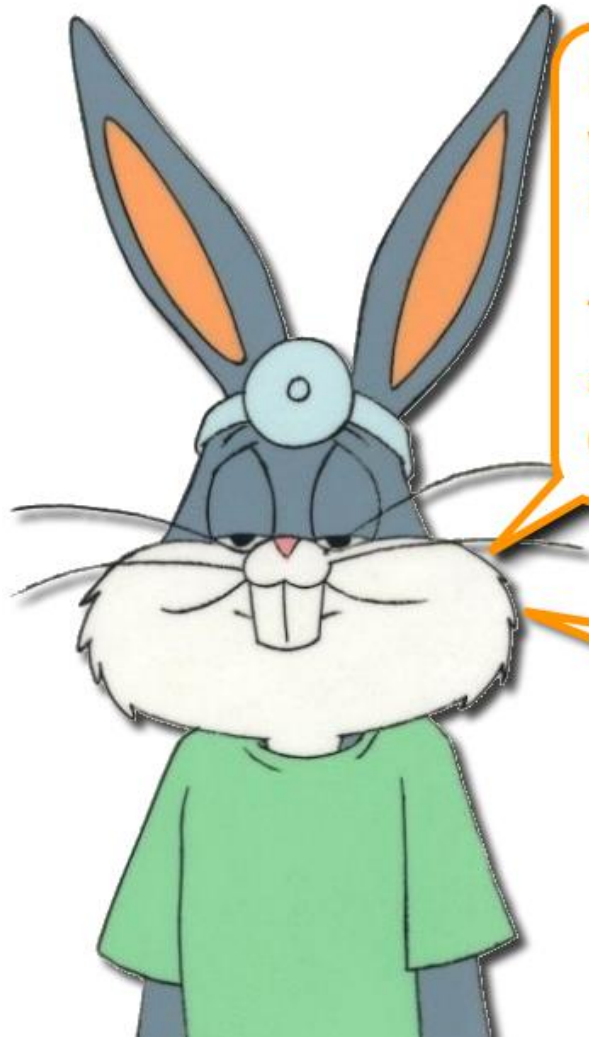


Foreign Body Aspiration In Children

Maryam Hassanzad
Full professor
Pediatric Pulmonologist



Hmmm, Doc, why don't we just make peanuts radio-opaque?

Then we won't worry about delayed diagnosis of FB as much.

This would be easy to see on Xray.



Death

- ▶ Airway foreign bodies are the third most common cause of death due to unintentional injury in children younger than 1 year

- ❖ *Mortality* occurs due to acute aspiration,
- ❖ *Morbidity* can occur due to acute hypoxia during the acute episode or due to chronic lung and airway damage from a long-standing aspirated foreign body.

Pathophysiology

- The human body has numerous defense mechanisms to keep the airway free and clear of extraneous matter. These include
- the physical actions of the epiglottis and arytenoid cartilages in blocking the airway,
- the intense spasm of the true and false vocal cords any time objects come near the vocal cords,
- highly sensitive cough reflex with afferent impulses generated throughout the larynx, trachea, and all branch points in the proximal tracheobronchial tree.
- However, none of these mechanisms is perfect, and foreign bodies frequently lodge in the airways of children.^[1]

Incidence

- ▶ More foreign body aspirations occur in children *younger than 3 years* than in other age groups, with a peak between the first and second birthdays.

The most common entities aspirated are

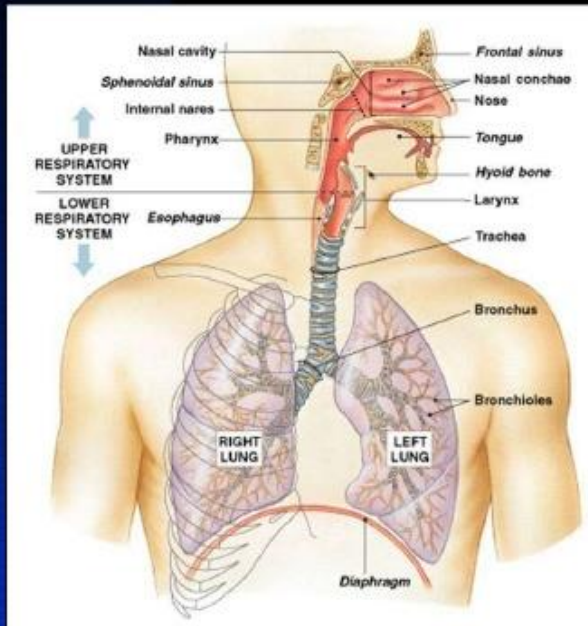
- ❖ small food items such as nuts, raisins, sunflower seeds
- ❖ improperly chewed pieces of meat and small, smooth items such as grapes, hot dogs, and sausages.

All of these should be avoided until the child is able to adequately chew them while sitting

In a review of 1068 foreign body aspirations in children, the authors found

- ▶ 3% in the larynx
- ▶ 13% in the trachea
- ▶ 52% in the right main bronchus
- ▶ 6% in the right lower lobe bronchus,
- ▶ fewer than 1% in the right middle lobe bronchus, 18% in the left main bronchus
- ▶ and 5% in the left lower lobe bronchus
- ▶ 2% were bilateral

Location of Impacted Foreign Bodies



- Larynx 1-5%
- Trachea 5-15%
- L Main Bronchus 30-35%
- R Main Bronchus 30-40%
- L Lobar Bronchus 5-15%
- R Lobar Bronchus 5-15%

History

- ✓ Often, the child presents after a sudden episode of coughing or choking while eating with subsequent wheezing, coughing, or stridor.
- ✓ However, in numerous cases, the choking episode is not witnessed, and, in many cases, the choking episode is not recalled at the time the history is taken.

The more difficult cases

- ▶ are those in which aspiration is not witnessed or is unrecognized and, therefore, is unsuspected.
- ▶ In these situations, the child may present with persistent or recurrent cough, wheezing, persistent or recurrent pneumonia, lung abscess, focal bronchiectasis, or hemoptysis.

Physical

- ▶ Major findings include new abnormal airway sounds, such as **wheezing**, **stridor**, or **decreased breath sounds**.
- ▶ Similarly, a lack of findings upon physical examination does not preclude the possibility of an airway foreign body. often, but not always, unilateral.

Physical

- ▶ The other situation in which patients commonly seek medical attention is usually the third clinical phase. At this point in time, clinical suspicion based on the history, exam, and ancillary studies must be used to determine the appropriate course of action.
- ▶ Patients may present with signs and symptoms of pneumonia. *In many such instances, a foreign body is not suspected and the foreign body remains untreated.* Such patients return with "*recurrent pneumonia*" which is actually *a pneumonia or atelectasis* which has never resolved because the foreign body is still there.

Collapse & Emphysema



Differential Diagnoses

Pediatric Bronchitis

Pediatric Asthma

Pediatric Pneumonia

Imaging Studies

Radiography

Most aspirated foreign bodies are food material and are radiolucent. Thus, one has to look indirectly for signs of the foreign body.

A plain radiograph

- ✓ A plain radiograph can reveal an area of focal overinflation or an area of atelectasis, depending on the degree of obstruction.
- ✓ If the material completely occludes the airway, the radiograph may reveal opacification of the distal lung as residual air is absorbed and no air entry is possible.

A plain radiograph

- ▶ If the obstruction is partial, progressive ball valve obstruction results in focal over inflation in the area of the lung distal to the affected airway.



CT scanning

- ▶ The use of CT scanning in managing the child with a foreign body in the airway has recently been questioned.

Management

- ❖ Blind finger sweeps should never be performed in infants or children since this may push the foreign body further downward into the airway.
- ❖ Infants with complete airway obstruction should have back blows and chest thrusts performed while children with complete airway obstruction should have abdominal thrusts performed in either the supine position or by the *Heimlich maneuver*.
- ❖ Once the patient is brought to the hospital, the patient will require rigid bronchoscopy for visualization of the airway and removal of the foreign body. Flexible bronchoscopy does not have a role in this situation because it is not the optimal tool for control of the foreign body or the safety of the patient during the removal procedure.

Bronchoscopy

- ▶ Even if no foreign body is evident on any of the radiographic studies, a foreign body may still be present, and a bronchoscopy should be performed if the suspicion is high.

Bronchoscopy

- ▶ If the history and physical findings are diagnostic, no workup is needed. The child should immediately be referred for rigid bronchoscopy. [Guidelines for bronchoscopy](#) have been established by the American Association for Respiratory Care

Although a *flexible bronchoscopy* is useful in detecting a foreign body, removing most foreign bodies using the currently available flexible bronchoscopes and their attachments is difficult. However, removal using a fiberoptic bronchoscope has been reported.^[7] If the diagnosis is known or confirmed, *rigid bronchoscopy* is the procedure of choice

Heimlich maneuver

- ▶ *the child has respiratory distress* and is unable to speak or cry, complete airway obstruction is probable, and the likelihood of morbidity or mortality is high. In those cases, a Heimlich maneuver may be performed.
- ▶ *If the child is able to speak*, the Heimlich maneuver is contraindicated because it might dislodge the material to an area where it could cause complete airway obstruction.

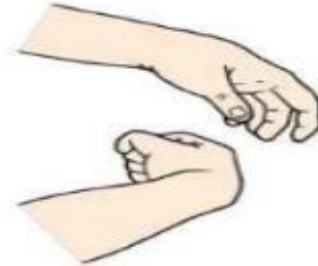
Heimlich maneuver



HEIMLICH MANEUVER



1. Lean the person forward slightly and stand behind him or her.



2. Make a fist with one hand.

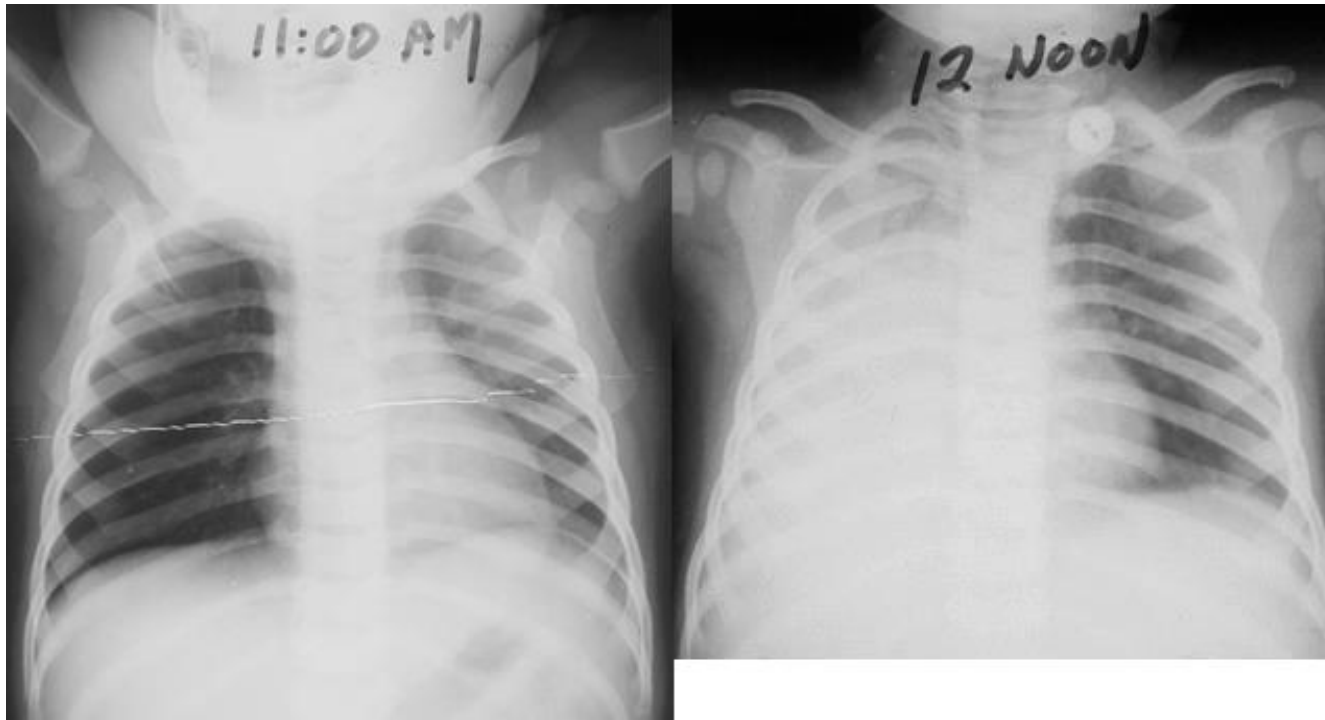


3. Put your arms around the person and grasp your fist with your other hand near the top of the stomach, just below the center of the rib cage.



4. Make a quick, hard movement, inward and upward.

Heimlich maneuver



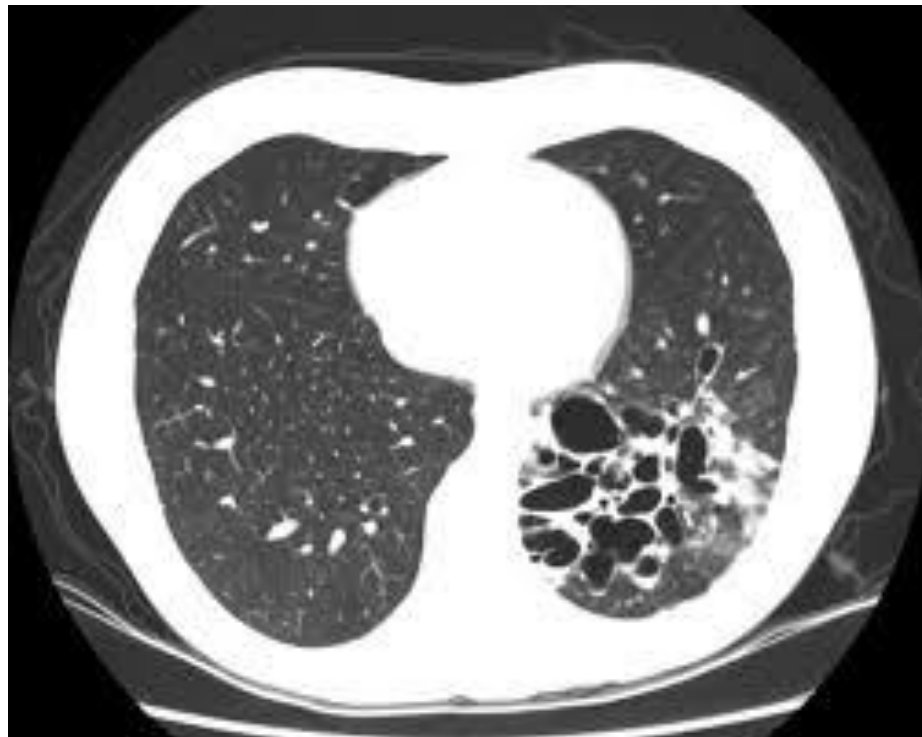
Complications

- ▶ Complications arising from foreign body aspiration depend on
- ▶ Location
- ▶ type of foreign body aspirated (organic vs. non-organic, sharp vs. dull)
- ▶ Duration of time the foreign body remained in the airways.
- ▶ If the foreign body is successfully removed within 24 hours of the incident, the complication rate is very low.
- ▶ However, the longer the foreign body remains in the airways, the more likely inflammation and thus, complications will occur..

Complications

- Potential complications include:
- bronchial stenosis
- bronchiectasis
- lung abscess
- tissue erosion/perforation
- and pneumomediastinum or pneumothorax

Bronchiectasis



Lung Abscess

