

# Foreign Body Aspiration and Foreign Body Ingestion in children

## Diagnosis and Management

Subject:	Diagnosis and Management of Foreign Body Aspiration and Foreign Body Ingestion in children
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Policy Executive Owner:	Clinical Director, CYP ICSU
Designation of Author:	Paediatric Speciality Trainee Dr C Fertleman (Consultant Paediatrician)
Name of Assurance Committee:	As above
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Review Date:	3 years hence
Target Audience:	Accident and emergency doctors and nurses, Paediatric doctors and nurses
Key Words:	Foreign Body, Aspiration, Ingestion, Children

## Version Control Sheet

Version	Date	Author	Status	Comment
1.0	May 2015	T.Polychronakis Approved by Dr C Fertleman Consultant Paediatrician	Off line	New guideline approved at May 2015 Clinical Guidelines Committee
2.0	Feb 2019	Prof C Fertleman	Live	Reviewed. No change required

### ➤ **Criteria for use**

This guideline was developed to aid the clinician in the diagnosis and management of children presenting with history and signs suggestive of foreign body aspiration or foreign body ingestion.

### ➤ **Background/ introduction**

Foreign body aspiration and foreign body ingestion are common accidents in childhood and represent an important cause of morbidity and mortality. In the US during 2000, ingestion or aspiration of a foreign body was responsible for more than 17,000 emergency department visits in children younger than 14 years [1].

80% of paediatric foreign body aspirations occur in children 0-3 years, with the peak incidence between 1-3 years of age. It is the fourth leading cause of accidental death in this group and the third in infants under one year [2-5]. Young children are particularly vulnerable because of the smaller diameter of their airway, which is prone to obstruction. Most of accidents happen at home [6], however, parents do not witness up to 40% of these. The majority of aspirated objects are organic in nature, mainly food. Peanuts are the cause most commonly identified [7] while plastic toys represent more than 10% of those identified in the developed world.

Foreign bodies can be found at any site in the airway, from the nose to the lung. Most will lodge in the bronchi. Rarely, foreign bodies are found in the larynx and trachea (3% and 13%) can cause complete or significant partial airway obstruction.

The majority of foreign body ingestions occur in children between the ages of 6 months-3 years [2,7,8]. Commonest foreign bodies ingested are coins (27%), followed by sharp objects (16%), for example needles. Other common foreign bodies are batteries, toy parts, bones (i.e chicken or fish) and jewellery. The majority are found in the stomach (60%) at the time of presentation. Only 10 to 20 percent will require endoscopic removal, and less than 1 percent require surgical intervention [1, 7,9]. Although mortality from foreign body ingestion is extremely low, deaths have been reported [10].

### ➤ **Inclusion/ exclusion criteria**

Foreign body aspiration in children may be suspected on the basis of a **choking episode** if such an episode is witnessed by an adult or remembered by the child. Children with foreign body ingestion are brought to medical attention by their parents or carers because the ingestion was witnessed or reported to them and are most

often asymptomatic. In contrast, the clinical presentation of un-witnessed foreign body aspiration or ingestion may be subtle; the diagnosis requires careful history taking and clinical assessment with the judicious use of imaging investigations.

## ➤ Clinical management

### **Diagnosis and Management of Foreign Body Aspiration:**

Early diagnosis is fundamental for optimal management, consisting of the removal of the foreign body as soon as possible to prevent respiratory complications. Foreign body aspiration represents a medical challenge since the clinical presentation has a wide spectrum from no symptoms in the case of small objects being deposited deep down in the airways to respiratory failure when objects are located at the epiglottis or at the carina.

#### **Presentation:**

An **elevated index of suspicion** is necessary in all cases of sudden onset cough or persistent cough, pneumonia, atelectasis or wheezing with atypical courses. A witnessed episode of choking, defined as the sudden onset of cough and/or dyspnea and/or cyanosis in a previously healthy child, has a sensitivity of 76 to 92 percent for the diagnosis of foreign body aspiration. Patients who present days or weeks after the aspiration often develop symptoms due to complications related to the presence of the FB, such as infection and inflammation of the airway. Thus, they may present with fever and other signs and symptoms of pneumonia.

**Physical examination** can be **normal** or **non-specific** in 20–40% of children. However, in the more common, less emergent situation, the physical examination may reveal generalised wheezing or localized findings, such as focal monophonic wheezing or decreased air entry. Respiratory failure can be the presentation in severe cases (see below: Life threatening foreign body aspiration).

#### **Management:**

**Neck and chest X-rays** are the most important investigations in every patient suspected of having a foreign body aspiration. X-ray abnormalities are more frequent when the foreign body is endo-bronchial. This location is also more frequent in cases of delayed diagnosis and delayed removal.

An **expiratory chest X-ray** should be requested when the standard inspired film is normal, since this strategy allows visualisation of air trapped by a valve-like effect due to partial obstruction of the bronchial lumen. A mediastinal shift may also be seen.

Normal findings occur in 6–80% according to different authors. Another important feature is that only 10% of FBs are radio-opaque therefore **an initial normal chest X-ray does not rule out the possibility of foreign body aspiration.**

## Life threatening FBA

If a child is unable to speak or cough, dislodgement using **five back blows** followed by **chest compressions** in infants less than one year of age is recommended. Abdominal thrusts are not advisable because they may cause damage to the liver, which is relatively large and unprotected in this age group. For children >1 year of age **five abdominal thrusts** (Heimlich manoeuvre) should be performed. Please refer to the **Advanced Paediatric Life Support guidelines**.

If this is not successful and the child is unresponsive continue with Basic Life Support and get senior anaesthetic help. If the child is alert, encourage coughing. Consider direct laryngoscopy, needle cricothyrotomy or intubation, ventilation and stabilisation (+/- transfer) for a definitive intervention as next steps. **Bronchoscopy** is the only procedure that can be both diagnostic and therapeutic. Removal of the foreign body from the airway must be undertaken using a rigid instrument. In those situations where a delayed diagnosis occurs, removal of the foreign body is not always possible and patients may require either a segmentectomy or even a pneumonectomy [7].

## Diagnosis and Treatment of Foreign Body Ingestion:

The type of foreign body ingested, the time since ingestion and the location of the foreign body in the gastrointestinal tract, as well as the history and physical examination all play a role as to how the patient will be managed [11].

### Presentation:

Children are **usually asymptomatic** at presentation. Older children may localize the sensation of something "stuck" to the neck or lower chest, or may present with refusal of feeds or dysphagia, drooling, or respiratory symptoms including wheezing, stridor, or choking. Longstanding oesophageal foreign bodies may cause weight loss or recurrent aspiration pneumonia, due to decreased caloric intake and mishandling of oral secretions, respectively. They also can damage the mucosa and lead to strictures, or erode the oesophageal wall, creating a fistula with the trachea or other nearby structures. Sharp objects may perforate the oesophagus, resulting in neck swelling, crepitus, or pneumomediastinum. Occasionally, foreign bodies may be retained in the distal gastrointestinal tract, where they can cause delayed complications.

### Management:

For all patients with suspected foreign body ingestion, the initial diagnostic test should be **neck, chest, and abdomen x-rays** (anteroposterior and lateral). Plain x-rays should be done even if the foreign body is thought to be radiolucent. This is to evaluate for the possibility of other swallowed objects, and for indirect evidence of the radiolucent foreign body (such as an air-fluid level in the oesophagus).

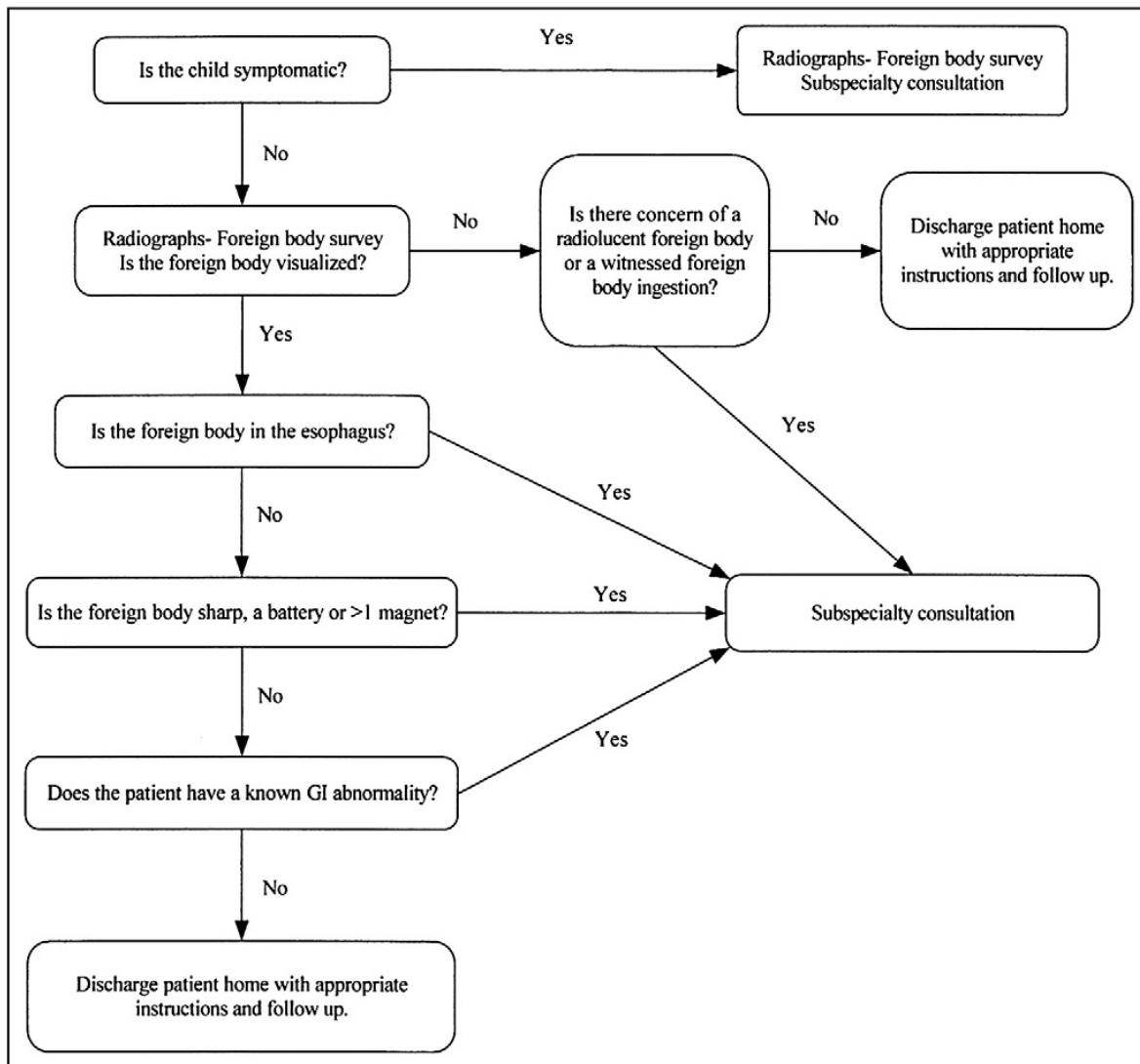
For objects found in the stomach **watchful wait** is recommended unless the ingested foreign body is **sharp, magnets or a battery** when **endoscopic removal** is recommended [7,9,12].

**Urgent intervention** — Urgent intervention is indicated if any of the following warning signs are present:

- When the ingested object is a **high-powered magnet or magnets**
- When the ingested object is **sharp, long (>5 cm)**, and is in the **oesophagus or stomach**.
- When a **disk battery** is in the oesophagus or in the stomach
- When the patient shows signs of **airway compromise**.
- When there is evidence of **near-complete oesophageal obstruction** (eg, patient cannot swallow secretions).
- When there are **signs or symptoms** suggesting inflammation or intestinal obstruction (fever, abdominal pain, or vomiting).

Various methods have been used to remove oesophageal foreign bodies. They include rigid and flexible endoscopy, bougienage, Foley catheterization of the oesophagus, and the "penny pincher" technique.

**Figure 1:** Suggested guideline for the paediatric patient with concern of a foreign body ingestion [11].



Chung S et al. A Review of Paediatric Foreign Body Ingestion and Management. *Clinical Pediatric Emergency Medicine*, 2010 Volume:11 , Issue:3 , Page(s):225

### ➤ Further information

See references.

### ➤ Contacts (inside and outside the Trust including out-of-hours contacts)

For further advice please speak to the on call Paediatric, ENT or Surgical Registrar. For specialist advice speak to the Paediatric Surgical Registrar or the Paediatric Gastroenterology Registrar or Paediatric ENT Registrar or the Paediatric Respiratory Registrar at Great Ormond street Hospital via switchboard.

➤ **References (evidence upon which the guideline is based)**

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➤ **Compliance with this guideline (how and when the guideline will be monitored e.g. audit and which committee the results will be reported to) Please use the tool provided at the end of this template**



Compliance will be monitored via audit and results will be reported to the Paediatric and Emergency Medicine Guidelines Committee.

To be completed and attached to any procedural document when submitted to the appropriate committee for consideration and approval

		Yes/No	Comments
1.	<b>Does the procedural document affect one group less or more favourably than another on the basis of:</b>		
	• Race	No	
	• Ethnic origins (including gypsies and travellers)	No	
	• Nationality	No	
	• Gender	No	
	• Culture	No	
	• Religion or belief	No	
	• Sexual orientation including lesbian, gay and bisexual people	No	
	• Age	No	
	• Disability - learning disabilities, physical disability, sensory impairment and mental health problems	No	
2.	<b>Is there any evidence that some groups are affected differently?</b>	No	
3.	<b>If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?</b>	No	
4.	<b>Is the impact of the procedural document likely to be negative?</b>	No	
5.	<b>If so can the impact be avoided?</b>	N/A	
6.	<b>What alternatives are there to achieving the procedural document without the impact?</b>	N/A	
7.	<b>Can we reduce the impact by taking different action?</b>	N/A	

If you have identified a potential discriminatory impact of this procedural document, please refer it to the Director of Human Resources, together with any suggestions as to the action required to avoid/reduce this impact.

For advice in respect of answering the above questions, please contact the Director of Human Resources.

## Checklist for the Review and Approval of Procedural Document

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	<b>Title of document being reviewed:</b>	<b>Yes/No</b>	<b>Comments</b>
<b>1.</b>	<b>Title</b>		
	Is the title clear and unambiguous?	Yes	
	Is it clear whether the document is a guideline, policy, protocol or standard?	Yes	
<b>2.</b>	<b>Rationale</b>		
	Are reasons for development of the document stated?	Yes	
<b>3.</b>	<b>Development Process</b>		
	Is it clear that the relevant people/groups have been involved in the development of the document?	Yes	
	Are people involved in the development?	Yes	
	Is there evidence of consultation with stakeholders and users?	Yes	
<b>4.</b>	<b>Content</b>		
	Is the objective of the document clear?	Yes	
	Is the target population clear and unambiguous?	Yes	
	Are the intended outcomes described?	Yes	
<b>5.</b>	<b>Evidence Base</b>		
	Are key references cited in full?	N/A	
	Are supporting documents referenced?	N/A	
<b>6.</b>	<b>Approval</b>		
	Does the document identify which committee/ group will approve it?	Yes	
<b>7.</b>	<b>Dissemination and Implementation</b>		
	Is there an outline/plan to identify how this will be done?	Yes	
<b>8.</b>	<b>Document Control</b>		
	Does the document identify where it will be held?	Yes	
<b>9.</b>	<b>Process to Monitor Compliance and Effectiveness</b>		

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	Are there measurable standards or KPIs to support the monitoring of compliance with and effectiveness of the document?	Yes	
	Is there a plan to review or audit compliance with the document?	Yes	
<b>10.</b>	<b>Review Date</b>		
	Is the review date identified?	Yes	
	Is the frequency of review identified? If so is it acceptable?	Yes	
<b>11.</b>	<b>Overall Responsibility for the Document</b>		
	Is it clear who will be responsible for co-ordinating the dissemination, implementation and review of the document?	Yes	

<b>Executive Sponsor Approval</b>			
If you approve the document, please sign and date it and forward to the author. Procedural documents will not be forwarded for ratification without Executive Sponsor Approval			
Name		Date	
Signature			
<b>Relevant Committee Approval</b>			
The Director of Nursing and Patient Experience's signature below confirms that this procedural document was ratified by the appropriate Governance Committee.			
Name		Date	
Signature			
<b>Responsible Committee Approval – only applies to reviewed procedural documents with minor changes</b>			
The Committee Chair's signature below confirms that this procedural document was ratified by the responsible Committee			
Name		Date	
Name of Committee		Name & role of Committee Chair	
Signature			

### Tool to Develop Monitoring Arrangements for Policies and guidelines

What key element(s) need(s) monitoring as per local approved policy or guidance?	Who will lead on this aspect of monitoring?  Name the lead and what is the role of the multidisciplinary team or others if any.	What tool will be used to monitor/check/observe/Assess/inspect/ authenticate that everything is working according to this key element from the approved policy?	How often is the need to monitor each element?  How often is the need complete a report ?  How often is the need to share the report?	What committee will the completed report go to?
Element to be monitored	Lead	Tool	Frequency	Reporting arrangements
Management of patients with foreign body aspiration or foreign body ingestion.	Paediatric, Emergency medicine Consultant on call.	Medical notes including electronic notes.	Annually.	Paediatric and emergency medicine guidelines committee.

