

# Clinical profile and management of aerodigestive foreign bodies in North-western Nigeria

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## Abstract

**Background:** Aerodigestive tract emergencies in Nigeria occur in all age groups. They sometimes have dreaded outcome if lodged in air passages. **Objective:** The aim is to present the results of this problem in a 5-year retrospective survey of cases in the Emergency Unit of the National Ear Care Centre, Kaduna, Nigeria, from January 2009 to December 2013. **Methods:** Retrieved cases were studied noting the clinical history, examination and intervention. The study included all patients diagnosed with aerodigestive foreign bodies within the period stated. **Results:** Fifty-seven thousand nine hundred and four patients were studied. Fifteen thousand eight hundred and fifty were emergencies. The hospital prevalence was 0.61% and the average annual incidence was 0.13%, male preponderance with male to female ratio of 2.24-1.00. All patients were symptomatic. Mortality was recorded in one patient who had a co-morbidity of esophageal perforation. **Conclusion:** Aerodigestive foreign bodies pose a serious challenge in a setting of poor resources and scarcity in diagnostic and interventional facilities

**Key words:** Aerodigestive foreign bodies, emergency ear care, Nigeria

## INTRODUCTION

Aerodigestive tract emergencies are not uncommon in developing countries like Nigeria and can occur in all age groups.<sup>[1]</sup> They present great difficulties for parents, patients, and the few Otorhinolaryngologists.<sup>[2]</sup> However, aerodigestive foreign bodies may turn out uneventful depending on its type, size, and location in the aerodigestive tract. Whatever the location, the most dreaded outcome of the event is seen when the foreign body is lodged in the air passage.<sup>[2]</sup> The most commonly ingested foreign bodies by children include coins, screws, buttons, and toys.<sup>[3-6]</sup> An estimated 1500-2750 individuals die annually in the United States following the ingestion of foreign objects.<sup>[7]</sup> Significant proportion of impaction

particularly in the elderly occurs at the site of benign or malignant strictures.<sup>[8]</sup> There are several reported serious and sometimes fatal complications associated with impacted pharyngo-esophageal foreign objects due either too late diagnosis, late referral to the hospital, or mismanagement.<sup>[7]</sup> A number of foreign bodies that are impacted in the throat are associated with acute symptoms calling for prompt removal.<sup>[9]</sup> Some of the swallowed foreign bodies pass harmlessly through the gastrointestinal tract.<sup>[10]</sup>

Rigid esophagoscopy for the removal of foreign bodies remains the best mode of treatment.<sup>[11-13]</sup> Others of importance include the use of flexible esophagoscopy, cervical esophagotomy, open thoracotomy,<sup>[14,15]</sup> and the use of Foley's catheter under fluoroscopic guidance.<sup>[11,16,17]</sup> Morbidity and mortality observed in cases of impacted aerodigestive foreign bodies in developing countries mainly stem from late presentation, late diagnosis, late referral to hospital, lack of adequate skills as well as nonavailability of relevant equipment in the hospitals.<sup>[18]</sup> Complications such as esophageal perforations, abscesses formation, pneumonia, may occur.<sup>[19-23]</sup> There might

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be associated anesthetic complications and sometimes mortality from either the foreign body or the procedure adopted for its removal.<sup>[24]</sup>

## MATERIALS AND METHODS

This is a 5-year retrospective study of all patients who presented to the emergency unit of the National Ear Care Center Kaduna Nigeria with diagnosis of aerodigestive foreign bodies from 1st January 2009 to 31st December 2013. Ethical clearance was obtained from the Research Ethics Committee of the study center.

The case notes of patients diagnosed with aerodigestive foreign body were retrieved. Demographics (age, gender, occupation, and tribe), clinical histories (duration of ingestion/aspiration, cough, drooling of saliva, dyspnea, Dysphagia, odynophagia, choking), examination findings (respiratory distress, fever, clinical status of the chest), investigations (X-ray soft tissue neck antero-posterior and lateral views, chest X-ray, serum electrolytes, packed cell volume) as well as intervention given (resuscitation, operative procedure, and intraoperative findings) were extracted. The data was analyzed using simple descriptive statistics. Results obtained from the analyzed data are as shown.

### Inclusion criteria

All patients with a diagnosis of aerodigestive foreign bodies within the period under review.

### Exclusion criteria

Patients with incomplete records in their file.

## RESULTS

Fifty-seven thousand nine hundred and four patients were seen at the study center during the period. Fifteen thousand eight hundred and fifty were emergencies out of which 96 presented with aerodigestive foreign bodies. The calculated hospital prevalence was 0.61%. The average annual incidence was 0.13%. Two patients did not meet the inclusion criteria and were excluded.

The minimum age at presentation was 3 months; maximum age was 80 years, with a mean age of  $17.36 \pm 20.03$  years. Table 1 shows the different age groups where aerodigestive foreign bodies were seen. Aerodigestive foreign bodies among Nigerians showed male preponderance, with a male to female ratio of 2.24:1. All our patients were symptomatic, having more than one symptom; the most common symptom was choking seen in 60 (%) of the patients, while the less common was fever seen in 14%. Predominantly, the aerodigestive foreign bodies were

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

| Age          | Frequency | Percentage |
|--------------|-----------|------------|
| 0-9          | 54        | 57.4       |
| 10-17        | 8         | 8.5        |
| 18-29        | 8         | 8.5        |
| 30-39        | 6         | 6.4        |
| 40-49        | 6         | 6.4        |
| 50-59        | 10        | 10.6       |
| 60 and above | 2         | 2.1        |
| Total        | 94        | 100.0      |

**Table 2: Procedures performed for retrieval of aerodigestive foreign bodies among Nigerians**

| Procedure           | Frequency | Percentage |
|---------------------|-----------|------------|
| Oesophagoscopy      | 59        | 62.77      |
| Bronchoscopy        | 25        | 26.59      |
| Direct laryngoscopy | 4         | 4.26       |
| Hypopharyngoscopy   | 6         | 6.38       |
| Total               | 94        | 100.00     |

**Table 3: Nature of aerodigestive foreign bodies retrieved among Nigerians**

| Nature of foreign body | Frequency | Percentage |
|------------------------|-----------|------------|
| Vegetative             | 5         | 5.32       |
| Bead                   | 9         | 9.57       |
| Coins                  | 2         | 2.13       |
| Plastic whistle        | 9         | 9.57       |
| Meat                   | 5         | 5.32       |
| Meat bone              | 8         | 8.51       |
| Denture                | 17        | 18.08      |
| Metallic objects       | 24        | 25.53      |
| Fish bone              | 4         | 4.26       |
| Plastic materials      | 6         | 6.38       |
| Not seen               | 2         | 2.13       |
| Others                 | 3         | 3.19       |
| Total                  | 94        | 100.00     |

lodged in the digestive tract while the airway foreign bodies constitute 30%.

Depending on the suspected site of impaction, an appropriate procedure was conducted. Table 2 shows esophagoscopy and foreign body removal as the most frequent procedure performed. Various objects and items were retrieved from the aerodigestive tracts of the patients. Intraoperatively, via rigid and flexible esophagoscopies, no foreign body was seen in 2 (2.13%) patients. Table 3 shows that the majority of the foreign bodies were of metallic origin, especially in the pediatric age groups, while denture was the predominant aerodigestive foreign body in adults.

Mortality was recorded in 1 (1.06%) patient who has co-morbidity. Esophageal perforation from denture

impaction was seen in 3 (3.19%), post-operative pyrexia, cardiac arrest, and death was recorded each in 1 (1.06%) of the patients. Importantly, 88 (93.62%) of our patients did not develop any complication from either the impacted foreign body or the procedure performed.

## DISCUSSION

Fifty-seven percent of those presented with aerodigestive foreign bodies to our center were children under 9 years of age. It shows another peak at 50-59 age group (11%). This finding is in consonance with the work of Alabi *et al.*<sup>[3]</sup> in Ilorin, Nigeria where the most common age group at presentation was 9 months to 3 years, also the work of Higo *et al.*<sup>[4]</sup> in Tokyo Japan, Mahafza *et al.*<sup>[5]</sup> and Al-Qudah *et al.*<sup>[23]</sup> in Jordan, Fatma *et al.*<sup>[15]</sup> in Turkey found the most affected age group to be under 3 years of age. Fifty-nine per cent of patients presenting with foreign bodies in Benin Nigeria were under 10 years of age in the work of Onyegwara *et al.*<sup>[2]</sup> It is not surprising that children under 9 years constitute the majority of our patients bearing in mind that children are so adventurous and usually do want to explore their facial orifices by inserting objects. However, most of the plastic whistles we encountered in this study were seen in children below 9 years of age. The second peak seen among those in the 50-59 years age bracket could be explained possibly by the increasing benign and or malignant esophageal conditions seen in the age bracket, especially in the developing world where malignancy age is observed to be about 10 years less than what is obtainable in the developed world.

Aerodigestive foreign bodies in Kaduna Nigeria showed male to female ratio of 2.2:1. This finding agrees with the work of Iseh *et al.*<sup>[7]</sup> in Sokoto Nigeria where the ratio approaches 2:1, as well as the works of Gulshan *et al.*<sup>[8]</sup> in Pakistan, Alabi *et al.*<sup>[3]</sup> in Ilorin Nigeria, Nwaorgu *et al.*<sup>[21]</sup> in Ibadan Nigeria and Onotai and Ibekwe<sup>[1]</sup> in Port Harcourt Nigeria. However, Al-Qudah *et al.*<sup>[23]</sup> in Jordan, Onyegwara *et al.*<sup>[2]</sup> in Benin Nigeria, Mahafza *et al.*<sup>[5]</sup> in Jordan as well as Fatma *et al.*<sup>[15]</sup> in Turkey did not find significant gender difference in their studies. No documented female preponderance was found in our literature search. The male preponderance found in this study could be attributed to the aggressiveness of the males.

Sixty-five (69.1%) of our patients had esophageal foreign bodies, 6 (9.23%) of which were located in the hypopharynx. Anatomically, the esophagus has its narrowest part at the region of the cricopharyngeus, demarcating the hypopharynx and the esophagus; the narrowing makes the area susceptible for foreign body impaction. This finding agrees with the work of Onotai and Ibekwe<sup>[1]</sup> in Port Harcourt Nigeria who found 66% in

their series being esophageal foreign bodies. Similarly, our finding is in agreement with the works of Alabi *et al.*<sup>[3]</sup> in Ilorin Nigeria where over 50% of the aerodigestive foreign bodies were impacted in the pharyngo-esophageal region. However, Onyegwara *et al.*<sup>[2]</sup> in Benin Nigeria found only 8.3% of ENT foreign bodies in the esophagus. The low number of esophageal foreign bodies in the work of Onyegwara *et al.* could be the inclusion of aural and nasal foreign bodies within the study population.

Sixty (63.83%) of the patients presented to the health facility within the first 24 h of ingestion of the foreign body, that was quite impressive while 3 (3.19%) patients presented after the first 24 h, probably due to the distance from the facility. Charles *et al.*<sup>[14]</sup> reported the time of presentation of an esophageal foreign body after about 4 days of ingestion, associated with mortality as a complication. Iseh *et al.*<sup>[7]</sup> reported the maximum duration of 7 years from impaction of esophageal foreign body to presentation. However, Umana *et al.*<sup>[10]</sup> in Calabar Nigeria reported 7 weeks period from ingestion of foreign body to presentation for care. Complications may arise from late presentation. However, due to awareness campaign on the services of the study center, majority of the patients enrolled for the study presented to the facility within the first 24 h of ingestion. In the same vein, of 29 patients with airway foreign bodies, 28 (96.55%) of them presented for care within the first 24 h of inhalation. A patient was referred from a peripheral hospital after 72 h of inhalation of a plastic material. It is documented<sup>[12,13,15-17]</sup> that patients present earlier due to symptoms such as the stridor and respiratory embarrassment.

The symptomatology of our patients is in line with the findings of Majori *et al.*<sup>[20]</sup> Fidkowski *et al.*<sup>[24]</sup> and Onotai and Ibekwe.<sup>[1]</sup> Esophageal foreign bodies were found to be associated with choking especially in children, likely due to the small caliber of their esophageal lumen.

Fifty (53.19%) of our patients were dehydrated, only one (1.06%) was clinically pale, 70 (76.1%) were normothermic, 8 (8.7%) were cyanosed, necessitating <6 h of resuscitation in 77 (83.7%) of the patients, the remaining 44 (46.81%) were resuscitated for 6-12 h. It is worthy of note that the majority of the dehydrated patients presented with impacted esophageal foreign bodies, with associated drooling of saliva. Our findings agree with those of Onotai and Ibekwe<sup>[1]</sup> who resuscitated all his patients. An oropharyngeal foreign body was seen in 1 (1.06%), which was impacted in the tonsils.

Ninety-three (98.94%) patients had roentgenograms of the soft tissue neck (anteroposterior and lateral views) and the

chest. X-ray of the soft tissue neck was suggestive of an aerodigestive foreign body in 58 (61.70%), while chest X-ray was suggestive of aerodigestive foreign body in 23 (24%) of the patients. Plain radiographs proved very useful in the evaluation of patients with suspected aerodigestive foreign bodies, especially in developing countries where the full gamut of radiologic facilities are not, usually, available in health centers. Akazawa *et al.*<sup>[6]</sup> reported the sensitivity and specificity of plain radiographs in evaluating esophageal foreign body to be 54.8% and 100%, respectively.

Seventeen (18.09%) of the patients had preliminary emergency tracheostomy to secure the airway before the definitive procedure. In Port Harcourt Nigeria, Onotai and Ibekwe<sup>[1]</sup> performed emergency tracheostomy in 50 (35.2%) of his patients. This is higher than what we found in our study. This is likely due to late presentations in their series, as in both studies esophageal foreign bodies predominate.

Direct laryngoscopy and foreign body removal was done in 4 (4.23%) patients, hypopharyngoscopy and foreign body removal in 6 (6.38%), bronchoscopy and foreign body removal in 25 (26.59%) patients while esophagoscopy and foreign body removal was performed in 59 (62.77%) patients. The two patients with missing esophageal foreign bodies were referred to cardiothoracic surgeons for an open procedure. Rigid scopes, though not encouraged for removal of aerodigestive foreign bodies are found handy in Nigeria. Keith<sup>[22]</sup> and Majori *et al.*<sup>[20]</sup> both posited that Fiberoptic scopes are the only acceptable intervention for objects that have been impacted for more than a few hours, sharp objects such as flange of dentures, button batteries, and those that are not smooth or inert. Thus, flexible scopes are superior to rigid scopes in the setting of distally wedged foreign bodies; however, the scopes are in most instances, not available in most healthcare facilities in the developing countries.

In this study, metallic objects accounted for a larger proportion of the aerodigestive foreign bodies, followed by impacted denture materials. This finding contradicts the report put forward by Gulshan *et al.*<sup>[8]</sup> in Pakistan where coins (55.6%) and meat bolus (20.7%) accounted for the foreign bodies, and those of Iseh *et al.*<sup>[7]</sup> Mahafza *et al.*<sup>[5]</sup> Fatma *et al.*<sup>[15]</sup> and Al-Qudah *et al.*<sup>[23]</sup> who found coins, peanuts, toys among the most commonly ingested or aspirated foreign bodies. Reason for denture being a significant contributor of impacted foreign bodies in our series could be because our study population consisted of both the adults and pediatric age groups.

Retrieval of aerodigestive foreign bodies could be with complications. In this study, complication rate of 6.38%

was recorded, about 50% of which was from impacted denture material. This appears to be slightly higher than what is reported by Mahafza *et al.*<sup>[5]</sup> Shraga *et al.*<sup>[16]</sup> who reported 2-6%. Iseh *et al.*<sup>[7]</sup> Al-Qudah *et al.*<sup>[23]</sup> did not report any complication. However, Onyegwara *et al.*<sup>[2]</sup> reported complication rate of 14%, which was attributed to late presentation. Singh *et al.*<sup>[17]</sup> found out that there is increased the incidence of complications with advancing age over 10 years of age.

Eighty-nine (94.68%) patients were discharged after an uneventful postoperative recovery. A patient that had cardiac arrest on the table was resuscitated and referred for intensive care. Three patients with esophageal perforations were referred to cardiothoracic surgeons for open operative treatment.

Hospital stay ranged from a day to 29 days; mean duration was  $4 \pm 4.08$  days. Nwaorgu *et al.*<sup>[21]</sup> reported the maximum period of hospitalization as 32 days, with a mean of 9.4 days.

## CONCLUSION

Aerodigestive foreign bodies pose a serious challenge in the setting of a poor resource country with death of diagnostic and interventional facilities. Late presentation and advancing age are associated with complications.

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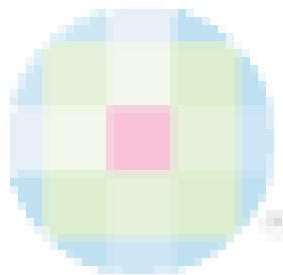
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