Ingestion of button batteries and super-strong magnets

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Background

- Most ingested foreign bodies are harmless and pass through the GI tract uneventfully
- Radio-opaque foreign bodies such as metal or some types of bone can be visualised on XR
- Most metal objects can be detected by a metal detector.
- Paper / wood / plastic objects may not be visualised

Hazardous objects such as
- Button batteries and other batteries
- Sharp objects, especially if long >6cm or wide >2cm
- Magnets e.g. fake tongue piercings / neodymium magnets
- Very large objects / filled balloons

Can cause life-threatening injuries such as:
1. Obstruction above the gastro-oesophageal junction, the narrowest part of the GI tract
2. Bowel perforation / rupture
3. Erosion from leaked battery contents or electrical currents discharged from button batteries leading to perforation or aorto-oesophageal fistula or trachea-oesophageal fistula.

Assessment

Symptoms and signs associated with FB in oesophagus:
- Dysphagia (difficulty swallowing)
- Food refusal
- Drooling / gagging
- Vomiting / haematemesis
- Sensation of FB / chest pain / sore throat
- Stridor / cough

Management

1. Non-hazardous, ingested foreign bodies
2. Hazardous, ingested foreign bodies
Non-hazardous ingested foreign bodies

Radio-opaque fish bones: Cod, haddock, cole, gurnard, lemon sole, monk fish, grey mullet, red snapper

Is FB radio-opaque or metallic?

YES

NO or unsure

Did patient cough or display any symptoms of respiratory problems since ingestion?

NO

YES

Did patient cough or display any symptoms of respiratory problems since ingestion?

CXR and refer to ENT

Tolerating food and no worrying symptoms?

NO

YES

XR chest +/- abdomen +/- neck

FB above diaphragm / worrying symptoms / not tolerating food?

**Upper oesophagus:** refer ENT

**Lower oesophagus:** refer surgery/endoscopy

Discharge home with reassurance and leaflet.

Do NOT instruct to inspect faeces for FB

Clinical / radiological review if becomes symptomatic

Safety net:
1. Vomiting or haematemesis
2. Abdominal pain
3. PR bleeding

Do not send home a patient who is coughing, choking or refusing to eat / drink after a suspected ingestion
Hazardous ingested foreign bodies

**Do not use metal detector for hazardous FB – the patient will usually require x-rays**

Passage of hazardous FB into the stomach is NOT an indication that the patient will not suffer any complications.

1. **Hazardous foreign body (Not button battery or super strong magnet)**

   **Management pathway**
   
   See separate pathways for Button batteries and super strong magnets

   ![Flowchart diagram](image)

2. **Button batteries**

   **XR is needed for all battery ingestions** as the battery may be missed on a metal detector test

   - Ingestion of button batteries can cause serious harm and death.
RSCH Adult Clinical Practice Guideline

- Severe tissue damage results from a build-up of sodium hydroxide as a result of the electrical current discharged from the battery (not leaking of contents as is often thought).
- Tissue burns, often in the oesophagus, can cause fistulisation into major blood vessels, resulting in catastrophic haemorrhage.
- Symptoms suggestive include haematemesis, haemoptysis, and respiratory difficulties.
- Can manifest up to 28 days after ingestion.

Urgent referral to ENT or Surgery is mandated if button battery ingestion has occurred or is suspected. Consider this in all children presenting with haematemesis.

Other types of batteries are less dangerous than button batteries but may leak from dissolution of seal in gastric acid. They can also attach to intestinal mucosa and cause erosion and perforation.

3. Neodymium or ‘super strong’ rare earth magnets

Extremely powerful magnetic attractions, widely available as toys, decorative items or fake e.g. tongue piercings.

- Usually small in size and round in shape. Brand names include BuckyBalls™ and Neocube™
- When more than one magnet, or a magnet with a metallic object is swallowed, the magnetic force can bring two pieces of intestine tightly together, leading to ischaemia and pressure necrosis, the consequence of which can include:
  - ulceration, necrosis, perforation, rupture, stricture, fistula, haemorrhage, mediastinitis, gastric outlet or bowel obstruction, volvulus, sepsis

URGENT assessment and treatment is vital as although abdominal symptoms may not manifest for weeks after ingestion of magnets, intestinal injury can occur early, within 8-24 hours following ingestion, despite the patient often remaining well

Consider the possibility of rare earth magnet ingestion or aspiration in patients with:

- stridor, wheezing or other noisy breathing;
- drooling; difficulty swallowing;
- coughing, choking or gagging when eating or drinking;
vomiting; chest pain or discomfort; abdominal pain; decreased appetite or refusal to eat.

Management

- Witnessed or suspected super strong magnet ingestion
- Magnet ingested with metal object
- Unexplained GI symptoms with availability of super strong magnets

Urgent CXR and abdominal x-ray (patient lying down, ideally prone)
If single magnet seen also get lateral abdominal x-ray

1. Symptoms or signs of obstruction?
2. Multiple magnets?
3. Evidence of obstruction?

Keep NBM
Refer to Surgery Registrar for admission / treatment / repeat imaging

Discharge criteria met?
- Single magnet ingestion
- Accidental ingestion
- No co-morbidities
- Tolerating oral intake
- Presents within 24hr of ingestion
- Caregiver can provide close observation

Yes

- Patient advice leaflet
  - **Arrange follow up attendances to SDEC for repeat AXR at least 6-12 hours** apart until magnet is seen to have passed through the stomach and is progressing through the small bowel or beyond.
- Ensure same position for the AXR on each occasion

Progression of single magnet (confirmed by radiologist) AND remains asymptomatic

No

Symptomatic at any time OR Failure of magnet to progress but remains asymptomatic

Discharge with safety netting advice

Witnessed or suspected super strong magnet ingestion
Magnet ingested with metal object
Unexplained GI symptoms with availability of super strong magnets
British Society of Gastroenterology guidance for oesophageal obstruction