

The Trust Clinical Guideline for Swallowed Foreign Bodies  
in Children under 16 years old

A Clinical Guideline

For use in:	Accident and Emergency, Children's Assessment Unit (CAU), Paediatric Surgery, Radiology and ENT
By:	Paediatric Surgery Department
For:	All Staff
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This guideline has been approved by the Trust's Clinical Guidelines Assessment Panel as an aid to the diagnosis and management of relevant patients and clinical circumstances. Not every patient or situation fits neatly into a standard guideline scenario and the guideline must be interpreted and applied in practice in the light of prevailing clinical circumstances, the diagnostic and treatment options available and the professional judgement, knowledge and expertise of relevant clinicians. It is advised that the rationale for any departure from relevant guidance should be documented in the patient's case notes.

The Trust's guidelines are made publicly available as part of the collective endeavour to continuously improve the quality of healthcare through sharing medical experience and knowledge. The Trust accepts no responsibility for any misunderstanding or misapplication of this document.

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**Version and Document Control:**

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3	22/05/2020	Changes to Button battery and Magnet flow charts. Some added text in Scope (last sentence). Reference added.	Mr Richard England and Mr Oliver Burdall
4	09/11/2021	Changes need to be in line with NaPSA alert, amendments made to flow chart and references	Mr Richard England and Mr Oliver Burdall

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## The Trust Clinical Guideline for Swallowed Foreign Bodies in Children under 16 years old

### 2. Definitions of Terms Used / Glossary

**Foreign body:** Any ingested, non-absorbable object that may lead to either obstruction or perforation of the GI tract.

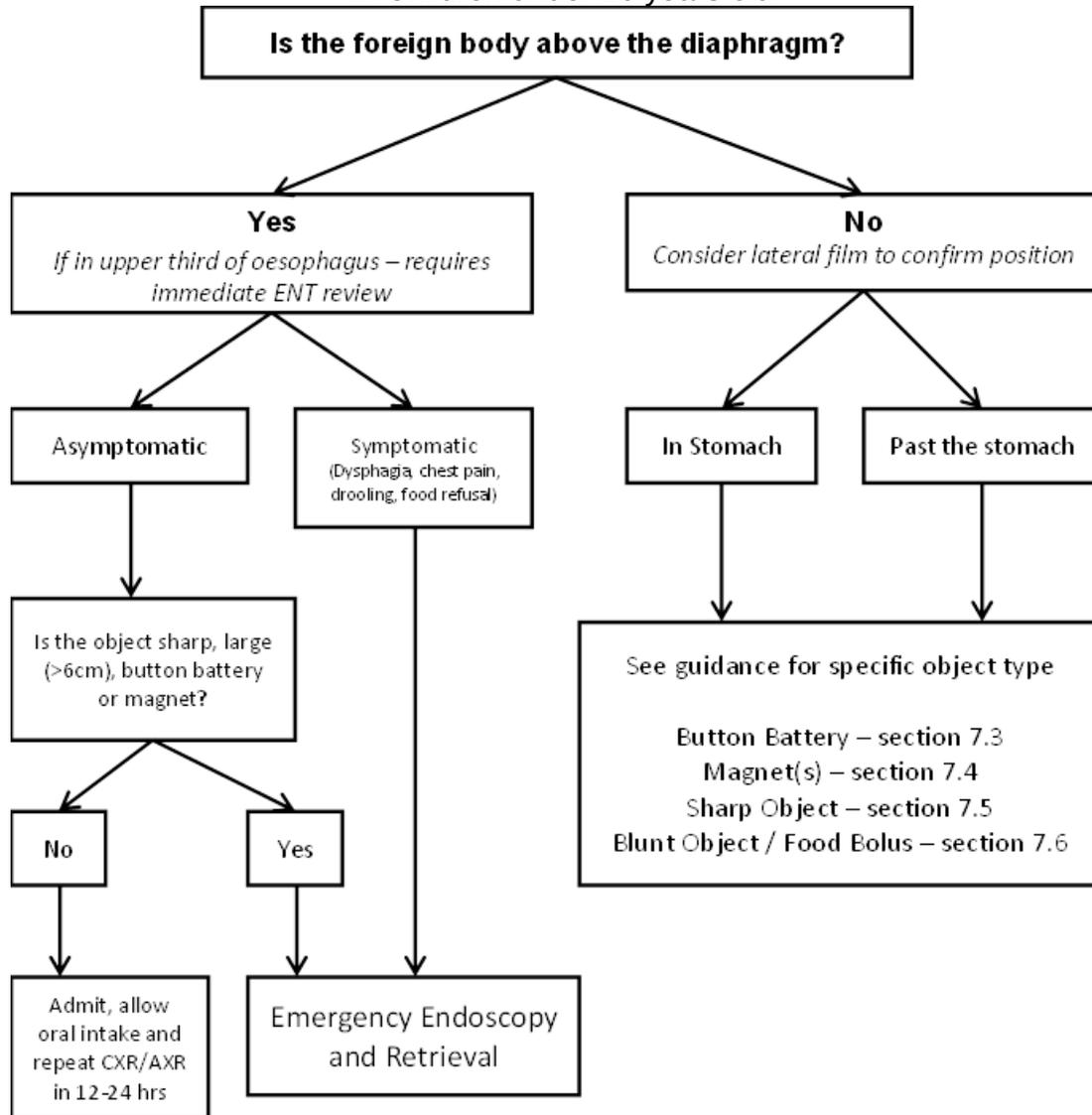
**Upper Third Oesophagus:** Positioned level with or above the clavicles on plain XR

**Timings for theatre:** Emergency: next available theatre space (<4hrs)  
Urgent: within 12 hours

### 3. Quick reference:

Figure 1: Initial management of swallowed foreign body. Paediatric surgery registrar to be informed of all swallowed foreign bodies that do not require urgent ENT review. Consider urgent ENT assessment for all foreign bodies that are INHALED or have been INSERTED into auditory canal / nasal cavity

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#### 4. Objective/s

The aim of this guideline is to provide recommendations and rationale for the management of children that have swallowed a foreign body, to be used by any health care professional involved in their treatment. This is not a definitive protocol, but guidance to be fitted with and tailored to the individual being treated at the discretion of the professions involved.

#### 5. Rationale

Children are naturally curious about the world they live in and, in the younger age groups, they often identify and recognise objects by putting them to their mouths. In 2000 the American Association of Poison Control Centres documented that 75% of the >116,000 ingestions reported were in children 5 years of age or younger. As opposed to adults, 98% of foreign body ingestions

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(FBIs) in children are accidental and involve common objects found in the home environment, such as coins, toys, jewellery, magnets, and batteries.

An ingested foreign body is often asymptomatic but can also lead to symptoms of stridor, respiratory distress, pain, drooling, chest pain, abdominal pain, refusing to feed, or fever. In the case of the more high risk objects, such as button batteries, ingestion has been shown to lead to significant morbidity in around 0.8% of cases with a study of 8600 button battery ingestions recording a mortality rate of 0.15% of treated patients [Kramer et al 2015; Brumbaugh et al, 2011]. Despite this coins remain the most common type of object swallowed by children, accounting for 70% of cases, and most pass through the gastrointestinal tract without incident. A recent systematic review found that the most common sites for impaction were at cricopharyngeus in the upper third of the oesophagus (75% of all cases) or at the oesophagogastric junction, with under 10% becoming impacted later if it passed into the stomach [Jayachandra et al, 2013; Stack and Munter, 1996]. Over two-thirds of swallowed foreign bodies in children are radio-opaque and plain chest and abdominal radiographs are essential in order to establish if the object is impacted above the diaphragm, which is an indication for urgent endoscopic removal [Wright and Closson, 2013]. Rates requiring urgent endoscopic removal vary in the literature but sit somewhere between 10-20% of ingested foreign bodies. The positive predictive value of radiographs is 100% for metallic objects, but is much lower for objects made of glass (43%), fish bones (26%) and plastics or wood which are completely radiolucent.

This guideline sets out the trust's recommended strategy to managing different swallowed foreign bodies in children, taking into account the different risks of different types of foreign body and their likely movement through the GI tract.

### 6. Scope

This guideline was created by the paediatric surgery department in conjunction with ENT and A&E to guide the management of patients from birth until 16 years of age. It is specifically designed to encompass the management of *swallowed* foreign bodies. It is important to remember that the history may be vague and foreign bodies that have been *inhaled* or *inserted* into the Ear, Nose or Throat may require urgent ENT assessment not covered in this guideline. Specific cases may present their own challenges and in a minority of cases it may be appropriate to deviate from the guidance presented here following a careful discussion with the consultant paediatric surgeon on-call.

### 7. Processes to be followed

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### 7.1: Initial Assessment:

What object was swallowed, timing, how many, whether it was witnessed and likelihood of being radio-opaque should all be documented from the history. Parents to provide another similar object or packaging if possible.

These along with symptoms will dictate the need for emergency upper GI endoscopy and retrieval.

Red flag symptoms include:

- Drooling
- Dysphagia
- Cyanosis
- Respiratory symptoms such as choking, stridor, wheezing
- Haematemesis
- Chest pain

Other symptoms can include refusal of food, sore throat, vomiting, foreign body sensation, abdominal distention or unexplained fever.

Symptoms at time of presentation are most common with objects lodged in the upper third of the oesophagus or at cricopharyngeus. Therefore if there are signs of stridor or respiratory distress at initial assessment or X-ray shows the object in the upper third of the oesophagus the patient will need an **EMERGENCY ENT REVIEW**, as they may require emergency laryngoscopy.

In the absence of stridor, cyanosis or respiratory distress the patient should have an urgent chest and abdominal radiograph to assess position and the Paediatric Surgical Registrar on-call should be informed of the patient.

### 7.2: Indications for Urgent Removal (see Figure 1):

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1. Signs of airway compromise or stridor
2. Oesophageal obstruction (excessive drooling)
3. Button battery, magnet, sharp or long (>6cm) object in the oesophagus (See Figure 1)
4. Foreign body impacted in the oesophagus for >24 hours
5. Signs or symptoms of intestinal obstruction or perforation

Paediatric Surgery Registrar to be informed of all swallowed foreign bodies that do not require urgent ENT review or are blunt small objects that have passed the stomach.

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### 7.3 Button Batteries:

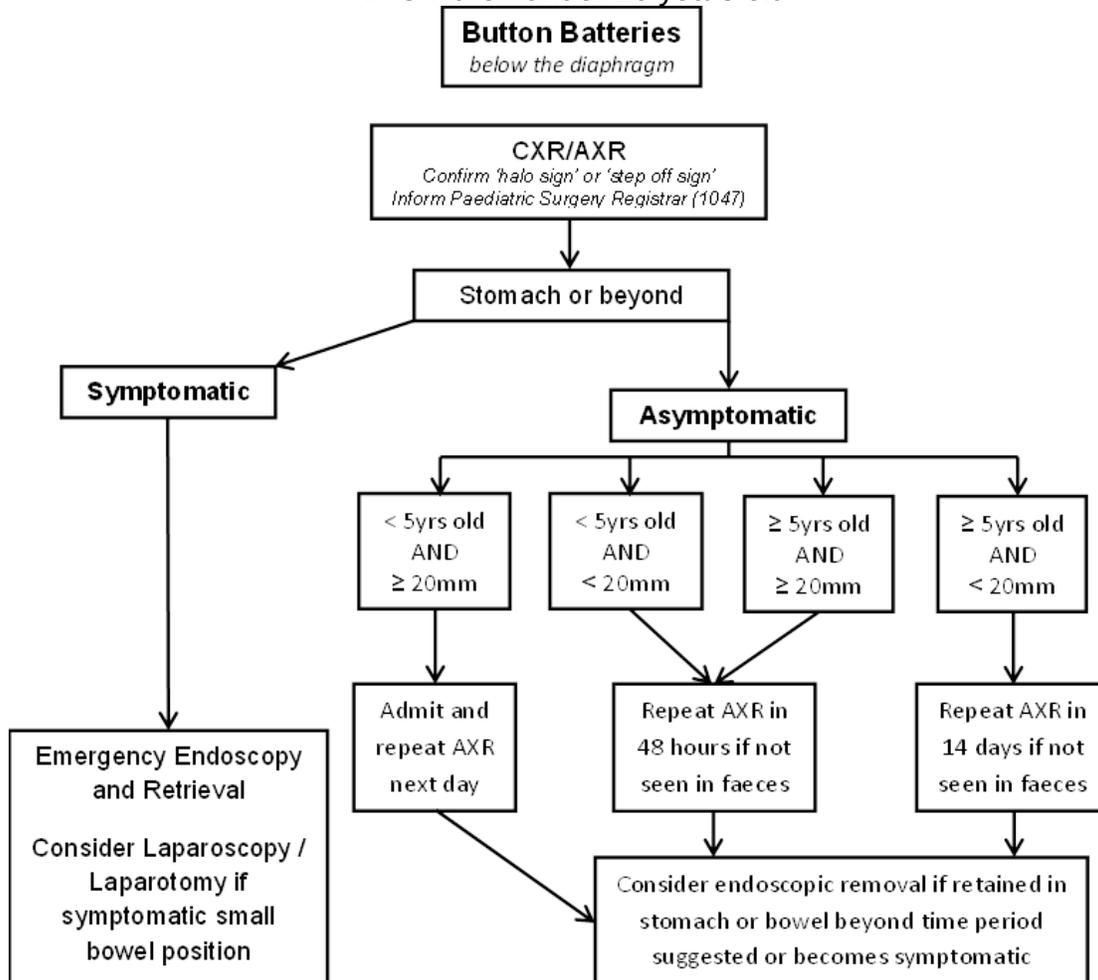
The main risks are associated with modern lithium batteries that are commonly found in, for example: remote controls, hearing aids or small electrical toys. These generate hydroxide radicals in the mucosa, resulting in a caustic injury from high pH, rather than an electrical-thermal injury. Animal data have documented a rise in pH from 7 to 13 at the negative pole of implanted BBs within 30 minutes of ingestion. These animal models document that necrosis within the oesophageal lamina propria may begin as soon as 15 minutes from the time of ingestion, with extension to the outer muscular layer within 30 minutes. Despite this, large studies found under 10% of patients are symptomatic. Once into the stomach the majority will pass through the intestine without incident and do not need to be retrieved. Once past the duodenum, 85% pass out of the body within 72 hours.

Much of the attention has been aimed at prevention of the catastrophic aortoenteric fistula, because only 1 case has been reported to date of a child being saved from this form of BB injury once it has occurred. Children at greatest risk are those younger than 5 years of age and those with battery ingestions >20 mm and multiple battery ingestions.

Figure 2: Management of swallowed button batteries lying below the diaphragm on initial X-ray. ***(Please inform Paediatric Surgery Registrar immediately on presentation as this may be a time critical situation)***. See Fig.1 for button batteries above the diaphragm.

### 7.4: Magnets:

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This is not an uncommon finding due to the ubiquity of magnets in toys, around the house (such as fridge magnets) or the ability of small metal objects to become magnetised (such as ball bearings). Ingestions by older children and adolescents, however, are also common, because they use the magnets to simulate a variety of face, tongue and body piercings. Ingestion of magnets can cause severe GI injury and death. The attractive force between multiple magnets or between a magnet and an ingested metal object can occur, trapping a portion of bowel wall between the 2 objects. Consequently, the pressure between the 2 objects can lead to bowel wall necrosis with fistula formation, perforation, obstruction, volvulus, or peritonitis. Some advocate removal, when possible, of all magnets even if only 1 magnet is evident on radiograph or if patient history is unreliable. Lateral films help determine if multiple magnets are ingested but lined up. A survey conducted by the North American Society of Pediatric Gastroenterology showed that 52% of these patients resulted in endoscopic intervention alone, 20% with endoscopy and surgery, and 8% resulted in surgery. Of those who underwent surgery, 41% had repair of a perforation or fistula and 22% required some degree of bowel resection [Hussein et al, 2012]. Multiple magnets firmly stuck together may progress unhindered with extremely careful observation, however this was only

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achieved in 15% of cases in this survey. Inpatient or ambulatory observation is  
advised with frequent serial x-rays. NPSA guidance 2021 highlighted the  
dangers of magnet ingestion.

Figure 3: Management of swallowed magnets lying below the diaphragm in initial X-ray:  
***(Please inform Paediatric Surgery Registrar immediately on presentation  
as this may be a time critical situation).***

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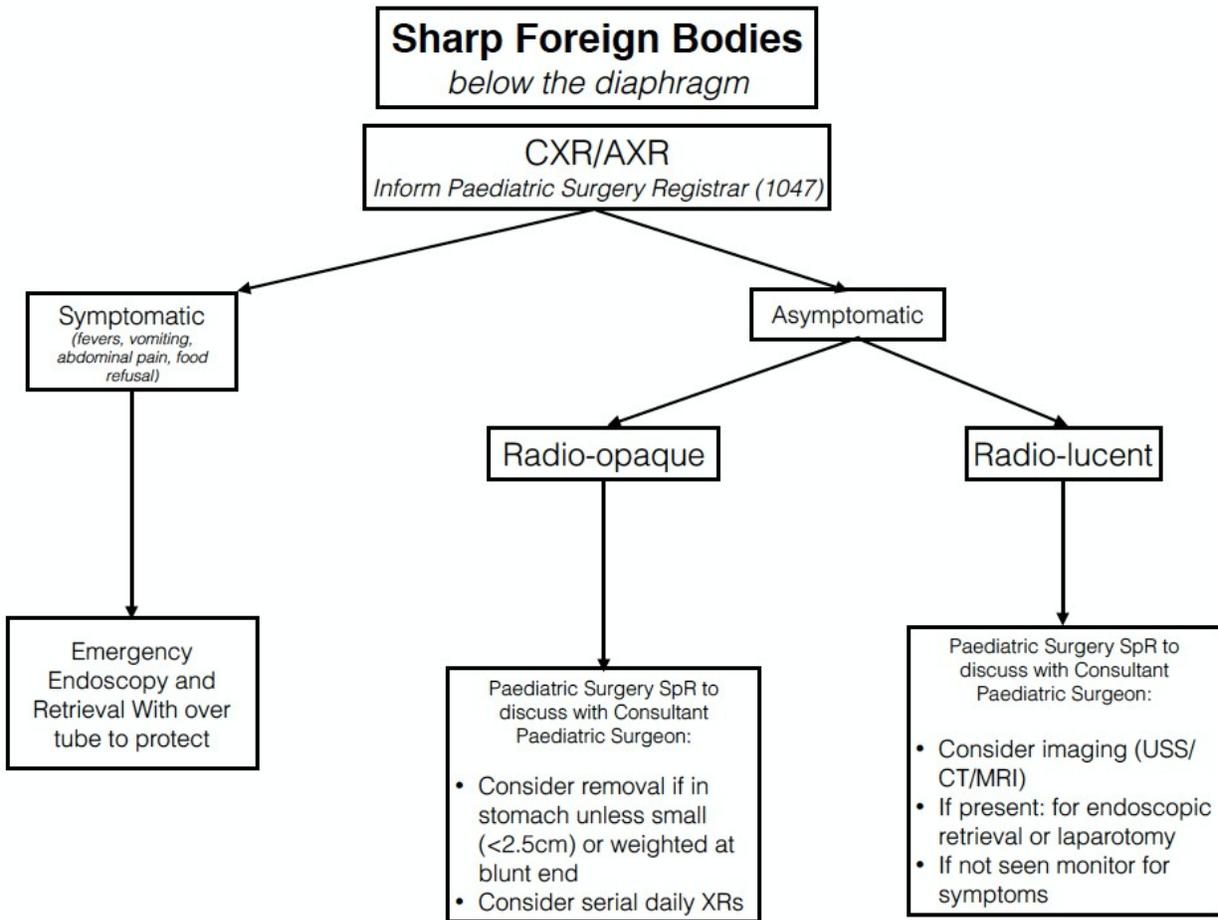
### 7.5: Sharp Foreign Bodies:

A myriad of ingested sharp/pointed objects have been associated with complications such as: small bones, straightened paperclips, toothpicks, needles and dental bridgework. Patients suspected of swallowing sharp-pointed objects must be evaluated to define the location of the object. Many sharp-pointed objects are not radiographically visible, so endoscopy should still follow a radiologic examination with negative findings. Sharp/pointed objects lodged in the oesophagus are a medical emergency. Direct laryngoscopy is an option to remove objects lodged at or above the cricopharyngeus which requires ENT management. Otherwise, rigid or flexible endoscopy may be performed by paediatric surgeons. Although the majority of sharp-pointed objects in the stomach will pass without incident, the risk of a complication caused by a sharp/pointed object is as high as 35%. Therefore, a sharp/pointed object that has passed into the stomach or proximal duodenum should be retrieved endoscopically if this can be accomplished safely. Otherwise, follow up with daily radiographs may be appropriate. Surgical intervention should be considered for objects that fail to progress after 3 days. The use of an overtube to allow safe endoscopic retrieval is recommended. (Gardus overtube setup video <https://youtu.be/xp13QZHACPY>)

Figure 4: Management of swallowed sharp or pointed objects lying below the diaphragm on initial X-ray. (*Please inform Paediatric Surgery Registrar*).

### 7.6: Blunt Foreign Bodies:

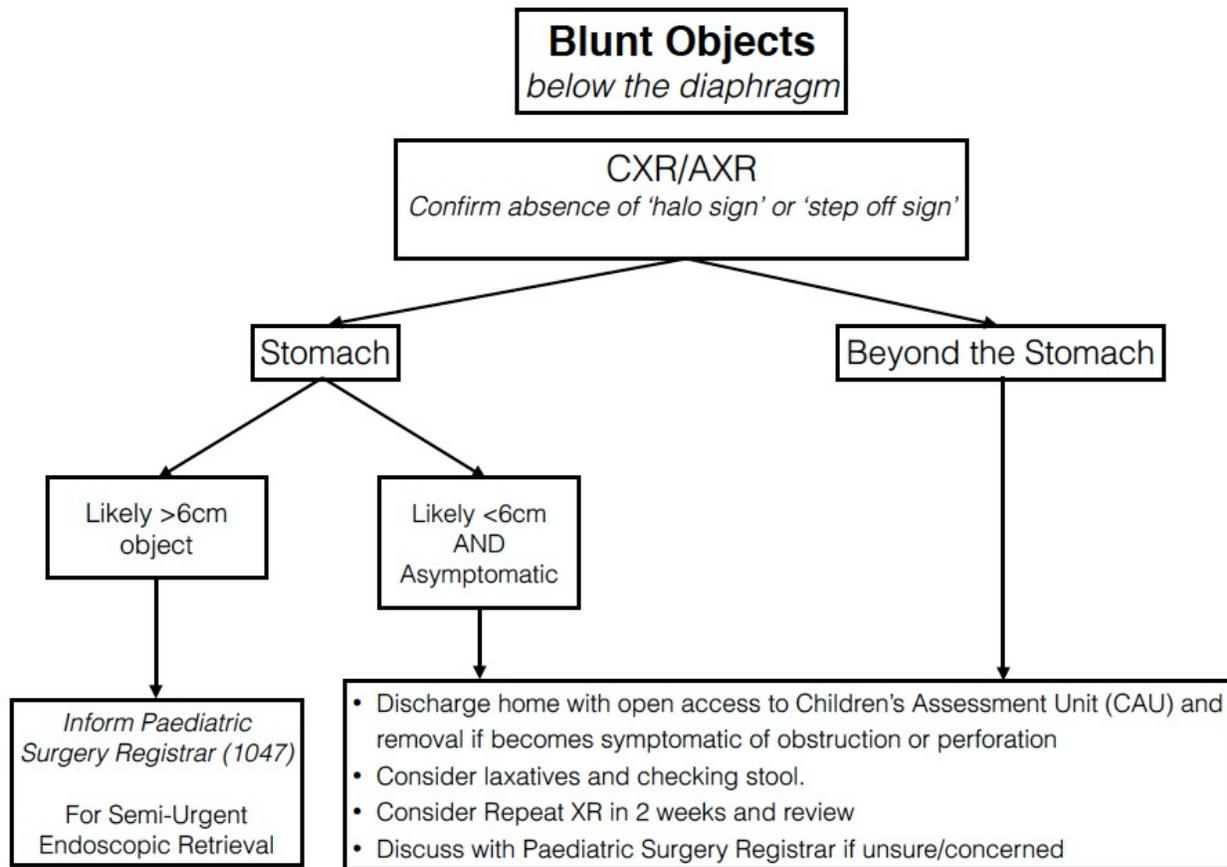
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The majority of blunt foreign bodies are swallowed coins. Therefore it is essential to study the radiograph in detail for the 'halo sign' or 'step-off sign' looking for a rim in keeping with button battery ingestion rather than a coin.

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Many experts have recommended endoscopic removal of objects wider than 2.5 cm in asymptomatic patients because they may be less likely to pass the pylorus, although limited data exist to support this recommendation. Though some consensus opinions and reviews recommend serial X-ray surveillance and possible surgical removal of objects static in the stomach or further along the GI tract; there is no evidence of long term outcomes of unremoved objects or time frames for this. However, most foreign bodies should pass through the bowel within 72hours. Objects longer than 6 cm, such as toothbrushes and eating utensils, are likely to have difficulty passing the duodenum and should be considered for semi-urgent removal. One study showed that 112 of 139 objects larger than 6 cm remained proximal to the pylorus at endoscopy. Sixty-four percent of the endoscopic procedures were performed more than 48 hours after presentation, suggesting that these objects will likely have difficulty passing



beyond the stomach.

Figure 5: Management of swallowed blunt objects lying below the diaphragm on initial X-ray. *(Please inform Paediatric Surgery Registrar).*

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### 8. Clinical audit standards:

To ensure that this document is compliant with the above standards, the following monitoring processes will be undertaken: Audit of practice every 2 years.

Standards to be assessed:

- 1) Referral to paediatric surgery if required
- 2) Urgent x ray whilst in A&E
- 3) Position documented on x ray
- 4) Time to theatre if requiring urgent endoscopy
- 5) Follow-up x ray if required and outcome documented

The audit results will be sent to clinical governance/audit and departmental leads for Paediatric Surgery, A&E and ENT who will ensure that these are discussed at relevant governance meetings to review the results and make recommendations for further action. Audit leads will ensure recommendations actioned and monitored.

### 9. Summary of development and consultation process undertaken before registration and dissemination

The authors listed above drafted this document on behalf of the Paediatric Surgery, ENT and Paediatric Emergency Department who have agreed the final content. During its development it has been circulated for comment to consultants responsible for clinical governance of those departments.

This version has been endorsed by the Clinical Guidelines Assessment Panel (CGAP).

### 10. References

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- The Royal College of Emergency Medicine Best Practice Guideline: Ingestion of super strong magnets in children. May 2021
- [NHS England » National Patient Safety Alert – Urgent assessment/treatment following ingestion of ‘super strong’ magnets](#)

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## Appendix 1

Written Patient Information leaflet for ingested magnets under x-ray follow-up  
The Royal College of Emergency Medicine

Best Practice Guideline: Ingestion of super strong magnets in children.  
May 2021

Recently, a different type of magnet (also known as Neo magnet, Bucky balls, Magnet balls or Super Strong Rare-Earth Magnets) has gone on sale. They are most often sold as 'adult desk toys, stress relievers or brain development toys' and it not legal to sell them to children less than 14 years of age.

They are between seven and fourteen times stronger than traditional magnets and are sometimes called super strong or powerful magnets. They can be a variety of shapes, most often balls or discs. These are some examples of what they look like.

Today, your child has been discharged after swallowing of a magnet. Even though the magnet has not passed through them yet, it is OK to take your child home.

After going home, your child will need a follow up X-ray 6-12 hours later and you should have been given a time to re attend the Emergency Department. This follow up X-ray is extremely important so doctors can make sure the magnet is moving normally through your child's bowels.

Until your child has had their repeat X-ray, remove any other external magnetic objects nearby and avoid clothes with metallic buttons or belts with buckle

There is no need to examine your child's faeces to find the swallowed object.

If a single magnet is ingested, it can be expected to be passed spontaneously if the magnet is not too large.

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Very rarely, the object can become stuck in the stomach or intestines. Take your child the Emergency Department IMMEDIATELY if they have

- Concerns of further magnet or foreign body ingestion
- Vomiting
- Abdominal (tummy) pain
- Blood in their vomit or poo
- A fever

You have concerns about a change in your child's eating patterns e.g. refusing food or fluids

Monitoring Compliance / Effectiveness Table				Appendix 2		
Element to be monitored	Lead Responsible for monitoring (Title needed & name of individual where appropriate)	Monitoring Tool / Method of monitoring	Frequency of monitoring	Lead Responsible for developing action plan & acting on recommendations	Reporting arrangements (Committee or group where monitoring results and action plan progress are reported to)	Sharing and disseminating lessons learned & recommended changes in practice as a result of monitoring compliance with document
<b>Swallowed foreign bodies in children under 16 years</b>	Mr Milind Kulkarni	Audit of Practice	2 yearly	Mr Milind Kulkarni	Paediatric Department governance	Women and Children's Governance

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