



**Beware the Double Halo
The Dangers of Button Batteries**

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Disclosures

- None






Learning Objectives

- Identify the clinical symptoms and radiographic signs of button battery ingestion
- Rapidly formulate a plan for the patient with button battery ingestion




22 m.o. female

- Increase in drooling over the past two days
- Occasional cough with eating
- Difficulty swallowing when eating
- Youngest of three





Symptoms Can Include

- Airway obstruction or wheezing
- Drooling
- Vomiting
- Chest discomfort
- Difficulty Swallowing, decreased appetite, refusal to eat
- Coughing, choking, or gagging with eating or drinking

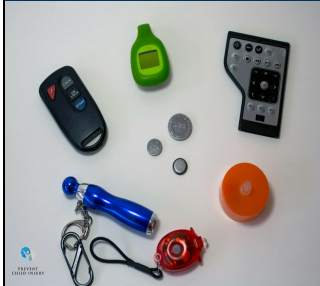


NOTE:

- Patient may OR may not have an ingestion history



Must rule out button battery ingestion



If swallowed, button batteries can cause serious injury or death in as little as two hours.

Button Batteries

- A true emergency
- Serious sequelae include:
 - Esophagus - esophageal burn, perforation, fistula
 - Nose - damage to nose, nasal septum
 - Ear - TM perforation, EAC burn



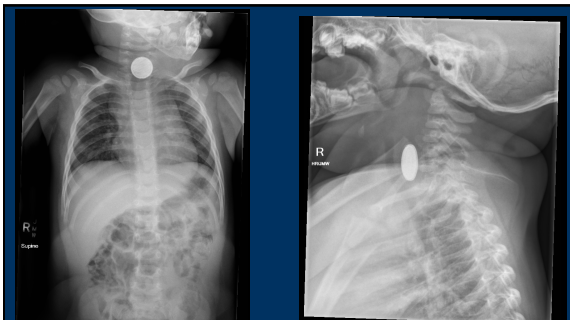
Esophageal battery protocol

- > 3000 BB ingestions/year
 - 2006-2017: 6 fold increase in severe injuries; 12 fold increase in mortality
- Damage occurs in as little as 2 hours



Imaging

- Always get two view Xrays – AP and Lateral
- Flat surface of best seen on AP view when in esophagus
- Flat surface of best seen on Lateral when in trachea
- **Double Halo sign / Step Off sign = Button Battery**



Case courtesy of Dr David Chang, Radiopaedia.org, rID: 61397




Button Battery 101





What is a button battery?

- 5mm – 25mm in diameter, 1mm – 6mm tall
- Stainless steel forms bottom body / positive terminal
- Metallic top – negative terminal
- Contents can include: zinc, lithium, manganese dioxide, silver oxide, carbon monofluoride, cupric oxide




Methods of Injury

- Creation of electrical current that hydrolyzes tissue fluids and produces hydroxide at the battery's negative pole
- Leakage of battery contents (Esp. Alkaline electrolyte)
- Physical pressure on adjacent tissue

Remember the 3 Ns

- Negative – Narrow – Necrotic
- The negative pole of the battery, which is the narrow side on the Xray, causes the most damage



National Poison Control Button Battery Hotline

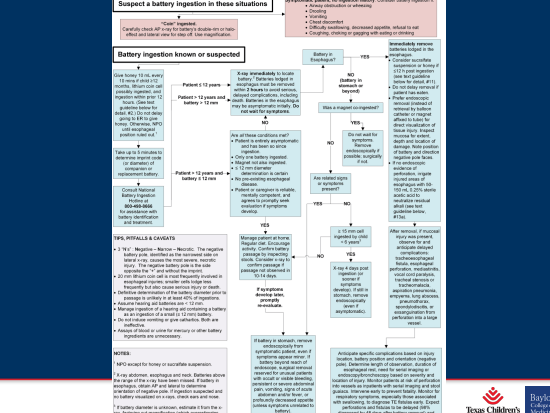

Swallowed a battery?
Get help from the battery ingestion hotline immediately
CALL 800-498-8666



Poison Control Website

- www.poison.org/battery



Immediate Treatment of Suspected Button Battery Ingestion

- 10mL of honey (if child > 12 months) or sucralfate every 10min
- Do not induce vomiting or give cathartics

The Laryngoscope
FOUNDED IN 1893

Bronchoesophagology

pH-neutralizing esophageal irrigations as a novel mitigation strategy for button battery injury

Rachel R. Anfang MA, Kris R. Jatana MD, Rebecca L. Linn MD, Keith Rhoades BS, Jared Fry BS, Ian N. Jacobs MD

First published: 11 June 2018 | <https://doi.org/10.1002/lary.27312> | Cited by: 4



Determining size of battery

- 20 mm lithium coin cell is most frequently involved in esophageal injuries
- Smaller batteries can lodge and cause problems too, but less frequently



Esophageal Button Battery



Case courtesy of Dr Yair Glick, Radiopaedia.org. rID: 52187



Esophageal Button Battery

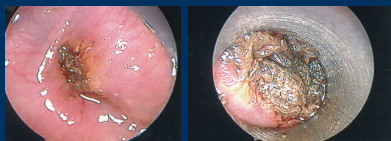
Removed from esophagus 2 hours after ingestion



Case courtesy of Dr Yair Glick, Radiopaedia.org. rID: 52187



Esophagoscopy

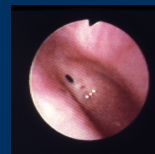


Images courtesy of Dr. Anna Messner



Complications following battery removal

- Esophageal stricture
- Vocal fold paralysis
- Tracheo-esophageal fistula
- Catastrophic hemorrhage



Images courtesy of Dr. Anna Messner



But wait! There's more!

- 4 year old boy
- Playing with bike light
- Comes to parent "something stuck in nose"

Case courtesy of Dr Alasdair Grenness, Radiopaedia.org, rID: 75978



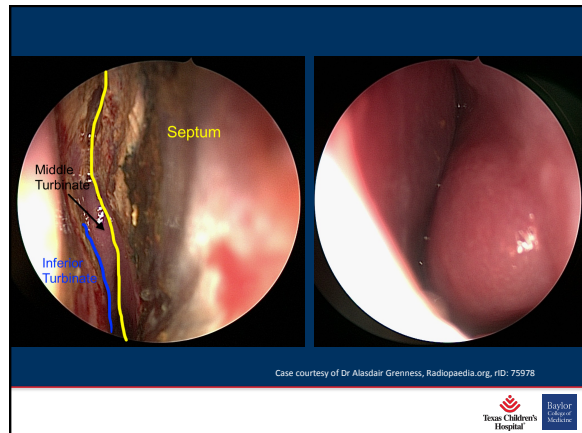
Case courtesy of Dr Alasdair Grenness, Radiopaedia.org, rID: 75978



Nasal Button Battery

- EC attempted removal – unsuccessful
- ENT consulted
- To OR within 4-5 hours of insertion

Case courtesy of Dr Alasdair Grenness, Radiopaedia.org, rID: 75978



Case courtesy of Dr Alasdair Grenness, Radiopaedia.org, rID: 75978



The Best Offense

 <p>Remote controls</p>	 <p>Fitness trackers & watches</p>
<p>Button batteries are in many small electronics you use every day but can cause serious harm or death if swallowed.</p> <p>Buy products with secure battery compartments, and store extra batteries out of sight and reach of children.</p>	
 <p>Tea lights & flameless candles</p>	 <p>Car key fobs & garage door openers</p>




Where can you find button batteries?


- Remote Controls
- Tea lights / flameless candles
- Garage door openers
- Keyless entry fobs
- Bathroom scales
- Parking transponders
- Toys
- Cameras
- Watches
- PDAs
- Calculators
- Digital Thermometers
- Hearing Aids
- Singing Greeting Cards
- Talking books
- Portable stereos
- Handheld Video Games
- Cell phones
- Home medical equipment / meters
- Flash and pen lights
- Flashing shoes
- Toothbrushes
- Bedwetting monitors
- Keychains
- Flashing / lighted jewelry or attire
- Any powered house hold item



Button Battery Safety



- Store all batteries out of sight and reach of children, preferably in a locked cabinet or container.
- Do not allow children to play with new or used batteries.
- Buy products with a secure battery compartment that requires a tool (often a screwdriver) to open. Check these compartments often to make sure they stay secure over time.
- When replacing batteries, immediately throw away old batteries in a trash can that children cannot access or put batteries for recycling out of sight and reach.
- Check other homes your children visit for possible access to button batteries: grandparents, family members, caregivers, and friends.



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Questions?

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