the Australian & New Zealand Society
of Paediatric Otorhinolaryngology
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BUTTON BATTERIES IN CHILDREN: UPDATE ON CURRENT MANAGEMENT

Button Battery (BB) ingestion and insertions are time critical injuries. In the oesophagus perforation can occur in less than four hours. Serious injuries can also occur in the nose, ear or other body orifices. Injury occurs due a caustic burn secondary to the release of electric charge from the negative anode (the smaller side). In Australia, three children have died from catastrophic bleeding as a consequence of aorto-oesophageal fistula. All batteries greater than 1.2V carry enough charge to cause this injury and this includes many “dead", “flat”, “unused” or discharged batteries.

In the perfect world these injuries would not occur; but unfortunately it is likely that BB will continue to be used widely, in the foreseeable future. Therefore, timely removal remains the mainstay of treatment. ANZSPO endorses strategies to improve response times and ensure BB are removed as soon as identified.

Caregivers who are concerned that a child has swallowed or inserted a BB should seek medical assistance immediately. The Australian Poison hotline have developed pathways to ensure clients are directed to the closest service where the child can be X-rayed and if required transferred or retrieved to a facility where the battery can be removed.

All ORL surgeons should be aware of the time critical nature of this injury and wherever possible facilitate removal without delay within their hospital service.

Emergency retrieval or transfer to tertiary services should only occur when no anaesthetic service is available, or active bleeding is occurring. Most worrisome are button batteries in the oesophagus. The airway is often clear for intubation so as to secure the airway prior to removal. Hospitals without ORL services should speak immediately with local general surgeons or gastroenterologists who may be able to assist by performing an urgent oesophagoscopy/ gastroscopy. After removal, children may then require transfer to tertiary services for further management. Coordination with paediatric retrieval services and paediatric ORL teams are encouraged. A comprehensive flow chart regarding of the management of BB injuries is provided below.

ANZSPO would like to bring to the attention of members of ASOHNS and NZOHNS, recent updates in the management of button batteries:

1. Following ingestion or insertion of a button battery, the child should not wait to be fasted. They should be transferred to theatre as soon as this can be coordinated. This requires the surgeon communicate with theatres and anaesthetics as soon a child is known to be on the way. This injury should take precedence over most other emergencies. (Hoagland, M., Ing, R., Jatana, K.,

Jacobs, I., Chatterjee, D. (2020). Anesthetic Implications of the New Guidelines for Button Battery Ingestion in Children. Anesthesia & Analgesia. 130(3): 665-672).

2. Honey or jam is recommended as first aid while waiting for the child to get to theatre - 2 teaspoons every 10min. This should be considered for all children who require transfer for removal. There is a small but recognised risk of botulism in children under one feed honey and this risk should be discussed with parents. (Anfang, R. R., Jatana, K. R., Linn, R. L., Rhoades, K., Fry, J. and Jacobs, I. N. (2018), pH-neutralizing esophageal irrigations as a novel mitigation strategy for button battery injury. The Laryngoscope. 129:49–57, 2019. Chiew AL, Lin CS, Nguyen DT, Sinclair FA, Chan BS, Solinas A. Home therapies to neutralize button battery injury in a porcine esophageal model. Annals of Emergency Medicine. 2024 Apr 1;83(4):351-9.).

3. Once the BB is removed the oesophagus should be irrigated with 50mls acetic acid 0.25% (Jatana, K. R., Rhoades, K. , Milkovich, S. and Jacobs, I. N. (2017), Basic mechanism of button battery ingestion injuries and novel mitigation strategies after diagnosis and removal. The Laryngoscope, 127: 1276-1282).

4. Collateral damage should be accessed. BB impacted at the cricopharyngeal region may cause recurrent laryngeal nerve injury with vocal cord palsy. Caustic erosion may result in trachea-oesphageal fistula, mediastinitis or aorto-oesophageal fistula. Clinicians should have a low level of suspicion to order imaging following removal looking for perforation and potential complications. Many children will require placement of a nasogastric tube at the time of removal. Serious injuries may need gastroscopy placement.

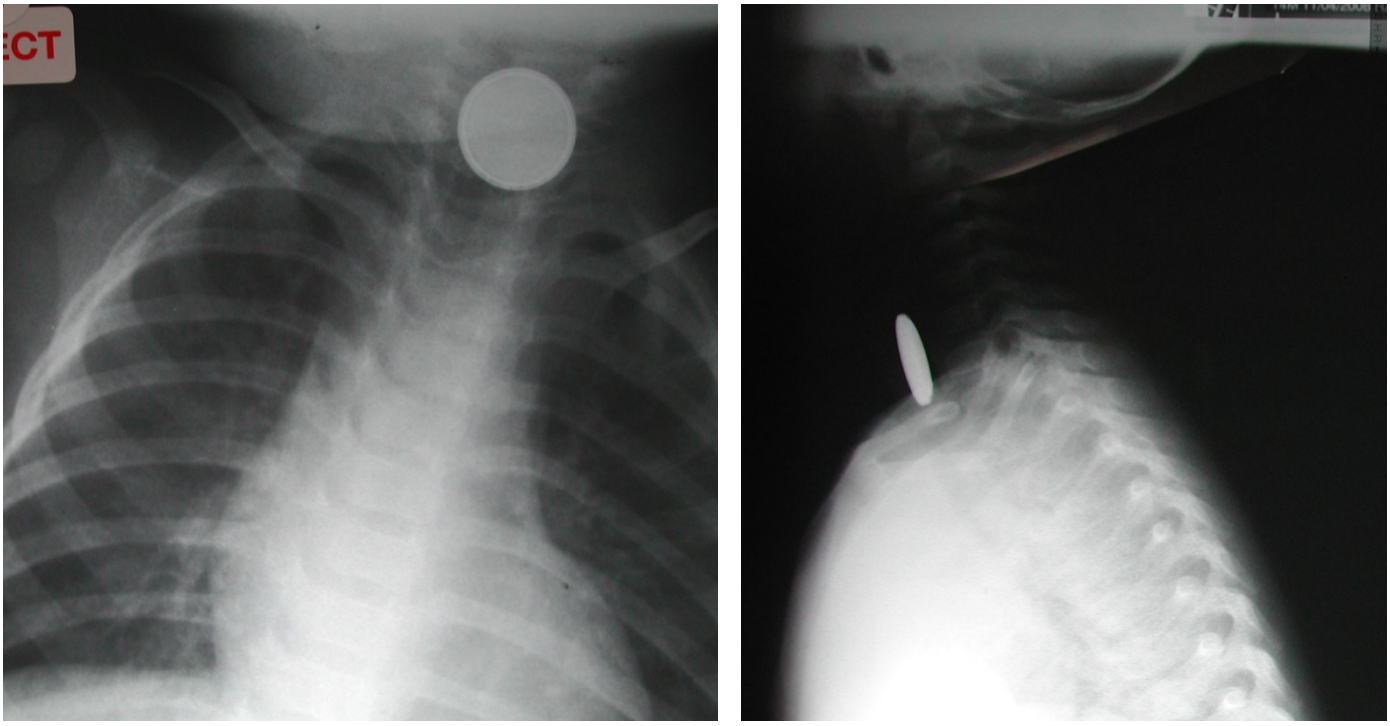
5. Please report all BB cases (including those in ears and nose) to The Australian Paediatric Surveillance Unit (http://apsu.org.au). Take a photo of the battery when removed and try to find out as much information as possible. If your department is not part of this database, please feel free to contact Hannah Burns via ANZSPO or Queensland Children's Hospital. Collecting this information is vital to improve regulation surrounding BBs and improving management protocols.

6. If available, gastroenterology may want to perform a flexible scope either at the initial time of removal or in the early post-op period for assessment. Long term follow-up scopes may require ENT help in the use of mitomycin to try and prevent stenosis. (Ghobrial CM, Eskander AE. Prospective study of the effect of topical application of Mitomycin C in refractory paediatric caustic esophageal strictures. *Surgical endoscopy*. 2018:1-7).

7. Remember tissue damage may continue even after the battery is removed. Any haemopytsis after removal should be considered an aorto-oesphageal injury and urgent discussion with cardiothoracic service sought.

Clinicians are encouraged to continue educating patients and colleagues about this preventable injury. In Australia, regulations now require button batteries to be sold in childproof packaging with appropriate warnings. Additionally, products containing button batteries must have secure battery compartments and carry warnings. Products that do not comply with these standards should be reported to the ACCC, the Office of Fair Trading, and Kids Safe Australia. Retailers selling non-compliant products may face fines.

Some button battery manufacturers have introduced deterrents like bitterants and dyes to improve safety. However, many products do not contain these deterrents, and they do not eliminate the immediate danger if the battery is swallowed or inserted. ANZSPO supports the American Academy of Otolaryngology's position that the industry must adopt new safe button or coin cell battery technologies that do not cause severe injury if ingested.



Classic double edge on X-ray

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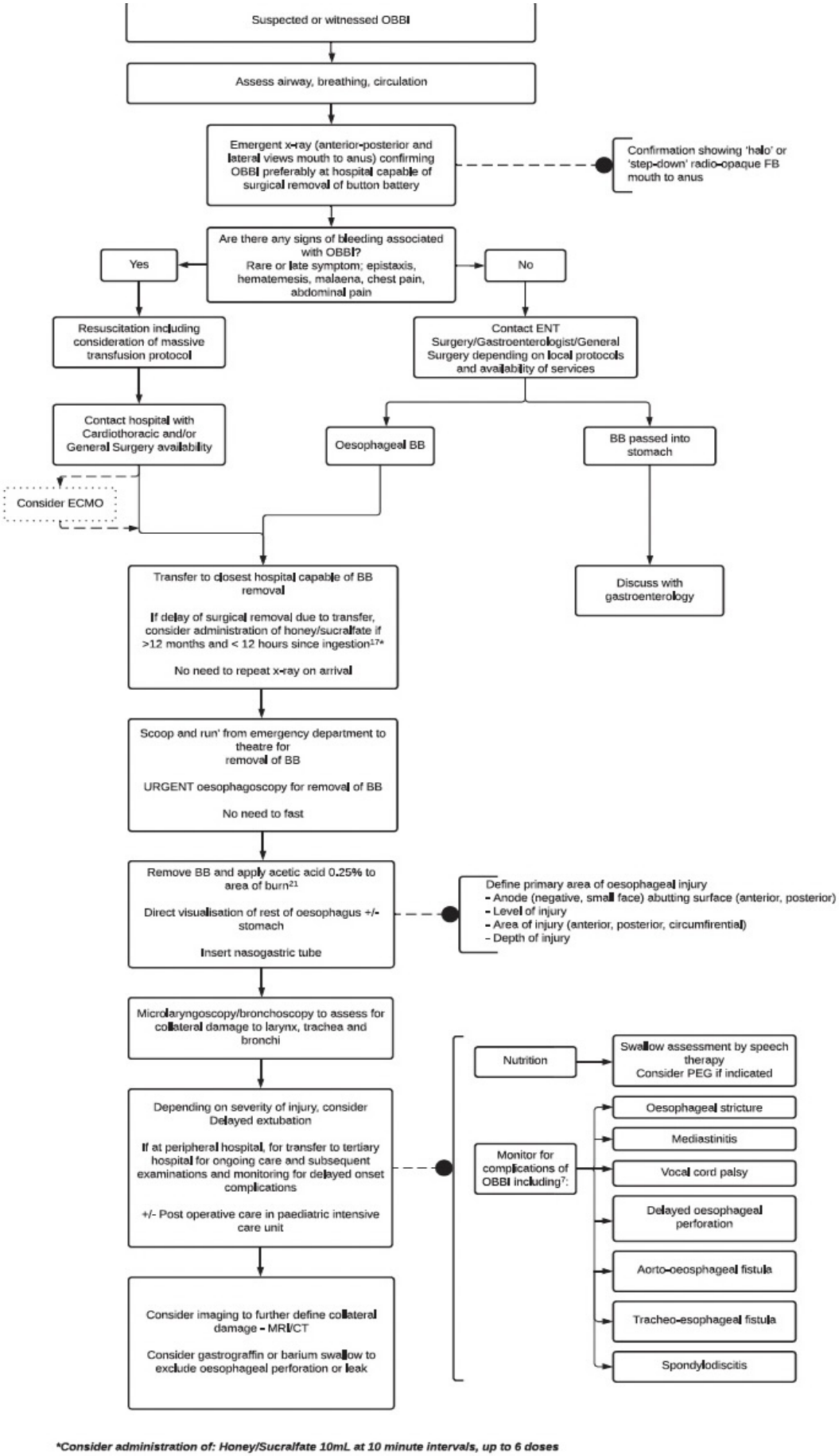

Consider administration of: Honey/Sucralfate 10mL at 10 minute intervals, up to 6 doses

Chandran D, Park S, Barker R, Burns H. Management of oesophageal impaction of button batteries in Queensland. ANZ journal of surgery. 2022 Apr 3.doi:10.1111/ans.17638