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Swallowed a Button Battery?

Each year, nearly 2,000 people of all ages in the US unintentionally swallow miniature disc or “button” batteries of the type used to power hearing aids, watches and calculators.

The National Capital Poison Center in Washington, DC has been studying what happens when one of these button batteries is swallowed. Most button cells pass through the body and are eliminated in the stool. However, sometimes batteries can get “hung up”, and these are the ones that cause problems. A

battery that doesn’t move through the gut, especially one that lodges in the esophagus, may adhere to tissue and leak or the electrical current passing through adjacent tissue can generate alkali. Chemical burns may result. When a battery is swallowed, it is impossible to know whether it will pass through or get “hung up”, however a number of factors are known to predict a bad outcome.

If anyone swallows a battery, this is what you should do:

- 1) Call the 24-hour National Button Battery Ingestion Hotline at **202-625-3333** IMMEDIATELY (TDD 202-362-8563). Feel free to call collect. Your physician or emergency room may also call. We are on duty 24-hours a day, 7 days a week.
 - 2) If available, provide the battery identification number (from the package or from a matching battery).
 - 3) An x-ray must be obtained immediately to be sure that the battery has gone through the esophagus into the stomach. Do not wait for symptoms to develop before getting an x-ray. **If the battery remains in the esophagus, it must be removed IMMEDIATELY. CAUTION: Batteries lodged in the esophagus can cause severe burns in JUST 2 HOURS!!** Battery removal is done with an endoscope; surgery is rarely, if ever, indicated. Do NOT give ipecac.
 - 4) If a battery has moved beyond the esophagus, it can be expected to pass by itself. Passage may take many days, or even months. **Removal is NOT indicated if the battery has passed beyond the esophagus and the patient is asymptomatic.** Once you are sure the battery is not in the esophagus, the patient can be sent home to wait for the battery to pass. Watch for fever, abdominal pain, vomiting or blood in the stools. Report symptoms immediately to your physician and the Battery Hotline (202-625-3333).
 - 5) Watch the stools until the battery has passed. Clean the battery, tape it to a card or wrap it carefully, and mail it to:
National Capital Poison Center
3201 New Mexico Ave, Suite 310
Washington, DC 20016
- Be sure to include your name, address and telephone number. To learn more about

battery ingestions, a toxicologist analyzes each battery and correlates the severity of the patient's clinical effects with the degree of corrosion noted on the battery.

Interesting Facts about Button Battery Ingestions

- ☆ Sixty-two percent of battery ingestions involve children under the age of 5 years, with a peak incidence in 1- and 2-year-olds. However, many battery ingestion cases involve adults!
- ☆ Nearly half (49%) of ingested batteries are cells intended for hearing aids. Another 12% are for games and toys. Other sources include: watches and clocks; calculators; camera equipment; beeping or lighted key chains; pocket organizers; remote control devices; thermometers; phones; fishing bobbers; as well as musical, beeping or lighted jewelry, greeting cards, shoelaces, shoes, clothing, pens, doormats, and story books.
- ☆ A nearly 70% decline (over an 8-year period) in the percentage of ingested batteries that come from games and toys reflects industry efforts to secure the battery compartments of these products so that small children cannot easily open them.
- ☆ Nearly 25% of batteries are swallowed because they are mistaken for medicines or pills.
- ☆ In 8.5% of cases, multiple batteries are swallowed.
- ☆ Adults and older children often think of the mouth as a "third hand", holding the battery there while working. The battery is inadvertently swallowed if they are startled.
- ☆ Battery size is a predictor of lodgement; and battery lodgement, whether in the esophagus, nose, or ear canal, is the sole consistent predictor of a severe clinical outcome. Esophageal lodgement generally follows ingestions of larger cells (20 to 23 mm in diameter). Button cells range in diameter from 6.8 mm to 23.0 mm; 97% of ingested cells are less than 15 mm in diameter. (The most popular standard sizes are 7.9 mm and 11.6 mm).
- ☆ Leakage and/or the generation of an external current are the major mechanisms of battery-induced tissue damage. Button cells often contain potassium or sodium hydroxide electrolyte in concentrations up to 45%. Corrosive dissolution of the crimp region surrounding the seal increases the risk of subsequent leakage. An external current flowing between battery cathode and anode passes through adjacent tissue causing hydrolysis of tissue fluids and local generation of hydroxides. These hydroxides act on tissue the same way that an alkaline chemical leaking from the battery would act. Thus batteries do NOT have to leak to cause injury.
- ☆ Esophageal lodgement is the most serious clinical problem and can lead to severe burns, perforation of the esophagus, stricture formation, and occasionally death. It may manifest as vomiting, fever, pain on swallowing or difficulty swallowing, rapid breathing, irritability, or refusal of food. Esophageal lodgement generally follows ingestions of larger cells (20 to 23 mm in diameter), although exceptions occur. Even these larger cells often pass to the stomach without consequence and cells with smaller diameters,

as small as 7.9 to 11.6 mm, may lodge. It is because of the small but real risk of esophageal lodgement that x-rays are recommended for all patients who swallow a battery.

- ☆ Mercury or other heavy metal poisoning is NOT a concern when button batteries are swallowed. On May 13, 1996 federal legislation known as the “Mercury-Containing and Rechargeable Battery Management Act” was enacted. This legislation bans the sale of mercuric oxide button cells in the U.S. and prohibits the use of intentionally introduced mercury in alkaline-manganese batteries, limiting the mercury concentration in these batteries to 0.025%. But even when mercuric oxide button cells are swallowed, the risk of mercury poisoning is virtually nonexistent as the mercuric oxide is converted in the stomach to the much less toxic elemental form of mercury.

- ☆ Ingested lithium cells pose a higher risk due to their larger diameter which makes them more likely to lodge in the esophagus and their greater voltage which generates more local hydroxide when lodgement occurs.

Treatment Essentials

- ① Obtain a radiograph promptly to determine battery location.
- ② Remove batteries lodged in the esophagus, nose, or ear emergently. Use endoscopy for removal of batteries in the esophagus.
- ③ Determine the battery diameter and chemical system from the imprint code. Call 202-625-3333, the National Button Battery Ingestion Hotline, for assistance and to report all cases.
- ④ Do not retrieve batteries which have passed beyond the esophagus unless significant injury to the gastrointestinal tract is evident (based on signs and symptoms). Avoid ipecac administration.
- ⑤ If the battery has passed beyond the esophagus and the patient has no clinical evidence of significant injury to the gastrointestinal tract, the patient should be managed at home, with a regular diet and normal activity to promote gastrointestinal transit. Be alert for special circumstances involving an ingested battery with diameter ≥ 15 mm.
- ⑥ Confirm battery passage by inspection of stools. In asymptomatic patients, radiographs may be repeated 7 to 14 days postingestion if battery passage has not yet been observed.
- ⑦ Mercury or other heavy metal poisoning is *unlikely*. Avoid obtaining blood or urine mercury levels unless mercuric oxide cells split in the gastrointestinal tract or radio-opaque droplets are evident in the gut. Chelation therapy is only used in the rare instance of toxic mercury levels or when clinical manifestations of mercury poisoning become evident. Legislation enacted in 1996 bans the marketing of mercuric oxide button cells in the U.S.

Battery in the Nose or Ear?

Button batteries may also cause severe injury when placed in the nose or in the ear. Young children and the elderly have been particularly involved in this kind of incident. Immediate removal is essential to prevent severe damage. Whenever pain and/or a discharge is noted from the nose or ears, an exam should be conducted to exclude the presence of a foreign body. NEVER use nose or ear drops until the person has been examined by a physician as these fluids cause additional injury if a battery is involved.

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