Button Battery Ingestion: Clinical Practice Guideline

If Active and/or Sentinel Bleed, Esophageal Perforation, Patient Clinically Unstable:
- MTP Activation
- Emergent General Surgical Consult
- Include Cardiothoracic/ Vascular Surgery
- Transfer to ECH PICU

Patient presents with known or suspected Button Battery (BB) ingestion[1,2]

For ingestion <12 hours[2]:
- ≥12 mo. give honey 10 ml PO Q10 min
- <12 mo. give Carafate 1g PO Q10 min

Keep patient NPO (except honey/ Carafate) Provide oral suction as needed.

Obtain Foreign Body Series per radiology protocol[3]

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) per ED CIP 5-10[2]

Determine size and location of BB[2]

If button battery is located beyond the pylorus, guideline does not apply, consult GI

ESOPHAGEAL
SR – Consult GI immediately
EG - Consult Surgery Immediately and notify GI Fellow

Emergent Removal

Goal Is Removal Within 2 Hours

GASTRIC
Consult GI Immediately

Emergent Removal If:
- Symptomatic[1], OR
- Magnet co-ingestion

Goal Is Removal Within 2 Hours

GASTRIC
Consult GI Immediately

Removal Within 24 Hours If:
- Multiple battery ingestion, OR
- Patient ≤ 6 years old, OR
- Battery ≥ 15 mm[2]

GASTRIC
Consider D/C If All Criteria Met:

Consult GI prior to D/C
- Asymptomatic[1]
- BB <15 mm in size
- Patient ≥ 7 years old
- Otherwise healthy patient

Endoscopic Removal

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

If low risk of complications and/or shorter duration of BB exposure

Outpatient/ Inpatient management as recommended[4,6]

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

Patient to return if symptomatic[1,6]

Esophageal Damage

Place NG tube during endoscopy, unless evidence of esophageal perforation[5]

Minimal Hospital Stay is 14 days

No Esophageal Damage

Do NOT Place NG tube

May extubate in OR/PACU as clinically indicated

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[4] as clinically indicated

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

Consult:
- Surgery- All
- GI- All
- Aortic Inflammation- CT Surgery
- Tracheal Inflammation- ENT
- CCM- if requiring PICU

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

MRI on Day 13-15 post removal[3]
- If MRI indicates ≥ 50% circumferential inflammation around Aorta/Great vessels, a CTA should be completed within 14-17 days post removal

If CTA is abnormal consult CV surgery and Button Battery Guideline Team for a Case Review

Discharge[6]
- 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

ESOPHAGEAL 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.

Button Battery Ingestion: Clinical Practice Guideline

Notes and Recommendations

[1]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 Emergent transfer to ECH or SR.**
- Batteries located in the esophagus may be asymptomatic initially. **Do not wait for symptoms to appea**r. 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 severe abdominal pain, vomiting, signs of acute abdomen and/or fever, and/or profoundly decreased appetite (unless symptoms unrelated to battery ingestion)

[2]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) See **ED CIP 5-10: Patients Presenting with Suspected Foreign Object**
- 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 10 ml PO Q10 min, max 6 Doses*
  - 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 BB's 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**

[3]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 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/anesthesia for MRI is at the discretion of clinical team

[3]Radiology Cont'd

Potential MRI findings 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 and 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

Management and Follow-up

[4]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 SERS 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

[5]Discharge Criteria

- 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

[6]Outpatient Management

- 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 Button Battery**

Potential Complications

- 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.