

Ear, nose and throat foreign bodies in the pediatric age. An experience in a quaternary care hospital in Maputo, Mozambique

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Abstract: Foreign bodies are very common in emergency services. The aim of this study is to analyze FBs in pediatric age, in terms of type, location, age, and gender and method of extraction, type of anesthesia and complication. The present study is a retrospective cross-sectional study based on records from the Mozambican hospital (1983-2009). These were specifically based on medical records for all pediatrics patients diagnosed with the presence of a FB in Otolaryngology. During the study period, 3130 patients under 14 years of age visited this hospital with FB in the ear, nose and throat area; 54.34% were males. Of the 3130 patients, 40.47% had FB in the ear, 32.74% in the esophagus, 18.62% in the nose. The FB was removed with anesthesia in 59.7% patients. In adults the FB story is clear, but in young children it is a challenge, because they do not tell for fear of being heard, or out of shame and a strong suspicion is crucial to avoid unwanted outcomes. The present study showed that FB are more frequent in young male children under 4 years of age, especially in the ear. General anesthesia was most often used to remove foreign bodies.

Keywords: Foreign Bodies; Ear; Nose; Throat; Pharynx; Larynx; Bronchus.

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1. Introduction

Foreign bodies (FB) are any element of origin outside the organism introduced into it voluntarily or involuntarily. In Otorhinolaryngology, they are most common in the ears, nasal cavities, airway and digestive tract. They can be animate (insects, cockroaches, larvae, etc.) or inanimate (stones, marbles, coins, food waste, etc.) [1]. The presence of FB in people's bodies has already been reported in a very old document by Aesop (560 BC) and in the findings of tobacco residue in the ear canal of skeletons from the beginning of civilization [2, 3].

The typical curiosity of children themselves in exploring the environment by placing objects in their mouths is one of the main causes of accidents due to FB [4]. In children, fine motor coordination allows them to place small objects in their mouth, but chewing food is incomplete due to the absence of molar teeth and the neuromuscular coordination of swallowing and protection of the airway is not yet fully developed, making the child predisposed to accidents due to FB [5-7].

At the Central Hospital of Maputo (HCM), a national referral and quaternary level hospital, an internship site for several health faculties, patients with FB constitute a quarter of Otorhinolaryngology emergencies [8] and it is the fifth cause of hospitalization in the Otorhinolaryngology Service [9]. The aim of this study is to analyze FBs in pedi-

ric age, in terms of type, anatomical location, age, and gender distribution and method of extraction, type of anesthesia and complication.

2. Methodology

A retrospective study was performed in the Otorhinolaryngology Service in a quaternary care hospital in the Capital City of Mozambique of all pediatrics patients with a diagnosis of presence of an FB. The study population includes the number of patients with ear, nose and throat FB lodgment who presented in the Outpatient Department or in the emergency room consecutively during the 26-year study period (1/1/1983-31/12/2009). Patients were excluded due to a history that did not reflect the type of FB and its anatomical location. The research was conducted in accordance with the required ethical standards. The study protocol was approved by the National Bioethics Commission accordance with the Helsinki Declaration on clinical research involving human subject (128/CNBS/10) of May 6, 2010.

The data were obtained from the hospital record books. Anterior rhinoscopy, otoscopy and Macintosh laryngoscopy examination were performed to diagnose FB of the nose, ear, pharynx, and larynx, respectively. Instruments such as probe, FB hook and for-ceps, were used in FB removal from the nose and ear. Improvised wire, wires used in orthopedics and clips were used to extract nasal FB. Syringing and suctioning were other methods for FB ear removal. Plain X-ray of the soft tissue of the neck and thorax X-ray was done in patients with a history of FB ingestion or aspiration. Rigid esophagoscopy, laryngoscopy and bronchoscopy were done in cases where the FB was not visible in X-ray to rule out presence of an FB or to determine its site of impaction. This was followed by removal of the FB from the hypopharynx and larynx with direct laryngoscopy, esophagus with rigid esophagoscopy, trachea and bronchi with bronchoscopy.

3. Results

During the study period, 3130 patients under 14 years of age visited this hospital with FB in the ear, nose and throat area; 54.3% were males and 45.7% were females. The average age of patients was 4.82 years (median of 4.0 and standard deviation of 3.289 years, the variation was from 2 months to 14 years). More than half of the patients (58.2%) were under 4 years of age, and 66.1% of FB (2068/3130) were inorganic. Of the 3130 patients, 40.5%, (1267/3130) had FB in the ear, 32.7% (1025/3130) in the esophagus and 18.6% (583/3130) in the nose. The FB was removed with anesthesia in 1869 (59.7%) patients (Table 1).

Table 1. Description of socio-demographic and clinical profile.

Socio-Demographic and Clinical Profile		n	%
Sex	Male	1701	54,3
	Female	1429	45,7
Age	0-4 years	1823	58,2
	5-9 years	926	29,6
	10-14 years	381	12,2
Nature of FB	Organic	1062	33,9
	Inorganic	2068	66,1
	Mouth	2	0,1
	Bronchus	96	3,1
Anatomical Location	Ears	1267	40,5
	Esophagus	1025	32,7
	Larynx	27	0,9

Type of Anesthesia	Nasal cavities	583	18,6
	Pharynx	112	3,6
	Trachea	18	0,6
	Local anesthesia	2	0,1
	General anesthesia	1869	59,7
	Without anesthesia	1259	40,2
	Sedation	0	0,0

Legend. n. Absolute number.

3.1 Foreign Bodies in the Ear

The most common location of FB is the ear. A total of 1267 patients presented to the hospital with FB in the ear (Table 1). The most frequent foreign bodies in this location are biological (seeds and grains) 604 (47.67%) and plastic types (15.78%; 200/1267) (Table 2).

Table 2. Distribution of patients by anatomical location with respect to the type of FB found.

Anatomical location	Type of FB													Total
	1	2	3	4	5	6	7	8	9	10	11	12	Another	
Mouth	1	0	0	0	0	1	0	0	0	0	0	0	0	2
Larynx	3	2	0	0	0	7	1	13	0	0	0	1	0	27
Pharynx	4	8	1	1	0	6	0	92	0	0	0	0	0	112
Esophagus	7	952	0	11	0	8	0	45	1	0	0	0	1	1025
Trachea	2	4	0	0	0	9	0	1	0	0	0	2	0	18
Bronchios	27	22	0	5	0	27	0	9	0	0	0	3	3	96
Nasal cavity	198	30	5	2	11	191	0	2	18	36	71	11	8	583
Ear	200	82	54	3	113	604	47	5	42	49	10	31	27	1267
Total	442	1100	60	22	124	853	48	167	61	85	81	48	39	3130

Legend. 1. Plastic. 2. Metals. 3. Wood. 4. Glass. 5. Cotton. 6. Seed, stem, leaves, and fruits. 7. Animals. 8. Fishbone and bones. 9. Stone. 10. Paper. 11. Sponge. 12. Rubber.

Most of these patients were between 4 and 9 years of age (41.7%; 529/1267) (Table 3). There is a slight predominance of organic auricular FBs (51.53%; 653/1267). All patients with auricular FB underwent extraction through syringe or instrumental extraction, however, in 2 patients it was necessary to make an endoaural incision to extract the foreign body (one seed and a piece of plastic) impacted in the external auditory canal. In 20 patients it was necessary to use a microscope to extract the FB (Table 4).

Table 3. Distribution of patient age range by anatomical location of foreign bodies.

AGE		0-4 years	5-9 years	10-14 years
FB Location	Mouth	1	0	1
	Larynx	22	4	1
	Pharynx	62	21	29
	Esophagus	629	281	115
	Trachea	14	3	1
	Bronchi	67	21	8
	Nasal cavity	509	67	7

Ears	519	529	219
Total	1823	926	381

Table 4. Distribution of the type of surgical procedure according to anatomical location of FB.

Type of intervention	Anatomical location							
	Mouth	Larynx	Pharynx	Esophagus	Trachea	Bronchi	Nasal cavity	Ears
Esophagoscopy	0	0	3	981	0	0	0	0
Direct Laryngoscopy	0	20	0	0	0	0	0	0
Blade laryngoscopy	0	6	52	7	0	0	0	0
Rhinoscopy	0	0	0	0	0	0	583	0
Otoscopy	0	0	0	0	0	0	0	1245
Pharyngoscopy	2	0	55	0	0	0	0	0
Bronchoscopy	0	1	0	0	18	93	0	0
Indirect laryngoscopy	0	0	1	0	0	0	0	0
Thoracotomy	0	0	0	0	0	3	0	0
Esophagotomy	0	0	0	1	0	0	0	0
Came out spontaneously	0	0	1	36	0	0	0	0
Endoaural incision	0	0	0	0	0	0	0	2
Otomicroscopy	0	0	0	0	0	0	0	20
Total	2	27	112	1025	18	96	583	1267

3.2 Foreign Bodies in the Esophagus

The second most common anatomical site implicated in FB incidents was the esophagus (Table 1). A total of 1025 patients (32.7%) presented to the hospital with FB in the esophagus. The most common type of esophageal FB was metal (952/1025), mainly due to coin ingestion (88.39%; 906/1025). Inorganic FB (coins) are much more common in this location (971/1025; 94.7%) (Table 2). Most children with esophageal FB underwent rigid esophagoscopy (95.7%; 981/1025) and only 7 cases were removed using the Macintosh laryngoscope (0.68%). In 36 cases, the esophageal FB came out spontaneously through the anus (3.5%). A 4-year-old boy underwent esophagostomy after ingesting a stone that got stuck in his cervical esophagus (Table 4). All patients with FB embedded in the esophagus underwent general anesthesia.

3.3 Foreign Bodies in the Nose

The nose occupies the third most frequent location for the presence of FB (583/3130; 18.6%) (Table 1). Of these, plastics and seeds were the most found (33.96%; 198/583) and 32.76% (191/583) respectively (Table 2). Most of these FB were found in younger children (0-4 years) (87.30%). Inorganic FB are more common in this area (67.58%; 394/583). (Table 3). All patients with nasal FB underwent rhinoscopy for extraction (Table 4).

3.4 Foreign Bodies in the Pharynx

The pharynx is in the fourth place most found with FB (3.6%; 112/3130). (Table 1). Organic FB are more common in this anatomical region (87.5%; 98/112). The most common type of pharyngeal FB was fishbone/bone/meat (92/112) (Table 2). The majority of pharyngeal FBs were removed using pharyngoscopy (49.1%; 55/112) and Macintosh

laryngoscopy (46.4%; 52/112) and one case passing spontaneously into the anus. (Table 4).

3.5 Foreign Bodies in the Bronchi

96 children had FB lodged in the bronchi (3.1%). Of these, 28% are seeds and plastics 27/96. The Inorganic FB are clearly more frequent in this location (62.5%; 60/96) All patients with bronchial FB underwent bronchoscopy for extraction, however, in 3 children it was necessary to perform thoracotomy due to the impossibility of extracting the impacted FB: A child was 9 years old and aspirated pin which lodged in the left bronchus. The second child, a male, 4 years old, was transferred from the north of the country and aspirated a fragment of glass that lodged in the left bronchus, causing intrabronchial hemorrhage, intraoperative cardiorespiratory arrest, and death. The last 3-year-old male child aspirated a light bulb that also lodged in the left bronchus. (Table 1, Table 2 and Table 4).

3.6 Foreign Bodies in the Larynx

Twenty-seven children had FB lodged in the larynx (0.9%) and almost half of the cases (48%) were due to fishbone/bone/meat. Of the 27 cases of FB in the bronchi, 20 (74.07%) were extracted by direct laryngoscopy, 6 by Macintosh laryngoscopy and one by bronchoscopy. In all patients, intervention was performed with general anesthesia, with the exception of 2 children with fish bones who underwent extraction without anesthesia using a Macintosh laryngoscope (Table 1, Table 2 and Table 4).

3.7 Foreign Bodies in the Trachea

18 children had FB lodged in the Trachea (0.6%) and half of the cases were due to seeds/grains/leaves. Metal is the most frequent FB (22%). All patients with tracheal FB underwent bronchoscopy for extraction (Table 1, Table 2 and Table 4)

3.8 Foreign Bodies in the Mouth

Only 2 children had FB lodged in the mouth (0.1%) (Table 1).

4. Discussion

In adults the FB story is clear, but in young children it is a challenge, because they do not tell for fear of being heard, or out of shame and a strong suspicion is crucial to avoid unwanted outcomes. This study showed that the majority of foreign bodies occur in children < 10 years of age, as in other studies [10], may be due to the tendency of young children to put, intentionally or accidentally, small objects into natural orifices of body.

Like other studies [11,12], males were the most affected, probably due to the more adventurous and curious spirit of this gender.

Similar to another's studies [10, 12], the ear FB was the most found in our study and include, seeds, grains, dolls eyes, erases, parts of plastic toys, cotton swabs, pebbles, sponges, beads from typically African hairstyles and animated FB such as insects, cockroaches, larvae, etc. Occasionally it may be asymptomatic and found incidentally during routine ear examination or may have otalgia, pruritus, otorrhea, otorrhagia, tinnitus and hypoacusis. The ear was the most affected probably because, unlike the airways, the FB in this location, does not evoke protective reflexes such as coughing, vomiting, or sneezing [12] and not produce dyspnea.

In this pediatric study, the esophageal foreign body was the second most common foreign body, with a frequency of 32.70%. Our study showed that there is predominance of esophageal FBs in younger children. The most frequently swallowed FBs in children is coins like many studies [13-15] and meat and meat bones (chicken bone/fish bone/mutton), although the latter is more common in adults. The ingestion of coins probably because young children have earlier access to coins since they help with

household tasks, namely going alone to buy bread or fruit at stalls located on the side of the road.

Nasal FB is a common problem and exclusively affects children, especially younger ones. The pathognomonic symptom is unilateral fetus rhinorrhea fetida. Removal of FB is not always easy. It requires proper instruments and skill and is often associated with complications resulting from poor expertise. In this study, there were several complications from otitis externa, perforation of the tympanic membrane, destruction of the ossicular chain, hearing loss, epistaxis, pneumonia, atelectasis, retropharyngeal abscess, mediastinitis and obits.

In this pediatric study with foreign bodies embedded in the external auditory canal and esophagus as the main locations, general anesthesia was the most used method. The use of general anesthesia has implications for both human resources (need for qualified human resources for this purpose) and material resources (appropriate equipment, consumables, etc.) and all of them have implications for the costs involved in this type of intervention.

Although our study does not allow us to know which side of the ear or nasal cavities the foreign body was located on, because normally this information is not written in the records, our perception is that there are more cases on the right side since the majority of the world's population is right-handed. Our research showed that Inorganic materials were more commonly found in bronchi (62.8%) than organic materials, contrary to what was postulated in the literature [16, 17]. In the presence of sudden respiratory difficulty, without a history of upper airway infection, consider FB in the airway. Chest radiography allows the visualization of metallic FBs, but plastic or plant-type FBs are not visible and after an in-depth anamnesis, the child must be taken to the operating room for bronchoscopy.

5. Conclusion

The present study showed that FB are more frequent in young male children under years of age. The most used location is the ear. General anesthesia was most often used to remove foreign bodies.

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