Ingestion of Foreign Bodies and Caustic Agents

Kids Eat the 'Darndest' Things

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Goals and Objectives
At the end of this presentation, the participant should be able to:
1. Recognize the signs & symptoms of foreign body & caustic ingestions in children
2. Diagnose and plan appropriate management of such ingestions
3. Correctly answer any board questions pertaining to the subject matter.
4. Stay awake during the lecture...and possibly save a life.

Foreign Body Ingestion...“Who??”

- **Children**
  - ingest almost 80% of all foreign bodies
  - usually 1-3 years of age

- **Adolescents/Adults**
  - underlying esophageal abnormality
  - eating too fast
  - intentional
  - psychiatrically disturbed
Foreign Bodies...”What??”

- Type of foreign body varies with age
  - Children: coins, toy parts, jewelry
  - Adolescents/adults: food (meat), dental items

Foreign Bodies...”Where??”

- Where does the ingestion take place?
  - Children: usually at home while in care of parents
  - Older children/adolescents: at school

Foreign Bodies...“Where??”

Where does the object lodge?

- Esophagus:
  1. below cricopharyngeal muscle (60-70%)
  2. at the level of the aortic arch (20%)
  3. above the LES (10-15%)

- Other potential ‘hang-ups’:
  - physiologic sphincters (pylorus, ICV)
  - duodenal C-loop
  - congenital malformations (Meckel's)
  - surgical anastomoses
General Rule
- If a foreign body makes it into the stomach spontaneously, it will usually pass thru the remainder of the GI tract (>95% chance).
- Exceptions to the rule...
  - foreign bodies longer than 5cm or wider than 2cm
  - ingestion of >1 magnet or a magnet in combination with a metallic foreign body within a 48-72 hour period

Foreign Body Ingestion...“When?”
- Children: noon-6pm
- Older Children/Adolescents: during school
- Adults: Dinner

Presenting Symptoms in Foreign Body Ingestion
- Most common symptoms:
  - dysphagia, drooling, hoarseness
- Additional complaints:
  - odynophagia, chest pain, wheezing/respiratory distress, vomiting, localization of the obstruction within the chest
- Long-standing foreign bodies can present as chronic inspiratory stridor, dysphagia, a neck mass
Foreign Body Ingestion: “What Should Be Done?”

- Radiologic examination recommended
  - 90% of ingested FB’s in children seen on plain films
  - Helps determine if multiple FB’s were ingested
  - Esophageal coins: AP film shows heads/tails
    lateral film shows edge
  - Ultrasound/CT may be helpful if suspect ‘body packer syndrome’

Management of Smooth Esophageal Foreign Bodies/Coins

- Patient symptomatic with respiratory distress or difficulty swallowing secretions
  - Emergent endoscopy
  - Foley balloon catheter extraction
- Patient able to swallow, is in no respiratory distress and FB is in lower 2/3 of esophagus
  - Repeat x-ray in 12-24 hours
  - If FB remains in esophagus after 24 hours, must be removed
What Foreign Bodies Should be Endoscopically Removed?

- Pointed or sharp objects (pins, fish bones, toothpicks, nails, needles, open safety pins, razor blades, dental retainers) should be removed immediately.
- Coins/blunt objects may remain in the stomach for up to 4-6 weeks.
- Long objects (>5cm in children; >13cm in adults).
- Condoms/Balloons containing illicit drugs should be surgically removed due to fragility.

Food/Meat Impaction

- Typically occurs in children with congenital esophageal anomalies or after their repair, esophageal strictures, motility disorders.
- Steak and hotdogs are most common offenders.
- Barium study NOT indicated.
- Should not remain in esophagus > 12 hrs.
- Enzymatic digestion (use of meat tenderizers) CONTRAINDICATED.
Button (Disc) Battery Ingestion
- > 2100 ingestions occur per year
- most common source of battery: child’s own hearing aid
- x-ray immediately if suspected
  - gives position of battery (if in esophagus, must be removed immediately)
  - AP view: double-density shadow
  - lateral view: edge has a step-off at junction of anode and cathode

If battery remains in stomach > 48 hours, should be endoscopically retrieved
- Prokinetic agents/laxatives may hasten transit through stomach and small intestines.
- If after 5 days, the battery fails to move within the intestines or if patient develops pain/peritoneal symptoms at any time, surgery indicated.
- Complications: perforation, stricture, rash, mercury toxicity (one mild case reported), death

Caustic Ingestions
- National registry reports > 1.9 million caustic ingestions per year
- Majority of patients: < 6 years
- Most frequently ingested products
  - household bleaches
  - automatic dishwasher products
  - laundry detergent
  - swimming pool products
  - toilet bowl/oven cleaners
Alkali Ingestion
- Causes *liquefaction necrosis* (penetrate deep causing edema and cell necrosis and often resulting in full thickness burn)
- less bitter tasting (colorless/odorless)
- damage usually to upper/lower esophagus; less often distally
- bleaches are the #1 ingested alkali-tend to have benign course/rarely require hospitalization
- cosmetic hair relaxers cause few significant burns

Acid Ingestion
- Causes *coagulation necrosis*-limits penetration
- bitter tasting (toilet bowl cleaners, swimming pool products)
- damage usually to stomach/pylorus

Caustic Ingestion
- Clinical Presentation
  - Most common symptoms
    - crying, spitting, coughing
    - drooling, dysphagia, chest pain, abdominal pain
  - Presence or absence of oral burns not predictive of esophageal damage
  - Study of 489 children with caustic ingestions
    - 45% w/o oral burns had esophageal burns
    - 54% w/ oral burns had esophageal burns

(Watson J Emerg Med 1985)
Caustic Ingestions: Management

- Avoid induction of emesis
- DO NOT give neutralizing agents (vinegar/bicarb)
- Administration of fluids to symptomatic child may predispose to emesis (increase risk of aspiration/further esophageal injury)
- If respiratory sx present, consult EENT/pulmonary
- If H&P c/w accidental ingestion of small amt of dilute acid/base and patient is asymptomatic and able to drink, may d/c to home without endoscopy
- If significant ingestion is suggested or patient is symptomatic, EGD recommended in 12-24 hours

Endoscopic Grading of Caustic Burn Injuries in Children

- Grade 0: normal mucosa
- Grade 1: superficial hyperemia
- Grade 2A: hemorrhages, exudate, linear erosions, ulceration (non-circumferential)
- Grade 2B: 2A+ circumferential
- Grade 3: deep ulceration, eschar formation with necrosis, full thickness injury with/without perforation

Caustic Ingestions: Management

- Grade 1 or 2A burns
  - start on clears; d/c to home when taking po well; usually no long-term sequellae
- Grade 2B or 3 burns
  - >70% chance of esophageal stricture
  - NG should be placed endoscopically for nutrition and to prevent complete obstruction of lumen
  - corticosteroids/antibiotics
  - 1,000 fold increased risk of esophageal squamous cell carcinoma after lye ingestion; average onset = 4 decades after injury
Question #1

A 2 year old boy has just swallowed a nickel. Physical exam reveals a quiet child in no distress. The MOST appropriate first step in managing this patient is:
A. administration of glucagon IM
B. administration of papain
C. admit for observation
D. obtain radiographs
E. perform endoscopy

Question #2

A young child has swallowed a penny. X-ray reveals the coin to be in the stomach. What is the next most appropriate step?
A. The child should be given ipecac to induce emesis.
B. The child should be admitted and observed for signs of intestinal obstruction.
C. The child should be sent home and the mother instructed to examine the stools.
D. The child should be referred for endoscopic removal of the penny.

Question #3

A 3 year old female is found crying and drooling with an open container of oven cleaner. The bottle is half empty. On exam in the ER, she has blisters and ulceration of her lips and buccal mucosa. Initial management should include:

A. Administration of ipecac to decrease the amount of caustic agent in the GI tract
B. Administration of milk or a neutralizing agent
C. NG placement for gastric lavage
D. NPO status, IVF and admission