Foreign Body and Caustic Ingestion

DR. NARGES ZARE

PEDIATRIC GASTROENTEROLOGY, HEPATOLOGY AND NUTRITION

ASSOCIATED PROFESSOR

Who Ingests

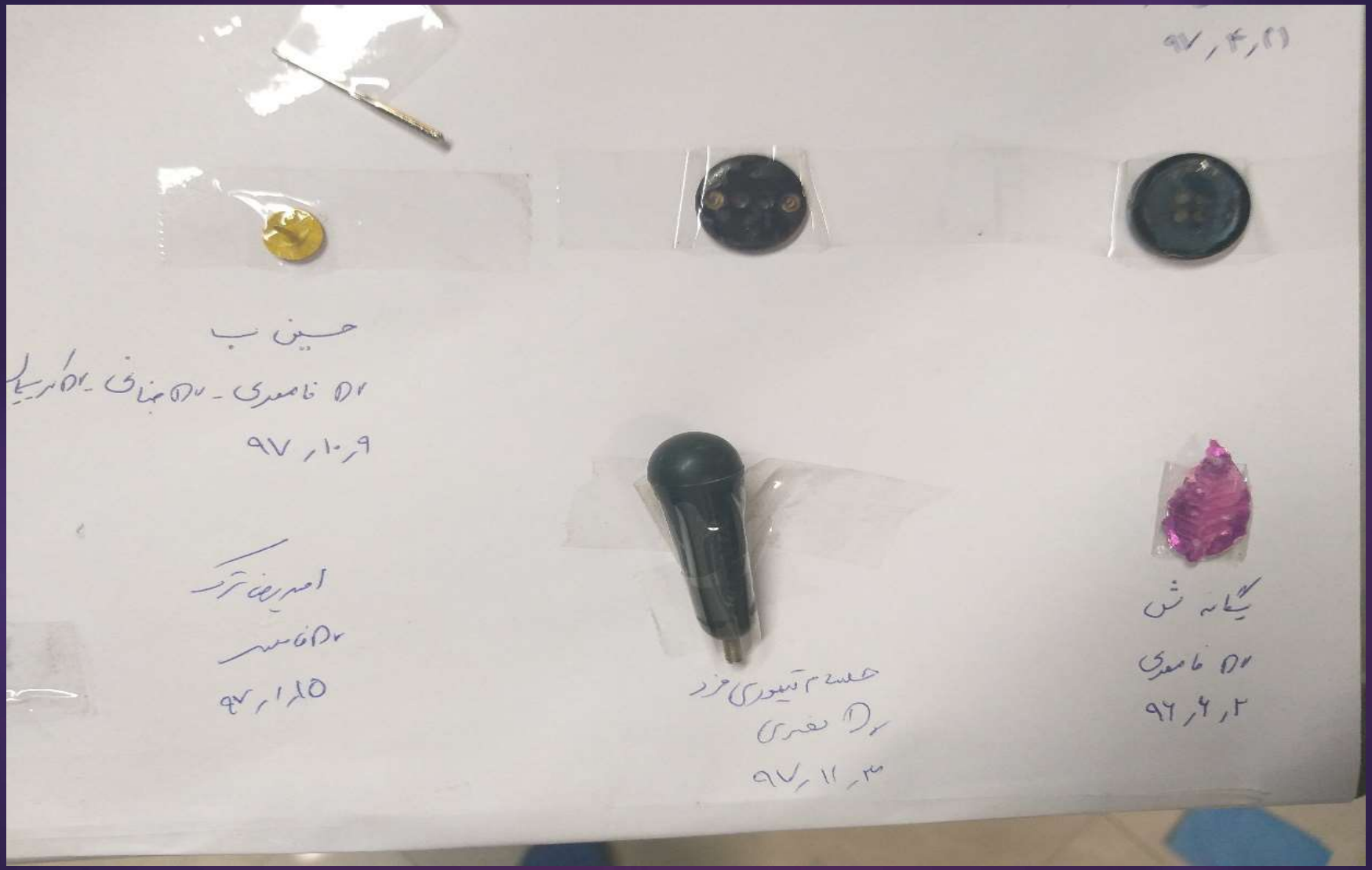
- Children between ۶ mo – ۳ years
- Older children with
  - NDD or psychotic disorders
  - Eating disorders
  - Alcohol or drug use

What Is Most Ingested

- Coins (US)
- Fish Bone (Asians)
- Aults : Food Impaction

  (Children with EoE , EA , Nissen Fundouplication)


ERNIE BALL
GROSCHEN CANTEEN SLOO
BOSSMAN SUPER HEAVY DUTY


۹۷/۴/۱۱
حسین ب
۹۷/۱۰/۹
امیرعلی ترک
۹۷/۱/۵
حسام تیموری فرد
۹۷/۱۲/۳
گیگا نه ش
۹۶/۶/۲

Esophageal Foreign Bodies

Clinical Presentations

- Initial: choking, gagging, and coughing
- Followed by:
  1. Excessive salivation
  2. Dysphagia
  3. Food refusal, emesis
  4. Pain in the neck, throat, or sternal notch regions

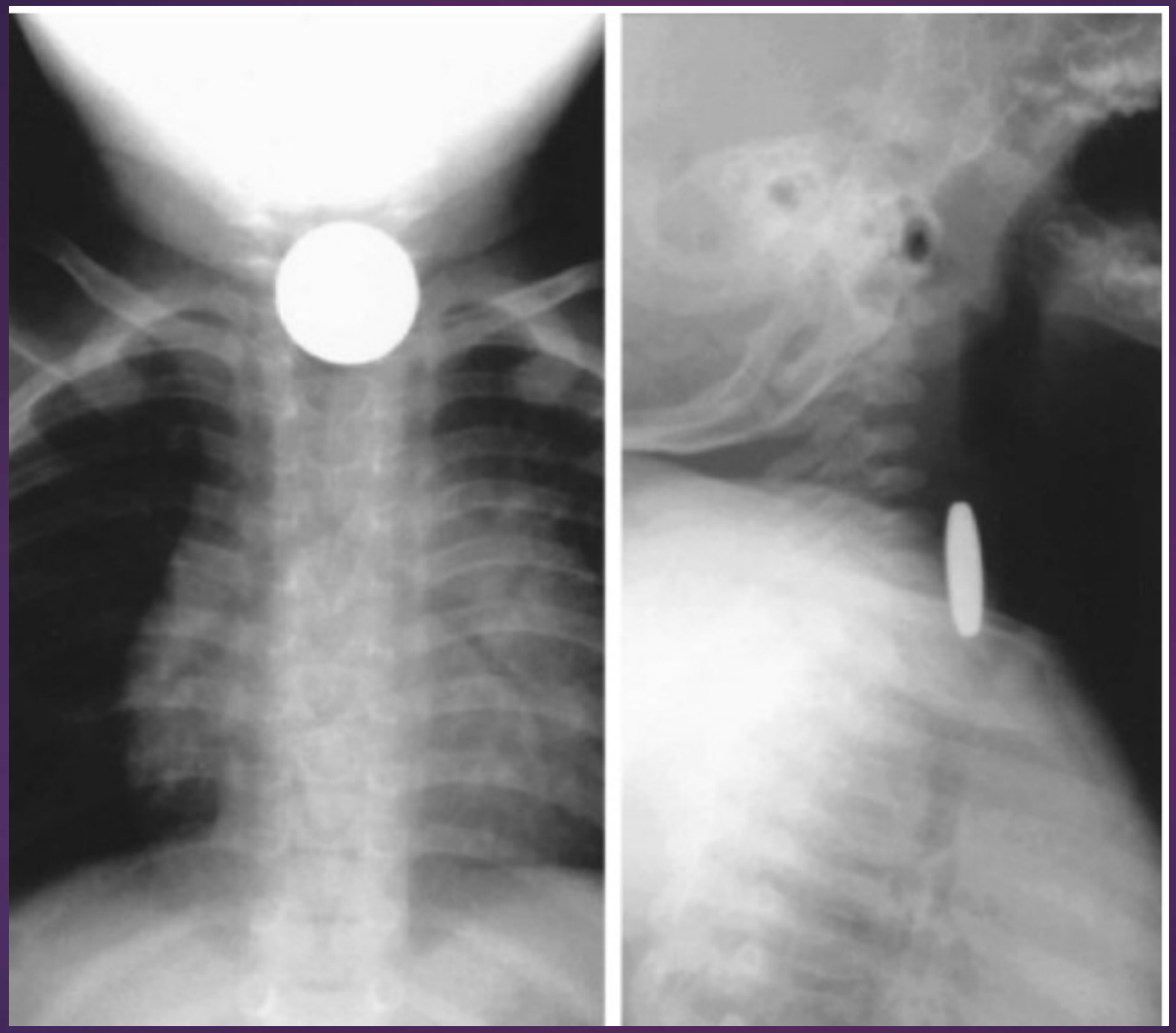
- Respiratory symptoms : if esophageal foreign body impinges on the larynx or membranous posterior tracheal wall
  - Stridor
  - Wheezing
  - Cyanosis
  - Dyspnea
- Perforation : Cervical swelling, erythema, or subcutaneous crepitations

At least ٣٠% of children with esophageal foreign bodies may be totally asymptomatic:

- **History of foreign body ingestion**

Evaluation

- Approximately ٩٠% : opaque
  - Plain anteroposterior (AP) radiographs of the neck, chest, and abdomen
  - Lateral views of the neck and chest



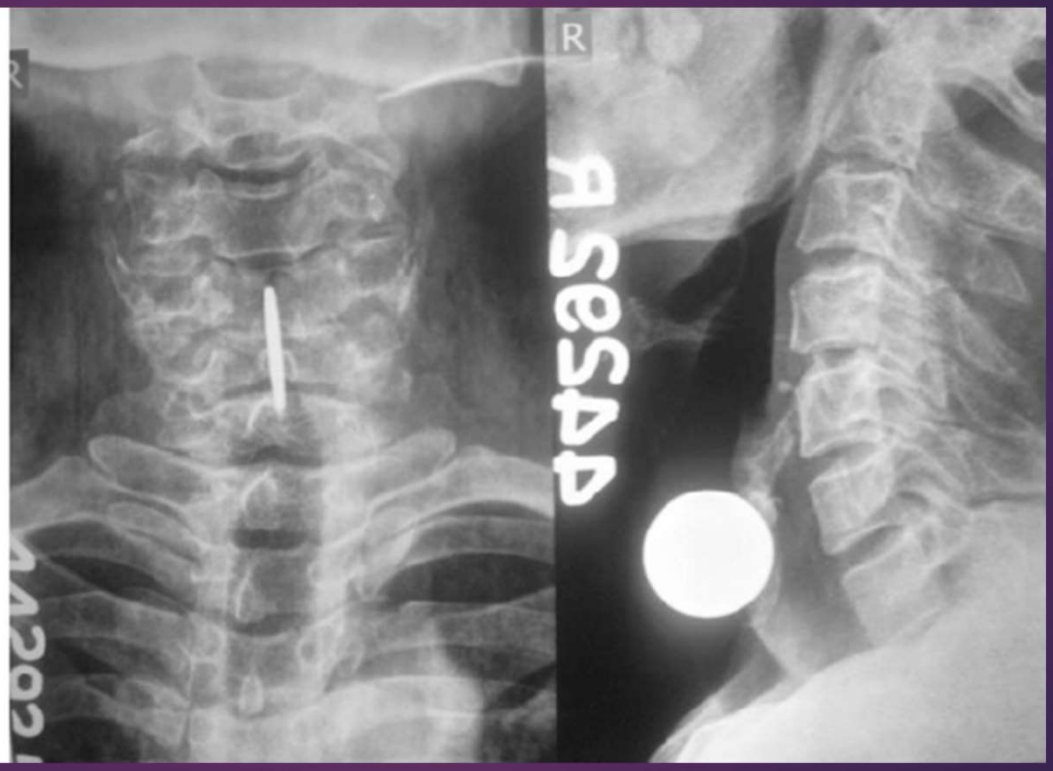
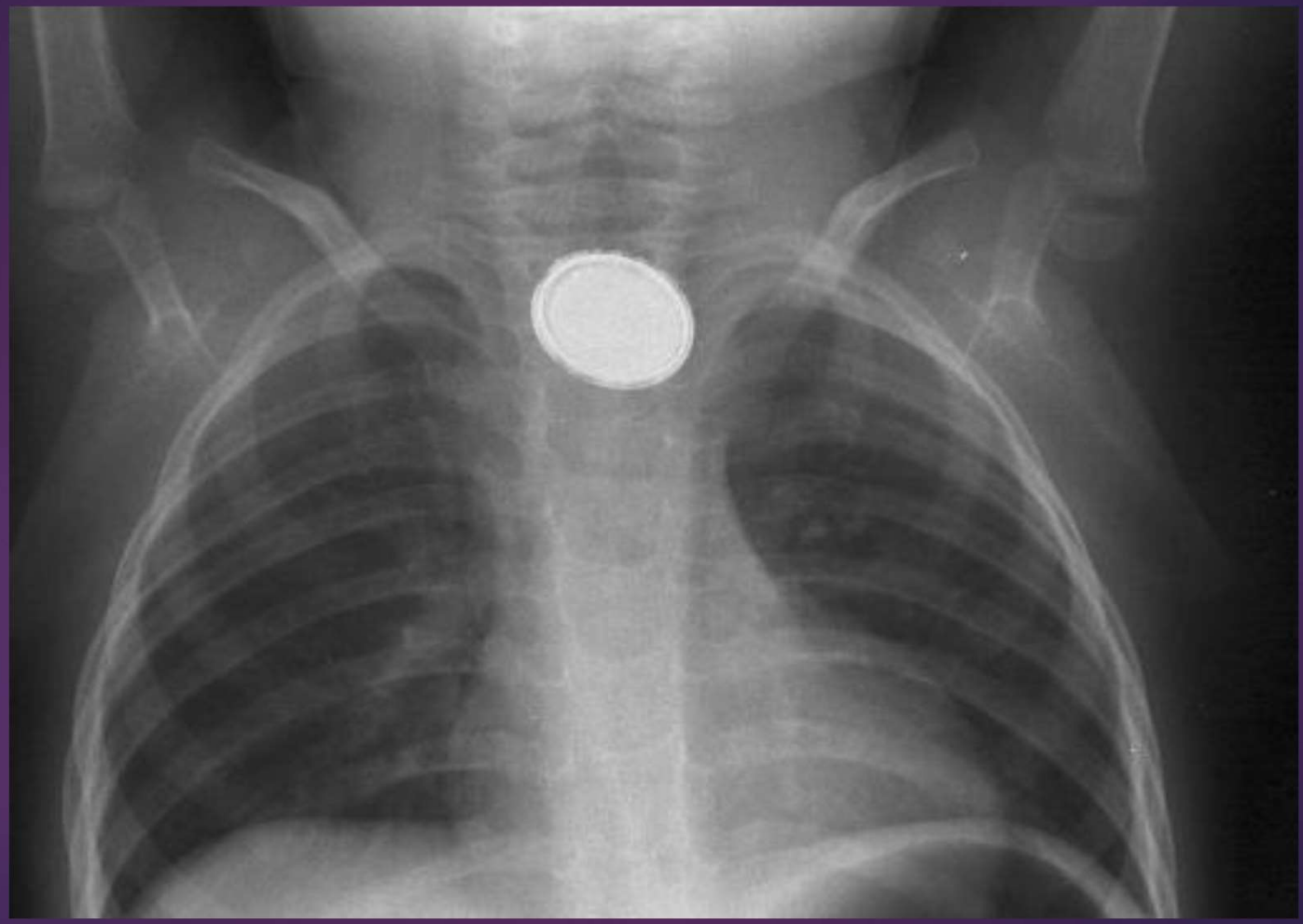


Fig. 2 Digital X-ray of the neck antero-posterior and lateral views confirming the position (lie) and site (subglottic) of the coin in situ



- Radiolucent: Materials such as plastic, wood, glass, aluminum, and bones
  1. Barium contrast studies
     - Asymptomatic patient with negative plain films
     - potential aspiration & making object removal difficult
  2. CT Scan

Treatment

- Management:
  ١. Type
  ٢. Location
  ٣. Length of time the item ingested

- Between ٥٠%-٩٠% of foreign objects pass spontaneously, ١٠% -٢٠% require removal, and less than ١% require surgical intervention

- Endoscopy:
  ١. Visualization of the object and underlying mucosa
  ٢. Removal of the object

- Urgent removal
  ١. Sharp objects in the esophagus
  ٢. Disk button batteries
  ٣. Foreign bodies associated with respiratory symptoms

- Asymptomatic blunt objects and coins lodged in the esophagus can be observed for up to ٢٤ hr in anticipation of passage into the stomach

- Esophageal coins impacted for <٢٤ hr, performed most safely by experienced radiology personnel, consists of passage of a Foley catheter beyond the coin at fluoroscopy

- Bougienage of esophageal coins toward the stomach in selected uncomplicated pediatric cases has been suggested to be an effective, safe, and economical modality where endoscopy might not be routinely available.

Food impaction

- If there are no problems in handling secretions, meat impactions can be observed for up to ١٢ hr
- In patients without prior esophageal surgeries, glucagon (٠/٠٥ mg/kg IV) can sometimes be useful in facilitating passage of distal esophageal food boluses by decreasing the LES pressure
- The use of meat tenderizers or gas-forming agents can lead to perforation and are not recommended

Button Battery

- Button batteries, in particular, must be expediently removed
  ١. Leakage of alkali
  ٢. Electrical current
  ٣. Heavy metal from battery degradation in the GI tract
  ٤. Tissue pressure necrosis

Lithium Battries

- Higher voltage
- Higher capacitance
- Larger diameter (٢٠-٢٥mm)

First Aid

- If:
  - Asymptomatic
  - Acute button battery ingestions (eg, witnessed or likely to have occurred within ١٢ hours)
  - Older than one year of age
  - Without allergies to honey

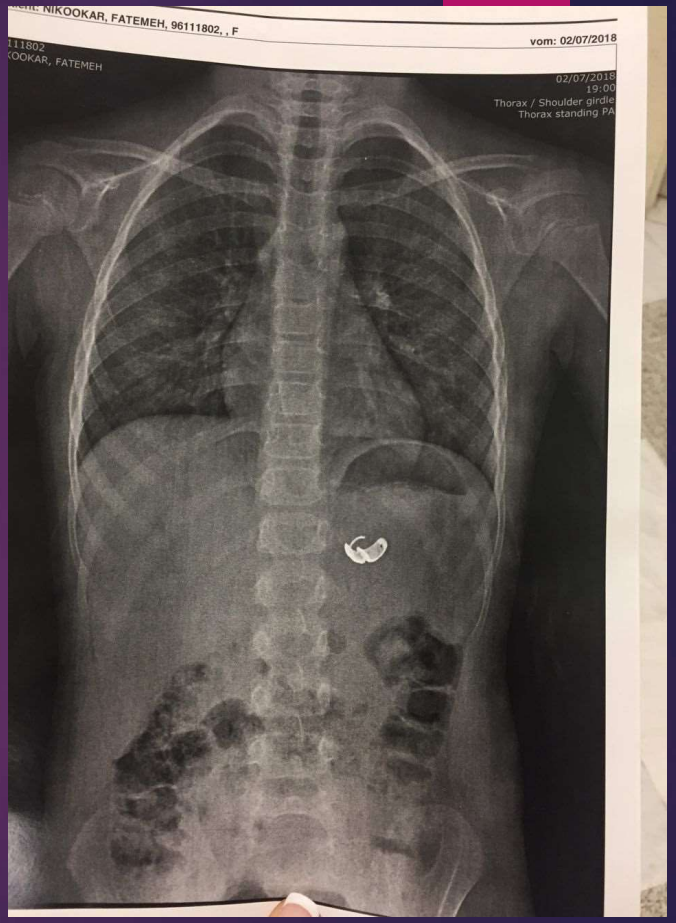
- One oral dose of pure honey (eg, ٥ to ١٠ mL) as soon as possible after ingestion. The child may receive another dose of honey or, if no history of allergy, a single dose of sucralfate ٥٠٠ mg prior to confirmation of esophageal impaction by radiography

- In emergency battery removal ingestion do not use honey or sucralfate

Foreign Bodies in the stomach


0593152501-352601-2
2018, 22:57
ABOLFAZL CHE
M. ABDO
R
Supine
EMAM REZA HOSPITAL-EDALATIAN-R


20901055652900-404118-1
10:17:2018 18:33
R


NIKOOKAR, FATEMEH, 96111802, , F
vom: 02/07/2018
111802
OOKAR, FATEMEH
02/07/2018
19:00
Thorax / Shoulder girdle
Thorax standing PA

Foreign Bodies in the stomach

- Conservative management is indicated for most of gastric foreign bodies
- Most objects pass though the intestine in ۴-۶ days, although some take as long as ۳-۴ wk
- While waiting for the object to pass, parents are instructed to continue a regular diet and to observe the stools for the appearance of the ingested object

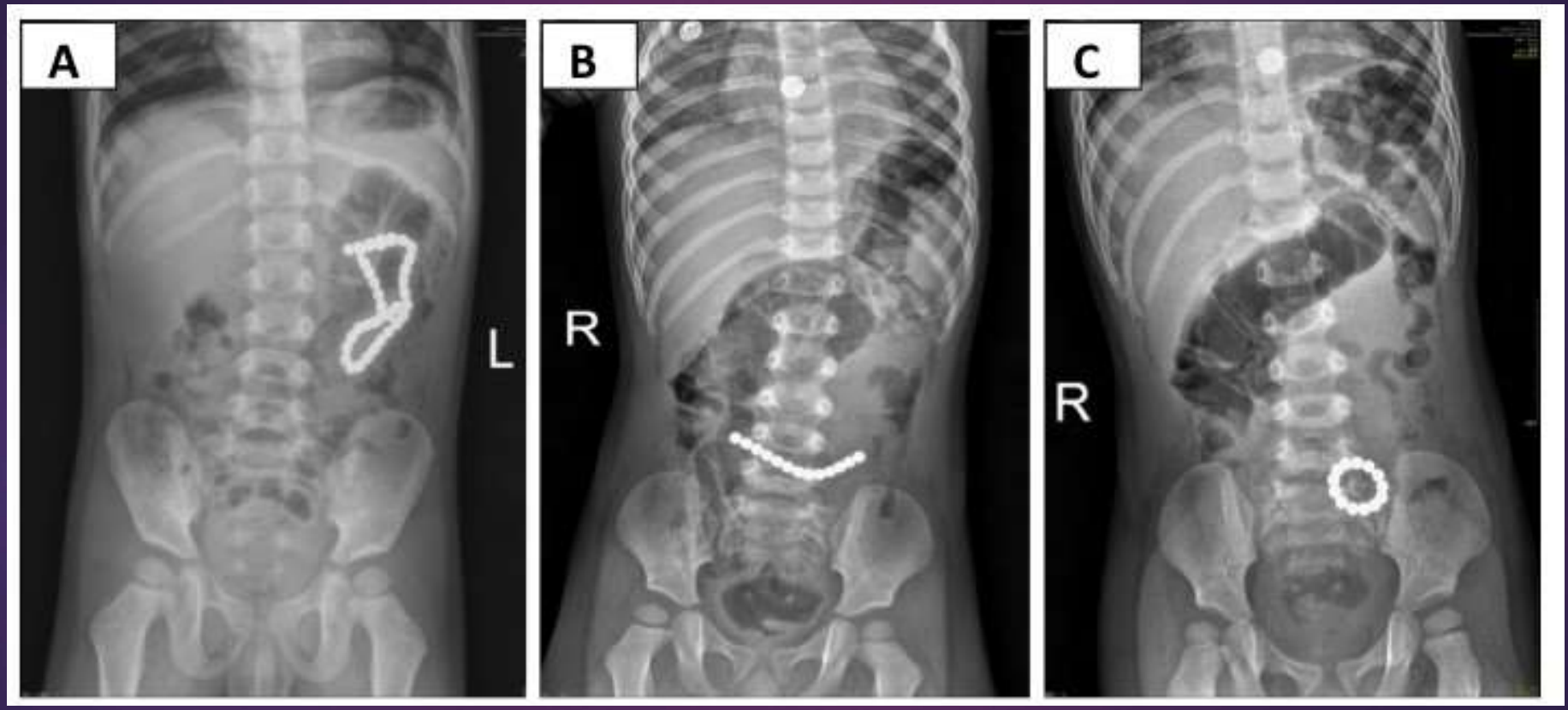
- Long or sharp objects are usually monitored radiologically

- Alarm:
  ١. Abdominal pain
  ٢. Vomiting
  ٣. Persistent fever
  ٤. Hematemesis or melena immediately

- Failure of the object to progress within ٣-٤ wk seldom implies an impeding perforation but may be associated with a congenital malformation or acquired bowel abnormality.

Certain objects pose more risk

- Sharp foreign bodies
- Multiple magnets
- Lead-based foreign bodies (Inexpensive toy medallions,…)
- Button batteries


A
L
B
R
C
R


R
HAS
AP STANDING


R
L
**
*
*
11 9 20

- The pylorus, duodenal C loop and terminal ileum/ileocecal valve are areas where long, sharp, or oddly shaped objects may become impacted

- Objects wider than ٢ cm, or ١ cm in smaller patients, will not likely traverse the pylorus and will require endoscopic retrieval

- Objects longer than ٥ cm, or ٢/٥-٣ cm in smaller patients, will not likely pass through the duodenal C loop, or more distally

BOX 18-1 *Indications for Urgent Foreign Body Removal*

Signs of respiratory distress
Signs of esophageal obstruction such as inability to manage secretions
Button battery in the esophagus
Sharp objects
Objects ≥5 cm in length and/or ≥2 cm in width
Multiple high-powered magnets
Signs of intestinal obstruction, such as fever, abdominal pain, or vomiting
Foreign body has been impacted in the esophagus for more than 24 hours or for an unknown period of time

CAUSTICS

- Most often: between ١-٣ years of age
- Boys: ٥٠ to ٦٢ percent of cases
- The most common agents were cosmetic and personal care products, analgesics, and cleaning substances
- Alkaline agents > Acids

RELATIONSHIP OF INGESTION TO TYPE OF INJURY

- Injury to the lips, oropharynx, and upper airway: many caustic agents
- Esophageal burns : ۱۸ to ۴۶ percent of caustic ingestions
- Most often from common household cleaning products: oven and drain cleaners, strong lyes , laundry detergents and cleaning agents with sodium phosphate, sodium carbonate, and ammonia

- Hair relaxers are ingested commonly, but they appear to be rare causes of esophageal injury
- Common acid household products: toilet bowel cleaners, battery fluids, and muriatic (hydrochloric) acid used in swimming pools
- Esophageal burns are rare with household bleaches (sodium hypochlorite) because they have a relatively neutral Ph (if there is often mild burns)
  - Industrial strength bleaches or household bleaches from other countries

- Solid caustic materials, which tend to adhere to the mucosa, can produce deep burns of the oral cavity and esophagus (but less likely reach the stomach)

- The immediate and severe pain produced by these products may limit the amount ingested and thus lessen the extent of injury

- Powdered or granular detergents tend to injure the upper airway, resulting in stridor and epiglottitis, whereas esophageal injury is less common

- Alkalis (pH >٧) cause liquefaction necrosis
  - → Early disintegration of the mucosa, allowing deep penetration and perforation

- Household detergents and phosphates (pH: ٩-١١) rarely cause serious injuries unless taken in large amounts

- PH ≥ ١١(nelson١٢) cause the most severe burns, even with ingestion of small amounts

- Penetration into the esophageal wall depends to the concentration and the length of time the agent remains in contact with the mucosa
- Acids or corrosives, with a pH<٧ (severe with < ٢), cause coagulation necrosis
- Upper airway injuries also are common with ingestion of acids

Timing of tissue damage and repair

Time	Injury
Day ٠	Acute injury
١ to ٧ days	Inflammation, vascular thrombosis
١٠ to ٢١ days	Granulation tissue
٣ weeks	Fibrosis/stricture

Gastric injury

- Less common than esophageal injury
- Patients who ingest relatively large amounts of alkali (٢٠٠ to ٣٠٠ mL) have a high risk of injury(٨٠%)
- Large ingestions have resulted in gastric perforation, hemorrhage, and death from erosion into a bronchial vein
- Gastric injury often is most severe with acids, (because of pooling in the antrum and antral spasm) may cause severe burns in the prepyloric area, potentially leading to pyloric obstruction

CLINICAL MANIFESTATIONS

- Early signs and/or symptoms may not correlate with the severity and extent of tissue injury

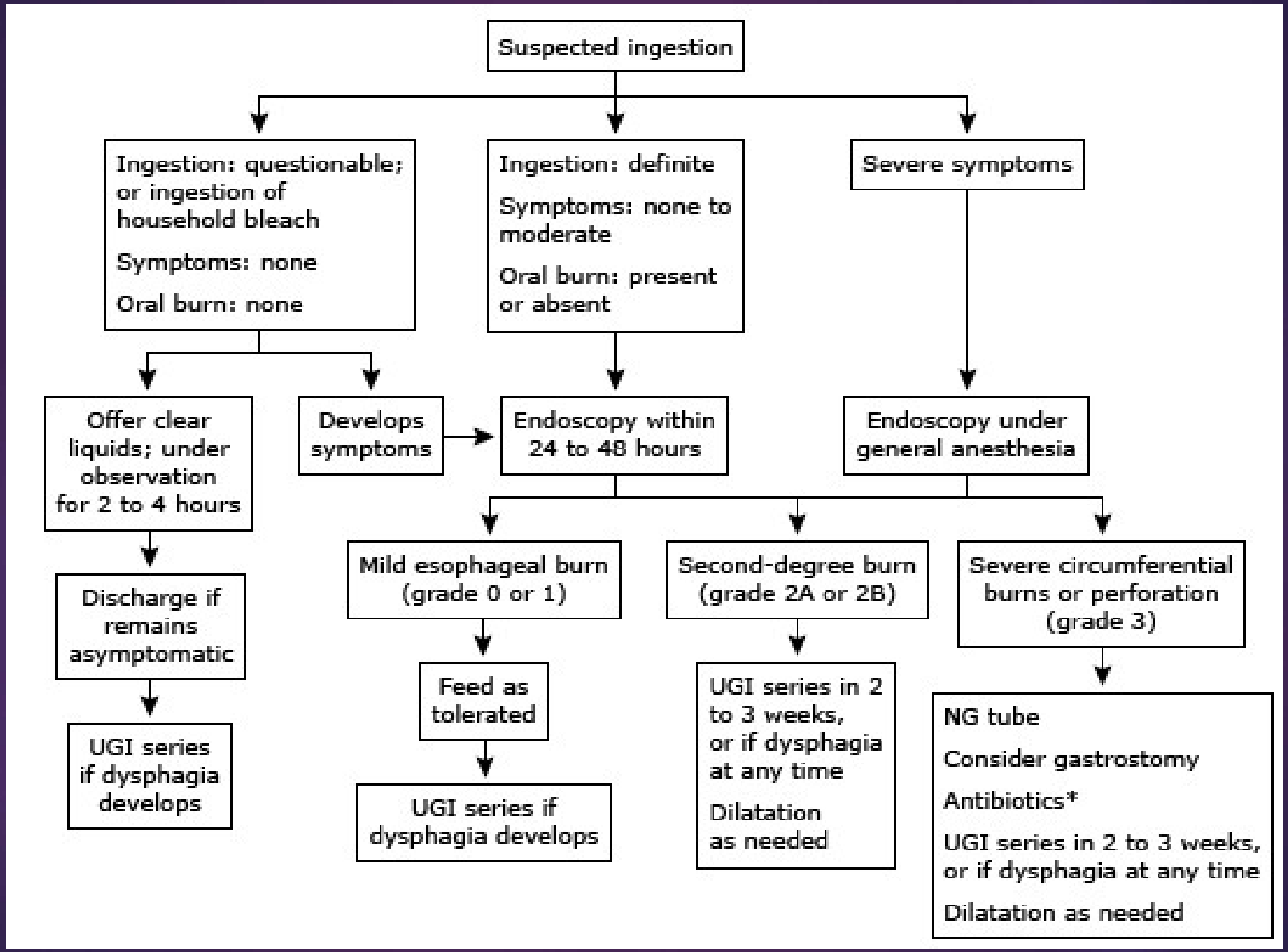
- The most common symptom is dysphagia
  - Without severe esophageal injury(loss of motility with delayed transit)
  - In severe injury (last for weeks)
  - Persistent dysphagia (fibrosis of deeper muscle layers, with or without stricture formation)

- Drooling
- Retrosternal or abdominal pain
- Hematemesis
- Upper airway injury such as stridor, hoarseness, nasal flaring, and retractions
- Epiglottitis can be severe, especially in children younger than two years of age, requiring prompt intubation

- Deep esophageal burns can be complicated by esophageal perforation with mediastinitis and the development of a TEF
- The presence or absence of any of the clinical features described above does not predict ingestion or the presence or severity of esophageal or gastric burns
- The presence or absence of oral lesions also is a poor predictor of esophageal injury

DIAGNOSTIC EVALUATION

- Usually involves an upper endoscopy, which can evaluate the extent of injury
- All patients with significant burns and the potential for stricture formation should be evaluated with barium contrast studies one to three weeks post ingestion


Suspected ingestion
Ingestion: questionable; or ingestion of household bleach
Symptoms: none
Oral burn: none
Ingestion: definite
Symptoms: none to moderate
Oral burn: present or absent
Severe symptoms
Offer clear liquids; under observation for 2 to 4 hours
Develops symptoms
Endoscopy within 24 to 48 hours
Endoscopy under general anesthesia
Discharge if remains asymptomatic
UGI series if dysphagia develops
Mild esophageal burn (grade 0 or 1)
Second-degree burn (grade 2A or 2B)
Severe circumferential burns or perforation (grade 3)
Feed as tolerated
UGI series if dysphagia develops
UGI series in 2 to 3 weeks, or if dysphagia at any time
Dilatation as needed
NG tube
Consider gastrostomy
Antibiotics*
UGI series in 2 to 3 weeks, or if dysphagia at any time
Dilatation as needed

Symptomatic ingestion

- Documenting the presence or absence of esophageal or gastric injury after symptomatic caustic ingestion is essential
- It is the only way to determine the extent of injury and thereby predict prognosis
- The most reliable method is by upper endoscopy which usually is performed within the first ٢٤ to ٤٨ hours in a range of ٦hr-٤ days
- Earlier endoscopy may not show the full extent of the injury and endoscopy after four days increases the risk of perforation

- On the other hand, endoscopy should be performed using general anesthesia and protection of the airway in patients with severe burns and with upper airway signs or symptoms

- Endoscopy is contraindicated in:
  ١. Hemodynamically unstability
  ٢. Evidence of perforation or severe respiratory distress
  ٣. Exhibit severe oropharyngeal or glottic edema and necrosis. Rigid endoscopes are still used commonly, but the risk of perforation remains a major consideration

Asymptomatic ingestion

- In patients with a questionable history of ingestion and no symptom & sign observe for hours and if the patient remains asymptomatic with normal swallowing , endoscopy is not indicated
- Patients who have ingested household bleaches rarely have significant tissue injury and, therefore, rarely require endoscopy
- Patients with a definite history or strong suggestion of ingestion even if asymptomatic, and patients with symptoms or oral burns, should be evaluated with upper endoscopy

Grading of esophageal burns from caustic injury

Visible Appearance	Grade
History of ingestion, but no visible damage or symptoms	Grade ٠
Edema, loss of normal vascular pattern, hyperemia, no transmucosal injury	Grade ١
Transmucosal injury with friability, hemorrhage, blistering, exudate, scattered superficial ulceration	Grade ٢a
Grade ٢a plus discrete ulceration and/or circumferential ulceration	Grade ٢b
Scattered deep ulceration with necrosis of the tissue	Grade ٣a
Extensive necrotic tissue	Grade ٣b

TREATMENT

- The initial treatment of caustic ingestion primarily is observation, with an emphasis on preventing vomiting, choking, and aspiration
- The induction of vomiting is contraindicated
- The use of neutralizing agents generally is not recommended because there is concern about additional damage from heat injury during the neutralization process
- The use of diluting agents, such as milk or water may induce vomiting and is not recommended (especially in the presence of acute airway swelling and obstruction)

Nasogastric tube

- In patients with extensive circumferential burns (Grade ٢B or ٣) a nasogastric tube (NGT) should be placed under direct visualization at the time of upper endoscopy(not inserted blindly)
- NGT : a route for nutritional support during the healing phase, and help maintain a lumen during stricture formation, and a guide for esophageal dilatation
- A silicone NGTs (ranging in size from ٥ to ١٠ mm)

Corticosteroids

- No benefit
- IIb,IIIa,ALKALINE & NO GASTRIC INVOLVMENT)

  (START AFTER ENDOSCOPIC EVALUATION)

Early dilation

- Early dilatation to prevent stricture formation has been tried, but the increased incidence of perforation has limited its use

Gastrostomy tube

- In severe burns with highly caustic materials, such as industrial-strength lye, extensive esophageal injury is common
- A gastrostomy can be helpful and should be considered at initial evaluation for placement of a string that can be used later for retrograde dilatation

LATE COMPLICATIONS

- Stricture formation is the primary complication of caustic injury, occurring in ٢ to ٣٨ percent of all ingestions and in ٣ to ٥٧ percent of ingestions with documented esophageal burns
- Most ٣th degree (circumferential) burns lead to esophageal strictures, regardless of treatment
- Approximately ٨٠ percent of patients who develop a stricture will have obstructive symptoms within two months

- Once a stricture is confirmed radiologically, esophageal dilatation usually is required to maintain or reestablish normal swallowing

- Balloon dilators under endoscopic control are prefered to previously used (mercury-filled bougies, Maloney antegrade dilators or Tucker dilators used in retrograde dilatation, and dilators passed over a string or guide wire)

- Repeated dilatations usually are needed

- Only ٣٣ to ٤٨ percent of patients with caustic strictures have long-term success with repeated dilatations

- The remaining patients, have progressive obstruction. Many of these patients have extensive strictures that ultimately require esophagectomy with colon interposition within two years following the ingestion

- Persistent difficulty swallowing, anastomotic strictures may need periodic dilatation, and reflux of gastric contents can produce gastrocolic ulceration

- Mitomycin C, an inhibitor of fibroblast proliferation, has been used in children who have required repeated dilatations

- Following colonic interposition, caustic injury appears to lead to an increased risk of carcinoma in the bypassed esophagus, with a reported incidence of ۲ to ۸ percent(or more to ۳۰% if follow enough)
- The time interval between ingestion and the detection of tumor has ranged from ۱۶ to ۴۲ years
- some authors now recommend resection at the time of bypass with colon interposition

- Any patient with a history of caustic ingestion and the late onset or worsening of dysphagia should be evaluated promptly, and carcinoma should be suspected until proved otherwise.

- Periodic endoscopy with cytological study of washings and biopsy should be considered in patients who are ٢٠ years or more from initial injury

- With severe injury to the stomach, gastric outlet obstruction may occur as early as three weeks or as late as ١٠ weeks
- Surgical bypass may be necessary, but endoscopic balloon dilatation also has been used successfully in case reports

Question

در کدامیک از انواع بلع مواد سوزاننده احتمال درگیری راه هوایی بیشتر است؟

- اسیدهای فرار خانگی
- انواع شوینده های پودری
- اسیدهای صنعتی قوی
- قلیاهای صنعتی قوی