Inhaled foreign body in Paeds – REFRESHER 2017

Typology of foreign bodies

- o ORGANIC
- o NON-ORGANIC – metal or non-metal
  - Lithium batteries- most dangerous

Complications secondary to FB:

- Mechanical obstruction
- Pressure necrosis
- Internal penetrating trauma
- Corrosive mucosal injury
- Perforation
- Leakage of oesophageal/bowel contents
- Catastrophic infection
- Chemical inflammation (often from organic FB, such as nuts)
- Hypoxic encephalopathy
- Mortality

Stats & Epidemiology

- Leading cause of asphyxiation and death in children under 4 yrs old
- 5th commonest cause for visit to trauma unit
- Most children under 4

Often misdiagnosed as a respiratory tract infection due to their cough, blocked nose.

Anaesthetic considerations

1. When?:- if delay, there may be associated morbidity & lung injury
2. What?- *type of foreign body will hint at complication risk*
3. Where?- *Anatomical site of lodgement is important for airway management. Can be from nose, all the way to bronchiole. Larynx/ trachea are usually large objects which can cause severe obstruction. 45% mortality! Most lodge in the right main bronchus.*

Four types of bronchial obstruction

1. **Bypass-valve effect**- partial obstruction during inhalation & expiration
2. **Check-valve effect:-** obstruction in exhalation. (CXR shows hyperinflation of ipsilateral lung)
3. **Ball-valve effect:-** partial obstruction by object which intermittently prolapses into & obstructs bronchus
4. **Stop-valve effect:-** complete bronchial obstruction with no air movement (CXR: segmental distal lung collapse)

Symptoms

Location	Signs and symptoms
Larynx + trachea	Acute airway distress, hoarseness, stridor, dyspnoea
Bronchi	Cough, wheeze, haemoptysis, dyspnoea, respiratory distress
Lower airway	Usually asymptomatic unless secondary infection

Special Investigations

- **CXR** – PA & lateral. May show FB or just associated lung changes.
- Laryngotracheal FB:- **lateral neck radiograph** may reveal subglottic swelling and laryngeal stenosis.
- High resolution spiral computerised tomography **(CT)** can be considered in stable patients.
- **Virtual bronchoscopy** is a new imaging modality that uses reconfigured axial images obtained during CT, generating an endoscopic perspective of the trachea and bronchi.

⍰ *Be cognisant of the radiation and contrast load.*

Management

Gold standard: Rigid bronchoscopy, under GA for FB removal.
If stable, allow for **adequate fasting**, as the airway will not be protected during the procedure
Anti-sialagogue: consider their use
Smooth, coordinated **sharing of the airway** between anaesthetic & surgical teams

Intra-op/ Bronchoscopy Anaesthetic Goals

1. Co-ordinated sharing of the airway
2. Adequate oxygenation & ventilation
3. Postoperative pain
4. Chronic pain

Induction:

- Maintain spont respiration to prevent conversion from partial to complete obstruction
- Propofol & Sevo combination has shown fewer adverse airway incidences (vs. Remi, Dexmet)
- Topicalize airway with laryngo-tracheal atomizer
- Use manual jet ventilation to minimize hypoxic events (meta-analyses)
- Consider sux if vocal cord movement impairs removal of FB
- Repeat bronchoscopy after removal of FB, for:- often other FB and inflammation, infection, bleeding or airway injury.

Post-Operative:

- CXR mandatory- to exclude pneumothorax or pneumomediastinum
- Re-intubation may be required for severe laryngeal/ bronchiolar oedema

"Ingested" foreign
REFRESHE

Most common FB ingested?

- Coin
- Batteries DANGER!

Symptoms:

- Vomiting, drooling & dysphagia.
- Coffee-ground vomitus
- Hematemesis

Areas of highest incidence of FB lodging, within GIT: (in descending order)

- proximal oesophagus,
- stomach,
- distal duodenum and
- distal oesophagus,

Complications secondary to FB:

- Liquefaction necrosis
- Mucosal disintegration
- Perforation
- Aorto-enteric fistula
- Tracheoesophageal fistulae
- Oesophageal perf
- Vocal cord paralysis from recurrent nerve injury
- Mediastinitis

CXR:

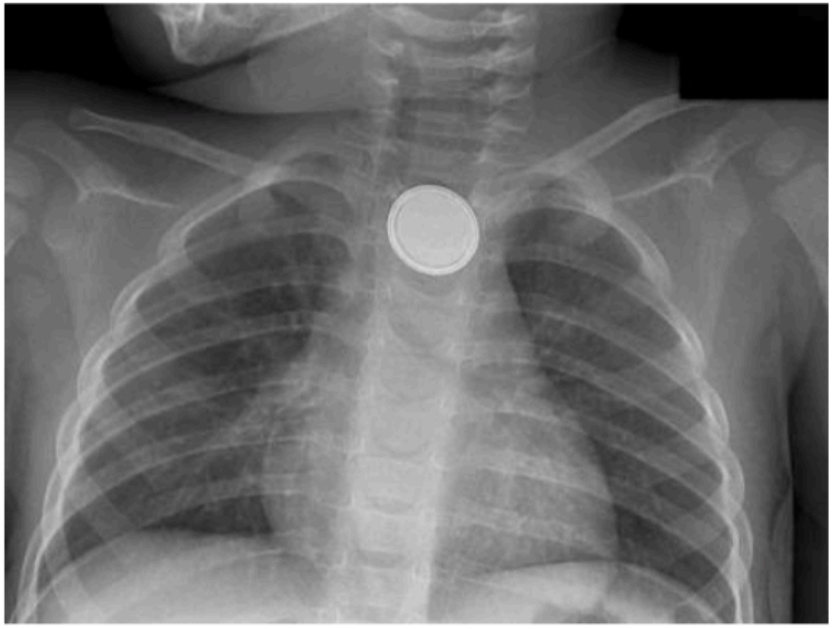

Figure 3. CXR showing the 'halo' of the button battery

"Halo" sign- diagnostic of a button battery
"Step off" sign- seen between the positive and negative nodes of the battery

CXR: can identify radio-opaque FB:- type of FB in terms of location, airway involvement, difficulty of removal and presence of complications.

Removal:

- Endoscopy
- Easier anaesthetic as airway is secured with an ETT