihara Y., Nagatomo M., Watanabe K. (1992) Magnetic resonance imaging of retained surgical sponges. *Clinical Imaging* **16**: 259–262.
- The Science and Technology Agency, Japan (1990). *Ingredients of Japanese Foods*. Ishiyakusyuppan, Tokyo.

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