

## Guideline for Management of Ingested Button Batteries in Children

### 1. Scope

For use within the Paediatric and Neonatal Decision Support and Retrieval Service (PaNDR) for the East of England

### 2. Purpose

To provide guidance on diagnosis and management of children with ingested button batteries

### 3. Key Points

*In any case of a suspected ingested or aspirated foreign body, button battery ingestion must be considered – the majority are unwitnessed*

- Larger diameter (>20mm) batteries are more likely to become lodged and cause corrosions
- Batteries lodged in the **airway or oesophagus should be removed immediately**
- Batteries co-ingested with magnets **should be removed immediately**
- Any patient with suspected ingestion and new symptoms **should be urgently discussed** with CUH paediatric surgery
- Asymptomatic patients with batteries <20mm diameter may be considered for discharge
- Honey (pre-hospital) or sucralfate can be given orally to prevent mucosal burns in children >12 months of age in the case of oesophageal batteries

### 4. Background

Also known as disk or coin batteries, button batteries are typically lithium-ion, circular metal batteries that come in a variety of sizes. Due to their shape, size and colour these present an alluring treat to a toddler or small child.

Once ingested, button batteries may lodge in the GI tract – the mucosa may then bridge the positive and negative terminal of the battery allowing current to flow. The flow of current then generates hydroxide ions at the negative pole, causing localised alkaline corrosive injury. Hence a large button battery lodged in a small lumen is highly likely to produce current and resultant alkali burns. Co-ingestion of a button battery with a magnet further increases the risk of corrosion due to attraction across a luminal wall.

Resultant alkali burns lead to ulceration and, if unchecked, ultimately perforation. Corrosion into adjacent blood vessels is also possible with potential catastrophic results if large calibre vessels are involved - aorto-oesophageal fistulas have been documented in several cases. In severe cases, subsequent stricture or fistula formation can occur even after battery removal. Mucosal injury can occur within minutes of contact, but a child is unlikely to be symptomatic on first presentation if brought in promptly following carer concern. A child with symptoms who presents late following ingestion carries a worse outcome.

Batteries lodged in other body cavities, such as ears or noses, must also be removed without delay due to the potential for corrosive injury to adjacent surfaces.

## 5. Management

*For all situations of potential ingested or aspirated foreign body consider whether a button battery and/or magnet has been ingested – the event may often be unwitnessed or history unreliable.*

### Pre-hospital

- All patients who have ingested a button battery should be referred to the Emergency Department immediately
- Consider giving honey to children over the age of 12 months if immediately available – 10ml (2 teaspoons) every 10 minutes up to 6 doses.

### On arrival to hospital

- Assessment of airway/breathing/circulation as per APLS guidelines
- If immediate concern for upper airway obstruction – urgent consultation with local ENT and paediatric anaesthetic team
- Perform imaging – AP x-ray neck/chest/abdomen +/- lateral airway view if above diaphragm
- If confirmed in GI tract and honey not yet given administer sucralfate in children >12 months old - 10ml (1 gram) orally every 10 minutes up to 3 doses

### Post imaging +/- resuscitation

- Arrange urgent transfer to CUH under paediatric surgical team for those who require immediate removal - **battery lodged in oesophagus, battery + magnet ingestion or battery + new, concerning symptoms**
- If in any doubt – contact CUH paediatric surgery for discussion

### **Who to contact**

- Battery confirmed in oesophagus or in GI tract with new symptoms – paediatric surgery at CUH
- Battery in upper airway – local ENT team if available, CUH ENT service if otherwise
- Battery passed into stomach or distal to pylorus and asymptomatic – follow-up as per local protocol

### **Key information for referrers:**

- Time of ingestion
- Results of any imaging – position and diameter of battery
- Symptoms at presentation
- Signs of haemodynamic instability

*The transfer of children with batteries lodged in the oesophagus or airway, or who are symptomatic is deemed time-critical – this should be discussed with the PANDR service, but transfer is likely to be performed by the local team.*

*Transfers that are described as ‘time critical’ are those where the benefits to the child of a rapid transfer to a tertiary centre by the local team outweigh the potential risks of a non-specialist transfer*

*For any urgent queries please do not hesitate to call the CUH PanDR service on 01223274274*

### **6. References**

- Jatana KR, Litovitz T, Reilly JS et al. Pediatric button battery injuries; 2013 task force update. International Journal of Pediatric Otorhinolaryngology 2013; 77:1392-1399.
- National Capital Poison Centre Button Battery Ingestion Triage and Treatment Guideline.
- Litovitz T, Whitaker N, Clark L et al. Emerging battery-ingestion hazard: clinical implications. Pediatrics 2010; 125: 1168-1177.
- Toxbase.org. 2021. TOXBASE - poisons information database for clinical toxicology advice. [online] Available at: <<https://www.toxbase.org/poisons-index-a-z/b-products/button-battery/>> [Accessed 26 September 2021].

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## Document management:

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**APPENDIX 1: Algorithm for the management of known or suspected button battery ingestion**

