

Pediatric Airway and Esophageal Foreign Bodies



Elizabeth A. Berdan, MD, MS^a, Thomas T. Sato, MD^{b,*}

KEYWORDS

- Aerodigestive foreign bodies • Bronchoscopy • Button battery
- Esophageal bougienage

KEY POINTS

- Common airway foreign bodies include peanuts, seeds, and vegetable matter.
- Many children with airway foreign bodies initially have normal chest radiographs.
- Suspicion of an airway foreign body mandates bronchoscopy.
- The most commonly retained esophageal foreign bodies are coins.
- Lithium button battery ingestion must be distinguished from coins. Button batteries require emergent diagnosis and removal to prevent life-threatening injury.

INTRODUCTION

Aerodigestive foreign bodies (FBs) in children are commonly encountered clinical problems with the potential for life-threatening complications. FB aspiration into the tracheobronchial tree or ingestion with esophageal retention requires prompt surgical diagnosis and management. The identification of a foreign object lodged in the trachea or esophagus can be difficult owing to a delay in presentation and nonspecific symptoms. This article focuses on the clinical presentation, treatment approach, and risks associated with pediatric aerodigestive FBs.

Gustav Killian performed the first bronchoscopic removal of a FB in a farmer in 1897. Decades later, Chevalier Jackson developed the lighted bronchoscope and several specialized instruments for removal of FBs.¹ Contemporary management of airway or esophageal FBs is characterized by evaluation and stabilization of the physiologic status of the child with the performance of appropriate diagnostic and therapeutic procedures designed to achieve safe, successful removal. These procedures mandate

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^a Children's Hospital of Wisconsin, Medical College of Wisconsin, Milwaukee, WI, USA;

^b Division of Pediatric Surgery, Children's Hospital of Wisconsin, Medical College of Wisconsin, Children's Corporate Center, Suite C320, 999 North 92nd Street, Milwaukee, WI 53226, USA

* Corresponding author.

E-mail address: tsato@chw.org

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coordinated efforts between the primary care provider, emergency room, pediatric surgeon, anesthesiologist, and the operating room team.²

AIRWAY FOREIGN BODIES: CLINICAL PRESENTATION

Aspiration is common for infants and children, and, in particular, between 1 and 4 years of age.²⁻⁵ Many FBs are either partially or completely expelled by coughing and spitting reflexes. Frequently inhaled FBs include organic materials such as nuts, seeds, vegetable matter, or dried fruits, and inorganic material such as toy pieces and pins.⁶ Most aspirated objects lodge in the bronchial tree, with the right main stem bronchus being the most common location because of its straighter trajectory relative to the trachea.^{2,5,7} The diagnostic difficulty is increased by the observation that the FB is visible on radiograph in only 10% to 20% of cases.^{4,5} Clinically, this is made more complex by an initially normal chest radiograph appearance in many infants and children who have aspirated a FB.⁸ A positive history or even a plausible history of witnessed aspiration of a FB should prompt evaluation and management for definitive diagnosis, because a delay in diagnosis increases the rate and severity of complications.⁹

FB aspiration typically presents with at least 1 symptom of coughing, choking, stridor, and/or wheezing at the time of aspiration.^{7,10,11} On physical examination, the character of persistent stridor may reflect the anatomic location of partial airway obstruction. High-pitched inspiratory stridor is usually a result of supraglottic obstruction or physiologic collapse. Biphase stridor indicates an obstruction in the glottis or subglottic region. Expiratory stridor is generally characteristic of tracheal or bronchial obstruction. The presence of decreased breath sounds and wheezing is highly correlated with an aspirated FB.⁴ The aspiration or ingestion event is often not witnessed, making the clinical history less clear in infants and preverbal children.

A high index of suspicion should be maintained for any infant, child, or adolescent who has a history consistent with aspiration. The degree of respiratory distress determines the urgency of intervention. Tachypnea, nasal flaring, retractions, or cyanosis requires immediate intervention, and acute respiratory distress necessitates emergent establishment of a secure airway. In a physiologically normal child, the urgency of intervention may change precipitously based on the location of the FB. Delay in diagnosis is common, and many children do not present acutely following FB aspiration. Subacute or chronic airway FB in the bronchi may cause chronic pulmonary infection, bronchiectasis, asthma, lung collapse, or lung abscess.^{5,12}

AIRWAY ASPIRATION: DIAGNOSTIC AND THERAPEUTIC PROCEDURES

Simulation courses can provide the foundation for trainees to become familiar with the assembly and utility of a ventilating bronchoscope, as well as how to address laryngospasm and other potential intraoperative issues. Most importantly, a simulated setting is an excellent way to provide experience to trainees and the team in the technical and communication aspects of the procedure.¹³

Radiographic findings of an aspirated FB include asymmetric air trapping with hyperinflation; unilateral atelectasis; and, later, pneumonia with distal chronic parenchymal infection.^{8,11} In children older than 3 years of age, inspiratory and expiratory radiographs may be attempted. Bilateral decubitus radiographs may also be helpful. The sensitivity and specificity of chest radiography in identifying an aspirated FB are 61% and 77%, respectively.⁹ For this reason, children with characteristic history and symptoms of FB aspiration should undergo prompt bronchoscopy regardless of radiographic findings.^{7,8}

Extraction of airway FB is performed under general anesthesia. The team should have the necessary equipment, personnel, and experience before attempting airway FB

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