Case Report

Value of MR Imaging in Detecting a Peanut Causing Bronchial Obstruction

Toshihiro O'Uchi,[1] Aya Tokumaru,[1] Ichiro Mikami,[2] Tatuya Yamasoba,[3] and Shigeru Kikuchi[3]

Bronchial obstruction due to aspirated foreign bodies is usually seen in children less than 5 years old [1, 2]. In 48–62% of cases in Japan [1] and the United States [2], the foreign body is a peanut. Because peanuts cannot be directly visualized on plain radiographs, the diagnosis is usually made on the basis of bronchoscopic findings [1, 2]. We report a case in which MR imaging was useful in detecting a peanut as the cause of bronchial obstruction.

Case Report

A 1½-year-old boy had progressive wheezing and fever for 1 week. He had no history of aspirating a peanut, but he ate peanuts daily. A chest radiograph showed overinflation of the right lung, mediastinal shift from right to left on expiration, and atelectasis of the right middle lobe.

MR was performed at the request of an otolaryngologist to localize the peanut. T1-weighted images, 600/15 (TR/TE), were obtained. A transverse image (Fig. 1A) showed a 5-mm area of high signal intensity in the right main bronchus.

At bronchoscopy, a peanut was detected in the right main bronchus near the carina, and an attempt was made to remove it. However, the patient's wheezing continued. A second MR examination showed that the area of high signal intensity in the right main bronchus had disappeared, but a focus of medium-intensity signal persisted around the narrow right bronchus. This was thought to represent granulation tissue. Atelectasis of the right middle lobe persisted. An area of high signal intensity less than 5 mm in diameter was seen in the left lower bronchus, suggesting that not all of the peanut had been removed at bronchoscopy and had moved to the contralateral side because of coughing (Figs. 1B and 1C).

Bronchoscopy was performed again, and a 5-mm fragment of peanut was removed from the left lower bronchus. The right main bronchus was narrowed by granulation tissue.

Discussion

MR is useful in detecting a peanut in the airway. Peanuts have high signal on T1-weighted images, and the surrounding air in the lung has low signal, allowing high contrast between the lesion and air in the lung. A peanut has a short T1 value because of its high fat content, and MR can show the location of the peanut in the trachea or bronchus.

The peanut is the most common foreign body found in the airway in children, especially those less than 5 years old. The highest rate of foreign body aspiration occurs in children less than 3 years old [3]. Often, there is no history of respiratory distress. In our patient, aspiration of a peanut was not obvious clinically. Radiographs showed the signs of well-developed obstructive emphysema: increased radiolucency of the involved lung segment, decreased vascular pattern, shift of mediastinal structures toward the normal lung during expiration, and decreased motion and depression of the diaphragm on the ipsilateral side [2]. However, inspiratory-expiratory

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[1] Department of Radiology, Kameda Medical Center, 929 Higashi-cho, Kamogawa, Chiba 296, Japan. Address reprint requests to T. O'Uchi.
[2] Department of Pediatrics, Kameda Medical Center, Chiba 296, Japan.
[3] Department of Otolaryngology, Kameda Medical Center, Chiba 296, Japan.

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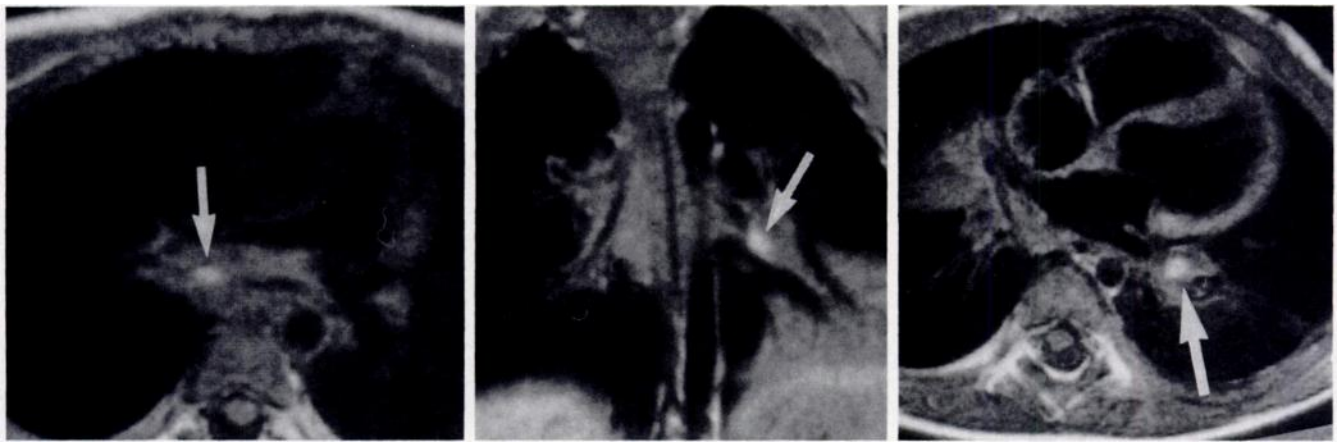

Fig. 1.—1½-year-old boy who had wheezing and fever for 1 week.
***A*, T1-weighted MR image shows high signal in right main bronchus caused by a piece of peanut (*arrow*).**
***B* and *C*, Axial (*B*) and coronal (*C*) MR images obtained 5 days after *A* show area of high signal intensity in left bronchus (*arrows*) suggesting movement of peanut.**

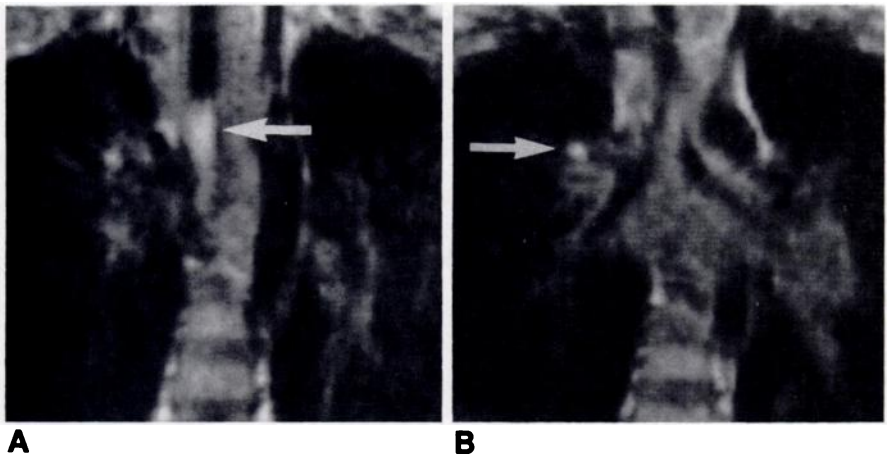

Fig. 2.—3-year-old girl who began wheezing while eating peanuts. Wheezing persisted and dyspnea developed. Chest radiograph at admission showed no obvious mediastinal shift on expiration and inspiration. At bronchoscopy, performed the next day, whole peanut located at carina was removed. Pus was seen in right upper bronchus, but expected piece of peanut was not found. A small piece of peanut, which was removed by suction, was detected in right lower lobe, suggesting movement of peanut because of coughing.
***A*, T1-weighted MR image shows a 10-mm area of high signal intensity (*arrow*) filling trachea at carina.**
***B*, T1-weighted MR image shows a 3-mm area of high signal intensity (*arrow*) in right upper bronchus.**

abnormalities were seen in only 27% of the cases studied by McGuirt et al. [3]. We had another patient with no signs of an inspiratory-expiratory abnormality because a whole peanut lodged at the carina (Fig. 2A). As many other reports have concluded [1–4], bronchoscopy was the most reliable diagnostic and therapeutic method.

Knowledge of the precise location of the peanut in the bronchus before bronchoscopy reduces the chances that small pieces of the peanut or peanut fragments (Fig. 1C) might be missed.

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