

# Foreign Bodies in Otolaryngology

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It is estimated that 1,500 deaths occur annually due to ingestion of foreign bodies (FB) and 3,000 deaths occur annually due to complications of foreign material aspiration. Foreign body ingestion and aspiration can affect persons of any age, however, 80% of cases occur in children (six months to three-years-old). Others include edentulous adults, prisoners and psychiatric patients.

## Esophageal FB

Eighty to ninety per cent of esophageal FB pass spontaneously, 10% to 20% require endoscopy and 1% would necessitate removal through a surgical procedure.

Dysphagia, odynophagia, drooling, chest and/or epigastric pain are common symptoms. However, wheezing/cough, respiratory distress, stridor and hoarseness of voice denote respiratory complications. Less common symptoms include nausea and vomiting.

The common FB in patients three-months-of-age to 10-years-old include: coins, bones, pins, pencils/crayons, batteries, buttons and meat (Figure 1 and 2). Table 1 shows commonly ingested FB.

The location of esophageal FB are the three normal anatomical constrictions:

1) Cricopharyngeus area (70% in children)

2) Gastroesophageal sphincter (70% in adults)  
3) Aortic arch area

The basic management scheme for esophageal FB is illustrated in Table 2. There are two types of endoscopes: rigid and flexible. The rigid scopes allow better visualization and > 94% success rate of removal. They are best used to remove sharp, penetrating and impacted objects. Objects that remain > 24 hours have a higher risk of perforation or stricture formation. Large items could cause obstruction. See Table 3 for high-risk situations.

## Disc batteries

Disc batteries deserve special mentioning. Different types are illustrated in Figure 3.

Ten per cent of ingested batteries are symptomatic and multiple ingestion occur in 10% of cases. The injuries include: direct corrosion (liquefaction necrosis), low-voltage burns, pressure necrosis and mercury toxicity. Esophago-tracheal and/or esophago-aortic fistulae are serious complications.

The epidemiological data point to an increase in the frequency of ingested button batteries. In 1986, the number was 1,221 and it rose to 2,063 in 1998. Sixty to seventy per cent occur in children younger than six-years-old, while 16% happen to children six- to 12-years-old. The

**Table 1**  
**Types of ingested foreign bodies (FB) by age**

Age: < 10-years-old	Ages: 10- to 18-years-old
• Coins	• Meat
• Bones	• Bones
• Pins	• Fiber
• Pencils/crayons	• Pills
• Batteries	• Coins
• Buttons	• Dental hardware
• Meat	• Batteries

majority (57%) are males. Forty-eight per cent are found loose or discarded in medicine chests, jewelry boxes, ashtrays, or on garage floors. One-third are removed from products such as hearing aids, watches, calculators, or cameras. A small percentage (3.4%) are taken directly from packages. The mechanisms of injury could be summarized as follows:

- **Electrolyte leakage:** zinc batteries submerged in hydrochloric acid showed corrosion and leakage within two to 62 hours
- **Alkali produced *de novo*:** in saline, batteries produce a hydrolytic reaction: the OH<sup>-</sup> complexes with sodium (Na) cation at anode region. Clinically more substantial mucosal damage occurs at anode
- **Mercury toxicity:** theoretical risk, only two cases were reported with no systemic symptoms
- **Pressure necrosis:** local irritation, tissue ischemia, subsequent necrosis combined with bacterial growth stimulate an inflammatory response leading to edema, ischemia and tissue loss

Symptoms are variable, but the child can be



Figure 1. Coin in upper esophagus.



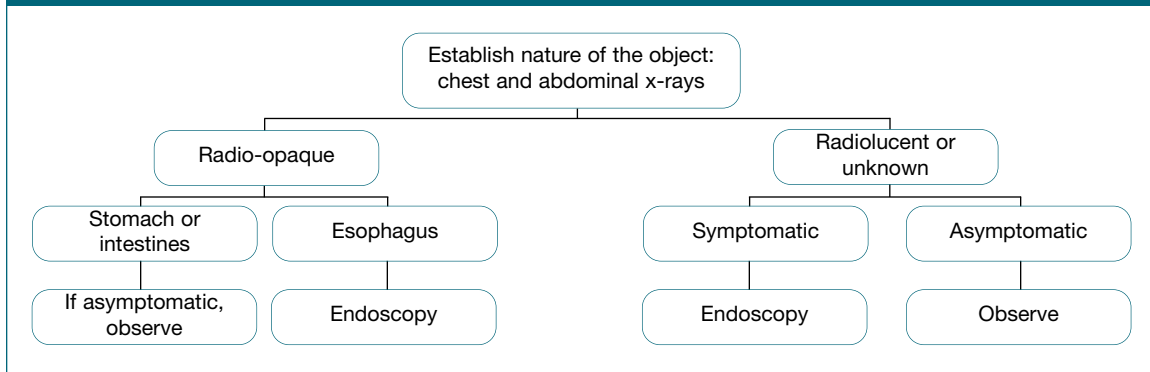
Figure 2. Safety pin in esophagus.

asymptomatic. Pain, cough, vomiting, irritability, fever, tachycardia, drooling, poor oral intake, increased heart rate, cyanosis, dehydration and shock have all been reported.

On x-ray, disc batteries are often misdiagnosed as coins. Classic double contour on anterior posterior view or stepped off appearance (side view) differentiate them from coins (Figure 3 and 4). Examples of the symptoms related to button batteries lodged in the nose are:

- Septal ulcerations leading to septal perforations

**Table 2**  
**Basic management scheme**



- Necrosis of turbinates and/or cartilage
- Epistaxis
- Nasal and/or choanal stenosis
- Facial cellulitis

If they are left in the external auditory canal (EAC), they may lead to ulcerations, tympanic membrane perforation and/or EAC stenosis.

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The management of rhinologic, otologic and esophageal battery impaction is immediate consultation to an otolaryngologist for direct or endoscopic removal as soon as possible. Nasal toilet and irrigation will be needed until the

mucosa heals. Elective septal perforation will need repair at a later date. Elective dilation for esophageal stenosis may also be necessary.

### *Airway FB*

They usually occur in children < 15-years-old. Toddlers (one- to three-years-old) are the most susceptible because they lack molars for proper grinding of food and are often running or playing at the time of aspiration. They tend to put objects in their mouth more frequently and lack coordination of swallowing and glottic closure. Vegetable matters such as peanuts, grass, carrots are common, as well as metallic FB (safety pins).

A high index of suspicion should be given to a history of choking episode followed by coughing spells. This is shown to be highly sensitive (> 90%) and specific (36% to 82%) for FB aspiration.

Eighty to ninety per cent of airway FB become lodged in the bronchi. In adults, bronchial FB tend to be lodged in the right main

Table 3


### High-risk situations following ingestion of FB

- Sharp objects/batteries
- Narcotics pack
- Objects > 24 hrs:
  - Fistula, stricture, or erosion
- Large items
  - Obstruction
  - > 2-3 cm for < 1-year-old
  - > 3-5 cm for > 1-year-old
- Underlying esophageal disease

bronchus. In children, FB could be lodged in either bronchi with equal frequency. Chest x-ray may be normal or shows air trapping, atelectasis, infiltrates or consolidation, however, it has a high false negative rate of 30%. Larger objects become lodged in the larynx or trachea. It is important to note that laryngeal FB have a 50% mortality rate.

In general, we describe three phases for aspirated FB:

- **Initial phase:** choking, gasping, coughing and/or airway obstruction at the time of aspiration
- **Asymptomatic phase:** lodging of the foreign object with relaxation of reflexes, reduction or cessation of symptoms (hours or weeks)
- **Complications phase:** foreign body producing erosion or obstruction with pneumonia, atelectasis, abscess or empyema

Proper and prompt diagnosis of FB aspiration is vital to prevent airway complications. Bronchoscopy should be performed as soon as possible. 

For resources, please contact [diagnosis@sta.ca](mailto:diagnosis@sta.ca)

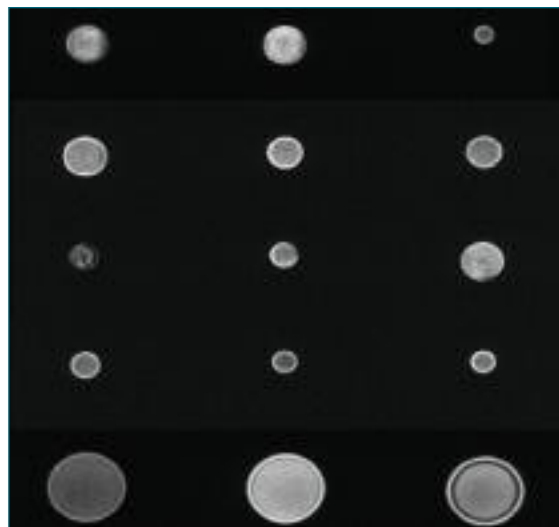


Figure 3. Different types of disc batteries (anterior posterior double contour).

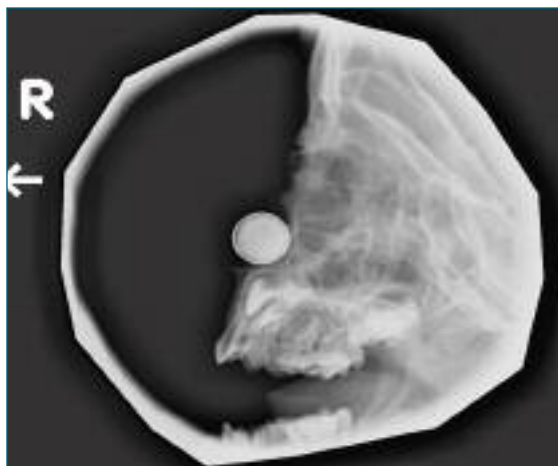


Figure 4. Disc battery in nose. Notice the double contour.



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