Patient presents with known or suspected Button Battery (BB) ingestion:

- For ingestion <12 hours:
  - ≥12 mo. give honey 10 ml PO Q10 min
  - <12 mo. give Carafate 1g PO Q10 min
- Keep patient NPO (except honey/Caraflate) Provide oral suction as needed.
- Obtain Foreign Body Series per radiology protocol

Determine size and location of BB:

- If button battery is located beyond the pylorus, guideline does not apply, consult GI
- For all known or suspected BB ingestions (<12 hours) that are called-in or transferred to the ED, recommend immediate administration of oral Honey (or Carafate)

### ESOPHAGEAL

- SR – Consult GI immediately
- EG - Consult Surgery immediately and notify GI Fellow
- Goal Is Removal Within 2 Hours

#### Emergent Removal

- Evaluate Esophageal Damage
  - Flush with 50-150 ml sterile 0.25% acetic acid if no evidence of esophageal perforation

#### Minimal Hospital Stay is 14 days

### GASTRIC

- Consult GI Immediately
- Emergent Removal If:
  - Symptomatic, OR
  - Magnet co-ingestion
- Goal Is Removal Within 2 Hours

#### Emergent Removal Within 24 Hours If:

- Multiple battery ingestion, OR
- Patient ≤ 6 years old, OR
- Battery ≥ 15 mm²

#### Endoscopic Removal

- Evaluate Esophageal Damage

#### Minimal Hospital Stay is 14 days

### Post Endoscopy Management

- Admit:
  - PICU if concern for airway management
  - Gen Care, admit to GI service within 24hrs of admission
  - If NG is in place, begin enteral feeds
  - Within 72hrs Perform Lateral neck X-ray and Esophagram (complete prior to starting PO feeds)
  - Consider swallow study (OPMS) if symptomatic (dysphagia) and normal esophagram
  - Start IV antibiotics-Unasyn as clinically indicated

#### Transfer to EG

- If concern for CV involvement transfer to EG at same level of care.

### MRA on Day 13-15 post removal

- If MRI indicates ≥ 50% circumferential inflammation around Aorta/Great vessels, a CTA should be completed within 14-17 days post removal

#### Discharge

- Medically Stable
- Tolerating soft diet
- MRI shows stable or improved inflammation around Aorta/Great vessels
- Follow up with GI 4 weeks after injury for a repeat Esophagram

#### Edinburgh Emergent Removal: Scottish Rite

- The GI group will retain the primary responsibility for removal of the battery and making immediate post removal decisions (including involvement of Surgery and transfer to ECH PICU).

#### EG: The surgeons will be called by the ED and will be primarily responsible for the removal. The ED will also notify the GI fellow on call as well and ideally, the procedure will be a joint procedure between Surgery and GI.

- If Metal Fragments are present:
  - X-ray must be repeated to confirm fragments have cleared before MRI on day 13 post removal

- Patient to return if symptomatic

- Outpatient/Inpatient management as recommended

- Repeat X-ray in 7-14 days if no battery passage

- Consider D/C If All Criteria Met:
  - Consult GI prior to D/C
  - Asymptomatic
  - BB <15 mm in size
  - Patient ≥ 7 years old
  - Otherwise healthy patient

- ECH PICU

- For ingestion ≥12 hours:
  - ≥12 mo. give honey 10 ml PO Q10 min
  - <12 mo. give Carafate 1g PO Q10 min
  - Provide oral suction as needed.

- Develop through the efforts of Children’s Healthcare of Atlanta and physicians on Children’s medical staff in the interest of advancing pediatric healthcare. This is a general guideline and does not represent a professional care standard governing providers’ obligation to patients. Ultimately the patient’s physician must determine the most appropriate care. © 2021 Children’s Healthcare of Atlanta, Inc.
### S1 SUSPECT BUTTON BATTERY (BB) INGESTION
- Patient with abrupt onset of any one of the following: refusal of oral intake, difficulty swallowing, chest pain, drooling, airway obstruction, or wheezing or stridor without typical prodromal symptoms of viral illness.
- Presumed “coin” shape ingestion.
- For patients presenting to an Urgent Care center with BB ingestion, immediately begin Honey/Carafate and contact Transfer Center for Emergency transfer to ECH or SR.
- Batteries located in the esophagus may be asymptomatic initially. Do not wait for symptoms to appear. Serious burns can occur within 2 hours.
- Do not induce vomiting or give cathartics.
- Consult the National Battery Hotline at 800-498-8666 (or 202-625-3333) as needed for assistance in battery identification & patient management.

Symptoms of BB ingestion include:
- Occult or visible bleeding, persistent or profound decreased appetite (unless symptoms unrelated to battery ingestion)
- Difficulty swallowing, chest pain, hematochezia, or fever should be determined by care team.
- Symptoms of BB ingestion that might trigger additional imaging and/or clinical intervention.
  - Proximal Esophageal injury (above carina T5) + tracheal wall thickening
  - Proximal esophageal injury (above carina T5) + edema/enhancement involving >50% circumference of Aorta/Great vessels
  - Mid-distal esophageal injury (below carina T5) + edema/a nd enhancement involving >50% circumference of descending thoracic aorta

For complicated cases may request a case review by the Button Battery Guideline Team & Consider repeat MRI on Day 20 post removal.

### S2 DETERMINE BB SIZE AND LOCATION
- Honey/Carafate is recommended for all known or suspected BB ingestions within the past 12 hours (increased risk of esophageal perforation if >12 hours).
- Begin honey/Carafate once BB ingestion suspected. If X-ray shows esophageal location, continue until patient reaches the OR. Discontinue if battery located in the stomach.
  - If ≥12 mo. give honey 30 ml PO Q10 min, max 6 doses* & max 6 without direct permission of radiology attending physician.
  - If <12 mo. give Carafate 1g PO Q10 min, max 3 doses*.
  - May exceed max doses per MD order.
- 1 honey packet (9.2 ml) is acceptable substitute for 10 ml dose.
- Chemical content & diameter of the BB can be determined from imprinted code found on the battery case.
- Assume hearing aid batteries are ≤12mm.
- Cylindrical batteries pose a lower threat for caustic damage after ingestion than BB, but due to their size may become trapped in the stomach. Any cylindrical battery ingestions warrant prompt x-ray evaluation & urgent endoscopic removal if located in the esophagus.
- Removal of gastric BB <15mm at the discretion of consulting provider.
- MRI shows stable or improved inflammation around aorta/great vessels.
- Patient tolerating soft diet.
- Patient to follow up with GI 4 weeks after battery removal for a repeat Esophagram to evaluate for persistent mucosal irregularity, stricture, and delayed perforation.
- MRI on Day 13-15 post removal for all patients with BB removal (not to be done afterhours or on weekends without direct permission of radiology attending physician).
- MRI to be limited sequence study (about 20 minutes in length).
- Need for sedation/anaesthesia for MRI is at the discretion of clinical team.

### S3 RADIOLOGY
- For all suspected BB ingestions, Foreign Body Series to include: AP x-ray nose to rectum & lateral x-ray neck. If circular metallic foreign body identified in chest, obtain lateral x-ray of chest to evaluate position of negative battery pole.
- Esophagram should be performed as “pull back” esophagram with contrast injected through enteric tube by radiology.
- MRI is at the discretion of clinical team.

### S4 INPATIENT MANAGEMENT
- All NG tubes placed under endoscopy must be non-weighted, MRI compatible, Bridle feeding tubes.
- If NG tube becomes dislodged, contact provider. Caregiver should not attempt to replace NG at bedside.
- Patients with button battery removal esophageal should be admitted.
- Once PO feedings advanced, patient must remain on soft diet until D/C.
- If battery removed from upper esophagus, monitor closely for voice changes, respiratory distress, or stridor due to possible vocal cord paralysis.
- Antibiotics: Unasyn 50 mg/kg IV Q6H (max dose 2000 mg). If PCN allergy: Clindamycin 10 mg/kg IV Q8H (max dose 900 mg). Length of antibiotics should be determined by extent of injury.
- If severe inflammation, mediastinitis, suspected perforation, and/or s/s of SIRS or systemic infection (i.e. fever, WBC, CRP), antibiotics may be administered for a min. of 7-10 days.
- In other cases, course of antibiotics to be determined by care team.

### S5 DISCHARGE CRITERIA
- Button batteries that have cleared the stomach usually pass the GI tract within 1 week without complications.
- Anticipatory guidance to include close monitoring for bloody emesis, melena, cough, and fever, and/or abdominal pain.
- Patients with symptoms of abdominal pain, hematochezia, or fever should seek immediate medical attention for emergent X-rays.
- Prompt surgical removal is indicated for symptomatic patients with radiographic confirmation of a retained intestinal Battery Button.

### S6 OUTPATIENT MANAGEMENT
- After removal, if mucosal injury was present, observe for and anticipate delayed complications: tracheoesophageal fistula, esophageal perforation, mediastinitis, vocal cord paralysis, tracheal stenosis, tracheomalacia, aspiration pneumonia, empyema, lung abscess, pneumothorax, spondylodiscitis, or exsanguination from perforation into a large vessel.
- Complications may be delayed for up to 30 days post ingestion.
- Consider battery proximity to the aorta or major vessels. If less than 3 mm tissue between area of esophageal injury and adjacent vessels on MRI/CTA monitor closely for sentinel bleeds. Involve cardiothoracic and vascular surgery early if possibility of impending esophageal-vascular fistula.