The management of foreign bodies in the pharynx and oesophagus using transnasal flexible laryngo-oesophagoscopy (TNFLO)

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ABSTRACT

INTRODUCTION We describe our experience of the diagnosis and removal of foreign bodies from the pharynx and oesophagus using transnasal flexible laryngo-oesophagoscopy (TNFLO) under local analgesic. The advantages of this novel instrumentation and technique are discussed.

PATIENTS AND METHODS Patients were examined with a Pentax 80K Series Digital Video Endoscope after local analgesia. The instrument was passed transnasally examining the oro- and hypopharynx, and then passed into the oesophagus. The presence, type and site of a foreign body could then be established. If a foreign body was detected, such as fish bone, it was extracted using flexible grabbing forceps passed down the instrument channel and delivered through the nasal or oral cavity. The object was then inspected to ensure removal in its entirety.

RESULTS Five cases have been successfully managed using TNFLO.

CONCLUSIONS TNFLO represents an improvement in the diagnosis and subsequent treatment of a selected group of foreign bodies as compared with established methodologies.

KEYWORDS

Flexible transnasal laryngo-oesophagoscopy – TNFLO – Foreign body

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In 2004, there were 100 admissions to the Norfolk and Norwich University Hospital (which serves a population of 500,000) for suspected foreign bodies lodged in the hypopharynx ($n = 21$) and oesophagus ($n = 79$). Published case series demonstrate that most of these are due to coins, fish or chicken bones being ingested and that 20% will undergo operation at which no foreign body is found.^{1,2} This is most commonly performed operation is direct pharyngo-oesophagoscopy under general anaesthetic. There are inherent problems with this technique in terms of unnecessary operating, safety, discomfort, delay and cost which could all be minimised if diagnosis could be confirmed and removal of some foreign bodies could be carried out endoscopically under local analgesia. We present a technique for the removal of foreign bodies from the pharynx and oesophagus.

Patients and Methods

Equipment

A Pentax 80K Series Digital Video Endoscope was used; it is a 5.1-mm diameter endoscope, incorporating a high-

resolution colour CCD chip in its tip, allowing excellent, full-screen images of high definition to be viewed on the monitor. As well as being able to perform suction and irrigation, insufflation (or indeed ventilation with oxygen) is also possible. The endoscope also has a 2-mm instrument channel allowing passage of re-usable grasping forceps.

Informed consent

Written and verbal consent was taken from all patients.

Analgesia

The nose was first prepared with 4 sprays of lidocaine hydrochloride (5%) + phenylephrine (0.5%) aerosol solution applied to each nostril; then, 3 ml of Instagel (containing 2% lidocaine) was applied to both anterior nares. The remaining 5 ml of Instagel was used as a lubricant on the endoscope itself, providing further topical analgesia. Finally, 2 sprays of lidocaine (10%) were directed towards the mouth and oropharynx. Analgesia was usually achieved within 5 min; however, a further dose of up to 2 ml of lidocaine (4%) may be used on the larynx under direct vision (Table 1).

Figure 1 View of fish bone.

Procedure

The TNFLO was passed transnasally examining the oro- and hypopharynx, and then passed into the oesophagus. The presence, type and site of a foreign body could then be established. If a foreign body was detected, such as fish bone, it could be visualised and extracted using flexible grabbing forceps passed down the instrument channel (Figs 1 and 2) and delivered through the nasal (Fig. 3) or oral cavity. The object was then inspected to ensure it has been removed in its entirety (Fig. 4). Any problem keeping the lens clear was resolved by asking the patient to swallow or using the suction function. Some objects are unsuitable for extraction by this method; however, others may be judged to be safely and easily assisted into the stomach by insufflation, *e.g.* a plum stone at the gastro-oesophageal junction (Fig. 5).

Recovery

Since the procedure is performed under local analgesia in clinic, the patient is able to eat and drink as soon as the effects of the local analgesic have worn off. This allows discharge 1 h after the procedure.

Table 1 Doses of topical anaesthetic

	Lignocaine (mg)
4 sprays lidocaine (5%)/phenylephedrine (0.5%) to nose	30
3 ml Instagel (lidocaine 2%) to nose	60
5 ml Instagel (lidocaine 2%) on endoscope	100
2 sprays lidocaine (10%) to mouth/oropharynx	20
Total topical dose	210

Figure 2 Application of forceps. Reproduced from Price *et al.*¹⁰ with the permission of Blackwell Publishing.

Figure 3 Delivery through the nasal cavity

Results

Table 2 describes five cases treated using TNFLO. So far, all patients have been successfully managed as described above. Confident exclusion of a foreign body in the pharynx or oesophagus, in patient 4 prevented further unnecessary intervention.

Discussion

TNFLO represents an improvement in the diagnosis and subsequent treatment of a selected group of foreign bodies as compared with established methodologies.

Diagnosis

Currently, 75% of oesophageal foreign bodies may be diagnosed radiologically using plain films of the neck or

Figure 4 Inspection of fish bone. Reproduced from Price *et al.*¹⁰ with the permission of Blackwell Publishing.

Figure 5 Plum stone at the gastro-oesophageal junction.

barium swallows.² Contrast medium impedes visualisation at oesophagoscopy and is associated with a small risk of contrast aspiration. Flexible nasendoscopy alone has been used to identify and remove some foreign bodies from the base of tongue and vallecula⁵ but it can not exclude the presence of a foreign body further down. The recent development of TNFLO technology has permitted the confirmation or exclusion of a foreign body in the pharynx or oesophagus determining the need for direct pharyngo-oesophagoscopy under general anaesthetic. Many foreign bodies can be removed at the time of inspection as described above; however, certain foreign bodies will be judged as too big or too embedded to be removed by this method.

Safety

Traditional direct pharyngo-oesophagoscopy under a general anaesthetic has inherent problems in terms of patient safety. Patients are more likely to suffer trauma or

perforation of the pharynx, oesophagus and teeth with a procedure involving a rigid endoscope. Any procedure which does not involve a general anaesthetic is inherently safer, patients who have recently eaten who are then placed under a general anaesthetic are at increased risk of aspiration.

Comfort

The senior authors have evaluated the patient experience with independently taken visual analogue scores on 50 of the patients undergoing TNFLO for various reasons. The average pain score was less than 1 out of a maximum of 10, where zero was no pain. The reason for this is thought to be the method of local analgesia.⁴

The use of local analgesic in this technique is safe (Table 1). A maximal dose of 9 mg/kg of topical lidocaine can be tolerated topically in the upper respiratory tract as the majority becomes absorbed in the gut and is subject to first-pass metabolism by the liver.⁵

Table 2 Five cases managed using TNFLO

Case no.	Age	Sex	Type of foreign body	Location	Management
1	72	F	Cod bone	Pyriiform fossa	Extraction via nose
2	26	F	Haddock bone	Post cricoid	Extraction via mouth
3	22	F	Cod bone	Base of tongue	Extraction via nose
4	57	F	Nil	Clear of foreign bodies	Re-assurance
5	40	M	Plum stone	Upper oesophagus	Pushed into stomach
6	54	F	Lamb bone	Upper oesophagus	Removed by direct pharyngoscopy under general anaesthetic

Speed and efficiency

TNFLO can be safely carried out by a single ENT surgeon with an assistant, without the need for an anaesthetist, theatre space, or recovery. It is a more rapid process than direct pharyngo-oesophagoscopy under general anaesthetic with the overall procedure taking less than 20 min, depending on the foreign body, while recovery and discharge are possible 1 h later.

Literature review

Published literature describes the extraction of foreign bodies, under local analgesia, from the hypopharynx using curved instruments placed via the oral cavity guided by a flexible nasendoscope⁵ or rigid 70° video laryngeal telescope.⁶ The use of instruments placed in the oral cavity risks initiating the swallowing (gag) reflex, which does not occur with TNFLO, and also the combination of independent viewing and grasping instrumentation requires a higher level of dexterity and co-ordination.

Sato and colleagues⁷⁻⁹ have published their early experience with TNFLO in Japan. They describe a similar technique for adults and children, without the use of local analgesic and report early success with fish bones and dried fish. In the discussion, they emphasise the technical advantages of the equipment, but not the wider beneficial consequences of its use in diagnosis and exclusion, safety, comfort, *etc.* we mention above. This paper describes, for the first time in the UK, an integrated system for the visualisation and removal of foreign bodies from the pharynx, with an evolving role for those in the oesophagus.

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