



## **Oesophageal Foreign Bodies: Pattern and Management in a Tertiary Health Facility of a Developing Country**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. Author JNN designed the study, performed the statistical analysis, wrote the protocol and first draft of the manuscript. Author ENC managed the analyses of the study and author UCO managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Introduction:** Foreign body (FB) impaction in the aero-digestive tract constitutes a common emergency in otolaryngology practice worldwide. Prompt and appropriate management would limit the morbidity and possible mortality that may arise therefrom.

**Objectives:** The study was aimed to re-establish the prevalent foreign bodies in the oesophagus, the preferred management procedure and how social and cultural practices affect the foreign bodies involved.

**Materials and Methods:** The study was a retrospective review of all the oesophageal foreign bodies retrieved surgically under anaesthesia by endoscopy over 10 years.

**Results:** A total of 90 patients were studied which consisted of 53.3% children and 46.7% for adults. A variety of foreign bodies were recovered of which dentures (24.44%), metallic objects (15.56%) and fish bone (14.44%) were the most common foreign bodies recovered. No FB was found in 12.22% of the cases. Rigid oesophagoscopy was the favoured and effective method of treatment.

**Conclusion:** Dentures, metallic objects and fish bone topped the list of FB retrieved. Rigid oesophagoscopy was effective in the extraction of the foreign bodies. Social and cultural leaning played out in the variety of foreign bodies in different parts of the country.

*Keywords: Oesophageal; foreign body; impaction; socio-cultural dimension.*

## 1. INTRODUCTION

Foreign body (FB) impaction in the oesophagus constitutes a common otolaryngology emergency in our environment and the world at large. The impaction of swallowed foreign body in the aerodigestive tract will continue to be a problem for the endoscopist especially the otolaryngologist as long as man has to eat to live. Impaction of a foreign body depends largely on the size and shape of the object. Sharp or pointed articles may stick in any part of the oesophagus. A large article or bolus of food may become impacted in a normal oesophagus, especially if swallowed hurriedly or accidentally. Mentally deranged (insane) or inebriated individuals are especially at risk. There are four sites of anatomical narrowing in the oesophagus where foreign bodies are likely to impact. These are the postcricoid region (just below the cricopharyngeus), the level of the aortic arch, the level of the left main bronchus, and the level of the diaphragmatic hiatus (just above the gastrooesophageal junction) [1].

These correspond to the level of 15 cm, 25 cm, 30 cm and 40 cm respectively from the upper incisor teeth to oesophageal landmarks in an adult. Impaction may also occur at sites of pathological narrowing, e.g. strictures secondary to peptic oesophagitis, corrosive strictures, anastomotic strictures or congenital stenosis.

A variety of objects have been described to impact in the aerodigestive tract with varied complications. Various factors have been adduced to predispose to the impaction of foreign bodies.

In this study, we intend to re-establish the prevalent foreign bodies causing oesophageal obstruction in our environment, outline the management protocol adopted highlighting its

benefits and challenges, and discuss the social and cultural influences that may determine the type/nature of foreign bodies impacted in the oesophagus in different parts of our country.

## 2. MATERIALS AND METHODS

This is a retrospective study of oesophageal foreign body managed in the department of Otolaryngology, University of Nigeria Teaching Hospital, Ituku/Ozalla, Enugu, Nigeria. Cases studied were selected from the year 2008 to 2017. All consecutive patients with suspected foreign body impaction in the oesophagus and who had oesophagoscopy were included in the study. Excluded were foreign bodies in other parts of the aerodigestive system other than the oesophagus. Also cases not done in the theatre under general anaesthesia and those with incomplete data were excluded. Case notes, clinical records and charts of the patients in the clinics, accident and emergency unit, ward and theatre were reviewed for the required information. Data extracted included: demographics (age, gender, tribe, and occupation), clinical features, investigations, the interventions given both initial and definitive, type and nature of the foreign body, the circumstances of impaction as well as any challenges and complications encountered. The disposition of the personnel involved in the management among others was also noted.

The data retrieved were analyzed using simple descriptive statistics and the results presented in tables, charts and text as appropriate.

Ethical clearance was obtained from the Research Ethics Committee (Institutional Review Board) of the hospital before the commencement of the study.

### 3. RESULTS

Ninety patients were evaluated and managed for oesophageal obstruction resulting from foreign body impaction. They consisted of 52 (57.8%) males and 38 (42.2%) females giving a ratio of 1.4:1. They were aged 0.5 to 85 years, mean  $23.62 \pm 24.69$ , with 95% Confidence Interval (CI) of 16.2075 to 31.0409. Males were aged 0.67 to 71 years, mean  $24.84 \pm 24.62$  with 95% CI of 14.8970 to 34.7891 while females were 0.5 to 85 years with a mean of  $21.96 \pm 25.35$  and 95% CI of 9.7395 to 34.1732. However, their ages were similar at  $24.84 \pm 24.62$  versus  $21.96 \pm 25.35$  ( $t = 0.3837$ ,  $p = 0.70$ ). Children constituted 48 (53.3%) of the patients studied. They were aged 0.5 – 12 years with a mean of  $4.17 \pm 3.68$  and there was no sex difference between them. Table 1 showed the age distribution of the patients with the majority 46.67% age  $\leq 10$  years. 31.11% of the patients were  $\leq 3$  years while 8.89% were less than 1 year of age.

Specific investigations done consisted mainly of Posterior-Anterior (PA) chest X-ray, X-ray neck, anterior-posterior (AP) and lateral.

All patients underwent rigid oesophagoscopy in the operating theatre under general anaesthesia with endotracheal intubation. A wide range of foreign bodies was recovered in both children and adults. Dentures (24.44%) topped the list, Table 2, followed by metallic objects (15.56%) and fish bone (14.44%).

There was a negative finding in 12.22% of the patients. The metallic objects consisted of safety pin, hairpin, ear ring, finger ring, pendant and key. Dentures were exclusively seen in adults while the fish bone was almost equal in both children and adults, but meat bone and bolus occurred in adults only. Vegetable matter (peanut) in this series was 2.22%.

Negative finding was more in children (7) than in adults (4) and was seen mostly in those with suspected fish bone impaction. Complications were virtually absent with no mortality recorded in the series except for minor abrasions which resolved without any consequence.

### 4. DISCUSSION

Approximately 47% of people with oesophageal foreign bodies in this series were children aged

0-10 years with two other equal peaks at 21-30 and 51-60 age groups (13.33% each). This result tallies with the findings in many other studies. [2-8] Various reasons have been adduced for the frequent involvement of children in foreign body ingestion ranging from natural curiosity to poverty and lack of individual attention to children who are left to feed themselves at an early age. [9] Also, this is the experimental and inquisitive age when children are mainly in the primary school and are prone to rough plays. The tendency to explore the environment and place objects in the mouth and other orifices [10,11] were other possible reasons. Male dominance, male: female ratio 1.4:1 was observed in the study. This is consistent with studies by other authors in different parts of the world [2-8] who found a male preponderance in their studies. This could be attributed to the aggressive nature of males in almost all their activities; and as such are more explorative and inquisitive than females [12-15]. Once suspicion of a foreign body has been aroused, its presence must be proved or disproved. The diagnosis can be made from history, clinical examination, radiological investigation and endoscopic examination. What is actually done is detected by the clinical status of the patient and the nature of the suspected foreign body. Chest X-ray PA view and X-ray soft tissue of the neck AP and lateral views on erect position will show the presence of radio-opaque foreign bodies. They will delineate the general shape of the FB, as well as its location. The presence of non-radio-opaque objects may be suggested by the increase in the distance between the cervical vertebrae and the larynx and trachea or air in the cervical oesophagus. It may be difficult to differentiate the FB from ossification in the laryngeal cartilages. Air in the soft tissues or in the oesophagus held open by the non-opaque FB is an important sign. If the foreign body cannot be located in this way, in the presence of positive history, symptoms or clinical suspicion, then endoscopic examination is suggested. Contrast radiological studies to locate the presence of non-radio-opaque foreign bodies should be avoided because it can obscure the FB during endoscopy. CT scan of the thorax/abdomen is useful for locating impacted objects of various types and considered superior to plain X-ray imaging [16]. It is also an investigation of choice in suspected cases of perforation or abscess formation. CT scans are invaluable when there is a challenge in the diagnosis of aero-digestive foreign bodies.

**Table 1. Age distribution of the patients**

Age (years)	No of patients	Male	Female	Percentage
0 – 10	42	22	20	46.67
11 -20	6	2	4	6.67
21-30	12	8	4	13.33
31-40	6	4	2	6.67
41-50	4	4	0	4.44
51- 60	12	8	4	13.33
61-70	4	2	2	4.44
71-80	2	2	0	2.22
81-90	2	0	2	2.22

**Table 2. Variety of foreign bodies found**

Type	Number	Percentage
Fish bone	13	14.44
Meat bone	3	3.33
Meat bolus	2	2.22
Coin	6	6.67
Metallic object	14	15.56
Rubber/Plastic	8	8.89
Stone	2	2.22
Vegetable (pea nut)	2	2.22
Disc battery	2	2.22
Denture	22	24.44
Tooth pick	3	3.33
No FB found	11	12.98

In this study denture (24.44%), metallic objects (15.56%) and fish bone (14.44%) formed the leading oesophageal foreign bodies encountered. This deviated from other studies where the most reported oesophageal FB in children is the coin, [17] whereas in adults fish bone rank among the most common impacted oesophageal foreign bodies [18]. Also contradicted were findings in Pakistan by Gulshan et al. [19] where coins (55.6%) and meat bolus (20.7%) were the predominant foreign bodies and that of Iseh et al. [20] who found coins, peanuts and toys among the commonly ingested or aspirated foreign bodies. However, our findings agree with that of Kirfi et al., [2] where metallic objects accounted for a larger proportion of the aero-digestive foreign bodies followed by impacted denture materials. The reason for the findings could be explained by the fact that the study involved both adults and children. Dentures were found exclusively in adults as expected while coins (6.67%) were seen only in children. Meat boluses and dentures are commonly swallowed in the elderly. Peristaltic changes in the oesophagus with age, a decrease in psychological function and reduction in tactile functions of the palate

consequent on the wearing of dentures are all contributory. When the use of coin currency was common in Nigeria its ingestion was the commonest foreign body found in the aerodigestive tracts of children [4,11]. Coins are now virtually out of use as it can hardly be accepted in the markets or shops and so not available to children as parting gifts and thus not available for them to play with. Negative findings at oesophagoscopy in the series constituted 12.22%, and was more in children [7] than in adults [4]. These occurred more in suspected cases of fish bone impaction. In a similar study of 36 patients with a foreign body in the oesophagus, Revadiet et al. [21] recorded no FB in 33.3% of the patients. There is also a possibility of further migration of the FB from its initial location before surgical intervention. Alabi et al. [22] in Ilorin had earlier reported migration of a sharp object from the oesophagus to the rectum over six days.

Treatment of aerodigestive foreign bodies varies from watchful waiting to instrumental removal, endoscopic extraction, balloon catheter extraction and external approaches [15,23]. However, management of the patient is influenced by the patient's age and clinical condition; the size, position of the foreign coin if vertical or horizontal, shape, and classification of the ingested material; the anatomic location in which the object is lodged; and the technical abilities of the endoscopist [24-26]. In our series, patients were managed with rigid oesophagoscopy under general anaesthesia with endotracheal intubation and this provided virtually event free scenario. Rigid oesophagoscopy under general anaesthesia remains the effective and safe method of oesophageal foreign body removal in the hand of the expert. [11]. Again rigid oesophagoscopy gives a much better view of hypopharynx, cricopharynx and first few cms of cervical oesophagus [27]. Success at endoscopy lean on

a range of factors. The history surrounding the foreign body ingestion is extremely important. When and how it occurred, as well as a description of the object, and subsequent symptoms can give the endoscopist valuable information. If available, a duplicate of the object can be helpful in choosing the most appropriate instruments for oesophagoscopy and removal of the foreign body. In cases of a positive history of foreign body ingestion, but the patient is asymptomatic, a conservative course can be pursued. Asymptomatic coin ingestion in children falls into this category, where simple serial radiographs may be sufficient to allay parental anxiety [28]. However, if symptoms such as dysphagia sets in or the foreign body fail to pass, endoscopy should be embarked upon without further delay.

Disimpaction of meat boluses with spasmolytic agents such as hyoscine butylbromide (Buscopan, 20 mg q.d.s, IV/IM) has been reported to be successful in up to two-thirds of patients [29]. Its use is contraindicated by its anticholinergic properties including glaucoma, urinary retention and heart failure.

Glucagon has been used successfully in promoting the passage of meat boluses since first described by Ferrucci and Lung [30] and is thought to work by reducing lower oesophageal sphincter pressure [31].

An adult with meat bolus impaction have been managed conservatively with intravenous rehydration, nil per oral, and light sedation with diazepam and pentazocine with meat bolus disimpacting into the stomach within 24-48 h of instituting the regime [3].

Also, a successful attempt has been made to dislodge boluses with gas-forming agents such as tartaric acid and bicarbonate mixtures, but they are yet to be fully evaluated [32].

Other gas-forming agents include simple carbonated drinks, carbex effervescent granules (sodium bicarbonate, activated dymethicone and citric acid) They release gas into the oesophagus thus raising intra-luminal pressure distending the oesophagus against a closed cricopharyngeal muscle and thus inferiorly forcing the bolus into the stomach. Forcing a foreign body into the stomach by eating bread, use of a probang, and blind removal of cervical oesophageal foreign bodies with Foleys catheters are condemned for the following reasons: foreign bodies are often

multiple; a smooth, opaque foreign body may be accompanied by a non-opaque sharp foreign body; esophageal foreign bodies are often associated with previous unrecognized esophageal abnormalities; loosened foreign bodies may be aspirated into the tracheobronchial tree, and safe methods of removing foreign bodies with open esophagoscopes exist [33].

The use of proteolytic enzymes such as papain to digest meat foreign bodies (boluses) has been abandoned because of two potentially life-threatening complication of enzymes – transmural digestion [34] of the oesophagus and haemorrhagic oedema if the compound is aspirated.

The flexible fibre-optic endoscope has been used in the removal of foreign bodies but its use is limited by concerns on the protection of the airway from aspiration and frequent resort to endoscopy. Flexible endoscopes allow only delicate forceps to be passed and so foreign body removal is limited. However, flexible endoscopy offers the advantage of allowing examination of the stomach and duodenum in the event of no foreign body being found in the oesophagus.

Even with the relatively uneventful outcome of this study, oesophageal foreign body impaction is not without complications. Problems usually arise in proportion to the duration of impaction [35]. Complications can arise either from the presence of the foreign body or attempt at its removal.

Possible complications include ulceration, stricture formation, trachea-oesophageal fistula, erosion through the wall of the oesophagus with mediastinal abscess or penetration into major blood vessels [36]. Perforation of the oesophagus may occur with any manipulation of the oesophagus. Perforation, either by the foreign body or by instrumentation, can lead to inflammatory changes in the para- and retropharyngeal tissue planes. Widening of the retropharyngeal soft tissue space is seen in such cases, sometimes with surgical emphysema or an abscess cavity. Morbidity and mortality observed in cases of aerodigestive foreign bodies in developing countries mainly stem from late presentation, late diagnosis, and referral to hospital, lack of adequate skills as well as non-availability of relevant equipment in the hospital [37].

Careful scrutiny of the various foreign body studies will reveal that social and cultural practices impact on the types and nature of foreign bodies involved. Children are noted to ingest more foreign bodies during the school holidays [38]. Their foreign bodies are mostly items of toy, and food. Adults who deliberately ingest foreign bodies are usually suffering from mental impairment or psychiatric illness. Prisoners ingest foreign objects to derive potential secondary gain from hospitalization. In the eastern part of Nigeria fish bones are predominant because a lot of fish is eaten there. This was born out in studies of foreign bodies in larynx [39] and pharynx and oesophagus [40] by Okafor. Okeowo [41] emphasized on the high incidence of whole kola nuts, *Cola nitida* seen in his group. He noted people swallowed whole kola nuts for traditional medicinal purposes. He reported that one patient in his series stated that it is the basis of the traditional charm which Yorubas call "Lukudi" and this is to help the swallower get rich quick. He further reported that during the oil "boom" era in Nigeria 1974, 75 and 76, an average of 4 patients was seen yearly with kola nut stuck in the pharynx or upper oesophagus. Akenroye and Osukoya [42] reported two cases of ingestion of calabash or bottle gourd, *Lagenaria siceraria* in one case and whole kola nut, *Cola nitida* in the other. The bottle gourd was found to be stuffed with black substance and the patient confessed he swallowed it to gain spiritual powers. The second case confessed he swallowed the whole kola nut on the instruction of a traditional medicine man who would use it after passing it out in stool to prepare him the medicine for love to be given to a lady he was deeply in love with but who could not agree to his proposal. Lawani et al. [43] not too long ago reported yet another case of deliberate ingestion of whole kola nut for spiritual purposes. These and many others highlight how cultural influences apply to the nature and type of foreign body ingestion.

#### 4. CONCLUSION

Dentures, metallic objects and fish bones were the most prevalent foreign bodies encountered in the study. Rigid oesophagoscopy for the removal of foreign bodies remains the best mode of treatment. Age, social and cultural practices held its way in determining the kind of objects impacted. Careful food preparation with the scrutiny of food for bones or uncooked areas, keeping safety pins and other inedible objects out of the mouth and keeping inappropriate food

and toys away from small children is important for prevention.

#### CONSENT

It is not applicable.

#### ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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