

EPIDEMIOLOGY OF TRACHEOBRONCHIAL FOREIGN BODIES IN IBADAN

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ABSTRACT

In a review of 135 cases of tracheobronchial foreign body aspirations over a period of 18 years (1975 – 1992) managed at the cardiothoracic surgical unit of the University College Hospital, Ibadan, predisposing factors, factors of prognostic importance and problems associated with foreign body aspirations were determined. There was an increased annual incidence of cases of foreign body aspiration from 6 per annum (1975 – 1984) to 11 per annum (1985 – 1992). Children under 12 years (81%) were most involved in this home accident, of which 61.4% were under 5 years of age. The male: female ratio was 1.85:1. Interval between aspiration and removal (time-lag) ranged between 5 hours to 9 years. Majority, 104 (77%) were seen within one week of the aspiration, of which 76(73%) came within 2 hours of aspiration. Ninety-six (69.6%) of the 138 retrieved foreign bodies were organic, while 42 (30.4%) were inorganic. The commonest organic foreign bodies were groundnut and corn, and they were found most commonly in the under-3 year olds. The peak incidence of aspirated organic foreign bodies was in the rainy season. The school age (4-10years) showed the highest incidence of aspirated inorganic foreign bodies. Symptoms were most severe with organic foreign bodies in children. There was a higher incidence of aspiration among the low social class. Six patients were brought in dead. This suggests larger unrecognized mortality. Improvement of the total environment of the Nigerian would significantly improve the outlook of this home accident.

KEYWORDS: *Foreign bodies, Tracheobronchial, Epidemiology.*

INTRODUCTION

The incidence of foreign bodies inhaled is closely related to the habits and the environment of the patients^{1,2}.

This communication highlights the causative factors and the problems associated with aspiration of foreign bodies in Nigeria. The factors of prognostic significance are also examined with the aim of determining areas where preventive measures could be directed at.

SUBJECT AND METHODS

One hundred and forty one patients with tracheobronchial bodies were seen over 18 years (1975 – 1992) at the Cardiothoracic Unit of the University College Hospital, Ibadan. One hundred and thirty five of these were managed over this period. Six cases with history of foreign body aspiration were brought in dead to the children emergency unit of the hospital.

The catchment area of the unit encompasses Kwara, Kogi, Oyo, Osun, Ogun and more recently Lagos states of Nigeria. Referrals from these areas constitute the basis for this study. Data obtained from the study of the patients case notes and unit's records were analysed for age and sex, time-lag between aspiration and treatment, and nature of aspirated materials. Other data were site of lodgment of foreign bodies and factors contributory to the observed morbidity and mortality.

RESULTS

Incidence

Annual emergencies seen by the Cardiothoracic Surgical Unit averaged 240 cases between 1975 and 1984 and 350 cases from 1985 to 1992. Over the first 10 years, 55 cases of aspirated foreign bodies were managed, while 90 cases have been managed in the following 8 years (1986 – 1992). The annual incidence of cases increased from 6 to 11 cases.

Age/Sex: the age distribution is as shown in the diagram. The male: female ratio was 1.85:1. One hundred and fourteen patients (84.4%) were under 12 years of age and there were 21 (15.6%) adolescents/adults. Seventy of the children (61.4%) were under 5 years while 62 (88.6%) of these were under 3 years. Forty (29.6%) of the cases were female, all under the age of 12 years. Ninety-five patients (70.4%) were males out of which 74 were under 12 years. In the paediatric age group (under 12 years) 74 were males and 40 were females.

Time-Lag/Symptoms

The time interval between aspiration of foreign body and removal ranged between 5 hours to 9 years. Majority, 104 (77%) of the patients managed came within one week of aspiration of foreign bodies, of which 76(73%) were seen within 24 hours. Most of the patients, 96(92.3%) had initial paroxysms of dry cough and dyspnoea and about 80 (76.9%) had pyrexia associated with these.

Thirty-one (23%) patients presenting later than one week had mild degree of productive cough and dyspnoea. Many had

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been treated for bronchopneumonia and 6 cases had had several months of anti-tuberculous drugs.

Aspirated Agents vs Age of Patient

Table 1 shows the types of foreign bodies retrieved from the tracheobronchial tree. One hundred and thirty eight foreign bodies were retrieved from 135 patients. There were multiple foreign bodies in 2 patients. Ninety-six (69.6%) of the retrieved foreign bodies were organic while 42 (30.4%) were inorganic. Groundnut retrieved in 59 patients, was the commonest foreign body aspirated (42.8%), forty-eight (81.4%) of which were retrieved from under three year olds. Corn, the next commonest, was retrieved from 25 patients (18%), 10 of which were retrieved from under 3 year olds. Adolescents and adults accounted for the remaining cases of aspiration of groundnut and corn grains. The school age children (4-10 years) accounted for the majority of the aspirated inorganic foreign bodies.

Table 1: Foreign Bodies Retrieved from the Tracheobronchial Tree

	Number of Cases	Percentage
Organic Foreign Bodies	96	69.6
Groundnut	59	42.8
Corn	25	18.1
Orange Seeds	7	5.1
Coconut	3	2.2
Meat Fibres	2	1.4
Inorganic Foreign Bodies	42	30.4
Metal	25	18.1
Metal screw	8	5.8
Metal earrings	7	5.1
Office pin	4	2.9
Nail	2	1.4
Press button	2	1.4
Biro tip	2	1.4
Others	17	12.3
Metal/Rubber	8	5.8
Beads	4	2.9
Tooth	2	1.4
Plastic	2	1.4
Touchlight	1	0.7

Table 2: Site of Lodgment of Tracheobronchial Foreign Bodies (FB)

Site of Lodgement	Adolescent/Adult No. of FB (n=21)(%)	Children No. of FB (n=17)(%)
Trachea/Carina	-	5(4.3)
Bronchus	21(100)	112(95.7)
Right	17(81)	67(57.3)
Left	4(19)	45(38.5)

Sites where lodged

Eighty-four foreign bodies (60.01%) were located in the right broncho-pulmonary tree while 49 (35.5%) were on the left and 5(3.6%) were located in trachea/carina. Table 2 shows the site of lodgement of 138 tracheobronchial foreign bodies. Lodgement on the right side was commoner among adolescent/adult but was less prominent among the children.

Social Status

The Social class of children and adolescent cannot be separated from the class of the parents or guardian. In children, 98 cases (86%) of foreign body aspirations were among low income earners, children of the middle income earners accounted for 12 cases (10.5%) while the high income earners accounted for 4 cases (3.5%). In the adolescent group there were 15 (71.4%) from the low-income class and 6(28.6%) from the middle-income class.

Morbidity

There were 16 patients with prolonged retention of foreign bodies 11(68.8%) of which were under 9 years of age. The period of retention ranged between 4.8 to 103 months. All these patients had bronchiectasis as the complication consequent to the prolonged retention.

DISCUSSION

Foreign body aspiration or ingestion is probably the most common paediatric emergency in Nigeria, though the exact incidence may never be known because many are not recognised especially in the rural communities¹. In consonance with the status in the USA³, foreign body aspiration may be the greatest cause of accidental death at home among Nigerian children^{1,4}. Increased hospital incidence to 11 cases per annum in our series may be related to improved awareness by the populace of the high salvage rate at hospital. Though less frequent when compared to empyema thoracis with an annual incidence of 89 cases, (Unpublished unit data), tracheobronchial foreign body poses a greater diagnostic and management challenge in a developing country.

Aspiration of foreign body occurs in every age group. However, our findings from this study and the previous series from Nigeria^{1,4} corroborate the findings from other parts of the world that children are more involved in aspiration of foreign bodies when compared to other age groups. This preponderance of children was found to be related to habits and anatomical factors among children^{2,4}. The circumstances under which the foreign bodies were aspirated particularly in children have involved either eating or playing^{1,3,4}. Contributory were the anatomical relation of the larynx in children; difficulty in chewing due to lack of wisdom teeth; the habit in children of putting every object into their mouth; and the shouting, crying and playing during eating^{2,4}. The place of carelessness of the parents cannot be underplayed^{2,5}. The circumstances in the adolescent and adults in Nigeria were found to be related to aspiration of various organic materials after the vomiting related to bouts of alcohol ingestion, and the habit of putting foreign bodies (e.g. office pin) in the mouth while speaking. Also, the games played by throwing groundnuts or corn up in the air and attempting to catch the seeds with open, upturned mouth has been found to result in

aspiration of such seeds. The higher activity in boys could contribute to the higher incidence of aspiration among them. This experience has also been previously shown in Lagos and Enugu series (both are centres in Nigeria).

The various time-lags are explained by the severity of the symptoms². Aspiration of a foreign body usually results in sudden bouts of cough, wheezing, dyspnoea and stridor. As the severity of these symptoms varies so also do the durations^{2,3,4}. The severity of these symptoms is related to site of lodgment of foreign body in the airways², the calibre of air passages⁴, and the chemical nature of aspirated foreign body^{1,3,6}. Other factors contributory to the severity of symptoms are, the ages of the patients⁴ and morphological characteristics of the foreign body⁶. Symptoms were worst with proximally located foreign bodies and are more dramatic among children because of their narrow air passages. Organic foreign bodies produce more severe symptoms and for a longer duration while smooth surfaced foreign bodies with spherical outlines are more obstructive and destructive^{6,7}. Our findings also accord well with other previous studies^{1,4} that two phases of symptoms are recognised (a) The Short phase of acute dyspnoea, cough, wheeze, stridor during inhalation and (b) The long phase of less distressing cough, mild pyrexia and dyspnoea^{1,2,4}. If the short phase is missed, the possibility of misdiagnosis is increased and a long time-lag may result^{4,6}. Therefore if a mother insists that her child has "swallowed something down the wrong way", or with something in its mouth has choked, gagged or coughed, attention should be paid to the story. Every practicable investigation should be carried out to exclude the presence of foreign body in the respiratory tract^{4,7}. This approach will prevent the complication of prolonged retention and the attendant destruction of the lung parenchyma^{6,7}.

Organic foreign bodies predominated and this is also the experience in Enugu¹, Greece², Kuwait⁴, Australia⁸, and Lagos⁴. Groundnut and corn seeds were the commonest hence the incidence of aspiration were highest in the rainy season (April – September in Nigeria). This type of relationship was experienced with water melon seeds in summer months in Kuwait⁴, while pumpkin seeds have a perennial incidence related to the dieting habits of the Greeks³.

The site of lodgment of foreign bodies is considered the most dependent at the time of the aspiration². The right main bronchus is the direct continuation of the trachea in the erect posture, hence does constitute the most direct passage for foreign body aspiration in the erect posture and in the right lateral position. However in the left lateral position, most foreign bodies which are small enough pass into the left side. These factors account for the difference in distribution of site of lodgment between the adolescent/adult and children. The review from

Lagos⁴ shows that majority of the children had right sided lodgment while reviews from Enugu¹ had almost equal lodgment to both sides of the chest. The pattern of lodgment is ultimately related to the position of the patient, method of retrieval and how fixed the foreign body is at the time of retrieval.

The labour force and burden of the Nigerian economy falls on the low socio-economic class. Salary is also lowest in this group with the resultant recruitment of all family members in petty trading to raise money for family upkeep. This could account for the significantly higher incidence of foreign body aspiration in the low-income group¹. There is reduced supervision in the home setting of the children. The adolescent of this group also tends to be more independent and venturing in the habit of playing with the organic foreign bodies. The total environment of the low social income Nigerian needs to be improved to significantly influence this home accident. The mortality recorded seems to be the tip of the Iceberg. Doubtless to say that many cases within the catchment area of the University College Hospital, Ibadan too distantly located die without getting to the hospital.

We conclude that tracheobronchial foreign body aspiration is better prevented than cured. Preventive measures directed at public awareness will reduce the incidence and limit the morbidity of this home accident.

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