South Australian Paediatric Clinical Practice Guidelines

Ingested foreign bodies

(including button batteries)

Note: This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

Explanation of the aboriginal artwork:
The aboriginal artwork used symbolises the connection to country and the circle shape shows the strong relationships amongst families and the aboriginal culture. The horse shoe shape design shown in front of the generic statement symbolises a woman and those enclosing a smaller horse shoe shape depicts a pregnant women. The smaller horse shoe shape in this instance represents the unborn child. The artwork shown before the specific statements within the document symbolises a footprint and demonstrates the need to move forward together in unison.

Cultural safety enhances clinical safety.

To secure the best health outcomes, clinicians must provide a culturally safe health care experience for Aboriginal children, young people and their families. Aboriginal children are born into strong kinship structures where roles and responsibilities are integral and woven into the social fabric of Aboriginal societies.

Australian Aboriginal culture is the oldest living culture in the world, yet Aboriginal people currently experience the poorest health outcomes when compared to non-Aboriginal Australians.

It remains a national disgrace that Australia has one of the highest youth suicide rates in the world. The over representation of Aboriginal children and young people in out of home care and juvenile detention and justice system is intolerable.

The accumulated effects of forced removal of Aboriginal children, poverty, exposure to violence, historical and transgenerational trauma, the ongoing effects of past and present systemic racism, culturally unsafe and discriminatory health services are all major contributors to the disparities in Aboriginal health outcomes.

Clinicians can secure positive long term health and wellbeing outcomes by making well informed clinical decisions based on cultural considerations.

The term 'Aboriginal' is used to refer to people who identify as Aboriginal, Torres Strait Islanders, or both Aboriginal and Torres Strait Islander. This is done because the people indigenous to South Australia are Aboriginal and we respect that many Aboriginal people prefer the term 'Aboriginal'. We also acknowledge and respect that many Aboriginal South Australians prefer to be known by their specific language group(s).

Purpose and Scope

The management of Ingested Foreign Bodies (including button batteries) Clinical Guideline is primarily aimed at medical staff working in any primary care, local, regional, general or tertiary hospitals. It may however assist the care provided by other clinicians such as nurses. The information is current at the time of publication and provides a minimum standard for the identification, assessment (including investigations) and management of ingestion of foreign bodies; it does not replace or remove clinical judgement or the professional care and duty necessary for each specific case.

Flowchart - Management for Ingested Foreign Bodies

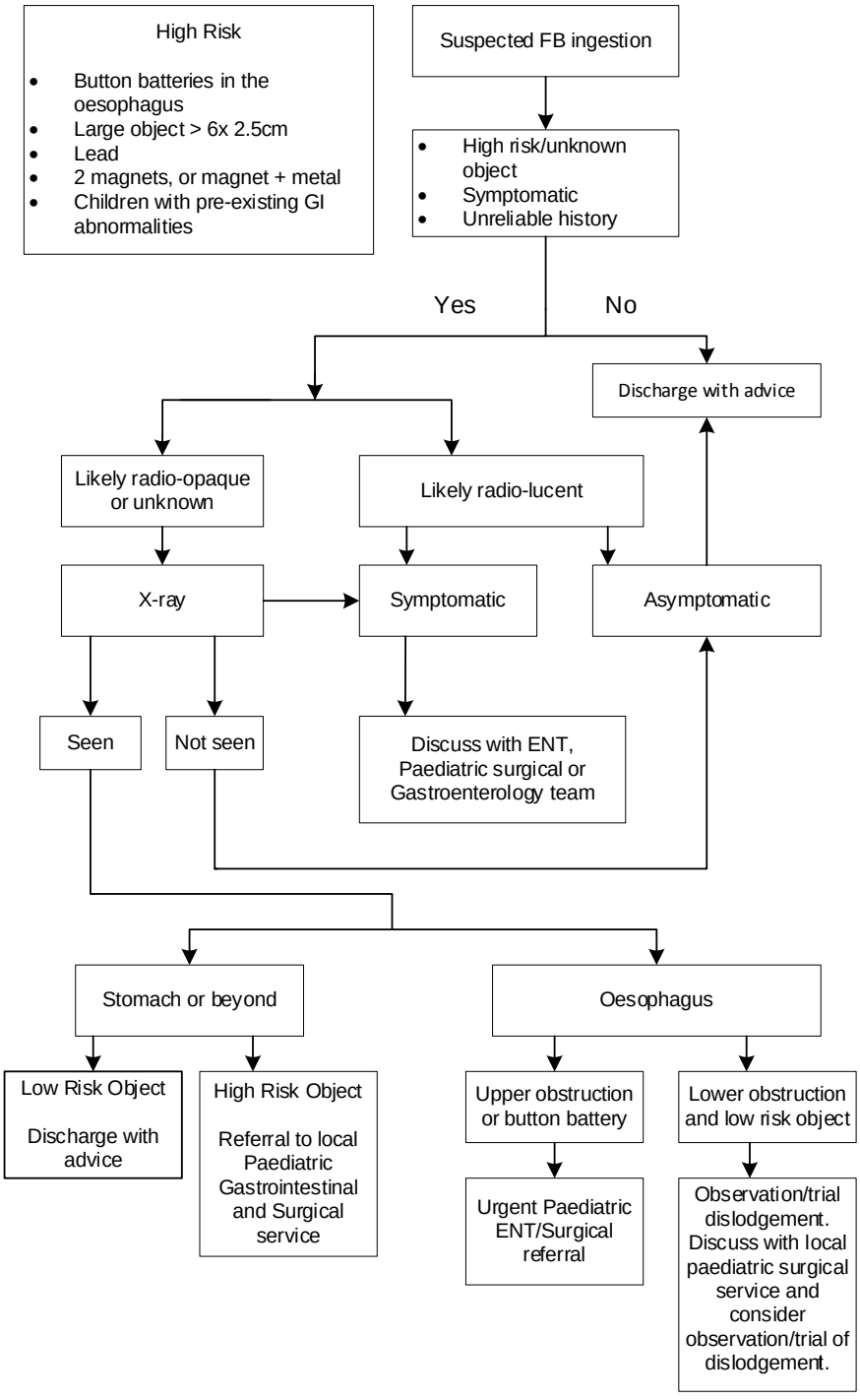

Table of Contents

Definitions and Abbreviations

ABC assessment	**Airway** > Check consciousness > Assess ability to take a deep breath > Assess ability to speak in a full sentence – can the patient speak a full sentences, just phrases, single words, or not at all > Assess if the airway is clear **Breathing** > Look, listen and feel for the movement of air > Assess the adequacy of the breathing process – is their sufficient rate and volume of air being moved? > Assess work of breathing (patient effort versus efficacy) > Listen to the chest (through Auscultation) and identify any variances of normal breathing. Normal breathing should sound like soft air movements; absent breath sounds is very bad; wheezes suggest bronchospasm; crackles and rales indicate pulmonary oedema or infection. **Circulation** > Examine for life- threatening haemorrhage > Assess perfusion (level of consciousness, skin colour, pulse rate and blood pressure > Assess the pulse manually – is it regular or irregular, what is the rate (15 seconds x 4), skin colour, temperature, central and peripheral cap refill.
ATS	> Australian Triage Scale
ENT	> Ear, Nose and Throat
FBC	> Fluid Balance Chart
GI	> Gastrointestinal
GIT	> Gastrointestinal tract
WCH	> Women's and Children's Hospital

Management Summary for Ingested Foreign Bodies

Introduction

Ingestion of a foreign body by a child is a common presentation to primary care and emergency departments. Most foreign body ingestions are benign and require no specific management. However some foreign bodies such as disc batteries and magnets may cause life threatening injury and require urgent removal.

The number of children presenting to heath facilities with a disc/button battery exposure is increasing. Severe injuries and fatalities are particularly associated with oesophageal impaction of a button battery following ingestion. A charged battery lodged in a moist environment produces a severe local caustic injury. Even spent button batteries have enough residual charge to cause injury.

The greatest risk of an ingested button battery becoming impacted and causing damage in the oesophagus is with 20mm 3V coin batteries in children less than five years of age as these are the most likely to lodge in the oesophagus due to their size and carry the highest charge. The time frame to oesophageal perforation from a new 3V battery can be as short as 2 hours from the time of ingestion. However, smaller batteries can also become impacted and risk factors include children under 12 months and those with pre-existing oesophageal conditions. Damage following impaction continues after battery removal with delayed complications including trachea-oesophageal fistula, spinal erosion and fistulae into vessels/cardiac structures.

Therefore a button battery impacted in the oesophagus of a child is a time critical emergency requiring both urgent battery extraction and aftercare in consultation with paediatric gastroenterology and general surgical service at the WCH. Batteries inserted into an orifice or situated in other areas of the digestive tract are less time critical but still require prompt assessment and specialist advice and follow up care.

Symptoms

Ingestion of a foreign body is not always witnessed, suspected by caregivers or disclosed by children. Symptoms of foreign body ingestion may be non-specific and may not occur for some time after ingestion.

Key features that may suggest foreign body/disc battery ingestion include:

- Sudden onset of symptoms
- Choking, drooling and/or gagging
- Young children may point to the neck/throat as a site of pain

Ingestion of a foreign body/disc battery should also be considered with the following clinical presentations:

- Persistent or atypical croup/cough/stridor
- Unexplained wheezing and respiratory distress
- Chest pain
- Unexplained gastrointestinal bleeding and /or abdominal pain
- Epistaxis
- Regurgitation or drooling
- Vomiting without fever and diarrhoea
- Unexplained food refusal or difficulty swallowing

Assessment

All children suspected of disc battery ingestion that present to an emergency department should be triaged at ATS priority 2 and seen by a medical officer within 10 minutes.

An initial airway, breathing and circulation (ABC) assessment should occur looking for signs of airway obstruction, respiratory distress and shock followed by appropriate resuscitation.

The child should be kept fasting until the position and nature of foreign body is identified and a treatment plan is in place.

The nature of the object ingested should be established. If the object is unknown, metallic or there is any suspicion of disc battery ingestion, an AP x-ray of the entire GI tract from nose to rectum should be performed.

Management

If single or multiple metallic foreign bodies are discovered on history or X-ray, the possibility of disc battery or magnets must be considered.

All multiple magnet ingestions must be referred for paediatric general surgery and gastroenterology review as urgent removal is indicated.

There is emerging evidence that honey may reduce the severity of mucosal injury for oesophageal impacted batteries. It should be administered from time of first contact as first aid measure until battery removal. 10ml every 10 minutes is recommended

The Poisons Information Service is available for advice at any stage on 131126.

Specialist advice should be sought for all symptomatic foreign body ingestions and high risk objects including oesophageal batteries, large objects, lead and magnets as per flowchart.

Although it is rare for pointed objects to puncture the gut mucosa these ingestions should be discussed with the on call WCH paediatric surgeon.

If the battery is located in the stomach it would be expected to pass through the remainder of the GIT. However a child < 6 years who has swallowed a battery more than 15mm in diameter will require follow up x-rays. If the battery has not passed from the stomach by 48 hours it is unlikely to do so. Endoscopic removal should be considered

Parents and care givers should be counselled to return promptly for re-assessment if symptoms of abdominal pain, gastrointestinal bleeding or fever develop.

Complications

Complications from disc battery ingestion are rare but potentially severe and life threatening. These include

- Tracheo-oesophageal fistula
- Vocal cord paralysis
- Oesophageal stenosis
- Mediastinitis
- Spondylodiscitis
- Aspiration pneumonia
- Vascular perforation
- Gastric haemorrhage
- Gastric and intestinal perforation

If there is evidence of mucosal injury at endoscopy these complications should be observed for and investigated accordingly.

Magnet ingestion is also associated with a risk of severe injury particularly where multiple magnets have been ingested. Enteroenteric fistula, peritonitis and bowel ischaemia/necrosis have all been described.

Risk factors for adverse outcomes include:

- Disc battery > 20 mm
- Age < 4 years
- Ingestion of multiple batteries
- Unwitnessed ingestions
- Misdiagnosis or delayed diagnosis
- Delay in removal
- Co-ingestion of a magnet

Ward Management Considerations

Patient needs to be monitored for signs of complications with foreign body ingestion. Key signs and symptoms to monitor include:

Any of the following signs / symptoms MUST to be escalated URGENTLY as per hospital policy / procedure

Airway

- Persistent or atypical croup/cough/stridor
- Regurgitation or drooling
- Choking and/or gagging

Breathing

- Unexplained wheezing and/or respiratory distress
- Shortness of breath

Circulation

- Hematemesis
- Melena
- Gastrointestinal bleeding
- Epistaxis

Monitor for:

- Uncontrolled abdominal pain
- Persistent vomiting (observe for clots and fresh blood)
- Fever
- Young children may point to the neck/throat as a site of pain
- Chest pain
- Unexplained food refusal or difficulty swallowing.

Documentation

Use the following description and/or codes for documenting blood loss on unit specific Fluid Balance Chart.

OUTPUT	DESCRIPTION
Urine	• Pale red/Rose • Bright red • Clots visible
Vomit	• Dark red • Bright red • Clots visible • Flecks / streaks red
Stool	• Dark red • Bright red • Clots visible • Black

Transfer and retrieval guidelines for Button Battery Impaction outside of WCH

The SAFE approach to children with possible button batteries ingestions

Suspect possible button battery ingestions in children.

Assess all possible button battery ingestions with urgent neck to bottom x-ray imaging.

Fast transport of the child with an impacted oesophageal button battery directly to an appropriate extraction centre

Extract battery as a surgical emergency

This plan has been developed in response to the 2015 Coronial recommendations following the death of a four year old girl who ingested a 20mm battery unbeknownst to her parents. The battery lodged in her oesophagus and she died days later due to haemorrhage from an aorto-oesophageal fistula.

The Problem

The problems associated with the geography of the state are complicated by limitations in X-ray availability to make the diagnosis of button battery ingestion in rural and remote areas.

In addition button battery presentations in children fall into two groups:

1) Acute/Obvious presentations: Child is brought to hospital or their GP by a parent from a witness, or suspected, button battery ingestion within 24 hours of the event.

2) Delayed/Occult presentations: Child is brought to hospital or their GP by a parent with non-specific symptoms related to an impacted battery with the parents being unaware of the risk following ingestion or unaware that ingestion has taken place at all.

The management and transport priorities are different for the two groups of children.

At any time, advice and assistance with possible button ingestions/insertions can be obtained from:

- **MedSTAR kids retrieval service 13 STAR (137827)**
- **Poisons Information on 131126**
- **Women's and Children's Hospital PED or Gastroenterology service or paediatric general surgical service 81617000**

Suspect possible button battery ingestions in children

Concern from a child's parents about possible button battery ingestion should be taken seriously and investigated urgently with x-ray imaging from neck to bottom. If there is no local x-ray availability MedSTAR kids retrieval service 13 STAR (137827) will be able to assist by facilitating transport of the child, to the most appropriate site that can perform an x-ray to confirm or exclude a button battery ingestion or insertion.

Children with unknown battery ingestions are at the highest risk of vascular and cardio-respiratory complications at or after extraction, because batteries may have been lodged for days to weeks. In these situations parents of children with non-specific symptoms are likely to present with their children directly to their GP, or the Emergency Department.

Features of occult ingestion can be non-specific. See page 5.

Assess all possible button battery ingestions with x-ray imaging as soon as possible

Where there is a battery impacted in the oesophagus MedSTAR can facilitate discussion with the paediatric gastroenterologist and surgeon on call at WCH and arrange urgent transfer for extraction.

Batteries inserted into orifices should be discussed with the relevant speciality service at WCH.

In general practice/rural and remote locations

For GPs in Adelaide and surrounds discuss the case with the WCH paediatric general surgery, gastroenterology unit and/or PED and send the child directly to the WCH Paediatric Emergency Department for urgent x-ray imaging.

In rural and remote areas contact MedSTAR for assistance in getting the child to the nearest facility that can urgently perform x-ray imaging. If the button battery is not impacted in the oesophagus further advice can be obtained from the paediatric general surgery on call about the child's management.

Fast transport to the WCH

Children with a button battery lodged in the neck or oesophagus require urgent transport to the WCH.

For acute witnessed ingestions with battery impaction less than 24 hours duration, transfer should be arranged with the South Australian Ambulance Service/MedSTAR Kids retrieval service.

For delayed presentations with battery impaction

Management will need to be determined by discussion with the Paediatric general surgery or Gastroenterology Service at WCH.

Extract battery and evaluate the extent of injury

Children with button battery impactions are taken immediately to the theatre for removal of the battery. Ongoing consultation with the paediatric general surgery and gastroenterology service at WCH can facilitate disposition and follow up care. Caustic damage can persist with late catastrophic events occurring days to weeks after battery removal and injury may not be evident on the initial endoscopy.

For delayed or occult button battery presentations the presence of any GIT bleeding, may represent a “herald bleed” (a small haemorrhage that precedes a catastrophic haemorrhage) and may indicate a possible aorto-oesphageal fistula. Removing the battery in this context may precipitate uncontrollable bleeding. In cases where there is potential bleeding from an aorto-oesphageal fistula, the transport and best site for initial and ongoing management will need to be determined by discussion with the Paediatric Gastroenterology/Surgery Service at WCH through MedSTAR.

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