The Foreign Body

Neil H. Stollman, MD, FACG

Associate Clinical Professor of Medicine
University of California San Francisco
Chief, Division of Gastroenterology
Alta Bates Summit Medical Center, Oakland, CA

Epidemiology

- 100,000 cases / year in the US
- 80% in children, largely 6 m – 5 years
- Higher risk populations:
  - Edentulous patients, inebriated patients, prisoners, or patients with psychiatric disorders or developmental delay (often multiple objects or repeated events)
- 10-20% require endoscopic removal (<1% surgical)
- 1500 deaths / year
Guidelines / consensus

• ASGE 2011
  – GIE 2011; 73:1085-1091
• ARRS 2014
  – AJR 2014; 203:37-53
• NASPGHAN 2015
  – JPGN 2015; 60:562-574
• ESGE 2016
  – Endoscopy 2016; epub ahead of print

Consequences of FBs

• Obstruction
• Perforation
• Aspiration / PNA / Lung abscess
• Fistula
• Mediastinitis
Sites of impaction

- **Physiologic narrowings**
  - Esophagus: UES, Aortic arch, bronchus, LES
  - Pylorus
  - Ileocecal valve

- **Pathologic narrowings**
  - Strictures, rings, webs, anastomoses
  - Neoplasms
  - Eosinophilic esophagitis (EoE)

- **Sharp angulations**
  - Duodenal sweep

**Commonly ingested FBs**

**CHILDREN**
- Most are accidental
- Coins
- Toys
- Button batteries (increasing problem due to larger size & Li+)
- Crayons
- Pen caps
- Bottle caps
- Safety pins

**ADULTS**
- Food
  - Meat (‘steakhouse syndrome’)
  - Bones (fish, chicken)
- Dentures
- Toothpicks
- Med blister packs
Clinical Presentation

CHILDREN
- Often brought in with witnessed or reported ingestion (and often Asx)
- Substernal pain
- Feeding refusal or difficulties
- Drooling
- Stridor / wheezing

ADULTS
- Dysphagia
- Foreign body sensation
- Drooling, spitting up

Physical Examination
- Mental status
- Neck exam
- Respiratory status / chest exam
- Drooling (implies complete obstruction)
- Subcutaneous emphysema
- Abdomen: obstruction, perforation, peritoneal signs
Radiological Examination

- Biplanar (PA/lat) X-rays of neck, chest, abdomen
  - Helpful if positive, but some bones, plastic, wood, glass can be missed.
  - Can identify obstruction, SQ air, mediastinal air, free intraperitoneal air
- If X-rays negative, management depends on Sxs and nature of FB
  - If the patient has symptoms, or if suspected FB has any dangerous characteristics \((\text{large} \geq 2 \text{ cm width}, \text{long} \geq 5 \text{ cm length}, \text{or sharp})\), or if the type of foreign body is not clearly known, consider 3D CT
  - If no Sxs and benign characteristics (small, not sharp, not button or magnet), no CT needed and can be discharged after observation
- Contrast studies generally contraindicated
  - aspiration risk and impede EGD visualization

When is endoscopy \textit{urgent}?

- When the ingested object is \textit{sharp}, \textit{long} (\geq 5 \text{ cm}), \textit{wide} (\geq 2 \text{ cm}) and/or is in the esophagus or stomach.
- When the ingested object is a high-powered \textit{magnet}
- When a \textit{disk battery} is in the esophagus (and in some cases in the stomach)
- When the patient shows signs of \textit{airway compromise}
- When there is evidence of near-complete esophageal \textit{obstruction} (eg, patient cannot swallow secretions)
- When there are signs or symptoms suggesting \textit{inflammation} or \textit{intestinal obstruction} (fever, abdominal pain, vomiting)
Timing of endoscopy

• **Emergent** endoscopy (<2 hours)
  – Patients with esophageal obstruction (i.e., unable to manage secretions)
  – Disk batteries in the esophagus
  – Sharp-pointed objects in the esophagus

• **Urgent** endoscopy (2-?? hours)
  – Esophageal foreign objects that are not sharp-pointed
  – Esophageal food impaction in patients without complete obstruction
  – Sharp-pointed objects in the stomach or duodenum
  – Long objects >6 cm at or above the proximal duodenum
  – Magnets within endoscopic reach

• **Non-urgent** endoscopy
  – Coins may be observed for 24 hours before removal in an asymptomatic patient
  – Batteries in the stomach w/o signs of GI injury may be observed for 48 hours

Tools of the trade

• Rigid Esophagoscopy (ENT) if at UES/pharynx
• Grasping forceps (rat toothed, alligator)
• Snares
• Nets (Roth)
• Baskets
• Hood (for sharp, pointed, if no overtube)
• Overtube (for sharp, or repeated passes)
Sharp / pointed FBs

- Fish / chicken bones, toothpicks, dentures, medication blister packets, bread bag clips
- Often not seen on plain films; CT if concern for perforation, but need urgent (2 hour) EGD if symptomatic, even if X-rays neg, due to high risk of perforation (15-30%, often at ICV) and also remove from stomach if hasn’t passed yet.
- Remove with sharp end trailing, use overtube or hood / cap to avoid injury
- If distal to stomach, daily X-Rays and surgery if no advancement in 3 days, or pointed end forward

Ring: net and hood
Disk / Button battery ingestion

- More common in children, from games, calculators, hearing aids. Change to lithium and larger size has increased this risk significantly and current consumer advocacy efforts underway to minimize.
- Danger of rapid liquefaction necrosis and fistula and perforation when lodged in the esophagus; this is an emergent EGD!
- Basket or net helpful, overtube if not a secure grasp, avoid puncturing with sharp forceps.
- Once in stomach, most pass spontaneously (unless >20 mm or in stomach >48 hours) but still need urgent EGD to assess for esophageal injury, which if present, requires Abx, inpatient observation, sequential imaging. If none, X-rays Q3-4 days reasonable, no role for antacids or emetics, cathartics unproven but reasonable and low risk.
Magnet ingestion

- Newer Neodymium magnets 5X stronger
  - Sold in 100’s as desk toys (“bucky balls”)
  - Used by teens as simulated piercings
- May stick together (or to other ingested metal) across bowel loops, causing pressure necrosis, fistulas, perforation
- Often require endoscopy, even surgery
  - should be removed if endo-reachable, and surgery vs inpatient observation if too distal.
- Banned by CPSC in 2012 but still easily available
Drug Packet ingestions

• “Body packing” of heroin or cocaine in condoms or balloons, swallowed or inserted rectally.
• Usually radio-opaque, but CT if AXR negative
• Rupture can be fatal
• Endoscopic removal is CONTRAINDICATED
• Inpatient observation, bowel irrigation, and radiographic follow-up initially
• Signs of intoxication or obstruction: surgery
Esophageal food impactions

- The most common ‘foreign body’ impaction in adults in US
  - Strictures / stenoses / rings / eosinophilic esophagitis
  - Tumors, dysmotility less common
- URGENT (2 hours) EGD if unable to swallow secretions at all, otherwise <24 hours. X-rays generally not needed.
- Removal proximally with net, snare, cap, or grasping forceps, overtube can decrease risk of aspiration
- Advance distally if able (data now support safety in >350 cases)
  - Try and advance scope beyond to assess obstruction
  - Try and push from right side (better angle for passage)
  - Be aware of hidden bone spicules in bolus
Esophageal food impactions

- **Papain**: NEVER, can digest esophagus too and reports of hypernatremia, perforation, death
- **Glucagon** 1 mg IV, lowers LES, but not effective on rings/strictures, may cause nausea and vomiting. Low efficacy but likely low risk too
- **Simultaneous dilation** to reduce recurrence usually reasonable and safe, but be cautious if EoE or prolonged impaction with significant mucosal damage
- **Biopsies** at time of initial EGD, particularly to r/o EoE, are safe and appropriate. If no etiologic dx made at index EGD, should have diagnostic EGD in follow up

Summary / conclusions

- Recognize indications for urgent removal
  - Complete obstruction, sharp/battery in esophagus
- Recognize contraindications (packing)
- Know your equipment
- Practice in advance