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Ingested foreign bodies – a contemporary management approach

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Abstract
A prospective study of all foreign body complaints presenting through our Accident and Emergency Department was conducted in a population where the condition is endemic. All patients were managed by otolaryngologists. Six hundred and eight patients were attended to yielding 179 foreign bodies. Making use of modern equipment and a practical approach, the requirement for examination under general anaesthesia was 6.3 per cent. In this series there was a complication rate of 0.5 per cent.

Key words: Foreign bodies

Introduction

Risks of unattended foreign bodies are high and include pharyngeal or oesophageal perforation, localized or retropharyngeal abscess, mediastinitis and fatal oesophago-aortic fistula. The clinical picture of foreign body impaction in the upper aerodigestive tract can be difficult to differentiate from that of mucosal abrasion. The traditional approach to distinguish between the two is by undertaking a thorough examination under general anaesthesia which includes rigid laryngopharyngoscopy and oesophagoscopy. The suspicion of foreign body impaction in a patient therefore warrants urgent attention by experienced clinicians. Rigid oesophagoscopy is associated with a perforation rate between 0.15 and 0.5 per cent (Webb, 1988; Shearman and Finlayson, 1989). Management approach involves balancing the risks of a retained foreign body with that of a rigid endoscopic procedure under general anaesthesia. It is the aim of this prospective study to clarify some of the issues in the management of ingested foreign bodies and to suggest a rational, safe and cost-effective approach to the problem.

Patients and methods

In an 18-month period from July 1987 to December 1988, 1425 patients attended the Accident and Emergency Department of the Prince of Wales Hospital, Hong Kong, complaining of an ingested foreign body. The Division of Otorhinolaryngology of the hospital received 608 consultations. All patients were examined by direct and indirect laryngoscopy and manual palpation by two of the authors (C.L.S. and J.K.S.W.) before admission. Appropriate radiographs of the neck, chest and abdomen were undertaken and reviewed in the Accident and Emergency Department.

The patients were asked to point with one finger to the site of maximal discomfort and grouped into those with supracricoid, cricoid or infracricoid symptoms. Subsequent management was dependent upon the preset protocol (Figure 1). Patients with mild supracricoid symptoms without the identification of foreign bodies in the Accident and Emergency Department were discharged and routinely followed-up. Patients with foreign bodies removed were discharged with free access to follow-up. The remainder totalling 260 patients (42 per cent) were admitted to the ward. Flexible fibreoptic pharyngolaryngoscopy was performed under local anaesthesia in the ward for patients with: (1) severe or prolonged (>48 hours) supracricoid symptoms; (2) cricoid or infracricoid symptoms; (3) identifiable supracricoid foreign bodies that were unable to be removed directly; (4) uncooperative patients.

An Olympus endoscope without a channel (Model nos. ENF-P2 or ENF-P3) was used for diagnostic purposes only. The technique of flexible nasopharyngoscopic removal of foreign bodies was as described by Choy *et al.* (1992). An Olympus endoscope (Model nos. BF type 1 T20 or lately ENF-T3) with a 5.9 mm external diameter and a

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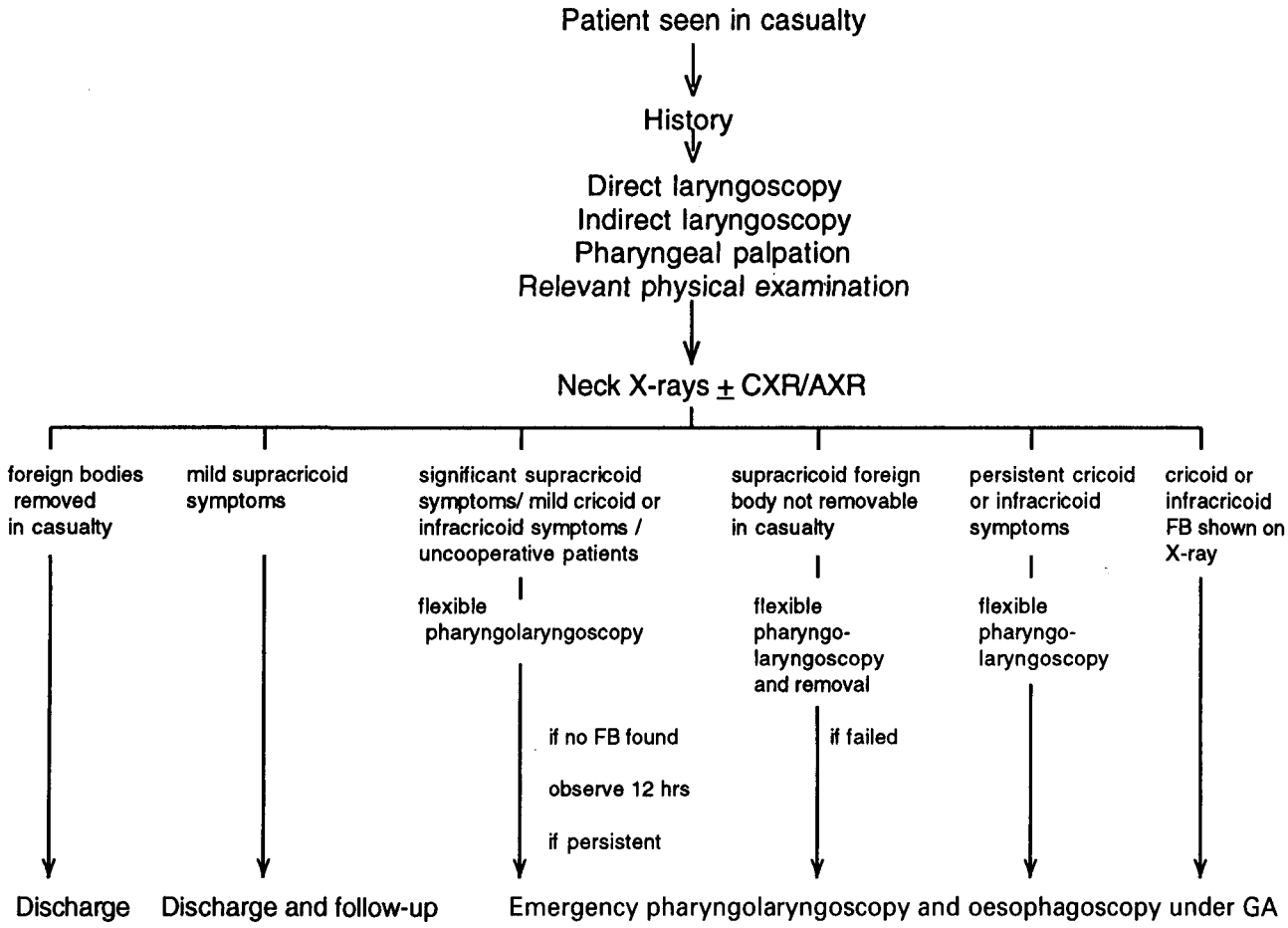

FIG. 1
Management protocol (GA = general anaesthesia).

channel for foreign body forceps (Model nos. FB-15C or FB-20C) was inserted through the nose, the foreign body being grasped by the forceps and removed by withdrawal of the entire endoscope or by an assistant using appropriate forceps introduced transorally. Rigid oesophagoscopy under general anaesthesia was undertaken if: (1) the symptoms had not improved 12 hours after admission; (2) severe cricoid or infracricoid symptoms were present with inconclusive findings on flexible pharyngolaryngoscopy; (3) supracricoid foreign bodies were seen but attempts at removal using the flexible pharyngolaryngoscope had failed; (4) there was radiographic evidence of a foreign body that could not otherwise be located.

Only cases in whom a foreign body was positively identified or removed were considered to be positive. All others were classified as negative although the foreign bodies might have been swallowed. All information was entered onto a standard data sheet and subjected to analysis.

Results

The 608 patients attended yielded a total of 179 foreign bodies. The ages of the patients ranged from seven months to 90 years with a slight female preponderance (ratio 1:1.3). One hundred and eight (18 per cent) of all patients fell within the paediatric age group (less than 12 years of age). There was no seasonal variation and the highest number of consultations seen in a day was 13. Fourteen patients presented with the same complaint after initial discharge by the attending Accident and Emergency Department doctor and four of these were subsequently found to have foreign bodies.

TABLE I
COMPLAINTS IN 608 PATIENTS ATTENDED TO FOR FOREIGN BODY (FB) INGESTION

	All patients (no.)	Patients with FB (no.)	Accuracy of the symptom (%)
Foreign body sensation	311	158	51
Irritative discomfort	293	19	6
Odynophagia	34	4	12
Blood-stained saliva	39	5	13
Vomiting	9	5	56
Others (parental complaints, choking, salivation)	53	14	26

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TABLE II
SITE OF THE FOREIGN BODIES FOUND

Nasopharynx	2
Oral cavity	3
Tonsils/pillars	51
Posterior 1/3 tongue	48
Oropharyngeal wall	6
Valleculae/epiglottis	33
Larynx	2
Pyriform fossa/hypopharynx	10
Cricopharyngeus	4
Oesophagus	15
Unknown/spontaneously ejected	5
Total	179

History, symptomatology and examination findings

The majority of patients (397 or 65 per cent) attended casualty within 12 hours of ingestion, 147 (24 per cent) presenting between 12 and 48 hours and 64 (11 per cent) after more than 48 hours. The incidence of finding foreign bodies in these three groups, was 32 per cent (128/397), 27 per cent (41/147) and 16 per cent (10/64) respectively. In 29 of 108 paediatric patients (26 per cent) and 150 of 500 adults (30 per cent), foreign bodies were found.

The chief complaints of the patients are tabulated in Table I. It should be noted that 85 per cent (152/179) of all patients yielding foreign bodies complained specifically of a foreign body sensation rather than a mere discomfort. Of the major symptoms, the order of significance was: a foreign body sensation, irritative discomfort, and odynophagia. Other significant symptoms included salivation, vomiting and choking.

Localization of symptoms correlated well with the site where the foreign body was located particularly for lateralizing and supracricoid symptoms. However, some patients, especially young children could not localize well. Figure 2 shows the proportion of correct localization of symptoms by patients. The exact location of the foreign bodies is indicated in Table II.

Seventy-eight (16 per cent) of the adult patients used dentures and had a higher positive foreign body rate (37 per cent) than those without dentures (29 per cent). Forty-three per cent of patients with dentures compared with 29 per cent of patients without dentures had a previous history of foreign body ingestion.

Most patients had attempted to dislodge the foreign body themselves by manual removal (297 or 48.8 per cent), swallowing a food bolus (299 or 49.2 per cent) or trial of medicine and chemicals notably vinegar (135 or 22.2 per cent).

A variety of objects were ingested by our patients (Table III), the majority being fish bones. One hundred and twenty-three (69 per cent) of the foreign bodies were removed with forceps under direct or indirect laryngoscopy. Seventeen (nine per cent) were removed via the flexible endoscope. Twenty (11 per cent) were removed under general anaesthesia using a rigid endoscope. Eight (four per cent) were dislodged while attempted removal was made with the flexible endoscope. Six (three per cent) spontaneously ejected their foreign bodies. The remaining five discharged themselves against medical advice even though foreign bodies were positively identified.

Hospital admission and stay

Two hundred and sixty (43 per cent) of all patients were admitted into the ward for further management and observation. The main reasons for admission included severe supraglottic pain, a strong foreign body sensation, symptoms persisting for longer than 48 hours (112 or 43 per cent), difficult examination (54 or 21 per cent), severe cricoid/infracricoid pain with a foreign body sensation (43 or 17 per cent) or radiographic suspicion of a foreign body (47 or 18 per cent). Of the 260 patients admitted, 28 per cent (73) had foreign bodies removed in the hospital.

The mean hospital stay was 1.6 days. The average stay was 2.9 days for patients who required general anaesthesia. Two patients stayed for more than seven days. One was a 74-year-old lady with radiographic and clinical evidence of a retropharyngeal abscess which settled on antibiotic treatment while the other was a 23-year-old female with persistent symptoms, pain and fever requiring a second oesophagoscopy by the senior surgeon. In both patients, no foreign body was found.

Plain neck X-rays

Six hundred and two soft tissue lateral neck X-rays were evaluated by the authors. One hundred and twenty-eight (73 per cent) of 176 X-rays taken in patients with foreign bodies were regarded as being normal. Forty-two (24 per cent) had their foreign bodies identified by the X-ray and six other abnormal findings in these 176 X-rays were noted. There were nine false-positives in that foreign bodies

TABLE III
NATURE OF COMPLAINT AND TYPE OF FOREIGN BODY FOUND

	Foreign body complaint		Foreign body found	
	No.	%	No.	%
Fish bone	485	(80%)	163	(91%)
Chicken/duck/goose/pigeon bone	55	(9%)	5	(3%)
Beef/pork bone	28	(5%)	2	(1%)
Coins	3	(<1%)	2	(1%)
Dentures	1	(<1%)	1	(<1%)
Fruit/seed	2	(<1%)	0	(0%)
Others	39	(6%)	6	(3%)
Total	608	(100%)	179	(100%)

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TABLE IV
THE INCIDENCE OF NEGATIVE (NORMAL) NECK X-RAYS IN THE PRESENCE OF A FOREIGN BODY ACCORDING TO THE SITE

Site	Number negative/ total number	Percentage
Oral cavity/pharynx	56/60	90
Posterior 1/3 tongue	39/48	81
Valleculae	19/32	59
Pyriform fossa	7/9	78
Larynx	2/2	100
Circopharyngeus	1/4	25
Oesophagus	1/1	100

were identified on the X-rays but not found after thorough examination. Foreign bodies below the level of cricopharyngeus were more often identified in plain radiography than those situated above this level (Table IV).

Transnasal flexible endoscopy

Transnasal flexible fibreoptic pharyngolaryngoscopy was performed in 231 patients. The findings are listed in Table V. Of the 73 patients who had their foreign bodies removed after admission to the hospital, 23 per cent were located and removed using the flexible endoscope, 22 per cent were identified by the endoscope but removed by other means and 11 per cent of these foreign bodies were dislodged by the flexible endoscope.

The use of transnasal flexible fibreoptic pharynolaryngoscope (Table V) negated the need for general anaesthetic removal in 39 cases (17 removed with the endoscope, 14 identified by the endoscope and removed with forceps and eight dislodged by the endoscope). This represents a 51 per cent [39/(39 + 38)] reduction in the requirement for general anaesthesia.

General anaesthesia

Thirty-eight general anaesthetic procedures were performed in 37 patients. This represents 2.6 per cent (37/1425) of all patients presenting to the hospital with a foreign body complaint, 6.1 per cent (37/608) of all patients presenting to the unit and 11.2 per cent of all the foreign bodies removed. The indications for general anaesthesia were persistent symptoms in 16 (42 per cent), supracricoid foreign bodies not removable under local anaesthesia in two (five per cent) and cricoid/infracricoid foreign bodies seen radiologically in 20 (53 per cent). Twenty foreign bodies were removed representing a retrieval rate of 53 per cent.

TABLE V
FINDINGS AT FLEXIBLE PHARYNGOLARYNGOSCOPY UNDER LOCAL ANAESTHESIA

Normal	138
Laceration/abrasion	38
Foreign bodies removed with the endoscope	17
Foreign bodies, located, removed by other means*	16
Foreign bodies located and dislodged	8
Other findings	12
Total	229

All foreign bodies located were above the cricopharyngeus.
*Two patients required general anaesthesia.

Complications

Three complications were observed during this 18-month period. One lateral tongue and one retropharyngeal abscess occurred. The third patient had a laceration of the oesophagus caused by the rigid endoscope. All were managed successfully by conservative treatment. There was no mortality in this series.

Discussion

The analysis of this series of 608 patients provides useful information and practical guidelines in the management of ingested foreign bodies from the time of the patient's attendance through to discharge. In Hong Kong where the majority of population is Chinese, the local style of cooking and traditional eating habits contribute to the prevalence of the problem found in our study (1.27/1000 population/year). Patients of all ages are susceptible, the youngest record of a fish bone being found in our experience being in a two-month-old infant (not during this study period)! The majority of patients seen in other series are in the paediatric age group (Webb, 1988) but the ages of our patients are evenly spread. Eighty per cent of the foreign bodies were fish bones which was consistent with the two other local series (Nandi and Ong, 1978; Ngan *et al.*, 1990) and higher than the UK series of 50 per cent (Phillipps and Patel, 1988).

Of all symptoms (Table I), persistent sensation of foreign body was the most reliable, followed by unusual symptoms such as vomiting and choking in paediatric patients, odynophagia and the presence of blood-stained saliva. A sensation of irritative discomfort was not an accurate symptom in our patients. 'Discomfort on swallowing' indicated abra-

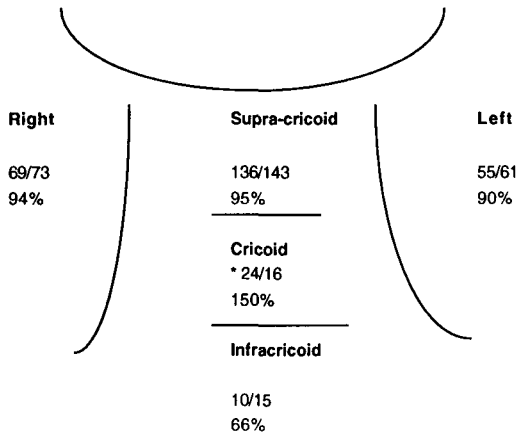

FIG. 2
Correlation of localization of symptoms with actual site of foreign bodies (foreign bodies found/foreign body; complaints).

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TABLE VI
COMPARISON OF THE PRESENT SERIES WITH THE RETROSPECTIVE ANALYSIS OF NANDI AND ONG (1978) AND PHILLIPS AND PATEL (1988)

	Nandi and Ong (1978)		Phillipps and Patel (1988)		Present series	
	No.	%	No.	%	No.	%
Total number of patients	2394	100	248	100	608	100
General anaesthesia	2236	93	59	24	38	6.3
Negative general anaesthesia	1392	58	28	11	18	3
Foreign bodies found by general anaesthesia	844	35	31	13	20	3.3
Foreign bodies found by other means	0	0	49	20	159	26
Discharged against advice	121	5	0	0	13	2
Repeat general anaesthesia	18	0.8	0	0	1	0.2
Spontaneously ejected/cleared	37	1.5	10	4	6	1

sion or laceration most of the time. Contrary to the belief and expectation that the longer the duration of symptoms, the higher the foreign body rate would be, the reverse was found to be the case. Our explanation is that the presence of a genuine foreign body sensation leads to prompt presentation for medical treatment.

The relationships between the localization of symptoms and the risk of impaction are well known but seldom mentioned in the literature. Our data confirms the belief that supracricoid symptoms are accurately localized as far as level and lateralization are concerned. Cricoid and infracricoid symptoms are less reliably localized (Figure 2).

As part of the study, routine radiographs of the neck were performed. The radiological assessment of fish bones in the neck is known to be difficult and inaccurate (Ell, 1989; Evan *et al.*, 1992). Plain radiographs would seldom show fish bones that are not obvious on clinical examination in the pharynx, tonsil, pyriform fossa or posterior third of tongue where the soft-tissue shadows are prominent. Our experience showed that the majority of these X-rays were not helpful (Table IV). For symptoms at the level of cricoid and cervical oesophagus, however, plain lateral radiographs of the neck are sometimes useful in showing abnormal air shadows or the foreign bodies themselves. Radiopaque chicken and beef bones are less likely to be missed in the neck (Webb, 1988).

The criteria we use for admission include severe supracricoid symptoms or symptoms lasting longer than 48 hours, difficult examinations, severe cricoid/infracricoid symptoms and positive radiological examination findings. Our admission rate of 43 per cent and mean hospital stay of 1.6 days reflects the efficacy of this pragmatic approach in managing these patients.

Flexible oesophagoscopy has been regularly used for retrieving foreign bodies in the thoracic oesophagus (Webb, 1988) and the transoral technique for removal of fish bones from the oropharynx, hypopharynx and oesophagus is widely practised in this locality by general surgeons (Ngan *et al.*, 1990; Chung *et al.*, 1991). For reasons cited by Choy *et al.* (1992) which include optimum mobility of the endoscope, a better view of the hypopharynx and larynx, minimal patient discomfort and shorter duration of procedures, the transnasal route for endoscopy is recommended. The reduction by 51 per cent in the general anaesthetic rate as a direct consequence of using transnasal flexible endoscope clearly demonstrates its contribution to the overall management of ingested foreign bodies. We believe that flexible endoscopy is not ideal for retrieving foreign bodies at cricopharyngeal level because of its potential complications. Where 18 flexible endoscopic procedures were performed for the removal of cricopharyngeal fish bones, three complications were reported including one mucosal tear of the sphincter and two prolonged removal procedures in excess of 40 minutes (Ngan *et al.*, 1990). In the same series, five bones were dislodged and one went undetected requiring a subsequent rigid oesophagoscopy. The present policy in our centre is that only foreign bodies in the thoracic oesophagus or below are submitted to fibreoptic oesophagoscopy.

There was no mortality in this series of 608 patients. A complication rate of 0.5 per cent was encountered relating to both the foreign bodies *per se* and the use of the rigid endoscope. The management approach of Nandi and Ong (1978) mainly relied upon the use of general anaesthesia and resulted in a complication rate of 2.8 per cent. A comparison of the use of general anaesthetics in the two series and that of a recent series (Phillipps and Patel, 1988) is made in Table VI. These graphic differences reflect changing practise utilizing a practical approach enhanced by available advanced technology.

Conclusion

This prospective study establishes important guidelines for the identification and effective removal of ingested foreign bodies. Clear indications for admission and general anaesthetic assessment are given. The low admission and general anaesthetic rate translates into a short cost-effective hospital stay. This practical approach is both kinder to patients, minimizes complications and limits the use of expensive resources.

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