Disc batteries:
Who and what do I X-ray?

Queensland Injury Surveillance Unit

Poor outcomes are associated with unknown ingestions/ insertions and delays in diagnosis. Damage occurs in as little as one hour. Therefore, X-rays looking for disc batteries **need to be processed urgently.**

If a disc battery ingestion is suspected it is suggested that a **neck/ chest/ abdominal film (achieved in one film in smaller children)** should be taken.

Where a disc battery insertion is suspected, you will need to X-ray the appropriate area; skull X-ray (ear or nose or eye insertion) or abdominal X-ray (vaginal/ rectal insertion).

When a disc battery ingestion/ insertion is not known about, how do I know which of my patients should be X-rayed?

Whilst the peak age for disc battery related injury is in children aged 1-5 years, there have been disc battery related injuries in infants who are not independently mobile (possibly fed batteries by siblings) and in older children.

A denial of ingestion/ insertion in a child of any age cannot exclude it. Children of all ages have denied ingestion even after being confronted with radiographic/ physical evidence.

The symptoms and signs are very non-specific, so key features in the patient history may prompt you to think of battery ingestion / insertion:

- **Sudden onset** of symptoms
- **Choking or gagging:** sometimes this is overheard rather than directly observed. Due to the size of the larger batteries, children often gag as they swallow the battery.

The following symptoms are common themes in cases of delayed diagnosis of disc battery related injuries. X-rays should be considered for children presenting with:

- **Persistent or atypical croup.** Oesophageal/ laryngeal lodgement depending on the size of the battery can result in laryngeal oedema that mimics croup.
- **Chest pain** or intermittent episodes of chest/ abdominal pain. In young children it is sometimes not clear where the child is experiencing pain, so it can be difficult to differentiate between chest and abdominal pain. **Sometimes this presents as grunting.**
- **Unexplained gastrointestinal bleeding** (haematemesis/ melaeeana/ haeeamatochezia). Most fatal cases have been associated with aortic haemorrhage. Several cases have had preceding melaeeana and/or initial smaller episodes of haematemesis that have heralded more catastrophic bleeds.
- **Epistaxis**. Upper gastrointestinal bleeding can present as 'epistaxis' in children as vomiting of blood can occur through the nose.
- **Regurgitation or drooling.** Regurgitation is return of ingested saliva/ food due to an oesophageal obstruction. It can be differentiated from vomiting in that it doesn't smell like vomit).
- **Vomiting without fever or diarrhoea.** This is a general flag for potential surgical causes of vomiting. Even if a battery is lodged in the oesophagousoesophagus, some children are still able to vomit without dislodging the battery. Fever can appear as a late sign, and usually indicates oesophageal perforation.

- **Unexplained food refusal.** Whilst food refusal is very common in young children, there is generally a clear explanation such as pharyngitis. Therefore, consider an X-ray if the reason for food refusal is not evident, the child can swallow fluids or soft food but not solids and particularly if the food refusal is prolonged. However, some children are still able to swallow solids with an oesophageal battery in situ, therefore an X-ray is still indicated if a battery ingestion is suspected.

Targeted facial views/ pelvic views may be required for the following children.

Children presenting with:

- **Unexplained bloody nasal/ ear discharge.** Smaller disc batteries are able to be inserted in the ear or nose. It is sometimes not possible to visualise a foreign body in this situation due to discharge.
- **Sudden onset of severe unilateral eye pain with or without discharge.** Examination may be difficult and a battery unable to be viewed.
- **Unexplained vaginal or rectal bleeding/ discharge.** Young children occasionally insert foreign bodies into the vagina/ rectum.

What if more than one child is involved in a missing battery incident?

This is a not uncommon scenario; siblings have been playing with a product and the battery is noted to be missing. Again, denial of ingestion / insertion does not exclude it. Targeted examination (ears and nose) and X-rays will depend on the size of the missing battery. If the battery is not located on examination, then start by X-raying one child and continue until the X-rays either reveal or exclude the culprit.

What do I do when I find a disc battery on X-ray?

You may have ordered the X-ray because you suspected a disc battery injury or an X-ray may reveal an unexpected battery when taken for more usual indications such as fever, abdominal pain or, grunting (usually looking for pneumonia). Regardless of the indication for the X-ray, any staff member who sees a disc battery (or possible disc battery) on X-ray **should report this urgently** to the senior treating clinician. Management will require an urgent referral to a paediatric specialty unit (gastroenterology, or ENT, surgical or ophthalmology depending on location of the battery).

Remember, any disc shaped metal object could be a disc battery. Disc batteries appear on X-ray as a metal disc with a radio-lucent ring around the perimeter; however, changes in film penetration windowing (penetration) can mask this ring and make a disc battery look like a coin. If in doubt, refer urgently anyway.