COMMENCING DECEMBER 2017

Australian Paediatric Surveillance Unit
STUDY PROTOCOL
Severe Injury Related to Disc Battery (SIRDB)

BACKGROUND

There has been an increasing trend in the number of reported severe and fatal disc battery exposures in children and adults in the United States[1]. This has paralleled the increasing utilisation of these compact batteries in domestic products. Having initially reported that the majority of batteries (if ingested) pass uneventfully, researchers have subsequently identified higher risk of severe injury or death associated with larger disc batteries (3V in strength and greater than 20mm in diameter)[1].

The mechanism of injury from impacted disc batteries involves generation of hydroxide ions at the negative pole of the battery causing liquefactive necrosis of surrounding tissues. The effects of this process are particularly severe when a disc battery is lodged in one location (e.g. oesophagus, nostril) for more than one hour. Almost all deaths described have been associated with oesophageal lodgement and erosion into the aorta or other large vessel and subsequent massive haemorrhage. To date there have been 2 deaths of children in Australia due to aorto-oesophageal fistulae (in 2013 and 2015), and a report of one child who survived this serious complication[2,3,4].

Poisons information centres and Emergency Departments (EDs) in Australia have seen increasing numbers of children presenting with possible battery exposures. The majority are able to be discharged (either no battery is demonstrated on x-ray or a small to medium sized ingested battery is in the stomach and allowed to pass). For children with a battery lodged in the oesophagus, expedited removal within 2-4 hours can minimise damage, but perforation has been described within 2 hours, and caustic injury and fistula development can persist after battery removal and cause complications up to a month later[4].

A small subset of children have sustained severe injury when the battery ingestion/ insertion is unrecognised by the parents/carers and the battery remains in situ for days. These children present with non-specific symptoms (cough, drooling, vomiting, refusal to feed, nasal/ear discharge). Identification of the battery insertion/ingestion is complicated in that many of these children are pre-verbal. In addition, pre-mobile children (not usually thought to be at risk of foreign body ingestion) have sustained battery related injury, presumably after being 'fed' the battery by a sibling. Whilst 20mm or larger batteries are most likely to lodge in a child's oesophagus, small to medium sized batteries have also resulted in severe oesophageal injury [5].

Identification of the battery exposure can be further complicated by failure to distinguish between a coin and a battery on x-ray. Disc batteries appear on x-ray to have a distinct radiolucent ring around the perimeter, but this feature is dependent on the penetration (windowing) and, at times, the battery may be almost indistinguishable from a coin. This has implications for the priority with which removal of the foreign body is planned.

STUDY OBJECTIVES

1. To estimate the incidence of SIRDB in Australian children aged <16 years.
2. To describe the types of serious injuries sustained by children due to disc batteries.
3. To describe the demographic features of children injured (ethnicity, age, sex).
4. To describe the type of battery associated product and how the battery was accessed.
5. To formulate recommendations for the prevention of severe injury related to disc batteries.

Please turn over for case definition

CASE DEFINITION:
Please report any child < 16 years of age with newly diagnosed injury related to disc or button battery ingestion or insertion that required procedural intervention either to remove the battery or to assess or repair damage related to the battery.

Exclusions:
Please do not report cases where the battery has been ingested/inserted and it has passed/fallen out of the patient and the patient does not require a procedure to remove the battery or to assess or repair damage related to the battery.

FOLLOW UP OF NOTIFICATIONS:
Clinicians notifying a case of severe injury related to disc battery will be requested to complete a brief survey at presentation and, at 3 months, follow-up about the child's longer term outcomes. If the 3 month follow-up survey indicates that additional imaging and/or procedures are planned for the child, then clinicians will be requested to complete an additional follow-up survey at 6 months after the initial presentation.

INVESTIGATOR DETAILS

Principal Investigator and contact person

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Co-ordinating Investigator

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