PATTERNS OF FOREIGN BODY IN THE AERO-DIGESTIVE TRACT OF THE PEDIATIC PATIENTS IN TIKUR ANBESSA HOSPITAL

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Abstract

Background: *Aspiration of foreign materials into the airway is one of the causes of choking and death in children before they obtain medical assistance. Lodging of foreign bodies in the constricted part of the esophagus is also another cause of morbidity in children.*

Objective: *The objective of this study was to describe patterns of foreign body accidents and treatment outcomes in the hospital.*

Material and methods: *A retrospective analysis of admissions of foreign bodies in the aero digestive tract was done over four years from May 2001 up to April 2005. Data was collected from patient records.*

The record of each patient was examined for the following information; age, sex, address, nature and site of foreign body, history of ingestion/aspiration, circumstance of the accident, presenting signs and symptoms interval between accident and hospital admission, radiological evaluation at admission, type of treatment, duration of hospital stay and final out come.

Results :*There were 71(65.1%) boys and 38(34.9%) girls with foreign body aspiration or foreign body ingestion. There was definitive history of foreign body aspiration or ingestion in 101(92.6%) of children. Of 38 cases of foreign body aspiration 19(50%) circumstance of the accident was while feeding whereas among 71 cases of foreign body ingestion 43(60.6%) circumstances of the accident was while playing with the object. The commonest radiological finding is infiltration/consolidation in the case of foreign body aspiration whereas all cases of foreign body ingestion showed radio –opaque foreign body in the esophagus.*

Conclusions :*There was no failure and death during surgical procedures in the study period unlike the previous study which showed high failure and death rate. This marked difference appears to be because of improvement in the management of foreign body aspiration.*

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Introduction

Foreign body aspiration is an important cause of morbidity and mortality in childhood and occurs most frequently in children aged between 6 months and 4 years (1).

Unfortunately the presence of foreign body in the air way and food passages may be some what difficult to diagnose in view of the fact that this problem mimics many other clinical entities (2). Pediatricians and primary care physicians must have high index of suspicion for the problem when developing differential diagnosis of any patient with upper respiratory symptoms or with difficulty of feeding (2).

The inhalation of foreign body is the leading cause of accidental death at home in children under 6 years of age (3). The diagnosis is challenging and can be overlooked because it usually occurs in infants and toddlers (1).

Clinical features which help in the diagnosis of foreign body aspiration are history of foreign body aspiration, which may be positive in up to 80% of cases, the common triads of coughing, choking and wheezing are the presenting features of children with foreign body aspiration (1- 4).

Chest x-ray findings in foreign body aspiration includes; radio-opaque foreign bodies which can be present in around 8% of cases, obstructive emphysema or atelectasis may be characteristics (1- 4). Chest x-ray may be normal in as much as 15 to 35% of cases (5).

Children less than 5 years of age are at greater risk of foreign body ingestion, with typical peak of incidence between one to two years of age (6-8). Esophageal foreign bodies in children are most commonly smooth and blunt that lodge in the proximal esophagus (9). These foreign bodies which lodge in the middle and distal esophagus require prompt removal to prevent complications which may include aspiration, esophageal erosion and perforation depending on the duration of residence (9). Coins are frequently swallowed by children and account for majority of esophageal foreign bodies (9).

Children with foreign body in the esophagus may present with refusal to take foods, increased salivation, pain, and discomfort on swallowing, vomiting or respiratory symptoms (2,9). Esophageal foreign bodies have to be removed by flexible endoscope. Folly catheter can be used as alternative, even though it has several draw backs (9). Plain film of the chest should be obtained one to two hours before attempting removal to verify esophageal location and avoid unnecessary endoscopy (9). The smooth blunt esophageal foreign body shouldn't have to be in place longer than two weeks. Batteries lodged in the esophagus should be removed urgently (8). Removal should be done under direct visualization by endoscopy (8).

The objective of this study was to describe patterns of foreign body accidents and treatment outcomes in a tertiary hospital.

Tikur Anbessa Hospital Department of Pediatrics has 150 bed capacity. It trains both under and post graduate students and gives service to all sick children. Surgical emergencies that need urgent intervention are first admitted to the Emergency Ward and later transferred to the wards. This analysis includes all admissions to the ward with the diagnosis of foreign body in the aero-digestive tract.

Materials and methods

Data was collected from charts of patients with diagnosis of foreign body aspiration and foreign body ingestion over period of four years from May 2001 up to April 2005 and was entered into data sheet prepared in away to include all necessary variables of the study. There were 182 patients admitted with the diagnosis of foreign body aspiration and foreign body ingestion over the study period, and 109 children‘s charts were retrieved. For all 109 children analysis was done in terms of age, sex, address, clinical features, duration of symptoms, circumstances of the accident, x-ray finding, modality of management, type of foreign body, duration of hospital stay and out come. After data collection was over, analysis was made using computer with spss10.0 soft ware program.

Results

There were 71 (65.1%) boys and 38 (34.9%) girls with foreign body aspiration or foreign body ingestion. Out

of the 109 patients, 71 (65.1%) were with foreign body ingestion and 38 (34.9%) were with foreign body aspiration. Sixty five (59.6%) were less than 5 years (Tables 1). There was definitive history of foreign body aspiration or ingestion in 101 (92.6%) of children. Duration of symptom before admission ranges from 01 hour to one year the average being 17 days.

Among the 38 cases of foreign body aspiration, 19 (50%) the circumstance of the accident was while feeding where as among 71 cases of foreign body ingestion 43 (60.6%) circumstances of the accident was while playing with the object (Table 2)

Table 1- age distribution of children with foreign body in the aero-digestive tract.

Age	(%)
< 1yr	16 (14.7)
1-5yrs	49 (45.0)
6-12yrs	29 (26.6)
>12yrs	15 (13.8)
Total	109 (100.0)

Table 2 - Circumstances of the accident in foreign body aspiration and ingestion.

Circumstance	F.B Aspiration *N* (%)	F. B ingestion *N* (%)	Total N (%)
while feeding	19 (50.0)	4 (5.6)	23 (21.1)
while exploring	11 (29.0)	59 (83.1)	70 (64.1)
Not witnessed	5 (13.2)	3 (4.2)	8 (7.3)
Other	3 (7.9)	5 (7.0)	8 (7.3)
Total	38 (100)	71 (100)	109 (100)

Majority of patients with foreign body aspiration presented with cough and dyspnea whereas the main presenting features of foreign body ingestion was vomiting and difficulty of feeding (Table - 3)

Among the 71 cases of foreign body ingestion 53 (74.6%) cases ingested coins whereas among the 38 cases foreign body aspiration 9 (23.7%) aspirated chick pea (table 4)

The commonest radiological finding is infiltration / consolidation in the case of foreign body aspiration whereas all cases with foreign body ingestion showed radio-opaque foreign body and 4 (10.5%) cases of foreign body aspiration have normal x-ray finding. Other radiological findings are obstructive emphysema 8 (21.01%), atelectasis 7 (18.4%) and only 6 (15.7%) patients had radio-opaque foreign body on chest x-ray (table- 5).

Table 3 - Signs and symptoms of foreign body aspiration and Ingestion

Signs and symptoms	FB Aspiration *N* (%)	F.B ingestion *N* (%)	Total *N* (%)
Dyspnea	30(78.9)	-	30 (27.5)
cough	35 (92.1)	13 (18.3)	48 (44.0)
decreased air entry	24 (63.2)	-	24 (22.0)
Fever	22 (57.9)	12 (16.9)	34 (31.1)
Choking	29 (76.3	10 (14.1)	39 (35.8)
Wheezes	16 (42.1)	1 (1.4)	17 (15.6)
Vomiting	15 (39.5)	50 (70.4)	65 (59.6)
Stridor	4 (10.5)	-	4 (3.7)
Cyanosis	2 (5.3)	-	2 (1.8)
Drooling	-	18 (25.4)	18 (16.5)
Difficulty of feeding	1 (2.6)	31 (43.7)	32 (29.3)

Table - 4 Types of foreign body aspirated or ingested

Types of foreign body	F.B Aspiration No (%)	F.B ingestion No (%)	Total No (%)
Bean	3 (7.9)	-	3 (2.7)
Coin	-	53 (74.6)	53 (48.6)
Chick pea	9 (23.7)	-	9 (8.25)
Bone	1 (2.6)	2 (2.8)	3 (2.7)
Corn seed	2 (5.3)	-	2 (1.8)
Plastic material	3 (7.9)	-	3 (2.7)
Piece of metal	2 (5.3)	6 (8.5)	8 (7.3)
Orange seed	2 (5.3)	-	2 (1.8)
Food particle	2 (5.3)	1 (1.4)	3 (2.7)
Coffee seed	2 (5.3)	-	2 (1.8)
Other	12 (31.5)	9 (12.7)	21 (19.2)
Total	38 (100)	71 (100)	109 (100)

Table - 5 Radiological findings in foreign body Aspiration and ingestion

Radiological finding	F.B Aspiration No (%)	F.B ingestion No (%)	Total No (%)
Normal	4 (10.5)	-	4 (3.6)
Infiltration /consolidation	12 (31.5)	-	12 (11)
Obstructive Emphysema	8 (21.0)	-	8 (7.3)
Atelectasis	7 (18.4)	-	7 (6.4)
Radio- Opaque F.B	6 (15.7)	71 (100)	77 (70.6)
Bronchiectasis	1 (2.6)	-	1 (0.9)

Other	5 (13.1)	-	5 (4.5)

Among the 38 cases of foreign body aspiration in 18 (47.3%) foreign body was found on right bronchus, 10 (26.3%) on the left bronchus 7 (18.4%) on the trachea and 3 (7.9%) patients foreign body was found on the larynx. Among 71 cases of foreign body ingestion in 57 (80.3%) foreign body was on proximal esophagus, in 7 (9.9%) patients in middle esophagus, in 2 (2.8%) patients in distal esophagus and in 5 (7%) patients the foreign body was found in the stomach.

Out of 71 cases of foreign body ingestion, 62 (87.3%) foreign body was successfully removed, in 3 (4.2%) it was spontaneously expelled and in 1 (1.4%), foreign body was found but was not removed. In 5 cases (7%), foreign body was left in the stomach and children spontaneously expelled with stool.

Out of 38 cases of foreign body aspiration, 34 (89.5%) foreign body was successfully removed in 3 (7.9%) patients bronchoscopy was done but foreign body was not found and in 1 (2.6%) foreign body was spontaneously expelled while waiting for bronchoscopy.

There was no death for both foreign body ingestion and aspiration in the study period.

The average duration of hospital stay was 2.7 days for foreign body ingestion and 4.2 days for foreign body aspiration and the longest duration of hospital stay for foreign body ingestion and aspiration was 20 days and 14 days respectively.

Discussion

Children less than 5 years of age are at greater risk of both foreign body ingestion and aspiration (1, 3, 8). In this series the majority of accidents occurred in children before their fifth birthday. There is predominance of boys in foreign body aspiration and foreign body ingestion probably related to their greater activity (1-5, 8). In this study, there were 71 boys and 38 girls which is in agreement with other studies.

In previous studies, positive history of foreign body aspiration / ingestion was obtained in up to 80% of cases (1, 3, 4, 8) but in this series there was definitive history of foreign body aspiration or ingestion in 101 (92.6%) children probably because more attention is being given to children nowadays.

Parental ignorance of the dangers of foreign body aspiration or ingestion is major predisposing factor for foreign body accidents (1). Moreover parents will console crying children by giving coins or other materials, because they are unaware of the risks of foreign body aspiration or ingestion. In our series 60.6% of patients with foreign body ingestion, the circumstance of the accident was while playing whereas in 50% of patients with foreign body aspiration the circumstance of the accident was while feeding.

The common triads coughing, choking and wheezing are the presenting features of children with foreign body aspiration (1,3,4), similarly children with foreign body ingestion may present with refusal to feed, drooling, vomiting and respiratory symptoms (2, 9). In our study the majority of children with foreign body aspiration presented with cough, dyspnea, and choking, where as children with foreign body ingestion presented with vomiting, difficulty of feeding, drooling and cough which is in agreement with other studies.

In developed western societies, peanut is the most commonly aspirated foreign body, in Middle East it is watermelon seeds. A previous study by Gebremariam A. (3) showed that bean seed was the most common aspirated foreign body in Ethiopia which is in agreement with other studies (1, 5). This geographic variation is probably related to the food habit of the specific area. Similarly coins were most frequently swallowed by children. In our study chickpea was the commonest foreign body aspirated whereas among children with foreign body ingestion coins were the commonest foreign bodies.

Radiolucent foreign bodies are not visible in routine plain x-ray studies; therefore, secondary radiographic changes must be sought especially in foreign body aspiration. Studies have shown that only 8% of the children aspirate radio-opaque foreign body and x-ray may be normal in as much as 15 to 35% of the cases (1-5). In our study 31.5% of the children with foreign body aspiration had infiltration or consolidation and only 10.5% of patients with foreign body aspiration had radio-opaque foreign bodies. Compared to other studies with foreign body aspiration more children in our series appear to have positive secondary radiographic changes probably because of late coming.

Some authors have observed that inhalation to the right bronchus is more frequent than the left because of anatomic reason others find no difference (3). In

children with foreign body ingestion, in the majority of them the foreign body lodges in the proximal esophagus (9). In our group it was found that in 44.7% of children with foreign body aspiration, the foreign body was on the right main bronchus but in 23.7% of children on the left bronchus. In 80.3 % of children with foreign body ingestion, the foreign body was found in the proximal esophagus which is in accordance with other studies.

In the previous study of foreign body aspiration by Gebremariam A (3), treatment failure rate was 34% and mortality was 24%; in contrast this study showed no treatment failure rate and there was no death. This marked difference in failure rate and mortality appears to be because of improvement in the treatment modality. By that time children with foreign body aspiration were managed with postural drainage and/or bronchoscope removal but currently bronchoscopic removal is the standard treatment protocol.

The major limitation of this analysis was incompleteness of the information in the charts particularly in patients with foreign body accidents who were admitted during emergency hours. Their x-ray findings were not commented by radiologists; even the results were not documented properly in some cases.

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