Management of foreign bodies in the ears and upper aerodigestive tract

Introduction

A foreign body in the ear, nose or throat is common, especially in children. This article presents an overview of the management of foreign bodies.

The external ear canal

Incidence

Foreign bodies in the external ear canal are most frequent in children, especially those under the age of 6 years. Inorganic objects such as stones, paper, toy parts and beads do not require urgent removal (*Figure 1*). However, organic objects such as nuts, seeds and beans will induce inflammation and oedema in the external auditory canal and may induce infected otitis externa. Insects may also crawl into the external auditory canal while sleeping outdoors (Fritz et al, 1987; Ngo et al, 2005).

Diagnosis

Children typically present after being seen inserting an object in their ear. However, objects are sometimes an incidental finding and occasionally children report the presence of the object to the parent or another adult after irritation, pain or a sensation of pressure in the ear (Ansley and Cunningham, 1998).

Management

An object within the external meatus may be removed in the emergency department if adequate instrumentation and staff support is available. However, the child's confidence should be gained and the procedure should be promptly stopped if there is any pain or discomfort. Trainees covering ear, nose and throat surgery during their on call should resist attempting

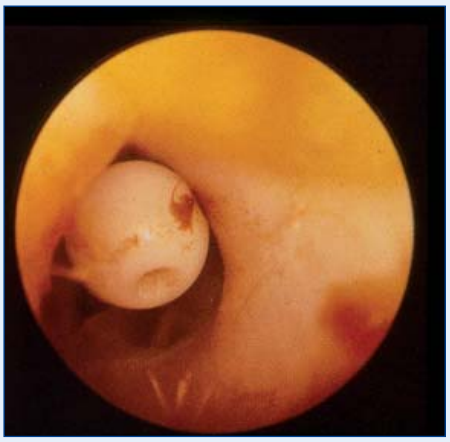


Figure 1. Bead in the right ear canal.

to remove objects that are not readily visible or easily grasped.

Because the external canal narrows acutely at the junction of its cartilaginous and osseous portions, objects within the medial two-thirds of the canal present a greater challenge, particularly with the greater sensitivity of this part of the canal. Inorganic objects may be removed by syringing but organic objects may swell with syringing and become impacted. Most foreign bodies in the external canal are spherical and cannot be retrieved with forceps. It may be possible to extract an object with a right angle hook providing that the canal is not completely blocked. If the object is impacted removal can be attempted with a Zoellner aural suction, but objects that induced a tissue reaction with swelling of the ear canal require removal under general anaesthesia (Walby, 1997; McLaughlin et al, 2002).

Nasal foreign bodies

Incidence

Foreign bodies in the nose are usually seen in children but occasionally occur in adults who have a mental illness (Walby, 1997). Children will insert a variety of small objects into the nose. Small button-like batteries will cause an intense local tissue reaction as a result of their composition of mercury, zinc, silver, nickel, cadmium and lithium. Liberation of these substances causes liquefaction necrosis leading to septal perforations, synechiae, constriction and stenosis of the nasal cavity (McRae et al, 1989; Loh et al, 2003).

Diagnosis

Children typically present soon after placing an object into their nose but they may also present after a delay with halitosis, unilateral foetid mucopurulent nasal discharge and inflammation of the skin of the vestibule and surrounding area (*Figure 2*). Nasal foreign bodies can be found in any part of the nasal cavity but most are below the inferior turbinate on the floor of the nose. They may not be visible, depending on the size, position and degree of surrounding inflammation.

Management

The technique for removal should be related to location, shape and composition of the foreign body. Removal is rarely an emergency, and can often wait for senior advice. The danger of attempting to remove an object from the nose is aspiration, particularly in an uncooperative, crying child who may inhale the object into the airway (Kalan and Tariq, 2000).

The child is best examined by tilting the head back slightly so that the floor of the nose is visible. An experienced assistant should maintain the head position. Most objects can be removed easily through the anterior nares by inserting a probe behind the object and sweeping forwards along

Figure 2. Inflammation of the vestibule and upper lip in a child with a unilateral nasal infection caused by a foreign body.

Mr EZ Osman *is Consultant Otolaryngologist and* **Mr A Swift** *is Consultant Otolaryngologist in the Department of Otorhinolaryngology and Head and Neck Surgery, University Hospital Aintree, Liverpool L9 7AL*

Correspondence to: Mr A Swift

the floor of the nose. This can sometimes be achieved without topical anaesthetic but spraying the nose with a local anaesthetic/vasoconstrictor solution such as cophenylcaine (lidocaine hydrochloride 5% and phenylephrine hydrochloride 0.5%) is advisable. Rough objects such as cotton, sponge or paper are best removed with forceps.

Rather than restraining the child in a challenging situation it is better to remove the object from the nose under a short general anaesthetic (Benger and Davies, 2001). The presence of a second foreign body should always be excluded after removing an object from the nose (Walby, 1997; Davies and Benger, 2000).

Tracheal foreign bodies

Incidence

Tracheobronchial aspiration most commonly occurs in children under the age of 6 years and has a high morbidity and mortality. For reasons that are unknown, boys are more likely to inhale objects than girls. An inhaled foreign body will lodge in the right main bronchus more often than the left because the left main bronchus is smaller than the right and is angled away from the midline (Evans, 1997; *Figure 3*).

Diagnosis

The typical history is a sudden onset of coughing or choking while eating and later development of wheezing, coughing or stridor. If aspiration is not witnessed or recognized the diagnosis may be unsuspected. The child may then present with wheezing, persistent or recurrent pneumonia, lung abscess, focal bronchiectasis or haemoptysis. New abnormal airway sounds, such as wheezing, stridor or decreased breath sounds, may be present on examination. A chest radiograph is mandatory and may clearly show the object. Atelectasis, air trapping, mediastinal shift, compensatory emphysema on the contralateral side, pneumonia or pneumothorax may also be seen (Swanson et al, 2002).

Figure 3. Endoscopic bronchoscopy: fragment of peanut in right main bronchus.

Management

Foreign body inhalation is often preventable. Children under the age of 2 years should avoid nuts and children's play areas should be kept free from any small objects that could be inhaled. In the acute situation, the Heimlich manoeuvre should be attempted. Children suspected of aspiration should undergo bronchoscopy even if physical examination and radiographical findings are normal. Long-standing objects in the airway are associated with considerable morbidity, and complications include pneumonia, lung abscess, recurrent haemoptysis and bronchiectasis that may necessitate a surgical resection (Dikensoy et al, 2002; Osman et al, 2003).

Tracheobronchial objects in children should be removed using a rigid bronchoscope that facilitates airway control and ventilation, and provides a conduit through which the foreign body can be removed. A wide range of rigid bronchoscope sizes, superb optical telescopes and a large array of ancillary instruments make this the preferred method of removal of objects from the paediatric airway (Swanson et al, 2002).

Figure 4. Coin in upper oesophagus.

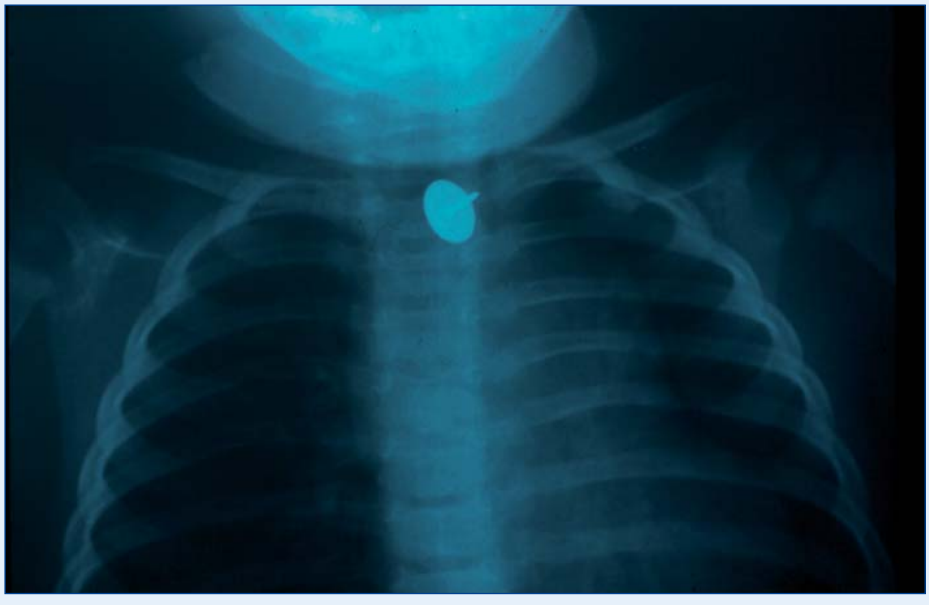
Oesophageal foreign bodies

Incidence

The prevalence of ingested objects is dependant on the eating habits and diet of the local population. Most oesophageal foreign bodies pass uneventfully through the digestive system, but some will lodge in the oesophagus and require surgical removal. In adults a meat bolus is common, particularly in those over the age of 60 years. Young children will ingest a wide range of objects (*Figures 4* and *5*). Each year 1500 people die in the United States from the complications associated with this event (Pinto et al, 2004).

The elderly are predisposed to impaction of swallowed objects as a result of oesopha-

Figure 5. Drawing pin in the mid-third of the oesophagus.



geal disease and poor oral sensitivity from dental prostheses. Impaction occurs in the cervical oesophagus in 77%, upper thoracic oesophagus in 17% and lower oesophagus in 6% of cases. Morbidity and mortality are determined by anatomical location and duration of impaction. Major complications occur mostly after 24 hours or more of impaction (Nandi and Ong, 1978; Taylor, 1987).

Diagnosis

Impacted oesophageal foreign bodies may induce respiratory distress as a result of the extreme compliance of the tissues between the oesophagus and the trachea. Neck and chest radiographs in the lateral and postero-anterior planes are often useful in identifying both the location and shape of the object (Lam et al, 2001).

Management

Patients with a meat bolus who are in severe distress or unable to swallow oral secretions require immediate intervention. If the patient is not uncomfortable and not at risk of aspiration from secretions, then intervention need not be immediate and can be postponed to a reasonably convenient time that may allow the impacted food to pass spontaneously. However, endoscopic intervention should not be delayed beyond 24 hours from presentation or the risk of complications increases (Webb, 1995).

Various pharmacological agents have been used to dislodge a food bolus with varying success rates. A proteolytic enzyme such as papain is associated with aspiration pneumonitis and should be avoided (Maini et al, 2001). Inducing relaxation of the oesophageal smooth muscle by glucagon or buscupan is generally safe but there is no clear evidence to support this (Basavaraj et al, 2005).

A bolus impacted in the upper or mid oesophagus should be removed by rigid oesophagoscopy under general anaesthesia. However, for objects impacted in the lower third of the oesophagus, flexible oesophagoscopy is safer because the bolus can either be extracted or pushed into the stomach (Lam et al, 2001; Yang et al, 2003). Sharp objects that become impacted carry a significant risk of perforation. In adults with a soft impacted food bolus, a stricture or tumour should be excluded. Oesophageal perforation is a serious complication and requires urgent management and appropriate referral to senior colleagues with specialist expertise. **BJHM**

The authors are very grateful to Mr Ray Clarke, Consultant Paediatric Otolaryngologist at the Royal Liverpool Childrens' Hospital, Alder Hey, for use of the images in this article.
Conflict of interest: none.

Ansley JF, Cunningham MJ (1998) Treatment of aural foreign bodies in children. *Pediatrics* **101:** 638–41

Basavaraj S, Penumetcha KR, Cable HR, Umapathy N (2005) Buscopan in oesophageal food bolus: is it really effective? *Eur Arch Otorhinolaryngol* **262:** 524–7

Benger JR, Davies PH (2001) Foreign bodies in the nasal cavities. *Postgrad Med J* **77:** 359

Davies PH, Benger JR (2000) Foreign bodies in the nose and ear: a review of techniques for removal in the emergency department. *J Accid Emerg Med* **17:** 91–4

Dikensoy O, Usalan C, Filiz A (2002) Foreign body aspiration: clinical utility of flexible bronchoscopy. *Postgrad Med J* **78:** 399–403

Evans JNG (1997) Foreign bodies in the larynx and trachea. In: Kerr AG, ed. *Scott-Brown's Otolaryngology-rhinology.* 6th edn. Butterworth-Heinemann, Oxford: 6/25/1–6/25/11

Fritz S, Kelen GD, Sivertson KT (1987) Foreign bodies of the external auditory canal. *Emerg Med Clin North Am* **5:** 183–92

Kalan A, Tariq M (2000) Foreign bodies in the nasal cavities: a comprehensive review of the aetiology, diagnostic pointers, and therapeutic measures. *Postgrad Med J* **76:** 484–7

Lam HC, Woo JK, Van Hasselt CA (2001) Management of ingested foreign bodies: a retrospective review of 5240 patients. *J Laryngol Otol* **115:** 954–7

Loh WS, Leong JL, Tan HK (2003) Hazardous foreign bodies: complications and management of button batteries in nose. *Ann Otol Rhinol Laryngol* **112:** 379–83

Maini S, Rudralingam M, Zeitoun H, Osbourne JE (2001) Aspiration pneumonitis following papain enzyme treatment for oesophageal meat impaction. *J Laryngol Otol* **115:** 585–6

McLaughlin R, Ullah R, Heylings D (2002) Comparative prospective study of foreign body removal from external auditory canals of cadavers with right angle hook or cyanoacrylate glue. *Emerg Med J* **19:** 43–5

McRae D, Premachandra DJ, Gatland DJ (1989) Button batteries in the ear, nose and cervical oesophagus, a destructive foreign body. *J Otolaryngol* **18:** 317–19

Nandi P, Ong GB (1978) Foreign body in the oesophagus. Review of 2394 cases. *Br J Surg* **65:** 5–9

Ngo A, Ng KC, Sim TP (2005) Otorhinolaryngeal foreign bodies in children presenting to the emergency department. *Singapore Med J* **46:** 172–8

Osman EZ, Webb CJ, Clarke RW (2003) Management of suspected foreign body aspiration in children. *Clin Otolaryngol* **28:** 276

Pinto A, Muzj C, Stavolo C, Pepe M, Cinque T, Romano L (2004) Pictorial essay: foreign body of the gastrointestinal tract in emergency radiology. *Radiol Med (Torino)* **107:** 145–52

Swanson KL, Prakash UB, Midthun DE, Edell ES, Utz JP, McDougall JC, Brutinel WM (2002) Flexible bronchoscopic management of airway foreign bodies in children. *Chest* **121:** 1695–700

Taylor RB (1987) Oesophageal foreign bodies. *Emerg Med Clin North Am* **5:** 301–11

Walby AP (1997) Foreign bodies in the ear or nose. In: Kerr AG, ed. *Scott-Brown's Otolaryngology-rhinology.* 6th edn. Butterworth- Heinemann, Oxford: 6/14/1–6/14/6

Webb WA (1995) Management of foreign bodies of the upper gastrointestinal tract: update. *Gastrointest Endoscopy* **41:** 39–51

Yang JY, Deutsch ES, Reilly JS (2003) Bronchoesophagology. In: Snow JB, Ballenger JJ, eds. *Ballenger's otorhinolaryngology head and neck surgery.* 16th edn. BC Decker, Hamilton, Ontario: 1549–77

KEY POINTS

- Attempting to remove foreign objects from an uncooperative child is distressing and should be avoided.
- Removing live insects is much less distressing if the ear canal has been previously filled with alcohol or water.
- The diagnosis of a foreign body in the nose should be considered in any child who presents with a persistent unilateral nasal discharge.
- Objects in the posterior part of a child's nose risk being inhaled and urgent removal under general anaesthesia is recommended.
- Wheeze of sudden onset is highly suggestive of foreign body aspiration.
- An inhaled foreign body should be excluded in children with persistent bronchitis or pneumonia that is not responding to treatment.
- Urgent rigid oesophagoscopy is indicated in patients with impaction by sharp or toxic objects or a compromised airway.
- Impacted soft food boluses may pass spontaneously and patients should be observed for 24 hours before oesophagoscopy.