Full Length Research Paper

Impacted foreign bodies in the larynx of Nigerian children

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ABSTRACT

Impacted foreign bodies in the larynx of children constitute a medical emergency and require immediate intervention. Most health workers are not equipped to deal with the challenge posed by this clinical condition. This study was carried out to evaluate our experience of impacted foreign bodies in the larynx of children in Nigeria. It will highlight the factors associated with increase in the occurrence, poor prognosis and proffer preventive measures. This is a prospective study of 128 patients seen in the Ear, Nose and Throat (ENT) department of University of Port Harcourt Teaching Hospital (U.P.T.H) and Rex Medical Centre both in Port Harcourt, Nigeria. This study was done over a five year period from January 2007 through December 2011. All children (age range 0-14 years) admitted with foreign bodies’ impactions in the larynx were selected for the study. Demographic and clinical data were documented and simple statistical tables were used to illustrate the data. Data analysis was done using SPSS for windows 15. A total of 128 patients were found to have impacted foreign bodies in their larynx. The otorhinolaryngological cases seen during the study period was 5,200 giving a prevalence rate of 2.5%. They were 90 males and 38 females (M: F ratio of 2.4:1). Age range was 0-14 years with a mean of 3.88 ± 2.47years. The highest incidence was in the age group 3-5 years. The commonest foreign body encountered was fish bone 90 (70.31%). Impacted foreign bodies in the larynx of children were common in our environment. They were mostly found in the age group 3-5 years. The commonest foreign body was fish bone. It is of public health importance to enlighten our population and health workers on how to prevent and manage the condition.

Keywords: Foreign body impaction, larynx, dyspnoea, tracheostomy, direct laryngoscopy, Nigeria.

INTRODUCTION

Impaction of foreign bodies in the larynx constitutes a medical emergency and requires immediate intervention. It is a common cause for Ear, Nose and Throat (ENT) referrals worldwide (Tan et al., 2000). Foreign bodies can get stuck in many different locations within the airway causing respiratory distress. However, most health workers in developing countries are not equipped to deal with the challenge posed by this clinical condition (Okafor, 1995).

The anatomy of the larynx is complex; it includes cartilages, membranes and muscles. After the aspiration of foreign body it can settle in 3 anatomic sub sites of the larynx namely; supraglottis, glottis and subglottis. It may further settle anywhere in the tracheo-bronchial tree if it is small enough to slip through the larynx. However, larger objects tend to impact in the larynx (Lima, 1989).

A suitably placed foreign body in the mouth can be aspirated into the larynx during the phase of deep inspiration when the larynx opens wide. Children lack molars for proper grinding of food and their cough reflex is less efficient. Besides, they lack good coordination of swallowing and glottic closure. All these make them more prone to foreign body aspiration (Onotai and Ebong, 2011).

Foreign bodies that can be impacted in the larynx include; metallic objects, plastic materials, fish bones and toy parts (Okafor, 1995; Ijaduola, 1986). However, vege-
mandatory. This can only be performed most times in a
conservative measures fail then a tracheostomy is
the upper airway obstruction is imperative and if
condition in our environment, this study was set out to
evaluate our experience with impacted foreign bodies in
the larynx and if there is primary care physicians and pediatricians to the need for
prompt diagnosis and early referral of patients to the
otolaryngologist. Finally, it will bring to light preventive
measures that can help curb the prevalence rate in our
environment.

MATERIALS AND METHODS

This is a prospective study of 128 patients seen in the
E.N.T department of U.P.T.H and Rex Medical centre
both in Port Harcourt, Nigeria over a five year period from
January 2007 to December 2011. Both hospitals serve as
referral centers for otorhinolaryngological cases. All
children (age range 0-14 years) admitted into the E.N.T
wards of both hospitals with impacted foreign bodies in
the larynx were recruited into the study. The age, gender,
clinical presentation, types of foreign bodies, intervention
options employed and results of treatment were
recorded. Simple statistical tables were used to illustrate
the data. Categorical data were expressed as mean and
standard deviation. Data analysis was done using SPSS
for windows 15.

RESULTS

A total of 128 patients were found to have impacted
foreign bodies in their larynx within the study period. The
total otorhinolaryngological cases seen in both hospitals
during this period were 5,200 giving a prevalence of
2.5%. Most of the patient 95 (74.22%) were from U.P.T.H
while the remaining 33 (25.78%) were from Rex Medical
centre. There were 90 males and 38 females with M: F
ratio of 2.4:1. The age range was 0-14 years with a mean
of 3.88 ± 2.47years. The highest incidence was found in
the age group 3-5 years (Table 1). Most of the patients
115 (89.84%) presented with difficulty in breathing,
hoarseness and occasional cough, while the remaining
13 (10.16%) presented with paroxysmal cough and
fatigue.

Most patients 88 (68.75%) presented late to the
hospital after 24 hours (Table 2) and the reasons were;
wrong diagnosis made by the primary physician that first
saw the patients (40%), poverty (30%) and ignorance on
the part of the parents (30%). Only 70 (54.69%) patients
did radiological investigations prior to removal of foreign
bodies. Haziness around the laryngeal inlet and radio-
opaque shadows around and within the laryngeal inlet
were the main features revealed by plain radiographs.
The commonest foreign bodies encountered were fish
bones 90 (70.31%) (Table 3). Most of the foreign bodies
85 (66.41%) impacted in the supraglottis region, 28
(21.87%) transglottis region and 15 (11.72%) in the
subglottis region.

The majority of the patients 108 (84.38%) had
tracheostomy which was either followed immediately or
later with direct laryngoscopy for the extraction of the
foreign bodies (Table 4). With plain radiographs we were
able to confirm some cases. However, majority of the
foreign bodies were confirmed Intra-operatively. We
encountered some complications associated with both
the foreign bodies` impaction and treatment. They were
Laryngeal oedema 40 (31.25%), subcutaneous
emphysema 4 (3.13%), tracheostomy tube dependence 2
(1.56%) and laryngeal stenosis 2 (1.56%). However,
there was no mortality in our study.

### Table 1. Age distribution of patients

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>No. of cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>30</td>
<td>23.44</td>
</tr>
<tr>
<td>3-5</td>
<td>80</td>
<td>62.50</td>
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<tr>
<td>6-8</td>
<td>10</td>
<td>7.81</td>
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<tr>
<td>9-11</td>
<td>5</td>
<td>3.91</td>
</tr>
<tr>
<td>12-14</td>
<td>3</td>
<td>2.34</td>
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</tbody>
</table>

The child who has aspirated foreign body can present
to the physician in several ways. The child will almost
certainly produce initial coughing, gagging, or spasmodic
choking. Acute signs and symptoms may be immediate
and result from complete occlusion or irritation of the
larynx (Ijaduola, 1986; Kent and Watson, 1990). Besides,
the child may present with dypsnoea and inspiratory
stridor and may be cyanosed. In most of the cases when
the patient develops sudden respiratory distress from an
impacted foreign body in the larynx and if there is
complete obstruction, the patient more often than not dies
before getting to the hospital (Okafor, 1995).

Nevertheless, foreign body can be dislodged from the
larynx of a toddler by inverting the child and slapping it’s
back. In older children and adults Heimlich maneuver can
be performed especially when the foreign body is a bolus
of food (Heimlich and Patrick, 1990). Immediate relief
of the upper airway obstruction is imperative and if
conservative measures fail then a tracheostomy is
mandatory. This can only be performed most times in a
hospital setting (Alabi et al., 2006; Singh et al., 2009). In
emergency situation, the patient must first be
resuscitated and airway secured before carrying out
radiological investigations and direct laryngoscopy (Silva
et al., 1998; Diop et al., 2000).

In view of the challenges posed by this clinical
condition in our environment, this study was set out to
evaluate our experience with impacted foreign bodies in
the larynx of children. It will also draw the attention of
matter like groundnouts and corn usually find their
way into the tracheo-bronchial tree because of their small
sizes (Kitchner and Baidoo, 2009/10; Onotai and Ebong,
2011). It will also draw the attention of

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</tr>
<tr>
<td>12-14</td>
<td>3</td>
<td>2.34</td>
</tr>
</tbody>
</table>
Table 2. Duration of patient symptoms before presentation to hospital

<table>
<thead>
<tr>
<th>Duration of symptom</th>
<th>No. of cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 24 hours</td>
<td>40</td>
<td>31.25</td>
</tr>
<tr>
<td>More than 24 hours</td>
<td>70</td>
<td>54.69</td>
</tr>
<tr>
<td>but less than 72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 72 hours</td>
<td>8</td>
<td>6.25</td>
</tr>
<tr>
<td>but less than 1 week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 1 week</td>
<td>10</td>
<td>7.81</td>
</tr>
</tbody>
</table>

Table 3. Type of foreign bodies

<table>
<thead>
<tr>
<th>Types</th>
<th>No. of cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish bone</td>
<td>90</td>
<td>70.31</td>
</tr>
<tr>
<td>Key</td>
<td>6</td>
<td>4.69</td>
</tr>
<tr>
<td>Toy part (plastic and metallic)</td>
<td>15</td>
<td>11.72</td>
</tr>
<tr>
<td>Meat bone</td>
<td>8</td>
<td>6.25</td>
</tr>
<tr>
<td>Ear ring</td>
<td>4</td>
<td>3.13</td>
</tr>
<tr>
<td>A piece of metallic object</td>
<td>2</td>
<td>1.56</td>
</tr>
<tr>
<td>Eraser</td>
<td>3</td>
<td>2.34</td>
</tr>
</tbody>
</table>

Table 4. Treatment modalities

<table>
<thead>
<tr>
<th>Modality of treatment</th>
<th>No. of cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency tracheostomy + direct laryngoscopy +removal of foreign body on the day of presentation</td>
<td>38</td>
<td>29.69</td>
</tr>
<tr>
<td>Direct laryngoscopy alone + removal of foreign body on the day of presentation</td>
<td>20</td>
<td>15.63</td>
</tr>
<tr>
<td>Emergency tracheostomy on the day of presentation + Direct laryngoscopy + removal of foreign body 1 week after presentation</td>
<td>70</td>
<td>54.69</td>
</tr>
</tbody>
</table>

DISCUSSION

Laryngeal foreign bodies in children have a prevalence of 2.5% an indication that this emergency condition is not uncommon in our environment. The reported prevalence of impacted foreign bodies in the larynx in literature varies from 2% to 11% (Rothmann and Boeckman, 1980).

In this study, male predominance was found, this could be attributed to the more physical and adventurous nature of the males than their female counterpart. Ibekwe in his study in Enugu South Eastern part of Nigeria also
found male predominance (Ibekwe, 1985). Similar finding was reported in Dakar Senegal (Diop et al., 2000).

We also found that the age group 3-5 years accounted for the highest number of cases. Impacted foreign bodies in the larynx were found to be higher in children predominantly in the under five age group compared to the adult population (Ijaduola, 1986). Special attention should be given to this vulnerable group of children especially when playing because they are likely to put small pieces of toy parts into their mouth. Besides, they should not be allowed to play or run with food or other objects in their mouths (Onotai and Ebong, 2011).

This study confirmed that the commonest foreign body that was impacted in the larynx of children was fish bone followed by toy parts and meat bone. These findings have been reported by other researchers in the past (Ibekwe, 1985; Ijaduola, 1986; Okafor, 1995; Lifschultz and Donoghue, 1996; Knight and Lesser, 1999; Tan, 2000). Fish meal is very common in Port Harcourt and other major cities of Nigeria; this could contribute to the high occurrence of impacted fish bones found in the larynx of children in the country. Toy is a common playing tool of children all over the world; its parts can be readily available to children (Bloom et al., 1995).

The clinical presentation of our patients was similar to the findings of other researchers (Ijaduola, 1986; Kent and Watson, 1990). Most of our patients presented with difficulty in breathing, hoarseness and occasional cough. However, when a primary care physician gets a history of choking, hoarseness and cough preceding severe respiratory distress especially in a child eating a fish meal or playing with toys unsupervised, the physician should have a high index of suspicion for impacted foreign body in the larynx until proven otherwise (Esclamado and Richardson, 1987; Kent and Watson, 1990; Martin and Van Hasselt, 2009).

Plain radiographs of the lateral soft tissue of the neck and that of the chest were necessary in the work-up of the patients. However, not all patients in our study could afford radiological investigations. Depending on the type of foreign body aspirated, radiological investigations can identify the foreign body as well as localize the site of impaction before removal. Metallic foreign bodies can be demonstrated clearly while the non-metallic foreign bodies may just show haziness around and within the laryngeal inlet. Furthermore, radiological investigations are very important in the post-operative management and follow up of the patients (Silva et al., 1998).

The majority of the foreign bodies found in our study were impacted in the supraglottis of the larynx. This could be attributed to their large size. Smaller size foreign bodies are more likely to slip through the larynx into the tracheo-bronchial tree. Ijaduola in his study in the South Western part of Nigeria found majority of his patients to have foreign bodies impacted in the transglottis region of the larynx none was impacted in the supraglottis region (Ijaduola, 1986).

Late presentation was a notable factor that could affect the prognosis of impacted foreign bodies in the larynx. We observed that most of the patients presented to the hospital after 24 hours of incidence and these were the group that developed most of the complications we encountered in our study. Other researchers had similar experience (Esclamado and Richardson, 1987; Okafor 1995; Philip et al, 2004; Bloom et al., 2005).

Our study revealed the reasons for late presentation to the hospitals they were; wrong diagnosis made by the primary care physician that first saw the patient, poverty and ignorance. In developing countries poverty and ignorance plague the population and out of pocket expenses are usually high because the healthcare financing method is predominantly by a direct payment which is regarded as the most primitive healthcare financing method (Walshe and Smith, 2006). Ibekwe, Ijaduola and Okafor have highlighted these findings in the past (Ibekwe, 1985; Ijaduola, 1986; Okafor, 1995).

Most of our patients had emergency tracheostomy and direct laryngoscopy for the removal of their foreign bodies. Besides, they were also managed with antibiotics and steroids. However, the management of these patients may be different in the developed countries because their patients tend to present early. Besides, their hospitals have better diagnostic, therapeutic and monitoring facilities.

Emergency tracheostomy was performed in almost all of the patients because most of them presented with severe respiratory distress. More so, from our experience in the past, patients who were treated without securing their airways with a tracheostomy tube before extraction of the foreign bodies tend to have more post-operative complications and mortality. Our management approach was similar to that employed by other researchers locally (Ijaduola, 1986; Okafor, 1995; Alabi et al., 2006).

Post-operatively, laryngeal oedema was found in most of the patients while laryngeal stenosis and tracheostomy tube dependence accounted for few cases. Ibekwe in Enugu, South Eastern Nigeria also found laryngeal oedema to be outstanding in his study (Ibekwe, 1985). Most complications arose from delay in making accurate diagnosis and late referral by the primary care physicians who first saw the patients. Poor surgical techniques by the surgeons could be blamed for surgical emphysema while laryngeal stenosis could either result from poor surgical technique or injury from the foreign body (Okafor, 1995).

A very remarkable complication of treatment worthy of mention is the displacement of foreign bodies into the tracheo-bronchial tree. However; we did not encounter this in our study (Esclamado and Richardson, 1987). Those patients with tracheostomy tube dependence were surgically decanulated in the theatre while those with laryngeal stenosis were referred to centers that had better facilities within the country for further expert management.
CONCLUSION

Impacted foreign bodies in the larynx of children were not uncommon in our environment. They were mostly found in the age group 3-5 years. The commonest foreign body encountered was fish bone. It is therefore of public health importance to enlighten our population on the need to supervise carefully the feeding of children with fish meals and to keep small objects and toys out of their reach (Karatzanis et al., 2007). It is equally important to educate health care providers on how to make prompt diagnosis of the condition to enhance early referral to the otolaryngologist.

REFERENCES


