

**TITLE: Foreign Body Aspiration**

**SOURCE: Grand Rounds Presentation, University of Texas Medical Branch,  
Dept. of Otolaryngology**

**DATE: February 25, 2009**

**RESIDENT PHYSICIAN: Ki-Hong Kevin Ho, MD**

**FACULTY PHYSICIAN: Harold Pine, MD**

**SERIES EDITORS: Francis B. Quinn, Jr., MD**

---

*"This material was prepared by resident physicians in partial fulfillment of educational requirements established for the Postgraduate Training Program of the UTMB Department of Otolaryngology/Head and Neck Surgery and was not intended for clinical use in its present form. It was prepared for the purpose of stimulating group discussion in a conference setting. No warranties, either express or implied, are made with respect to its accuracy, completeness, or timeliness. The material does not necessarily reflect the current or past opinions of members of the UTMB faculty and should not be used for purposes of diagnosis or treatment without consulting appropriate literature sources and informed professional opinion."*

---

## **Introduction:**

Foreign body aspiration (FBA) is a major cause of accidental death in children. It occurs more commonly in young children aged 3 or less, as a result of their tendency to place objects in their mouth, lack of molar teeth, and the immaturity of laryngeal protective mechanisms. Seeds, peanuts, and beans represent the most common aspirated food objects (1) and the majority of them are radiolucent on chest x-ray. Foreign bodies tend to enter the right main bronchus due to its wider diameter and vertical position. In young children, however, it can easily lodge in the left main bronchus, which is wider than its right counterpart in 34% of cases (2). It is paramount for Otolaryngologists to be familiar with the clinical findings and workup for FBA as delayed diagnosis of FBA could have devastating consequences.

## **Diagnosis:**

Patients with FBA often do not have obvious symptoms, physical manifestations, or radiographic findings. A high index of suspicion should be given to a history of choking episode followed by coughing spells, which is shown to be highly sensitive (>90%) and specific (36-82%) for FBA (3). Physical examination (sensitivity 24-86%, specificity 12-64%) may reveal findings of wheezing and decreased breath sounds. Chest x-ray may show air trapping, atelectasis, infiltrates or consolidation, though it has a high false negative rate of 20-40%. A lateral chest x-ray is more useful than a posterior-anterior (PA) view as it differentiates foreign body in the airway versus the esophagus. Hyperinflation of obstructed lung is better visualized in an expiratory film. A "double lumen" sign of a round object on x-ray should alert clinicians to the possibility of a battery in the aerodigestive tract, a true emergency that warrants urgent bronchoscopic evaluation to avoid the dreadful complications of mucosal burn, pressure necrosis, and tracheoesophageal fistula.

Fluoroscopy is a useful adjunct to chest radiography and may indicate findings of mediastinal shift and paradoxical movement of diaphragm, but it was reported to have a high false negative rate of 53% (4). The utility of CT scan in the setting of FBA has gathered interest in recent years. In a retrospective review of 42 patients by Hong et al. (5), the sensitivity and specificity of CT scan are 100% and 66.7 % respectively, a significant improvement from chest radiography. CT scan has the ability to detect radiolucent objects that account for more than 90% of aspirated foreign bodies in the pediatric airway. Future prospective studies of a larger scale may better define the role of CT scan in FBA given its higher cost and radiation dosage.

### **Indications for bronchoscopy:**

Prompt diagnosis and management of FBA are vital to prevent airway complications, including atelectasis, pneumonia, pneumothorax, granulation tissue formation, hemorrhage, and death. Bronchoscopy should be performed should any one of the diagnostic modalities (history, physical examination, and radiography) be positive. When the history is negative and both physical examination and radiographic findings are questionable, repeat examination and radiography after 24 hours has been shown to improve diagnostic yield in a stable patient (6).

### **Endoscopy:**

The availability and preoperative communication with a pediatric anesthesiologist cannot be understated. Topical anesthesia of the glottis and trachea with 2% lidocaine aids the maintenance of spontaneous ventilation and prevents laryngospasm. Preoperative preparation of age-appropriate laryngoscopes, bronchoscopes, and optical forceps not only facilitates foreign body retrieval but also avoids operative delays. Novel instruments such as the Roth net and endoscopic baskets via flexible bronchoscopy allow easier retrieval of foreign bodies in the distal airway (7). Tracheostomy may be indicated in cases involving foreign objects too large or sharp to pass through the glottis or when significant laryngeal edema is observed.

### **Postoperative care:**

Antibiotics can be administered when granulation tissues or purulent drainage are observed especially in the setting of delayed diagnosis. Post-instrumentation edema may benefit from intravenous steroid treatment. Chest physiotherapy is helpful to mobilize secretions and decrease the risk of infection.

## References:

- (1) Chik KK et al. Foreign body aspiration in Hong Kong Chinese children. *Hong Kong Med J*. 2009 Feb;15(1):6-11
- (2) Tahir N et al. Tracheobronchial anatomy and the distribution of inhaled foreign bodies in children. *Eur J Pediatr*. 2009 Mar;168(3):289-95.
- (3) Digoy GP. Diagnosis and management of upper aerodigestive tract foreign bodies. *Otolaryngol Clin North Am*. 2008 Jun;41(3):485-96, vii-viii. Review.
- (4) Even L et al. Diagnostic evaluation of foreign body aspiration in children: a prospective study. *J Pediatr Surg*. 2005 Nov;40(11):1815
- (5) Hong SJ et al. Utility of spiral and cine CT scans in pediatric patients suspected of aspirating radiolucent foreign bodies. *Otolaryngol Head Neck Surg*. 2008 May;138(5):576-80
- (6) Tokar B, Ozkan R, Ilhan H. Tracheobronchial foreign bodies in children: importance of accurate history and plain chest radiography in delayed presentation. *Clin Radiol* 2004;59(7): 609–15.
- (7) Sepehr A et al. Aspiration of a capsule endoscope and description of a unique retrieval technique. *Otolaryngology - Head and Neck Surgery*, 2007 Volume 137, Issue 6, Pages 965-966