Disc Batteries:

Queensland Injury Surveillance Unit

Who and what do I X-ray?

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 pelvic X-ray (vaginal/ rectal insertion).

If a disc battery is missing it could (depending on size) be either ingested or inserted. A neck to bottom film can often incorporate ear/ nose and pelvic sites, as well as chest/ abdomen. Remember, there may be more than one battery!

What do I look for in unknown disc battery ingestions/ insertions and who do I X-ray?

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, particularly those on the autistic spectrum.

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/choke as they swallow the battery. Batteries do not cause fatal choking as they have a tendency to be swallowed instead. Parents have sometimes been falsely reassured when choking resolves.
- Battery inhalation is extremely rare.

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.**
- **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 oesophagus, some children are still able to vomit past the obstruction without dislodging the battery. Fever can appear as a late sign, and usually indicates oesophageal perforation.

Queensland Injury Surveillance Unit

- **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, if the child can swallow fluids or soft food but not solids or if the food refusal is prolonged. **As the battery erodes into the wall of the oesophagus, some children will be able to swallow solids again.** This can be falsely reassuring for parents. Therefore, despite solid intake, an X-ray is still indicated if a battery ingestion is suspected.
- **Unexplained gastrointestinal bleeding** (haematemesis/ melaena/ haematochezia). This is a late sign. Most fatal cases have been associated with aortic haemorrhage. Several cases have had preceding melaena 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.

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.

Remember, there may be more than one battery. Xray even if you can see the battery.

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 may require an urgent referral to a paediatric specialty unit (gastroenterology, or ENT, surgical or ophthalmology depending on size and 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 windowing (penetration) can mask this ring and make a disc battery look like a coin. If in doubt, refer urgently anyway.