

## **Suspected Foreign Body Ingestion**

### **1. General Presentation**

Background: Of more than 100,000 cases of foreign body ingestion reported each year in the United States, 80% occur in children, with the majority of the foreign body ingestion being accidental. Most often foreign body ingestion occurs in children between ages of six months and three years; reflecting the tendency of small children to use their mouths in exploration of their world. Coins are the most common foreign body ingested by children; others include toys, toy parts, magnets, batteries, safety pins, screws, marbles, bones and food boluses. In countries in Asia, where fish is a food staple, fish bones are most commonly ingested. Fortunately, mortality rates are low, and most foreign bodies pass harmlessly and are eliminated in the stool. Complications include systemic reactions due to allergies to ingested object, gastrointestinal mucosal erosion or perforation, peritonitis, pneumothorax, and production of an aortoenteric fistula.

Pathophysiology: The location of the foreign body ingested is important for determining the appropriate investigations, prognosis and treatment. This is usually categorized anatomically into esophagus and stomach/lower gastrointestinal tract.

Most complications from pediatric foreign body ingestion are due to esophageal impaction, usually at one of the 3 physiological narrowing areas:

- 1) about 70% at the upper esophageal sphincter or thoracic inlet,
- 2) about 15% in the mid-esophagus at the level of the aortic notch, and
- 3) about 15% just above lower esophageal sphincter.

Patients are at an increased risk if they are small, have an underlying esophageal disease such as a stricture, have undergone previous esophageal surgery, or have ingested several coins at one time.

Once the foreign body has reached the stomach in a child with a normal GI tract, it is less likely to lead to complications. However, exceptions include sharp or toxic bodies, objects too large to pass through the pyloric sphincter (greater than 2x6 cm), and more than one magnet which may attract and adhere tightly through the tract leading to obstruction, necrosis of intervening tissues or even the formation of a fistula.

Clinical Symptoms: Children can often be asymptomatic, have transient symptoms, or have vague symptoms which do not immediately suggest foreign body ingestion; therefore, it is important to always keep the possibility of a foreign body in mind.

### **2. Questions to Ask**

- Did you witness the child ingesting a foreign body?

- Did the child report to you that he/she ingested a foreign body?
- Do you know what the foreign body is? (size, shape, identity)
- Do you know when the child ingested the foreign body?
- Have you found the foreign body in the stool already?
- Has the child previously swallowed any objects before?
- Does the child have any other medical illnesses or have had previous surgery?
- Does the child have fever, abdominal pain, or vomiting? If yes, where is the pain? What color, and how much vomit? Any blood in the vomit?
- Has the child had any stools? If so, how many times, what color? **We need to be aware of potential GI obstruction**
- Is the child having difficulty breathing or showing any signs of airway compromise? If yes, we need to retrieve the object promptly.

Esophageal Foreign Body Symptoms	Stomach/Lower GI Foreign Body Symptoms
Dysphagia	Abdominal distention
Food refusal, weight loss	Pain
Drooling, gagging	Vomiting
Emesis, hematemesi	Hematochezia
Foreign body sensation	Unexplained fever
Chest pain, sore throat	
Stridor, cough	
Unexplained fever	

### 3. Differential Diagnosis

Acute appendicitis	Esophageal stricture
Disk battery ingestion	Meckel diverticulum
Esophagitis	Intussusception
Foreign body aspiration	Pyloric stenosis
Gastritis	Reactive Airway Disease
Peptic Ulcer Disease	Pharyngitis
Gastroenteritis	Pneumonia
Munchausen syndrome	Psychiatric diseases
Gastrointestinal obstruction-large or small bowel	Pneumothorax

### 4. Investigations and Management

#### a) Physical exam:

- examine airway and breathing – **always manage ABCs before continuing**

- b. examine neck for swelling, erythema, crepitus suggesting potential esophageal perforation and requiring surgical consult
  - c. examine chest for stridor or wheezing suggesting lodged esophageal foreign body with tracheal compression
  - d. examine abdomen for small bowel obstruction (auscultate) or perforation (palpate for pain) which requires immediate surgical consult and abdominal imaging
- b) Lab studies: children with foreign body ingestion do not usually require lab testing, although they may be indicated if suspect potential infection
- c) Imaging studies:
- a. Single frontal radiograph of neck, chest and entire abdomen to locate the object; this only works if swallowed object is radiopaque
  - b. If the object is below diaphragm, no further radiographs are necessary
  - c. If object is in esophagus, frontal and lateral chest radiographs are necessary to precisely locate and better identify the object
    - i. General rule: if coin is in esophagus, it appears in coronal orientation; if coin is in trachea, it appears in sagittal orientation
    - ii. Coin versus battery: disk batteries have a distinctive two-step profile and a double circle appearance (Figure 1 and 2)
  - d. Endoscopy is preferred over barium contrast studies for radiolucent objects as it allows removal of object as well
- d) Metal Detectors: sensitive and specific for identifying the location of ingested metallic objects such as aluminum
- e) Endoscopy: children who require extensive radiologic investigation may be referred for endoscopy as it is safe and highly effective
- f) Management: see Figure 3 below for management.

(Figure 3 – Management of suspected pediatric esophageal or gastrointestinal foreign body ingestion)

5. **Urgent intervention for:**

- When the ingested object is sharp, long (>5 cm), consists of multiple magnets, and is in the esophagus or stomach.
- When a disk battery is in the esophagus (and in some cases in the stomach)
- When the patient shows signs of airway compromise.

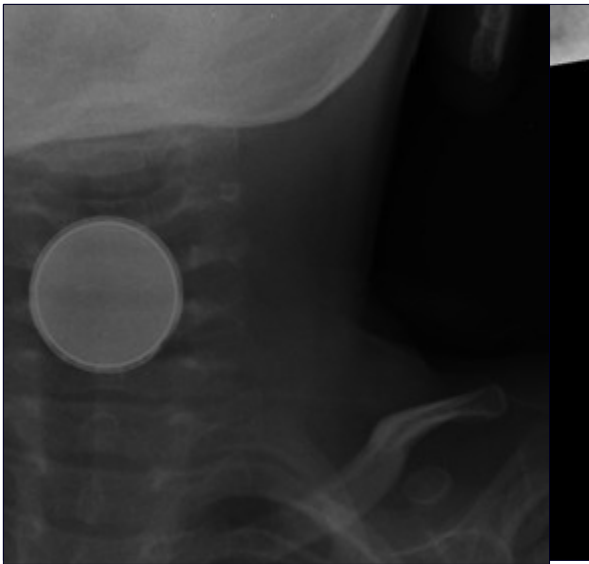
- When there is evidence of near-complete esophageal obstruction
- When there are signs or symptoms suggesting inflammation or intestinal obstruction

#### 6. **Approaches for specific types of foreign bodies**

- Coins:** usually can be observed for up to 24 hours after ingestion as 20-30% will pass into stomach spontaneously. Esophageal coins should be removed promptly if patient is symptomatic or does not pass esophageous spontaneously by 24 hours after ingestion
- Disk batteries:** a medical emergency, as contact with esophageal wall with both poles of battery can conduct electricity which can rapidly lead to necrosis and perforation of esophagus. However, once passed to stomach, most pass harmlessly.
- Sharp pointed objects:** if lodged in esophagus, represents a medical emergency because 15-35% risk of perforation. Endoscopy should be performed because many sharp pointed objects are not readily visible by x-ray.
- Magnets:** a single ingested magnet is usually low risk, however two or more magnets may attract across layers of bowel leading to necrosis, fistula, perforation or obstruction. Thus, location, and number of ingested magnets are important to determine and multiple magnets ingestion indicates preemptive removal.

#### **References:**

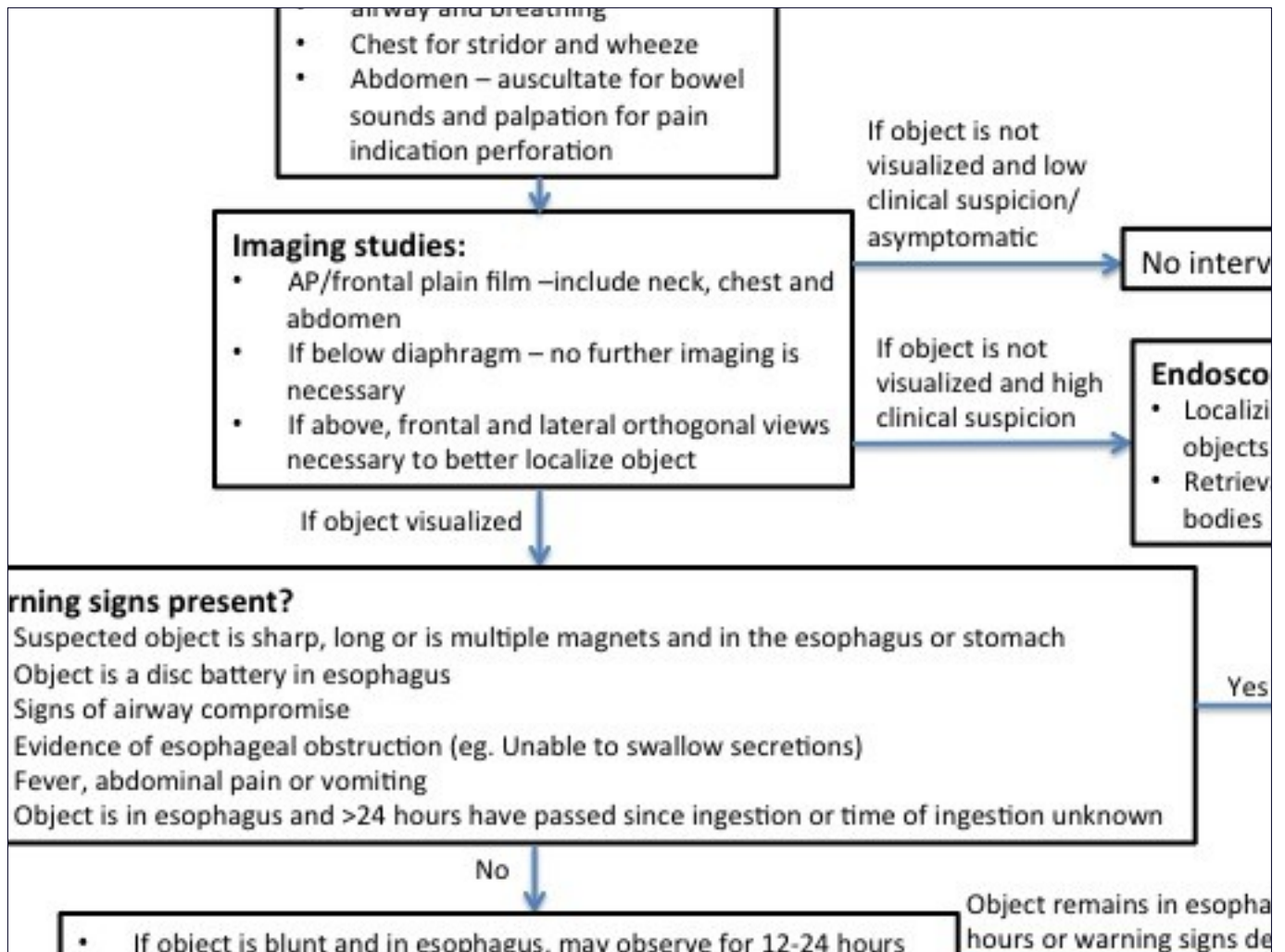
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**Figure 1. Lateral and Frontal View of Ingestion of a disk battery.** Note the two-step pattern on the lateral radiograph and the double circle pattern in coronal plane on the frontal radiograph. (Adapted from Pediatric Foreign Body Ingestion - eMedicine 2010)



**Figure 2. Frontal View of Ingestion of a coin.** Note the lack of double circle pattern and simply an radiopaque object in coronal plane. (Adapted from Pediatric Foreign Body Ingestion - eMedicine 2010)



**Figure 3. Management of suspected foreign body ingestion in children.** (Image adapted from Foreign bodies of the esophagus and the gastrointestinal tract in children – UptoDate 2010.)