FOREIGN BODY INGESTION & ASPIRATION
Agenda

- Patient presentation
- Overview of foreign body ingestion & aspiration
- Review of anatomy
- Radiography
- Complications
- Management
- Pt outcome
First, our patient!
Our Patient: Clinical Presentation

- 56 yo M w/ h/o schizophrenia who presents to ED w/ abdominal pain and suicidal ideation
- HPI: Pt brought from group home after threatening to commit suicide. Admits to a plan but refuses to divulge the details. Abd pain of unclear duration.
- PE:
  - VS: T 97.9 BP 139/99 HR 69 RR 20 O₂Sat 99% RA
  - Abd: generalized tenderness to palpation w/o rebound or guarding
Findings:

- 6.9 cm and 1.1 cm radiopaque foreign bodies in the LLQ and RLQ
- Mild gaseous distention of small and large bowel loops
- No pneumoperitoneum
On further questioning pt admitted to swallowing 6 razor cartridges
Overview
Foreign body ingestion: over 125,000 cases per year in US amongst children 19 & under
- Often asymptomatic; drooling, inability to swallow, chest pain, or respiratory distress; obstructive symptoms
- Most commonly coins

Foreign body aspiration: 5th most common cause of death in infants <1 year of age
- Most commonly infants and children between 6 months & 3 years old
- Coughing, wheezing, and stridor
- Most commonly nuts and other organic material
Adults

- **Foreign body ingestion:** usually elderly who are edentulous or mentally impaired – food bolus impaction above esophageal stricture/ring
  - Intentional ingestion in inmates or psychiatric pts
  - Pill ingestion
  - Most commonly acute onset of dysphagia, inability to swallow saliva, or neck tenderness; signs of obstruction or perforation

- **Foreign body aspiration:** rare
  - Coughing most commonly; usually no acute presentation due to distal obstruction; dyspnea is less common
Review of Relevant Anatomy
Esophagus

- Begins at lower border of cricoid cartilage
- Descends anterior to vertebral column in the superior & posterior mediastinum
- Midline placement w/ 2 leftward curvatures:
  - B/t commencement and 5th thoracic vertebrae
  - Distal esophagus approaching gastroesophageal junction
- Most contracted at commencement and at level of diaphragm
Common Sites of Impaction & Obstruction

- Esophagus: level of thoracic inlet, aortic arch/left mainstem bronchus, and just above GE junction
- Areas of narrowing or angulation in the remainder of the GI tract, including the pylorus, duodenal sweep, ileocecal valve, and rectum

Trachea

- Bounded by C-shaped cartilaginous rings, which confers a convex anterior surface w/ posterior flattening
- Divides into R and L mainstem bronchi at the carina
- R mainstem more vertically oriented and wider in caliber compared to L
  - R mainstem more prone to foreign body aspiration (60% of cases involve R lung)

Radiologic Approach
Menu of Tests

- Plain radiograph
- Contrast esophagram
- CT
- Less commonly MRI
Initial evaluation for anyone suspected of foreign body ingestion or aspiration

Ingestion: anteroposterior and lateral views of the chest as well as KUB

- 60% of ingested foreign bodies are radiopaque: coins, metal (except aluminum), magnets
- Radiolucent: fish bones, chicken bones, wood, aluminum, glass, food impactions
Aspiration: AP and lateral films of chest
- Only 10% of objects children aspirate are radiopaque
- May see subglottic density or swelling
- Air-trapping may result in hyperinflation of the affected lung, which can be demonstrated by lack of lung compression on dependent lateral decubitus view
- Sensitivity and specificity of 68-74% and 45-67%, respectively, in kids
Toddler with respiratory distress: coin ingestion or aspiration?

- When in esophagus, coin is en face on frontal radiograph because of compression of esophagus between the trachea and spine.
- When in trachea, coin is en face on lateral radiograph because of C-shaped cartilaginous rings.

Findings:
- Coin en face on frontal radiograph (A) → esophagus
- Lodged at level of aortic arch
- Associated edema resulting in airway compression

Comparison Pt#2: Disc Battery on CXR

- Can easily be mistaken for a coin
- Step-off between anode and cathode confers a targetoid appearance

Contrast Esophagram

- Can identify non-radiopaque foreign body ingestions
- Generally not indicated:
  - May obscure subsequent endoscopy
  - If obstructed, risk for aspiration of contrast
- May be helpful post-removal of foreign body to identify posttraumatic pseudodiverticulum or underlying stricture
CT

- Ingestion: CT with 3-D reconstruction can identify radiolucent foreign bodies

- Aspiration: near 100% sensitivity
  - Indicated in pts with typical symptoms and high clinical suspicion with negative or equivocal radiographic findings
  - Findings: endoluminal mass with various attenuation; may also see post-obstructive air-trapping, atelectasis, or consolidation
MRI

- Less commonly used
- May identify radiolucent foreign bodies
- Contraindicated if the suspected foreign body is metallic
Complications
Complications of Ingestion

- Aspiration pneumonia from obstruction
- Trauma leading to esophageal stricture, ulceration, perforation, aortoesophageal fistula, or tracheoesophageal fistula
Comparison Pt#3: Esophago-aortic Fistula on CT

Findings: fistula formed between esophagus and 1st portion of descending aorta (Ao.d); foreign body lodged in esophagus

Complications of Aspiration

- Complete airway obstruction, respiratory distress, atelectasis, post-obstructive pneumonia
- Long-standing aspiration may lead to bronchiectasis
Comparison Pt#4: RLL Collapse from FB on CXR & CT

Findings on imaging of 3 yo girl with respiratory distress: (A) Plain chest radiograph demonstrates RLL airspace opacity with volume loss suggestive of atelectasis. (B) Axial chest shows lumenal mass with low attenuation obstructing R bronchus intermedius

Indications for Endoscopy Following FB Ingestion

- Foreign object should not remain in esophagus >24h after presentation
- Emergent endoscopy: esophageal obstruction, sharp-pointed objects in esophagus, and disk batteries in esophagus
  - Contact of poles of disk battery with esophageal wall leads to electrical conduction with liquefactive necrosis and perforation!
- Urgent: Sharp-pointed objects in stomach
- Nonurgent removal: coins in esophagus, long objects (>5 cm) in the stomach, blunt objects failing to pass stomach in 3-4 wks, blunt objects distal to duodenum remaining in same location for >1 wk
- Most ingested foreign bodies will otherwise pass spontaneously once clearing esophagus
Magnet Ingestion on Abdominal Plain Film

- Magnets in separate bowel loops may adhere to each other, tethering loops of bowel together. Can lead to bowel obstruction, volvulus, and perforation secondary to pressure necrosis.
- Rapid surgical consultation

2 yo M with mildly dilated proximal small bowel loops and clustered radiopaque foreign bodies representing magnets; pt required surgical removal and was found to have small perforations of the small bowel.

Management of Aspirated Foreign Body

- Complete airway obstruction (inability to speak or cough): back blows and chest compressions in infants; Heimlich in older children
- Otherwise removal by rigid bronchoscopy with ventilation under general anesthesia
Back to our patient...
Non-urgent EGD did not visualize the razors, suggesting passage distally
Managed conservatively with serial KUBs
Eventually razors passed the ileocecal valve and pt was given laxatives
Upon discharge 3 of 6 razors had passed, with 3 remaining in cecum
Scheduled for KUB 5 days post-discharge, but was lost to follow-up
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References