FOREIGN BODY ASPIRATION in children

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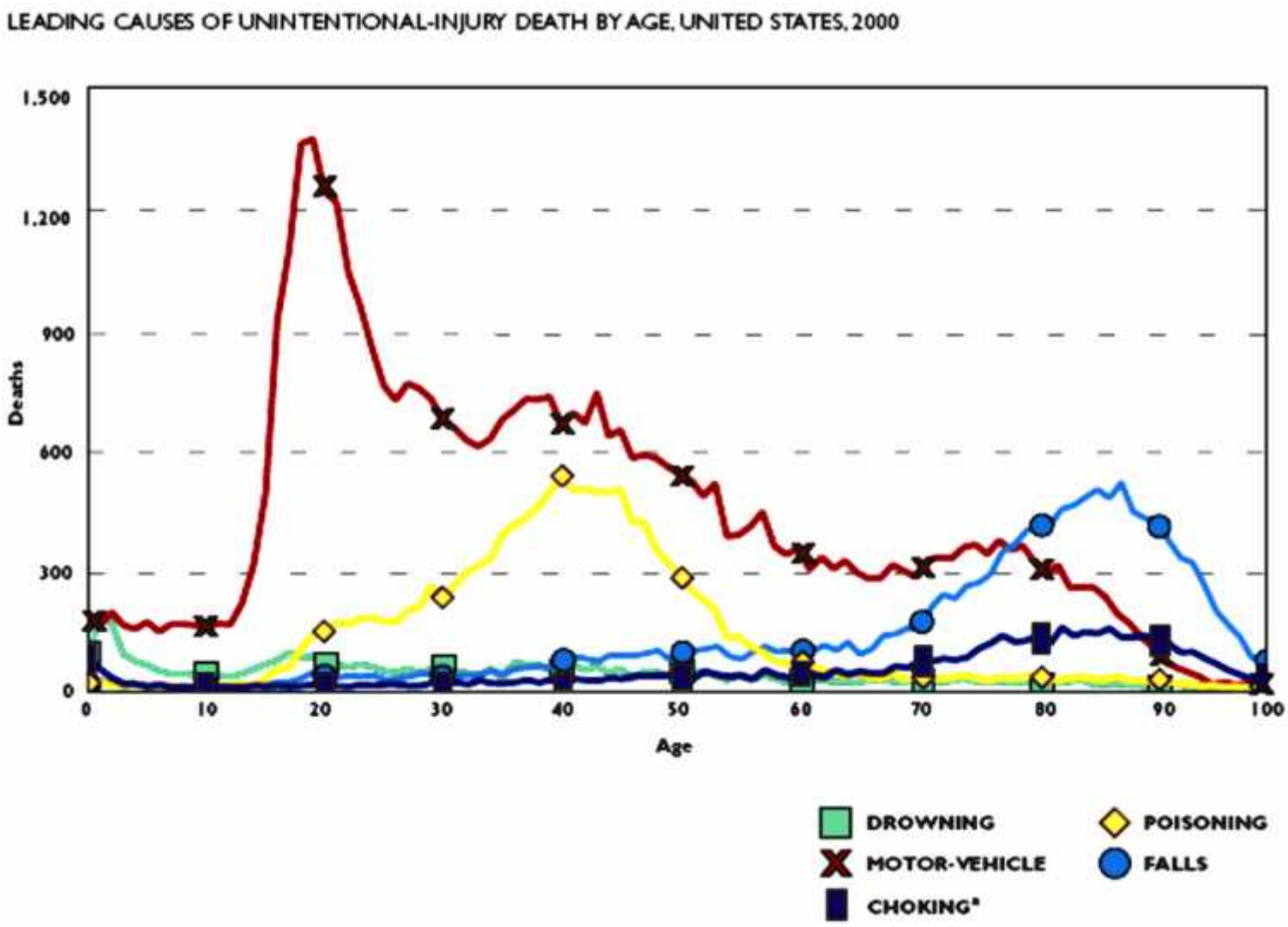
How common is choking?

- About 3,000 people die/year from choking
- Figure remained unchanged last 20 years
- There has been a progressive decline in the childhood deaths from choking:
  - 1968, 650 children died
  - 1990, 261 children died



Choking was the 4th leading cause of unintentional injury death in 2000.

Epidemiology

- Ages affected
  - Age <3 years old: 50%
  - Age <10 years old: 95%
- Preschoolers: 75-90%
  - <1 year 10-15%
  - 1-2 years 40-50%
  - 2-3 years 15-25%
  - >3 years 15-20%

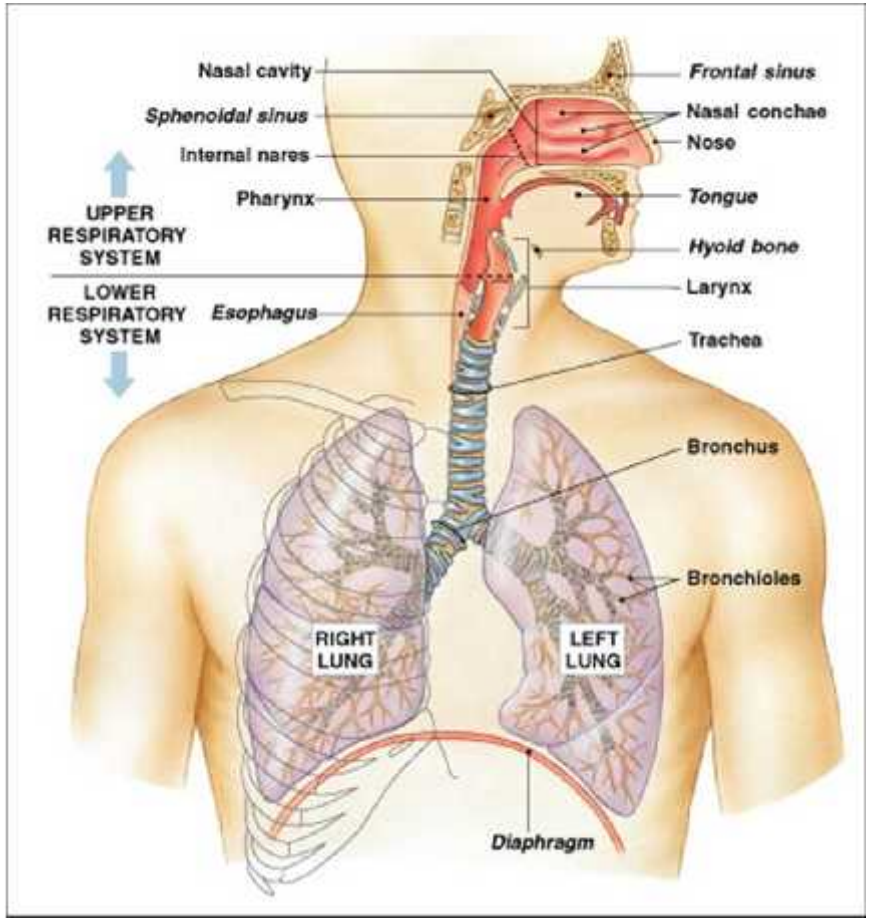
Epidemiology

- Sex: boys more often than girls, 2:1
- Increased incidence at holiday time
- Known object aspiration in <40%
- Large case series indicate that nuts and peanuts account for an estimated half of all foreign body aspirations in children
- Choking deaths related to toy use 68% of the time
  - Latex Balloons 29% of choking deaths
  - Marbles, Balls 19% of choking deaths

Choke Hazards

- A 1995 study found round objects to be most dangerous in choking deaths in children
- According to Centers for Disease Control and Prevention, of the ≥17,000 cases of pediatric choking in 2001:
  - 60% related to food
  - 31% related to non-food substances
  - 9% related to undetermined objects
- Of the food-related choking incidents,19% from candy or gum
- Of the choking incidents from non-food objects, 13% were related to coins

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%

Pathophysiology

- Near-total obstruction of the larynx or trachea can cause immediate asphyxia and death
- Should the object pass beyond the carina, its location would depend on the patient's age and physical position at the time of the aspiration
- Until the age of 15 years, foreign bodies are found on either side with equal frequency
- Once aspirated, objects may subsequently change position or migrate distally
- The object itself might cause obstruction or induce inflammation, edema, cellular infiltration, ulceration, and granulation tissue formation which may contribute to airway obstruction

Pathophysiology

- Distal to the obstruction, air trapping leading to local emphysema, atelectasis, hypoxic vasoconstriction, post-obstructive pneumonia and possible volume loss, necrotizing pneumonia or abscess, suppurative pneumonia, or bronchiectasis may occur
- The likelihood of complications increases after 24-48 hours, making quick removal of the foreign body urgent

Laryngeal Foreign Body?

Clinical Manifestations:

- Hoarseness
- Croupy cough
- Aphonia
- Hemoptysis
- Dyspnea with wheezing
- Cyanosis

Laryngeal Foreign Body

Diagnosis:

- Lateral and anteroposterior x-rays of the neck will show indirect evidence if radiolucent or exact location if opaque foreign bodies
  - Lodged anteriorly, in the larynx
  - Behind soft-tissue shadows, hypopharynx or cervical esophagus
  - Sagittal plane, larynx
  - Coronal plane, esophagus
- Direct laryngoscopy confirms diagnosis and provides access for removal
- For severe dyspnea, do tracheotomy first before laryngoscopy

Tracheal Foreign Body

Characteristic signs:

- Asthmatoid wheeze
- Audible slap and palpable thud produced by temporary expiratory impaction at the subglottic level

Diagnosis:

- Occasionally by a chest x-ray
- In most cases, definitive only by a bronchoscopy

Bronchial Foreign Body

Clinical Manifestations:

- Initial: cough, blood-streaked sputum & metallic taste
- Depends on degree of obstruction and stage patient seen:
  - Nonobstructive – asymptomatic
  - Near-total obstruction – signs of asphyxia
  - Slight obstruction –wheezing
  - Greater degree of obstruction – emphysema or atelectasis
  - If persistent – chronic bronchopulmonary disease

Bronchial Foreign Body

Clinical Manifestations:

- Most often, aspirated into right lung:
  - Immediate: choking, gagging and paroxysmal coughing
  - Latent period – occasional cough or slight wheezing
  - Recurrent lobar pneumonia or intractable asthma
- Rarely, hemoptysis
- Vegetal – *arachidic bronchitis* – cough septic fever and dyspnea

Bronchial Foreign Body

Diagnosis:

- History, but should always be considered in acute or chronic pulmonary lesions whether or not suggested
- PE: distally, limited expansion, decreased vocal fremitus, impaired or hyperresonant percussion and diminished breath sounds
- Arterial blood gas analysis is useful for judging the adequacy of ventilation
- Monitor oxygen saturation by by pulse oximeter
- Inspiratory posteroanterior (PA) chest x-rays to look for unilateral hyperinflation, lobar or segmental atelectasis, mediastinal shift, or pneumomediastinum

Bronchial Foreign Body

Diagnosis:

- Expiratory chest radiographs are more sensitive for air trapping than inspiratory chest radiographs, also lateral decubitus views
- Fluoroscopy useful in check valve obstruction when little or no air escapes during expiration leading to obstructive overinflation
- Even extensive x-rays will not completely rule out presence of a foreign body; most foreign bodies are radiolucent but <20% of aspirated foreign bodies are radiopaque
- Only bronchoscopy definitive

Emergency Management

Universal sign for choking

ADAM.

- <1 year: 5 Back slaps and 5 chest thrusts
- Blind finger sweeps should <u>not</u> be done

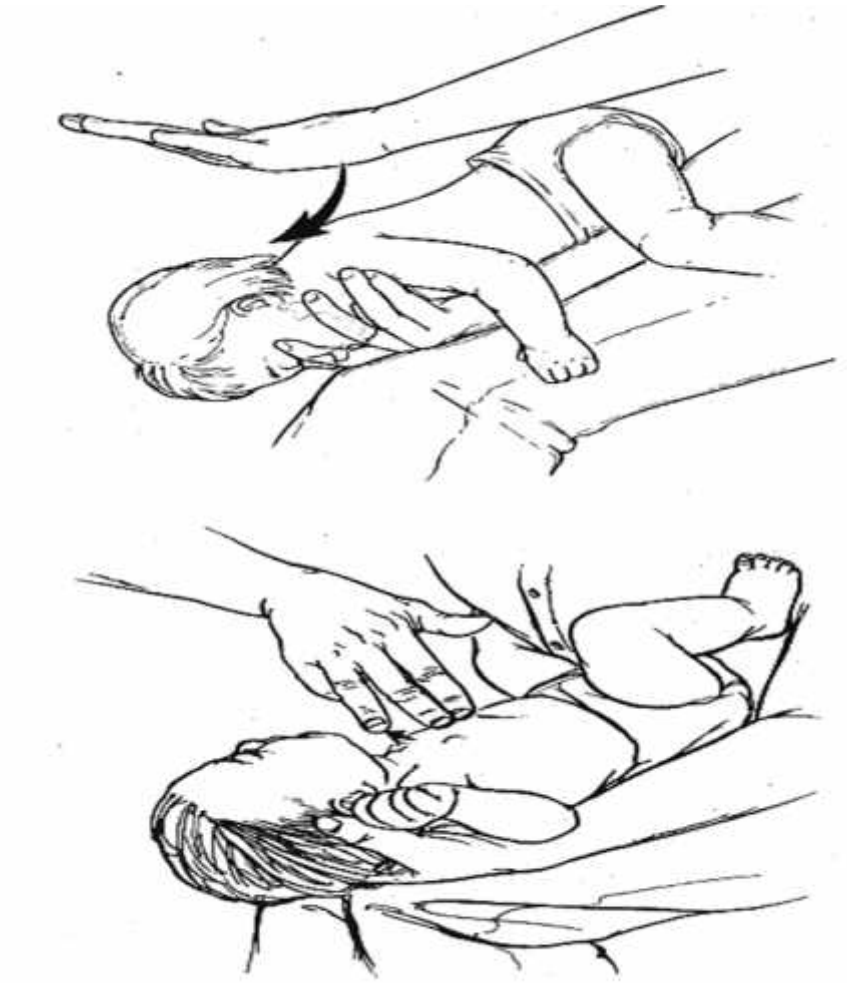


Fig 12. Back blows (top) and chest thrusts (bottom) to relieve foreign-body airway obstruction in the infant.

Heimlich Maneuver

Treatment

- Almost all aspirated foreign bodies can be extracted bronchoscopically
- If rigid bronchoscopy is unsuccessful, surgical bronchotomy or segmental resection may be necessary
- Chronic bronchial obstruction with bronchiectasis and destruction of lung parenchyma may require segmental or lobar resection
- Antibiotics for secondary infections
- Steroids for inflammation
- Treat complications

Reference

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- Lea E, Nawaf H, Yoav T, ecte. Diagnostic evaluation of foreign body aspiration in children: a prospective study. J pediatr surg 2005; 40:1122-7

Thank You!