

## Ingestion of Super Strong Magnets - Full Clinical Guideline

Reference no.CG-  
SURGEN/2022/013

### 1. Introduction

Neodymium magnets have become easy to purchase. They are between five and ten times stronger than ceramic magnets and are sometimes called 'super strong' magnets. They are often brightly coloured and can be of a variety of shapes, usually of less than 6 mm in diameter. These inexpensive and readily available magnets can be swallowed with ease, accidentally or intentionally.

The ingestion of a single super strong magnet is unlikely to cause significant harm, however, if multiple magnets are ingested, or if a magnet is swallowed along with a metal object significant injury can occur. Ingestion of a magnet with a button battery is a time critical emergency. Magnets can attract each other across layers of bowel to cause ischemia and pressure necrosis of the gut and serious complications. The types of injuries have included ulceration, necrosis, perforation, rupture, stricture, fistula, haemorrhage, mediastinitis, gastric outlet or bowel obstruction, volvulus, sepsis and death.

### 2. Aim and Purpose

This Clinical Guideline relates specifically to the assessment of adults presenting to UHDB with possible ingestion of super strong magnets. Please see separate guidance for assessment and management of children presenting with ingestion of super strong magnets. This guideline does not cover non-ingestion super strong magnet foreign body (for example, intranasal or aspiration), though some of the same principles of potential harm may be relevant to guide practice in individual cases.

### 3. Keywords

**Neodymium Magnets:** also known as Neo magnets, bucky balls, Magnet balls, Super Strong magnets, Rare-Earth magnets, NdFeB, NIB or powerful magnets.

Ingestion

Foreign body

Abdominal pain

#### 4. Presentation

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

Abdominal symptoms may not manifest for weeks after ingestion of magnets however intestinal injury can occur early, within 8-24 hours following ingestion, despite the person often remaining well.

#### 5. Assessment and Management

Unlike most other 'foreign body' ingestions, passage of rare earth magnets into the stomach must not be used as an indication that a person is free from any potentially catastrophic underlying injury. The progression of the magnet/magnets through the gastrointestinal (GI) tract is crucial to determining whether surgical intervention is required.

Metal detectors should not be used for the assessment of patients with suspected rare earth magnet ingestion.

Chest X-ray (CXR) and abdominal X-ray (AXR) with the patient lying down supine should be requested to assess both the position of any magnets and the number of magnets. In the case of a foreign body in keeping with a magnet being identified by clinician on an AXR, a lateral AXR should then also be requested to confirm that only one magnet has been ingested.

Pitfalls in radiological interpretation include:

- A neodymium magnet appears like a ball-bearing on an X-ray, and clinicians should be careful to not misdiagnose it as a metal ball
- Misdiagnosis of multiple magnets as solitary magnet ingestion can lead to a delay in diagnosis and subsequent complications

Patients could be considered suitable for discharge after rare earth magnet ingestion if ALL of the following apply:

- single magnet ingestion AND
- accidental ingestion AND
- no co-morbidities AND
- tolerating oral intake AND
- presents within 24 hours of ingestion AND
- care-giver able to provide close observation (there is no need to examine the patient's faeces) AND
- able to go home and return within the given timeframe (i.e. not frail and reliant on patient transport, etc).

All patients who are being discharged with rare earth magnet ingestion require follow-up imaging after 6-12 hours, repeated earlier imaging is not indicated. If the person becomes symptomatic before the repeat radiograph urgent surgical review will be required. They should be advised to attend the Emergency Department (ED) immediately, for assessment, emergency management and referral to General Surgical team on-call.

Follow up AXR should be requested (only repeat CXR if magnets seen in the chest on the first image). It is essential that the abdominal radiographs are always performed in the same position (lying down supine). Interpretation of the AXR and the finding of progression of the rare earth magnet through the gastrointestinal tract should be formally confirmed by a radiologist.

Follow-up AXRs should continue to be performed until it can be demonstrated (and confirmed by a radiologist) that the magnet has passed through the stomach and serial X-rays (at least 6-12 hours apart) show that it is progressing through the small bowel or beyond. Failure of the magnet to progress through the GI tract, (defined as: the magnet having not moved from the last demonstrated position on AXR irrespective of location in GI tract after a period of 6-12 hours and confirmed by a radiologist) is an indication for discussion with General Surgeons on-call.

Radiological interpretation of X-rays is by UHDB on-call radiologists in-hours at all sites and out-of hours at Royal Derby Hospital, and by 4-ways reporting out-of-hours at Queen's Hospital Burton.

If the person presented to Minor Injuries Unit (MIU) initially, then this MIU should make arrangements for the interval follow-up radiographs and their review. If the initial presentation was to an Emergency Department (ED) then subsequent interval follow-up radiographs should be arranged with the Surgical Assessment Unit (SAU) on the same hospital site. The reason for this is the waiting times to be seen within EDs could introduce clinical risk in delays to the interval radiographs. Repeat radiographs should be at least daily, with reduction of frequency only at the discretion of a senior General Surgeon.

If a single magnet is ingested, it can be expected to be passed spontaneously, if the magnet is not too large. If a rare earth magnet has been ingested, remove any other external magnetic objects nearby and avoid clothes with metallic buttons or belts with buckle. Patients / carers should be provided with a patient advice leaflet.

Patients who do not meet discharge criteria e.g. symptomatic patients, signs of deterioration, ingestion of two or more rare earth magnets should be referred to General Surgeons on-call for urgent assessment and admission to hospital. This admission would enable close observation as well as repeat imaging and in the event of any deterioration, rapid transfer to surgical intervention. If operative management is deemed appropriate, then in theatre X-ray prior to closure should be part of good theatre practice.

## 6. References

The Royal College of Emergency Medicine Best Practice Guideline. "Ingestion of Super Strong Magnets in Children". May 2021

## 7. Documentation Controls

<b>Reference Number</b> CG-SURGEN/2022/013	<b>Version: 1.0</b>		<b>Status</b> Final	
<b>Version / Amendment History</b>	<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Reason</b>
	1.0	February 2022	Dr Elizabeth Bateman, Consultant Emergency Department	Following a National Patient Safety Alert, the requirement was to review or produce guidelines aligned to the RCEM 'Best Practice Guideline'
<b>Intended Recipients:</b> State who the Clinical Guideline is aimed at – staff groups etc. Medical, nursing and radiological staff in the emergency department, UTC/MIU's, radiology department and SAU's				
<b>Training and Dissemination:</b> How will you implement the Clinical Guideline, cascade the information and address training Dissemination via email to the relevant staff.				
<b>Development of Guideline:</b> <b>Job Title:</b> Consultant, Emergency Department, Dr Elizabeth Bateman				
<b>Consultation with:</b> Mr J Quarmby (surgical consultant), Dr J Crookdake (radiology consultant), Dr S Pearson (emergency department consultant), Alison Wadlow, (Matron Emergency Department). Circulated to the Medical Divisional Governance meeting and the Surgical Divisional Quality Risk meeting and approved/signed off at both.				

**Linked Documents:** State the name(s) of any other relevant documents

None

Suitable for printing to guide individual patient management but not for storage  
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Review Due:

<b>Keywords:</b> ingestion, super strong magnets, magnets	
<b>Business Unit Sign Off</b>	<b>Group:</b> <b>Date:</b>
<b>Divisional Sign Off</b>	<b>Group:</b> Medical Divisional Governance Meeting <b>Date:</b> 17 <sup>th</sup> December 2021 <b>Group:</b> Surgical Divisional Quality Risk Meeting <b>Date:</b> 9 February 2022
<b>Date of Upload</b>	April 2022
<b>Review Date</b>	3 yearly April 2025
<b>Contact for Review</b>	Dr Elizabeth Bateman, Consultant Emergency Department

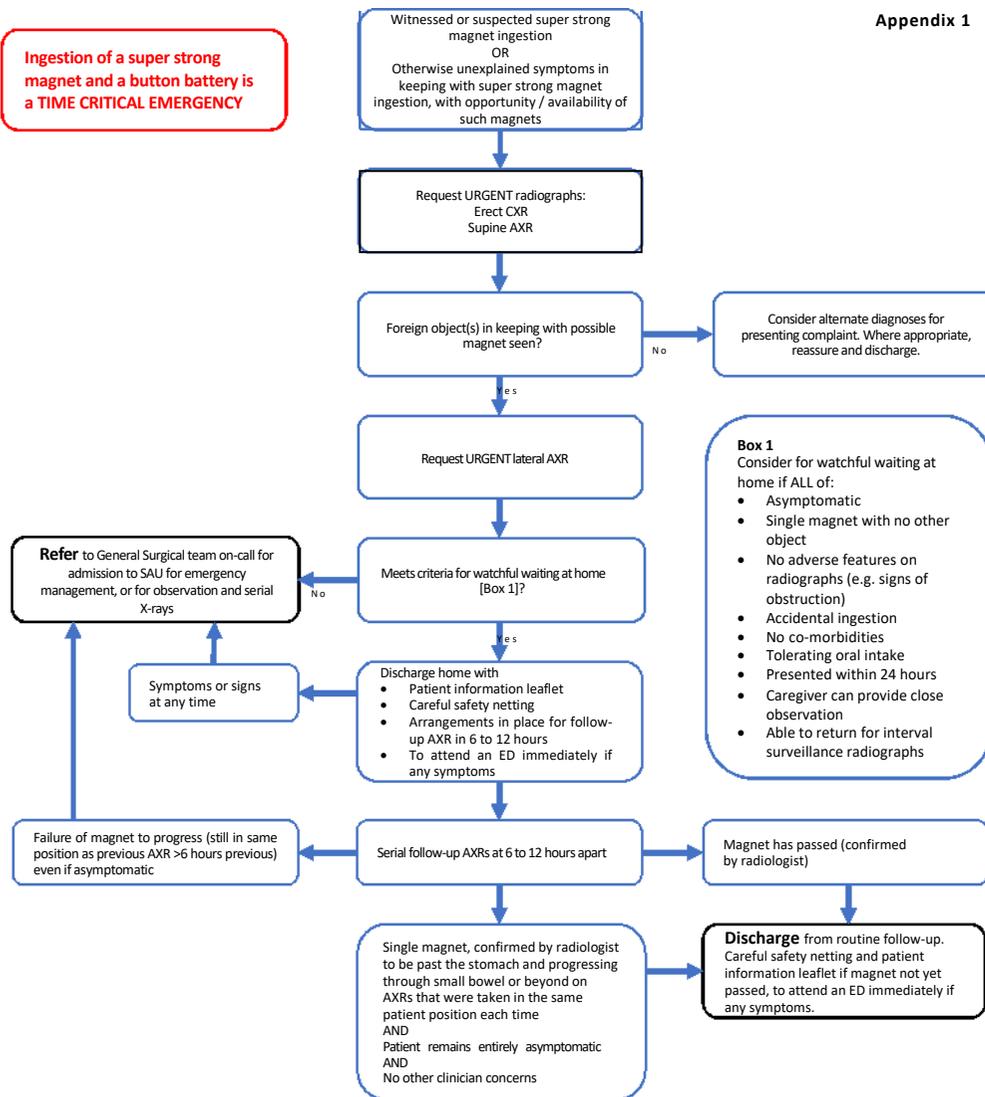
## 8. Appendices

1. Management Algorithm
2. Adult Patient Information Leaflet
3. Paediatric Patient Information Leaflet



**Ingestion of a super strong magnet and a button battery is a TIME CRITICAL EMERGENCY**

**Appendix 1**



## Appendix 2

# Swallowed magnet

Recently, a different type of magnet has gone on sale. They are known as Neo magnets, bucky balls, Magnet balls, Super Strong Rare-Earth Magnets, or powerful magnets. They can be a variety of shapes, most often balls or discs.

You have been discharged from hospital after swallowing a magnet. Even though the magnet has not yet passed though, it is OK to leave hospital. It is important to have a follow-up X-ray 6 to 12 hours after the first X-ray was taken. This repeat X-ray is extremely important, to check whether the magnet is moving through your bowels normally.

Until you have had your repeat X-ray, remove any other external magnetic objects nearby and avoid clothes with metallic buttons or belts with a buckle.

There is no need to check your faeces to find the swallowed magnet.

If a single small magnet was swallowed, it can be expected to pass through with no problems.

Very rarely, the magnet can become stuck in the stomach or intestines. Go to the Emergency Department IMMEDIATELY if you have:

- Any further magnets or foreign bodies swallowed
- Vomiting
- Abdominal (tummy) pain
- Blood in your vomit or poo
- A fever

Here are the details of the time and place you should go for the repeat X-ray:

## Swallowed magnet

Recently, a different type of magnet has gone on sale. They are known as Neo magnets, bucky balls, Magnet balls, Super Strong Rare-Earth Magnets, or powerful magnets. They can be a variety of shapes, most often balls or discs.

Your has been discharged from hospital after swallowing a magnet. Even though the magnet has not yet passed though, it is OK for them to leave hospital. It is very important that they have a follow-up X-ray 6 to 12 hours after the first X-ray was taken. This repeat X-ray is extremely important, to check whether the magnet is moving through you're their bowels normally.

Until they have had their repeat X-ray, remove any other external magnetic objects nearby and avoid clothes with metallic buttons or belts with a buckle.

There is no need to check your child's faeces to find the swallowed magnet. If a single small magnet was swallowed, it can be expected to pass through with no problems.

Very rarely, the magnet can become stuck in the stomach or intestines. Take your child to the Children's Emergency Department IMMEDIATELY if they have:

- Any suspected further magnets or foreign bodies swallowed
- Vomiting
- Abdominal (tummy) pain
- Blood in their vomit or poo
- A fever
- A change in eating pattern e.g. refusing food or drink

Here are the details of the time and place you should take your child for the repeat X-ray: