Accidental ingestion of a toothbrush!

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SUMMARY

A case is reported of a 16-year-old girl who accidentally swallowed a toothbrush, which was safely extracted under local anaesthesia using a fibre-optic endoscope. The technique described is safe, and can be adapted for the extraction of a variety of foreign bodies from the oesophagus and the stomach. Guidelines are presented for the management of ingested foreign bodies, based on a review of the literature.

INTRODUCTION

Most cases of accidental or intentional ingestion of a foreign body first present to the accident and emergency department. The majority can be discharged after reassurance and only a small proportion are detained for observation. A smaller fraction still may require operative intervention. It is estimated that 80–90% of swallowed foreign bodies entering the stomach will safely negotiate the gastrointestinal tract (Spitz, 1971). Until recently, foreign bodies impacted in the gastrointestinal tract could only be extracted by thoracotomy or laparotomy. Surgery, however, carries a significant morbidity and a small mortality.

Over the last decade, sporadic reports have appeared describing the use of the flexible endoscope for the removal of foreign bodies from the stomach. Unfortunately, some of the techniques described are potentially even more hazardous than surgery. This report describes a case in which an accidentally swallowed toothbrush was safely removed from the stomach using a flexible endoscope. The indications, advantages and limitations of the technique are discussed, and an opportunity has been taken to review the literature for guidelines on the management of ingested foreign bodies.

CASE REPORT

A normal, healthy, 16-year-old girl accidentally swallowed a toothbrush when, as she was running down the stairs brushing her teeth, she collided with her sister running the other way! On presentation to the accident and emergency department 2 hours later, she was completely asymptomatic. There were no abnormal findings on physical examination and a plain X-ray of the abdomen showed the bristles of the brush within the stomach (Fig. 1). Safe, spontaneous passage of the object was considered unlikely and it was, therefore, decided to attempt endoscopic removal. Since the parents had very thoughtfully brought along an identical toothbrush (a type which has a hole at the end of the handle), it was possible to plan and rehearse the procedure. It was found that firm purchase of the brush could be obtained by opening the jaws of a biopsy forceps after first passing it through the hole in the handle (Fig. 2). Furthermore, by first drawing a 20 cm long flexible plastic sheath (in this case the sheath of the Nottingham introducer: a piece of equipment designed to facilitate endoscopic intubation of oesophageal strictures) over the scope, the brush, along with the scope, could be safely withdrawn into the sheath to prevent oesophageal injury (Figs. 3 & 4).

Fig. 1 Plain X-ray of the abdomen showing the radio-opaque bristles of the toothbrush in the stomach.

After sedation with 10 mg of intravenous diazepam, gastroscopy was performed using the Olympus D3 endoscope. This confirmed the toothbrush to be in the stomach, with its head in the antrum and the end of the handle in the fundus. The scope was removed, the Nottingham sheath drawn over it and the instrument re-passed. Because of the awkward position of the brush, the most difficult part of the procedure was passing the biopsy forceps through the hole in it. However, after 15 minutes of manipulation, the

Fig. 2 The use of biopsy forceps to hold the brush.

Fig. 3 The endoscope, sheath and biopsy forceps. The extracted toothbrush and an identical brush used for rehearsal are shown side by side.

Fig. 4 The sheath drawn over the scope prior to getting hold of the brush with the biopsy forceps.

brush was successfully grabbed and pulled right up to the scope using the biopsy forceps. The sheath was then advanced over the scope, as far as possible into the oesophagus. While holding the sheath firmly in this position, the scope, together with the toothbrush was pulled up into it. With the patient's head extended, the whole assembly—brush, scope and sheath—was removed as one.

Re-passage of the scope showed no evidence of trauma to the stomach or the oesophagus. The patient was discharged the following day.

DISCUSSION

The management of ingested foreign bodies has been clearly outlined by Spitz (1971) and Nandi & Ong (1978). Oesophageal foreign bodies, except those in the lower third, should be extracted as soon as possible because once impacted, spontaneous passage is rare; because, with the passage of time, oedema grips the object even more firmly; and because perforation of the oesophagus has a high mortality. Rounded or otherwise blunt objects in the lower third of the oesophagus should be observed for 12 hours as some will pass into the stomach.

Once in the stomach, 80–90% of foreign objects will pass safely through the gastrointestinal tract. Removal is indicated if the object fails to progress for 10–12 days. Although even dangerous objects such as razor blades and open safety pins will pass safely through the gastrointestinal tract (Ashby & Hunter-Craig, 1967), Spitz (1971) recommends removal of such objects in children, particularly those under the age of 10 years, because of a high risk of duodenal perforation. Foreign bodies in the intestines should be treated conservatively unless complications develop or spontaneous passage does not occur within 3 weeks.

Although the endoscopic removal of various objects from the stomach has been described previously (Witzel *et al.*, 1974; Mee & Wright, 1981; Sykes & Schwesinger, 1983; Ricote *et al.*, 1985), there are few reports of the removal of long objects such as a toothbrush and the potential hazards of the technique have received little attention.

There are two main technical problems with endoscopic extraction. Firstly, how to get a firm hold of the object and, secondly, how to avoid serious trauma while withdrawing a jagged object through the oesophagus.

The first has taxed the ingenuity of many endoscopists, since there is an almost infinite variety of objects that can be swallowed. Extraction devices have ranged from a hood made out of a condom for removing dentures (Sykes & Schwesinger, 1979) to elaborate clasps designed for grabbing yoghurt spoons (Frimberger & Kühner, 1976). However, it is useful to obtain an identical object if one is available, so that the feasibility of endoscopic extraction can be assessed. Withdrawal of the object is rendered safer by the use of a sheath as described here. Others have reported a similar method for the extraction of objects such as razor blades (Mee & Wright, 1981). Another advantage of the sheath is that it allows repeated passage of the scope to remove multiple objects.

It is surprising how well such a procedure is tolerated using a combination of local anaesthesia and sedation. This technique should only be used for a foreign object in the oesophagus or stomach which, by the above criteria, merits removal, provided that its

size and configuration will allow the use of the protective sheath. Attempts at removal without the sheath may result in serious injury to the oesophagus. For the same reason the procedure must not be attempted under local anaesthesia in children and uncooperative patients.

Before surgical removal is considered for oesophageal or gastric foreign bodies, the opinion of an experienced endoscopist should be sought regarding the possibility of non-operative removal. Endoscopic extraction rates of oesophageal and gastric foreign bodies range from 18% (Spitz, 1971) to 94% (Ricote *et al.*, 1985), depending on the object and the skill of the endoscopist. This is not a technique for the occasional endoscopist and should ideally be performed by an experienced surgeon.

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