A STUDY OF PATIENTS PRESENTING WITH FOREIGN BODIES IN THE EAR AND AERODIGESTIVE TRACTS IN THE DEPARTMENT OF OTORHINOLARYNGOLOGY OF MUHIMBILI NATIONAL HOSPITAL

by

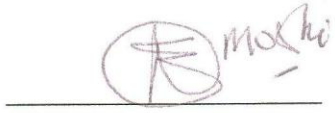
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A dissertation submitted in partial fulfillment for the degree of Masters of medicine in Otorhinolaryngology of the Muhimbili University of Health and Allied Science

(August 2008)

CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the Muhimbili University of Health and Allied Science a dissertation entitled; **A study of foreign bodies presenting to the aerodigestive tract and the ear at the department of Otorhinolaryngology at Muhimbili National Hospital** in partial fulfillment of the requirements for the degree of Master of Medicine (Otorhinolaryngology).



Prof. N. Moshi

SUPERVISOR

Date: 27/11/2008

DECLARATION

AND

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I, Dr Edwin Thomusy Liyombo, declare that this dissertation is my own work and that it has not been submitted to any other university or academic institution for a similar or any academic award.

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I praise the LORD my GOD, the sole fountain of life and sustenance, who, by His unmerited favour, has taken me through this work and my studies at large. Glory, praise and honour be unto him now and forever more. Amen

DEDICATION

This dissertation is dedicated to my parents, my wife Lillian Shija, my daughters, Vanessa, Immaculate and my son Jimmy Gregory Kaka.

ABSTRACT

Foreign bodies' accident in Otorhinolaryngology is an important reason for seeking emergency services.

Objective: To evaluate the incidence of patients with foreign bodies, to analyze the types, sites, the commonest presentations, average duration before presentation and complications related to delayed presentation.

Method: The prospective study was realized in 113 patients with a diagnosis of foreign bodies of the nose, ear, pharynx, oesophagus and tracheabronchial tree in the Otorhinolaryngology service of the Muhimbili National Hospital in Dar es Salaam between march/2007 and september/2007.

Results: The overall incidence of foreign bodies in the aerodigestive tracts and the ear was 2.46% of all the patients attended at the Otorhinolaryngology service during the study period (113/4600). It was 2.54% in male (59/2324), and 2.37% in female (54/2276). The highest foreign bodies incidence was 6.56% in the age group between 0 to 4years (74/1129).Among these 43(38.05%) cases of foreign bodies in the nose, 28 (24.78%) cases in the ear and 18 (15.93%) cases in the pharynx, 16(14.16%)cases in the oesophagus and 8(7.08%) cases in the tracheabronchial tree. Of these patients, 52.21% were male and 47.79% were female.

Two-year-old were the most common patients, and the range from age 0 to age 4 included 65.48% of all the patients. 50.44% of these cases were taken care of in less than 24 hours and 25.66% more than 72hours.

The most common symptoms of the foreign bodies was; odynophagia which present in 66.67% of the cases of the pharynx ; unilateral purulent rhinorrhea which was present in 69.77% of the nose, pain which was present in 96.43% cases of ear ; dysphagia which was present in 62.5% cases of oesophagus and difficult in breathing which was present in 100% cases of tracheabronchial-tree The most frequent foreign bodies were coin (61.11%) in the pharynx; bean seed (39.53%) in the nose; beads (25%) in the ear; and groundnut seed and metallic object 25% each in the tracheabronchial -tree. Complications which resulted from delayed presentation were found in 20 cases (17.7%).

Conclusion: Young children were the most affected age group Coin was the most common oesophagus and pharyngeal foreign bodies. Seeds and beads were commonest foreign bodies in the nose, tracheabronchial-tree and the ear respectively. Foreign bodies in the aerodigestive tracts tended to present early and were more promptly removed compared with ear and nose foreign bodies. Most cases of foreign bodies which presented early had no complications; however those who presented late were associated with complications in particular those in the tracheabronchial-tree.

This emphasizes the need to educate caretaker on taking care of the children and presenting them promptly to a health facility in the event of foreign bodies accidents. Since most of the foreign bodies' accidents are preventable health education to the public should be emphasized

ABBREVIATIONS.

MNH……..Muhimbili National Hospital

MUHAS…….Muhimbili University of Health and Allied Science

ORL…….Otorhinolaryngology

FBS…… Foreign bodies

FB……..Foreign body

ENT…….Ear, Nose, and Throat

EAC…….External auditory canal

A.P……Anterior posterior

LTB……..Lower trachea bronchial

TBT……..Tracheobronchial –tree

OESOPH……..Oesophagus

PTS…….Patients

Definitions

Odynophagia .....painful swallowing

Dysphagia .....difficult in breathing

Otalgia .....ear pain

Otitis externa .....infection of the external ear

Otorrhea.....ear discharge

Rhinorrhea .....nasal discharge

Epistaxis.....nasal bleeding

Rhinosinusitis.....infection of the nose and paranasal sinuses

CONTENTS

	Page
Certification	i
Declaration and copyright.....	ii
Acknowledgement	iii
Dedication	iv
Abstract	v
Abbreviations.....	vii
Definitions.....	viii
List of tables.....	ix
List of charts and figure.....	xiii
1. Chapter one.....	**1**
1.1. Introduction and background.....	1
1.1.2 Nasal foreign bodies.....	6
1.1.2.1 Types of Foreign bodies	7
1.1.2.2. Pathology.....	9
1.1.2.3. Symptoms and signs.....	10
1.1.2.4 Management.....	13
1.1.3. Foreign bodies in the pharynx.....	17
1.1.3.1. Symptoms.....	17
1.1.3.2. Signs on examination and diagnosis.....	17

1.1.3.3. Treatment..... 18

1.1.4. Foreign bodies in the oesophagus..... 18

1.1.4.1. Nature of foreign body..... 18

1.1.4.2. Pathophysiology..... 19

1.1.4.3. Site of obstruction in oesophagus..... 19

1.1.4.4. History and examination..... 20

1.1.5 Foreign bodies in the larynx, trachea and bronchi..... 23

1.1.5.1. Nature of foreign bodies..... 23

1.1.5.2. Aetiology..... 23

1.1.5.3. Pathophysiology..... 24

1.1.5.4. Clinical presentation..... 24

1.1.5.5. Diagnosis..... 26

1.1.5.6. Management..... 26

1.1.5.7.1. Laryngeal FBS..... 26

1.1.5.8.2. Removal of FBS..... 27

1.1.5.9.3. Tracheal FBS..... 27

1.1.5.10.4. Bronchial FBS..... 27

1.1.6 Foreign bodies in the ear..... 28

1.1.6..1. Aetiology and epidemiology..... 28

1.1.6..2. Types of aural FBS..... 29

1.1.6..3. Patient preparation..... 30

1.1.6.4. Anaesthesia..... 30

1.1.6.5. Visualization..... 31

1.1.6.6. Technique for removal..... 32

1.1.6.7.1. General considerations..... 32

1.1.6.7.2. Irrigation..... 32

1.1.6.7.3. Négative pressure technique (suction)..... 33

1.1.6.7.4. Glue..... 33

1.1.6.7.5. Impression materials..... 34

1.1.6.7.6. Surgical instruments..... 34

1.1.6.7.7. Manufactured instruments..... 35

1.1.6.7.8. Unique to the type of FB..... 35

1.1.6.7.9. Insect drowning..... 36

1.1.6.8. Complications and referral..... 36

1.1.6.9. Follow up..... 36

1.2. Literature review..... 38

2. Chapter two..... 46

2.0 Statement of the problem..... 46

2.1 Study rationale..... 47

3. Chapter three..... 48

3.0. Objective of the study..... 48

3.1. Broad objective..... 48

3.2. Specific objectives..... 48

4. Chapter four..... 49

4.0 Methodology..... 49

4.1. Study area 49

4.2. Study design..... 50

4.3. Study population 50

4.4. Sample size..... 50

4.5. Patients recruitment..... 50

4.6 .Ethical issues..... 51

4.7. Material and methods..... 51

4.8. Data analysis..... 52

5. Chapter five..... 53

5.0 Results..... 46

5.1 Discussion..... 66

5.2 Conclusion..... 73

5.3 Recommandations..... 74

6.0 Référence..... 77

7.0 Appendices..... 91

7.1. Questionnaire..... 91

7.2. Informed consent..... 96

List of tables;

Table 1; Incidence of FBS by sex..... 53

Table 2; Incidence of FBS by age..... 54

Table 3; Distribution of FBS according to age and site..... 55

Table 4; Duration before presentation according to site..... 56

Table 5; Frequency of patients who had complication according by site... 63

List of figures;

Figure I; Distribution of FBS by site..... 55

Figure II; Duration before presentation by site..... 57

Figure III; Duration before presentation by site among those with complications... 64

Chart I; Types of FBS..... 59

Chart II; Frequency of FBS according to site..... 60

Chart III; Clinical presentation according to site..... 62

Chart IV; Frequency of complications according to site..... 65

CHAPTER ONE

1.1 Introduction and Background

Foreign bodies are common problem in pediatric Otolaryngology and are frequently associated with significant severe complications.[1-2]

The early years of a child's life represent a phase of exploration and interaction with the environment. When they start moving independently, children start having access to a number of objects that they explore.

This process encompasses, amongst other things, the placement of objects in orifices, such as the ears, nose and throat. [2]

Parent's laxness and lack of attention by leaving small objects at the reach of children contributes to this high incidence of FBS. Ears, noses and throats are the most exposed orifices, hence the high incidence of FBS in them.

In adults we may have cases which were inflicted on purpose or accidentally, the former being rarely seen on patients without psychiatric disorders. The accidents are mostly caused by insects that enter the ear or nasal cavities and rarely, shifting of FBS from mouth and hypopharynx to the nasopharynx.

Despite the high frequency of ingested and aspirated FBS and advances in diagnosis and treatment, their management dilemmas have persisted.

Since Chevalier Jackson described endoscopes techniques for the removal of FBS in 1936, this has remained the safest and most trusted method of treatment.[3]

Techniques for FB removal employing fiberoptic endoscopes have been described, and the use of Foley catheters or carbonated beverages for the removal of esophageal FBS have typified the continued interest in treating this often troubling and all too common problem. FB ingestion and aspiration can affect persons of any age, but the vast majority occurs in children under the age of five. [4]

It is estimated that 1500 deaths related to the ingestion of FBS and 3000 deaths related to aspiration of FBS occur annually in US. [5]

Suffocation resulting from FB ingestion and aspiration is the third leading cause of accidental death in children under the age of one year, and the fourth leading cause of death in children from ages 1 to 6 in US. [6]

There are many reasons for these impressive statistics. Young children explore their environments and pick anything and put into their mouth and thus are at risk for the ingestion and aspiration of FBS. In the past, safety pins were a frequently implicated object, but since the introduction of the disposable diaper

have predominated coins. [7-10, 4,] batteries, marbles and screws have also been reported. [11]

In addition, the lack of posterior dentition and immaturity of the swallowing mechanism makes lodgment of food in the esophagus common, and foods such as nuts and seeds are the most common airway FBS in children. In adults, food is by far the most common FB of the aerodigestive tract. [12]

Due to the decreased sensation of food in the oral cavity in denture wearers, small FBS such as fish bones are commonly found lodged in the oropharynx. [12]

In addition, hurried eating can lead to large boluses of meat lodging in the esophagus. A prior history of oesophageal pathology such as tracheo-esophageal fistula increases the risk for impaction of food in the oesophagus. Oesophageal strictures or obstructing masses may present as an esophageal FB. [13, 3] A thorough inspection of the food passage is necessary when evaluating patients with these problems.

FB aspiration is a condition seen all over the world. It can present in a variety of ways, ranging from no or trivial symptoms to irreversible damage to the lung, which may be life- threatening. [14]

FB aspiration in adults is more common in the setting of advanced age, underlying neurological disorder, poor dentition, alcohol consumption and sedatives use. [15, 16, 3] In the absence of predisposing factors, children are reported to be at a higher risk than adults. [17-19]

In children the aspirated material is usually an object like toys, screws and other household items. Aspiration of organic material such as nuts, seeds, and bones have been described in adults. [20, 13]

FBS in the external auditory canal in children are commonly seen in paediatric and ORL clinics the profile of FBS in children's ears has been reported from a number of countries; however the adult experience is not well documented. [21-28] In aural FBS complications may arise due to the small nature of the EAC and its proximity to important anatomical structures. [29]

Removal may be difficult when the FB is close to the tympanic membrane or the bony EAC because of intense pain due to increased sensitivity .Cautious attempts at removal are usually recommended, with referral to an Otolaryngologist for failures or complications. [23, 30-33]

The recommendation for referral is emphasized in the otolaryngology literature because of the high complication rate that occurs when attempts are made to remove these objects in less than optimal conditions. It is financially and practically impossible to mandate that all FBS in the EAC in children be removed by specialists. [23]

Yet, the development of practical triage criteria that could be readily used by primary health workers to select which children are likely to tolerate removal with an acceptable complication rate in the primary setting would be valuable.

Foreign bodies may vary widely in shape, size and composition. Schulze et al (2000) in a retrospective study of 698 ear FB cases proposed an 8-class classification system based on FB shape and texture was proposed. [28]

Foreign bodies may also be classified according to the introduction mode, either voluntary or accidental. Voluntary placement of FBS occurs mostly in children and accidental introduction is usually of live animals. [34]

The shape and size of FBS establishes the level of difficulty in their removal

1.1.2. Nasal foreign bodies ; Nasal cavity foreign bodies are accompanied with many symptoms. After a few days in the nasal cavity muco-purulent discharge and foul odor occur.[34]

It is a classic axiom that these two symptoms, especially if unilateral in children are indication of FB until proven otherwise. Nasal FBS can be found in any portion of the nasal cavity, although they are typically discovered around the floor of the nose just below the inferior turbinate. Another common location is immediately anterior to the middle turbinate. [35] Children or mentally retarded patients generally place these objects whose curiosity leads them to explore body orifices. Any article small enough to be admitted into the anterior nasal orifice has, at one time or the other, been removed from the nose [36, 37]

Foreign bodies that are impacted or those that have been present for long time and have become encrusted frequently challenges removal. Live and mobile animate FBS (such as maggots and larvae) pose similar difficulties. Foreign bodies in the nose have been implicated as carriers of the causative organisms of diphtheria and other infectious diseases. [11]

It therefore appears that FBS in the nose can create a real problem and should not be taken lightly.

1.1.2.1. Types of foreign bodies;

The list of types of inanimate FBS that have been removed from the nose is endless. The most commonly identified inanimate FBS include rubber erasers, paper wads, pebbles, beads, marbles, beans, safety pins, washers, nuts, sponges, and chalk. [35, 38] Other authors have reported plasticine, pieces of wood, a door handle, [39] metal hooks and, pieces of cloth, bullets, thimbles, [40] shrapnel, umbrella springs, Iron bolts, corks, and coins. [41]

Endogenous materials like bone and pieces of cartilage have been left behind in the nasal cavity after surgical intranasal manipulations. Trauma to structures adjacent to the nose such as orbits, paranasal sinuses, and palate can force bone spicules and cartilage fragments into the nose.[42] Animate FBS like Myiasis of the nose is common in warm tropical climates of South Western United States and the Far East including India, the frequency of infestation being primarily related to the poor hygiene of the inhabitants. The most common of all infestations is the fly maggot.

Screw worms, also known as "Texas" screw worms (which is the larval state of Cochliomya macellaria and the Cochliomyia homnivorax, "the blow fly") are serious pests to humans and cattle. A high incidence of human infestation would therefore be expected in cattle raising areas but this does not appear to be the case. [43]

This indicates that the principal factor in infestation is not the livestock but rather the constitution and habitat of the host, the ordinary maggot represents the larval stage of this blowfly. It thrives in dead tissue only and does not destroy living material.

Larvae of other flies like those of aestrous, hypoderma, and dermatobia also invade the nasal cavities. Wohlfahrtia magnifica may also infest the nose. These infestations occur more commonly in patients suffering from ozaena and nasal syphilis. [36]

Ascaris lumbricoides is a species of nematode or round worms and will find lodgment in the nose when regurgitated or coughed up. It is the most common intestinal helminthes of man and frequently reaches epidemic proportions. Although it flourishes best in warm, tropical climates, it is cosmopolitan in distribution. In temperate regions it is generally associated with low standards of personal hygiene.

1.1.2.2 Pathology

Some FBS are inert and may remain in the nose for years without mucosal changes. However, most inanimate objects initiate congestion and swelling of the nasal mucosa, with the possibility of pressure necrosis producing ulceration, mucosal erosion, and epistaxis.

The retained secretion, the decomposed FB, and the accompanying ulceration can result in foul fetor. These changes further impact the FB because of surrounding oedema, granulations, and discharge.

This is particularly seen with vegetable FBS, which not only absorb water from the tissues and swell but also evoke a very brisk inflammatory reaction Occasionally, the inflammatory reaction is sufficient to produce toxaemia. [36]

A FB can act as a nucleus for concretion if it is firmly impacted or is buried in granulation tissue by receiving a coating of calcium, Magnesium phosphate, and carbonate and thus becomes a rhinolith. Occasionally this process may occur around an area of inspissated mucopus, or even a blood clot. Rhinolith usually form near the floor of the nose and are radio-opaque. Button batteries may result in severe destruction of the nasal septum [43]

These are composed of various types of heavy metals: mercury, zinc, silver, nickel, cadmium, and lithium.

Liberation of these substances causes various types of lesions depending on the localization, with an intense local tissue reaction and liquefaction necrosis.

As a result they can cause septal perforations, synechiae, constriction, and stenosis of the nasal cavity. Maggots and screwworms in the nose initiate varying degrees of inflammatory reaction from a mild localized infection to maximum destruction of the nasal structures with formation of deep, stinking suppurating caverns. The larvae hatch in these caverns and a new cycle is repeated. [45]

1.1.2.3 Symptoms and signs;

Most nasal FBS are noticed or reported and removed before symptoms and signs ensue. However unnoticed FBS will eventually present with unilateral mucopurulent discharge with foul odour this is the most consistent findings in patients with a nasal FBS. Occasionally it can be bloodstained. [45]

The ensuing unilateral vestibulitis, specific of the paediatric age group is diagnostic, nasal FBS are generally painless. In fact some FBS have reportedly been present in the nasal cavity for years without symptoms.[46] However rarely, pain and headache have been experienced on the involved side with intermittent epistaxis and sneezing reported by others. [45] cases describing bromhidrosis (foul body odour) associated with nasal FBS in children have also been published. [47]

In patients with animate nasal foreign bodies, the symptoms tend to be bilateral. [36, 35] Nasal occlusion, headaches, and sneezing with serosanguinous discharge usually are the presenting symptoms.
A rise in body temperature occurs and a disagreeable fetid odour emanates from the nasal passages.

Leucocytosis results from the accompanying secondary infection. Examination of the nasal cavity may reveal extensive destruction of the surrounding mucous membranes, bone, and cartilage and the mucosa are fragile and bleed easily.
Constant motion and masses of different worms may be observed.
These worms are firmly attached and difficult to extract. Owing to the secondary infection and bone destruction, complications are not infrequent. [45]

Rhinolith are initially symptom less and later cause nasal obstruction only if they become enlarged. Examination of the nasal cavity shows a greyish irregular mass, usually along the floor of the nose that feels bony, hard, and gritty on probing. Radiography usually confirms the diagnosis and reveals the extent of the rhinolith. As mentioned before unilateral foul nasal discharge in a child should raise the suspicion of a FB until proven otherwise.

The physical examination of the nose involving anterior rhinoscopy and use of either a fibreoptic nasopharyngoscope or a 0 degree rigid endoscope will often reveal the foreign object. However on occasions mucosal oedema or granulations tend to hide it. In such cases the nose should be sprayed with a vasoconstrictor agent to shrink the mucosa before re-examination. Many times the FB becomes apparent with this manoeuvre. [45]

In younger or very apprehensive children it may be necessary for the search to be carried out under a general anaesthesia. In patients with parasitic and larvae infestation of the nose diagnosis is relatively easy as the organisms are directly visualized. Several unilateral lesions found in both children and adults may produce obstruction of the involved side.

Such lesions would include both benign and malignant tumours of the nasal cavity, unilateral sinusitis, unilateral choanal atresia, unilateral nasal polyps, septal haematoma, and infections like syphilis and Diphtheria. [48]

1.1.2.4 Management

A cooperative patient is needed to detect and remove a nasal FB successfully. The patient is usually examined in the upright sitting position carried out for routine otorhinological examination.

A child may be best examined by tilting the head back slightly so that the floor of the nose is visible to the examiner. For this an adult may need to restrain a child and hold the head steady. Most inanimate FBS, if visualized well, can be removed easily through the anterior nares with the use of cerumen hook, cupped forceps, haemostats, old metallic Eustachian tube catheters, and suction. This can be done either with no anaesthetic or after spraying with a local topically acting anaesthetic solution such as 4% Lignocaine (Lidocaine).

Removal of a rounded object may be an arduous task because of difficulty in grasping FBS of this shape. A cerumen hook is best suited for this job. The hook is first passed behind the object, the tip rotated to rest just behind it and then the FB is gradually drawn forwards and out through the nose. [49]

Additionally, several suction methods have been described that aid in the removal of round FBS. [50, 51] Plastic objects and vegetable matter may be difficult to extract because of their tendency to break into small pieces. However, it cannot be too strongly emphasized those unskilled attempts to remove the FB in accident and emergency departments by a person without appropriate training may result in disaster. The FB may be displaced backwards and may even reach the nasopharynx with a risk of inhalation. [45]

In a crying child the FB while being removed from the nose can fall into the mouth with alamitous effects. Marked epistaxis may occur or a docile child may become terrified and require a general anaesthesia, which might otherwise have been avoided. [45] In cases in which removal of a FB is particularly difficult, several alternative procedures have been described. If the patient can cooperate, they can be instructed to take a deep breath through the mouth and then forcibly exhale through the nose. The attending doctor should occlude the uninvolved nostril during this procedure. [52]

Mouth ventilation can be administered to the patient by the doctor, again occluding the uninvolved side.[53]

Both the success rate and the incidence of complications associated with the above-mentioned procedures are not well reported in the literature. An additional method described by some authors is the use either a Foley catheter or a Fogarty bleary catheter for removal of nasal FBS. [54,]

In rare cases, the only successful method of removing a nasal FB is to push the object posteriorly into the pharynx. In these cases a general anaesthetic is required and endotracheal intubations performed to protect the airway. Different techniques are employed for removal of animate foreign bodies.

In the case of screw worms, larvae and maggots, a weak solution of 25% chloroform is instilled into the nasal spaces to kill the larvae. This may have to be repeated two or three times a week for about six weeks until all larvae are killed. After each treatment, removal can be accomplished by blowing the nose if the patient is awake and by suction, irrigation, or curettage if the patient is under general anaesthesia. With Ascaris lumbricoides manual or forceps extraction is utilized thus avoiding the need for killing these worms before removal. The roundworms that become lodged in the nose, however, present only a part of the heavy intestinal infestation that has to be eradicated in order to prevent further nasal lodgment.

Oral levamisole or mebendazole may be used for this. After successful removal of a nasal FB, careful examination of the involved nasal cavity as well as the other body orifices must be undertaken to exclude the presence of other unrecognized foreign bodies. Particular attention must be paid to the examination of the ear and sinuses on the involved side as acute otitis media or sinusitis are commonly seen if the FB has been present for any length of time.

Additionally, epistaxis, which frequently accompanies the removal of nasal FBS must be appropriately dealt with. Several important complications have been associated with the presence of a nasal foreign body.

These include formation and development of Rhinolith ,erosion into a contiguous structure, and producing infections in surrounding structures. Apart from acute sinusitis or otitis media, other infections reported include per orbital cellulites, meningitis, acute epiglottitis, Diphtheria, and Tetanus. [56,11,6]

1.1.3 Foreign body in the pharynx

By far the most common FB in the pharynx is fish bone but sometimes other types of bones and rarely other types of FBS may get impacted in the pharynx. [13] Although, all age groups can be affected, most of the patients are adults and report to the doctor soon after impaction of the FB (mostly fishbone) in their pharynx., other types FBS are mainly encountered in children and include metallic, glass and plastic objects and toys .

1.1.3.1 Symptoms

Soon after swallowing, the patient feels acute pain in the throat. This is accompanied by dysphagia and salivation.

1.1.3.2 Signs on examination and diagnosis

On examination of the pharynx by tongue depressor or direct laryngoscopy the FB may be seen stuck up in the base of the tongue, the vallecula, the tonsil or the pyriform fossa, much less commonly in other places.

Not infrequently, the FB has passed on or been expelled, for example, by vomiting, but the ulcer, which is left behind in the throat, feels like a FB. If no FB can be seen in the throat, one of two courses may be followed. Either an X-ray may be taken when the foreign body may be seen, provided it is radio-opaque.

Failure to see a FB in the X-ray means that either there is nothing in the throat or that the FB is radio-translucent. The second course that can be followed is to put the patient on an antibiotic and watch him for a further period of one or more days for further developments. If the case shows steady improvement, there was no FB in the throat, but only a scratch, which was produced by it. In the case of either of these two alternatives, if further investigation is required direct endoscopy can be performed

1.1.3.3 Treatment

The treatment is removal. If the FB is visible and easily approachable, it can be reached a region where it does not allow removal without anesthesia, the anaesthesia may be given and the FB removed with direct endoscopy. As previously stated, direct examination may also be required for combined diagnosis and treatment

1.1.4 Foreign body in oesophagus

1.1.4.1 Nature of foreign body

In the case of children, a FB is usually a coin. [4] In adults, it may be meat bone, a big piece of meat, or denture. Sometimes, other types of FBS include small metal and plastic toys, buttons, bones, batteries, safety pins, thumbtacks, and wood or glass objects.

1.1.4.2 Pathophysiology

The inherent curiosity of children may lead them to ingest many types of objects other than appropriately sized foodstuffs. Most esophageal foreign bodies are radiopaque. Fortunately, the vast majority of ingested objects pass through the gastrointestinal tract without problems. Some of these foreign bodies become lodged in the esophagus because of normal physiologic narrowing, while others may become lodged at the site of underlying pathology. An FB that is retained for a long period can serve as a nidus for a local tissue reaction and result in chronic inflammatory change. High morbidity rates are associated with the chronic retention of esophageal FBS. Complications of retained esophageal FBS are primarily related to perforation of the esophagus, but they may also result in intrinsic esophageal stenosis.

1.1.4.3 Site of obstruction in oesophagus

In Children; FBS, usually coin is stuck up at the upper end of the oesophagus. On X-ray, in the A.P. view, it is seen while lying flat, i.e., in the coronal plane. In the side view this can be demonstrated by A-P view x-ray of the chest and neck or lateral view of the chest and neck, which will reveal, its edge lying behind the air shadow in the trachea

In Adults,

FB may be stuck up anywhere along the course of the oesophagus, but usually along natural constriction, that is the;

- The cricopharyngeal fold (the constrictor at the upper end of the oesophagus).
- Crossing of the arch of the aorta over the oesophagus.
- Crossing of the left bronchus over the oesophagus.
- The pressure of the right atrium of the heart over the oesophagus, and, passing of the oesophagus through the hiatus in the diaphragm

Occasionally FB may be stuck into a malignant growth of which the patient was not aware of.

1.1.4.4 History and examination

History:

History is very typical. In the case of children, the patient is brought to the Hospital by the parents with a complaint of dysphagia, which they suspect is due to impaction of the coin, because the child was playing with it which they could not find immediately following the development of dysphagia. In the case of adults, the complaint is that of dysphagia and the history is undoubted. Sometimes when a denture is impacted, it has slipped down during sleep and the patient discovers it on waking up.

Occasionally oesophagoscopy may fail to remove the FB and then if it is not very far down, it can be removed through an external oesophagotomy through the left side of the neck. In some cases, it may become necessary to push it into the stomach; it will then get evacuated in stools.

If it is impacted too far down, the case should be handed over to a chest surgeon. When no FB is discovered even on oesophagoscopy, it may have passed down into the stomach abdominal X-ray should be taken to search for it. Minor mucosal injuries may occur in cases where the coin or other objects have been present for less than 24 hours, but the likelihood of significant complications increases with FB that have been lodged for 3 days or more. [57, 58] Complications from retained esophageal FBS are rare but potentially serious, including; esophageal perforation, [59,27], airway obstruction with cyanosis, [60] extraluminal migration,[61], pneumomediastinum, [60] tracheoesophageal fistula[62] and fatal aortoesophageal fistula. [63] Complications may also arise frequently during FB removal, making it essential for ENT specialists to treat these cases.

1.1.5 Foreign body in larynx, trachea and bronchi

An FB aspirated into the air passage can lodge in the larynx, trachea, or bronchi. Site of lodgment would depend on the size and nature of the foreign body. [13] A large FB unable to pass through the glottis will lodge in the supraglottic area, while the smaller one will pass down through the larynx into the trachea or bronchi.

FBS with sharp points, e.g. pins, needles, fish bones, etc. can stick anywhere in the larynx or tracheobronchial tree. [13]

1.1.5.1 Nature of foreign bodies

These are inorganic e.g. plastic, glass or metal (e.g. pins, needles, battery cells etc) or organic such as seeds, peanuts and beans. Organic FBS may set up a diffuse violent reaction leading to congestion and oedema of the tracheobronchial mucosa; "vegetable bronchitis".

1.1.5.2 Aetiology

Young children comprise the most common age group for FB aspiration because of the following:

- They lack molars for proper grinding of food.
- They tend to play, laugh and talk while chewing at the time of aspiration.
- They tend to put objects in their mouth more frequently.
- They lack coordination of swallowing and glottic closure

1.1.5.3 Pathophysiology

After FB aspiration occurs, the FB can settle in 3 anatomic sites, the larynx, trachea, or bronchus. Of aspirated FBS, 80-90% becomes lodged in the bronchi.[18]

In adults, bronchial FBS tend to be lodged in the right main bronchus because of its lesser angle of convergence compared with the left bronchus and because of the location of the carina left of the midline. Larger objects tend to become lodged in the larynx or trachea

1.1.5.4 Clinical presentation;

In general, aspiration of FBS produces the following 3 phases:

Initial phase - Choking and gasping, coughing, or airway obstruction at the time of aspiration

Asymptomatic phase - Subsequent lodging of the object with relaxation of reflexes that often results in a reduction or cessation of symptoms, lasting for hours to weeks

Complications phase - FBS producing erosion or obstruction leading to Pneumonia, atelectasis, or abscess. Clinical presentation depends on the location of the FB. A large FB lodged in the larynx or trachea can produce complete airway obstruction from either the dimensions of the object or the resulting edema. Laryngeal FBS present with airway obstruction and hoarseness of voice or aphonia.

Tracheal FBS present similarly to laryngeal FBS but without hoarseness of voice or aphonia. Tracheal FBS can demonstrate wheezing similar to asthma. Bronchial FBS typically present with cough, unilateral wheezing, and decreased breath sounds, but only 65% of patients present with this classic triad. FB aspiration can mimic other respiratory problems, such as asthma. FB aspiration differs in the presence of unilateral wheezing and decreased breath sounds. [18]

The three phases of FB symptoms, also occur in larynx and trachea, i.e. an initial period of choking, gagging and wheezing followed by a symptom less middle stage, finally leading to late symptoms of obstruction, trauma and inflammation. The additional features in case of larynx and trachea are as follows;

In case of larynx, a large FB may totally obstruct the airway leading to sudden death, unless resuscitative measures are taken urgently.

A partially obstructive FB will cause discomfort or pain in the throat, hoarseness of voice, croupy cough, aphonia, dyspnoea, wheezing and haemoptysis.

In case of tracheal FB, sharp FBS will produce cough

and haemoptysis. A loose FB like seed may move up and down the trachea between the carina and the undersurface of vocal cords causing

"audible slap" and "palpatory thud".Asthmatoid wheeze may also be present. It is best heard at patient's open mouth.

1.1.5.5 Diagnosis

Diagnosis can be made by detailed history of the FB "ingestion",physical examination of the neck and chest and radiographs. The x-rays that are advisable are soft tissue poster anterior and lateral view of the neck, in its extended position which can show radio-opaque and sometimes even the radiolucent FBS in the larynx and trachea and Postero-anterior and lateral view of the chest

1.1.5.6 Management

1.1.5.7.1 Laryngeal FBS;

A large bolus of food obstructing above the cords may make the patient totally aphonic, unable to cry for help. He may die of .asphyxia unless immediate first aid measures are taken.

The measures consist of pounding on the back, turning the patient upside down and Heimlich maneuver. [64]

These measures should not be done if patient is only partially obstructed, for fear of causing total obstruction. The following are important maneuvers in laryngeal obstruction Heimlich maneuver ;

This is carried out in the following way: Stand behind the person. Place your arms around his lower chest and give four abdominal thrusts. The residual air in the lungs may dislodge the FB providing some airway. [64]

Cricothyrotomy or emergency tracheostomy;

This maneuver should be done if Heimlich maneuver fails. This should be performed only by doctors and persons trained in this field and never by a common man.

1.1.5.8.2 Removal of FBS;

Once acute respiratory emergency is over, FB can be removed by direct laryngoscopy or by laryngofissure, if found impacted.

1.1.5.9.3 Tracheal FBS;

Tracheal and bronchial FBS can be removed by bronchoscopy with full preparation and under general anaesthesia. Emergency removal of these FBS is not indicated, unless there is airway obstruction or they are of the vegetable nature (e.g. seeds) and likely to swell up. [13]

1.1.5.10.4 Bronchial FBS;

The treatment in this case is removal. In the case of vegetable FBS, it is a real emergency, whereas the other types of FBS may lie in the air passages or a short or a long period without producing marked

symptoms, but when diagnosed, the sooner they are removed, the better it is. If not removed, they ultimately cause suppuration of the lung and may cause death.

Methods to remove tracheabronchial FBS;

Following methods are commonly employed to remove tracheabronchial FBS:

1. Conventional rigid bronchoscopy
2. Rigid bronchoscopy with telescopic aid
3. Bronchoscopy with C-arm fluoroscopy
4. Use of Dormia basket or Fogarthy's balloon for rounded objects
5. Tracheostomy and bronchoscopy through tracheostome
6. Thoracotomy and bronchotomy for peripheral FBS
7. Flexible fibre optic bronchoscopy in selected adult patient. [13]

1.1.6.0 Foreign bodies in the ear

1.1.6.1 Aetiology and epidemiology;

Patients presenting with FBS in the ear are predominantly children in the 2 to 8 age group. [22]

The earliest presentation is likely to be around the age of 9 months when a child develops a pincer grip, allowing easy manipulation of small objects. [65] Patients are more likely to be male and of low socioeconomic status. [66]

One series from India 28 has shown that insertion of FBS into the ear is associated with pre-existing irritative disease (most commonly chronic otitis externa), although this finding has not been substantiated in other studies. [22, 67]

1.1.6.2 Types of aural FBS;

The range of aural FBS that present to the emergency department is limited only by the imagination. [68] A useful classification is animal, vegetable or mineral, [69] as removal techniques will vary according to the composition of the FB. Animals (for example, cockroaches ants, moths, flies, etc) are the most common FBS in the adult ear and often require immediate attention as they cause pain and agitation in the patient. [70]

They should generally be killed before attempted removal, which then becomes less urgent. Vegetable matter (for example, paper, beans, peas, and cotton buds) tend not only to cause an inflammatory reaction, but also to swell in moist conditions resulting in further impaction and difficulty in removal. The most commonly inserted mineral FBS include beads, rubber erasers, and small toy parts. [71]

1.1.6.3 Patient preparation;

Writing in the ABC of Otolaryngology, [72] Ludman states "On initial inspection, the FB may be seized and removed with forceps before the child is aware of the result". While this may be true, an unsuccessful attempt significantly jeopardizes subsequent efforts. The first attempt is likely to be the most successful, [70]as repeated trials not only cause further swelling and bleeding but also compromise patient cooperation. [73] As previously mentioned, children form a large part of this patient group and a careful approach is especially important. While attitudes are changing there is probably still over-reliance in the emergency department on restraining methods such as papoose strapping boards or "mummy" techniques involving sheets and tape. [74, 75]

Providing adequate resources are available, sedation in the emergency department may now be a more favored option, although this will not prevent the wriggling caused by a sudden painful stimulus.

1.1.6.4 Anaesthesia;

Adequate local anaesthesia within the auditory canal is rather harder to achieve. Topically applied local anaesthetic tends to have a partial effect at best, and although a "four quadrant block" has been described; even this may not produce complete anaesthesia, particularly of the tympanic

membrane. [76] Furthermore, four injections of local anaesthesia will do little for compliance in the paediatric population? for this reason a general anaesthetic is to be preferred where the patient is uncooperative or removal of a foreign body proves difficult. [77]

1.1.6.5 Visualization;

Adequate visualization is essential for the successful removal of foreign bodies from the ear. One study has shown that canal lacerations occurred in 48% of patients where removal was attempted without the use of a microscope, compared with only 4% where a microscope was used. [70] The traditional equipment for viewing FBS in the emergency room is the otoscope. Although this provides an adequate light source it is less likely to be of use in retrieval, because of difficult instrumentation through or around the small speculum end. The use of a specialized ENT speculum allows more space for instrumentation a headlamp or an illuminated magnifying glass probably provide the best form of light source, as they leave both hands free. A pair of magnifying loopes will provide useful hands free magnification. This equipment is not expensive and will prove useful for other practical tasks in the department.

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1.1.6.6 Technique for removal;

1.1.6.7.1 General considerations;

The choice of technique for removal should be related to the exact location, shape, and composition of the FB. Removal is rarely an emergency, and the problem can often wait-either for more senior advice or referral to a specialist. The main danger in removing a FB from the ear is the risk of drum perforation either before insertion of the FB, as a result of its presence or arising from over-zealous attempts at removal .Finally it is essential to re-inspect the ear after successful removal to ensure that there is not a second FB still present. [65]It is also prudent to check the contra lateral orifice, especially in the paediatric population.

1.1.6.7.2 Irrigation;

This technique is useful for a small FB close to the tympanic membrane. Irrigation fluid (tap water or normal saline) should be of body temperature to decrease the risk of inner ear stimulation. Perforation of the eardrum or a FB composed of vegetable matter, which would swell, are contraindications. [70]The flow should be brisk and aimed at the superior aspect of the ear canal. [76]

Although specialized irrigation catheters can be used, a butterfly cannula with the needle cut off is soft, flexible, non-traumatic and easily available in the emergency department.[66]

Specialized machines providing a pulsed flow have recently been shown to improve the success rate for removal. [78]

1.1.6.7.3 Negative pressure technique (suction);

This technique is supposedly well suited to round objects that are difficult to grasp with forceps. [79] Suction is easily available in the emergency department and needs to provide between 100 and 140 mm Hg of negative pressure to be of use. [80, 81] Commercial suction catheters tend to be metal, increasing the risk of trauma. They can be protected with plastic tips (umbrellas) [81] or alternatively a soft and flexible endotracheal suction catheter can be used to minimize this risk. [76] Soft catheters can also be modified with a flanged tip to increase the chance that a smooth, spherical object will be successfully held and withdrawn. [82] One significant drawback in the paediatric population is fear associated with the noise created by suction devices. The use of play before the procedure may allay a child's fears.

1.1.6.7.4 Glue;

The first recorded use of glue was in India in 1977 when a gum-based glue was used to retrieve a FB. [83] This has been superseded by faster setting Cyanoacrylate "superglues" and is now in common use. [84–86] It is most effective in removing smooth, round objects that are difficult to grasp.

The FB must be dry and easily visualized so that the risk of accidental contact with the mucosa or tympanic membrane is avoided. Care needs to be taken to limit the amount of glue introduced into the ear. Although patient compliance is required the technique has been found to be generally acceptable to children.

1.1.6.7.5 Impression materials;

This method was first described in 1977 by Stassen and Hilding but has since had little publicity. [87] Semi liquid materials such as acrylic, dental alginate, and silicone were poured into the external meatus encompassing the foreign body and allowed to set. FB and impression material were then both removed. A success rate of 92% was reported in cases that had been referred from the emergency department. Problems were found relating to the length of drying time, but it would appear that the materials were well tolerated. Perforation of the eardrum is a contraindication to this technique.

1.1.6.7.6 Surgical instruments;

Many surgical instruments have been designed or adapted to assist in the removal of FBS. [88], Their use is commonly associated with abrasions and bleeding, [70] and more rarely with perforation of the tympanic membrane. This technique should therefore only be attempted under direct vision in a compliant patient.

The choice of instrument depends on the type of FB. Alligator or other forceps are useful for irregular objects with an easily visible edge that can be grasped. Hooks, curettes and loops are required when the FB is smooth or spherical and impossible to grasp. These techniques are of little value with friable FBS, which tend to tear on removal.

1.1.6.7.7 Manufactured instruments;

A number of instruments manufactured from various pieces of equipment have been described in the literature, though these generally mimic equipment already in service. The paper clip seems a popular item, from which is fashioned a wire loop or hook to assist in retrieval. [89, 90] If using this method, care should again be taken to ensure that there is minimal trauma to the patient.

1.1.6.7.8 Unique to the type of FB;

The ingenious suggestion of using a magnet for removal of ferrous items [91, 92] has not yet been supported by case reports. The expense of buying one that is of sufficient strength for removal, combined with the relative lack of use, is likely to limit this method of retrieval. The fortuitous discovery that ethyl chloride dissolves Styrofoam beads provides another unique approach to the removal of a common FB.

1.1.6.7.9 Insect drowning;

Live animal FBS in the ear are extremely distressing to the patient and should be killed before removal. This is best achieved by filling the ear canal with a liquid such as olive oil, methylated spirit, or Lignocaine. [69], Removal then becomes an urgent rather than an emergent procedure. Lignocaine also appears to have a more specific irritant effect that drives insects, specifically cockroaches, from the ear canal. [93]

1.1.6.8 Complications and referral

Complications may arise from the FB itself, the examination or attempted removal (by physician or patient). Reported complications include abrasions, bleeding, infection, and perforation of the tympanic membrane. [76] The latter is rare but if suspected the patient should be referred for further assessment. Failure to remove a FB also necessitates non-urgent referral unless the patient is in pain. Caustic FBS such as batteries can cause mucosal damage including ulceration and necrosis, and these cases should be referred urgently. [94, 12]

1.1.6.9 Follow up

No routine follow up is required, except in cases of infection, severe trauma, or perforation of the eardrum. It is important to check the other aural before discharge to exclude coexisting FB. Parents should be educated to minimize the exposure of children to potential FBS. [79]

DiMuzio et al. [27] in USA found that certain FBS (graspable type) of the EAC in pediatric patients can be successfully managed by skilled emergency department personnel with low complication rates, whereas other FBS (Nongraspable types) may be better managed by early referral to an Otolaryngologist. In this study 36 patients were brought to the emergency department over a 12-month period with FBS of the EAC. Their mean age was 6.5 ears (range, 1–16 Yr). Numerous FBS were noted; beads were the most common. Successful removal was achieved in 53% of cases, and one or more complications were recorded in 47%. When the FBS were grouped into Nongraspable and graspable objects, the success rate or the Nongraspable group was 45%, with a complication rate of 70%, whereas for graspable objects the successful removal rate was 64%, with a complication rate of only 14%. The difference in complication rates was statistically significant ($p < 0.001$.)

1.2 LITERATURE REVIEW

Several studies have been done to determine the incidence, age most affected, types, sites, methods of removal and complications of FBS in aerodigestive tract and the ear.

Kay M, et al [5] in USA commented that Ingestion of FBS is a Common pediatric problem, with more than 100,000 cases occurring each year. The vast majority of pediatric ingestions are accidental; increasing incidence of intentional ingestions starts in the adolescent age group. In the United States, the most common pediatric FBS ingested are coins, followed by a variety of other objects including toys, toy parts, sharp objects, batteries, bones, and food. In adolescents and adults, meat or food impactions are the most common accidental FB ingestion. Esophageal pathology underlies most cases of food impaction. Management of FB ingestions varies based on the object ingested, its location, and the patient's age and size.

Esophageal FBS as a group require early intervention because of their potential to cause respiratory symptoms and complications, esophageal erosions, or even an aortoesophageal fistula

Ingested batteries that lodge in the esophagus require urgent endoscopic removal even in the asymptomatic patient due to the high risk of complications sharp FBS increase the FB complication rate from less than 1% to 15% to 35%, except for straight pins, which usually follow a relatively benign course unless multiple pins are ingested.

Magnets are increasingly ingested, due to their ubiquitous nature and the perception that they do not pose a risk. Ingestion of multiple magnets creates a significant risk of obstruction, perforation, and fistula development.

In review of aerodigestive tract FBS, Murty PSN, et al [95] recommended that no FB in the upper aero-digestive tract should be left alone with the hope that it will come out spontaneously. All the impacted FBS should be, removed via peroral endoscopy as soon as possible.

For the trauma and dangers caused by the FBS can be minimized if parents are made aware of the risks and taught paediatric home care. In this study retrospectively reviewed cases of 58 patients who underwent peroral endoscopy under general anaesthesia for the retrieval of FBS for alleged aspiration or swallowing.

Tracheobronchial FBS were commonly seen in children whereas the food passage hosted FBS in all the age groups. The right bronchus was more likely to have a foreign body than the left. Scarf pins were the commonest? Oesophagus had more FBS than the hypopharynx. One out of 14 bronchoscopies (7.14%) and 5/44 oesophagoscopies (11.36%) were negative for the presence of FBS. FB related complications such as retropharyngeal abscess, pulmonary oedema and lung collapse were seen in three patients (5.2%).

Romualdo SLT et al [96] in Brazil commented that most cases of FB conditions, in which a non-specialist professional or a non-professional person previously handles its removal, have a bad evolution with emerging complications. In his study 81 patients had a diagnosis of FBS .The ear, nose and oropharynx accounted for 57 cases, 13 cases and 11 cases respectively. Of these 51.85% were males and 48.15% were females. The mean age was 23 years .83.95% of the patients received initial treatment at the ORL clinic while 16.05% came from other services where attempted removal had been done. Most frequent FBS per site were fish spine (54.55%) in oropharynx, paper (30.77%) in the nose and cotton (31.58%) in the ears.

Razi A et al [26] in Kuala Lumpur Malaysia, found that FBS in the aerodigestive tract tend to present earlier and were more promptly removed than those in the ear and nose. There was a significantly higher proportion of FB in the right ear and right nostril compared to the left. A prospective study of 94 patients with history of ear, nose or aerodigestive tract FBS was done. 66%to 94% of patients presented within 24 hours to a primary care doctor, 80 to 94% were referred to the ENT Department within 24 hours and 89 to 93% of the patients had their FBS removed within 24 hours. The percentage per site of FBS removed within 48 hours was 58% aural, 67% nasal and 94% aerodigestive tracts. Complication rate was low due to prompt removal of FBS in this study. Higo R et al [97] in Japan found a typical FB in the pharynx to be fish bone; toys were commonly encountered in the nose. There was a serious increase of disk type batteries in the oesophagus.

The study consisted of 310 patients less than 15 years old .It was found that two –years –old were the common patients, and the range from age 1 to age 4 included 67.7% of all the patients. The most involved sites were the nose (39.4%) the pharynx (38.4%), the esophagus (12.9%) and the trachea-bronchi (6.5%). The frequency of fish bones and toys were 30.7% and 13.6% respectively.

Other FBS encountered included coins, food, candy, peanuts, nuts, and

batteries. The type of FB was closely related to the site in which FBS were lodged: 77.3% of FBS in the pharynx were fish bones, and toys were the most common impacted FBS in the nose.

In the esophagus, site related impacted FBS were coins (35.7%). Although most FBS in the esophagus were safely removed, one case of a disk-type battery had a serious sequela.

In a retrospective study of 420 cases by Ricardo RF et al [34] in Rio de Janeiro, nasal FBS were most common in children between the ages of 0 and 4 years, foam fragments and plastic objects were the most frequent. Complications were found in 9.05% of the cases, epistaxis and nasal vestibulitis being the most common.

In a study of 104 patients with ingested FBS by Shivakumar AM et al [98] in India they recommended early removal of the sharp FBS to reduce the risk of this complication. Endoscopic removal was done for all foreign objects impacted in esophagus. In 84.6% cases, history of having swallowed the FB was the most common symptom? Majority of patients (61.53%) presented within 24 hours after ingestion of FB. Coins were the most frequent offending agents in children (87.5%).

Seventy-six cases of coins were impacted in the postcricoid region.

Complications of retropharyngeal abscess were seen in two cases (1.92%), which were associated with sharp FBS.

Diaz GA et al [99] in Puerto Rico found FB aspiration or ingestion to be common events that could be prevented in the pediatric age. They affirmed parental education to be important at that stage. In their study a total of 158 patients were reviewed, 51 children had FB in their airway and 107 children had FB in their digestive tract . Of the 51 FBS aspirations, 25 were boys and 26 were girls; and of the 107 ingestion, 67 were boys and 40 were girls.

Endican S, et al [100] in Papua New Guinea. Found Otolaryngological FBS to be common in children. For early diagnosis a high index of suspicion had to be maintained by pediatric Otolaryngologist. In their study 1037 cases of ENT FBS were retrospectively analyzed .

The frequency of FBS was the EAC 711 (68.6%) cases, nose 258 (24.9%), pharynx 26 (2.5%), esophagus 21 (2.0%) and laryngotracheobronchial (LTB) tree 21 (2.0%). Innumerable varieties of FBS were removed from the ear. The common ones were stones 277 (39.0%), seeds 142 (20.0%), plastic ornament beads 70 (9.8%) and cotton 48 (6.8%) cases.

613 (86.2%) of them were removed under the microscope at the clinic without any complications.

The difficult ones in uncooperative children were removed in the operation theatre. They numbered 98 (13.8%). Nasal FBS were exclusively limited to children under12 years of age. Common nasal FBS were foam 54 (20.9%), Seeds 51 (19.8%), stone 28 (10.9%) and ornament beads 24 (9.3%). Two hundred and Forty-six (95.3%) of them were removed in the clinic. Only 12 (4.7%) were removed in the operation theatre. Fish bones were the commonest (23, 90.2%) FB encountered in the pharynx of the children. Coins were the exclusive esophageal FBS in children and all were removed in the operation theatre under general anesthesia.

In the LTB tree the FBs were mostly localized to the right main bronchus, which occurred in 11 (52.4%) cases. This was followed by the trachea 4 (19.1%) cases. The different types of FBs encountered were coffee beans 8 (38.0%), peanuts 5 (23.8%) and plant seeds 3 (14.2%). Two mortalities were encountered in the LTB FB patients.

Bhatia PL [101] found the incidence of FBS in the ear, nose and throat to be quite high in Jos Community of Nigeria .In his study 411 cases were reported over a period of three years. These occurred most frequently in the ears, while the oesophagus was the second commonest site. Of the 411 cases, 270 (66.7%) were removed at the outpatient or the casualty departments while the remaining 141 cases had to be admitted to hospital.

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CHAPTER TWO

2.0 Statement of the problem

Foreign body ingestion and aspiration is a significant universal health problem .It can affect person of any age, but most of the cases affect children under five years of age[4]

It is estimated that 1500 deaths occur annually related to the ingestion of foreign materials and 3000 deaths occur annually due to complications offoreign material aspiration. [5]

Suffocation resulting from foreign body ingestion and aspiration is the third leading cause of accidental death in children under one year of age, and the fourth leading cause of death in children from ages 1 to 6. [6.]

It is considered that aerodigestive tract FBS especially in the air way are a cause of serious morbidity and mortality. The magnitude of this problem in Tanzania is not well known.

2.1. Rationale of the study

Otolaryngologist in Tanzania frequently encounters aerodigestive tract and aural FBS, particularly among children and mentally retarded patients. But no comprehensive study of this important subject has been published locally.

This study aim at determining the incidence of FBS in the aerodigestive tract and the ear among patient attending ORL service at Muhimbili National Hospital.

This will elucidate the magnitude of the problem locally and help in interventional planning. The review of the different types of FBS, age and gender affected, the various clinical presentations, and complications associated with FBS. The results will help health planner to give more evidence based health education to the general public which will help in the prevention of this serious problem in future.

Also this study is done as a partial fulfillment for the award of Master of Medicine in Otorhinolaryngology at the Muhimbili University of Health and Allied Sciences

CHAPTER THREE

3.0 Study objective

3.1 Broad objective;

To determine the incidence of FBS in the aerodigestive tracts and the ear among patients attending ORL department at MNH.

3.2. Specific objectives;

1) To determine the incidence of FBS in the aerodigestive tracts and the ear according to the age and sex among patients attending ORL department at MNH

2) To determine the distribution of FBs by age and sex among patients with FBS attending ORL department at MNH.

3) To determine the types and sites of FBS among patients with FBS attending ORL department at MNH.

4) To describe the common presenting symptoms and signs of FBS among Patients with FBS attending ORL department at MNH.

5) To determine the average time passed between FBS Placement and removal with their related complications among patients with FBS attending ORL Department at MNH.

CHAPTER FOUR

4.0 Methodology

4.1. Study area

This was Hospital –Based study, which was conducted in the ORL wards and out patient's clinic at the Muhimbili National Hospital-MNH. MNH is one of the referral and teaching Hospital in the country. It is located in the city of Dar es Salaam which has a population of about 3.5 million. A part from serving city residents as a referral centre, the hospital also serves as a National Referral Hospital. MNH consist among other departments, the department of ORL, which encompasses two firms. All ORL patients are received at the casuality department where they are sorted and sent to ORL wards and outpatients clinic. The patients are then clerked by a registrar followed by a resident on call and later on a consultant if a need arises. Patients from non-ORL wards that need ORL attention are referred accordingly.

Most of the ORL emergencies are performed by Residents and registrar, who have been supervised by consultants until they are capable of working independently. They are however required to get advised from their consultants wherever necessary. Both public and private patients are currently treated in the hospital.

4.2 Study design

This was a prospective descriptive study of patients who presented with FBS in the aerodigestive tract and ear at MNH

4. 3. Study population

All patients who were admitted in the ORL wards and attended ORL outpatient clinic with history or symptoms and/or signs of FBS insertion, ingestion or aspiration or diagnosis of FBS and confirmed by Otorhinolaryngological examinations and/or radiological examinations.

4.4 Sample size

All patients who presented to hospital with aerodigestive tract or ear FBS who were attended at out patient clinic and/or admitted in ORL wards between March and September 2007.

4.5 Patient recruitment

Once the patient was suspected to have FBS in aerodigestive tract and the ear, a thorough history was taken including blood for hemoglobin level and x-rays when needed.

Inclusion criteria;

- Patients with history, or symptoms and/or signs of FBS either insertion, ingestion or aspiration OR diagnosis of FB

- Patients who accepted to sign Consent for the study .

Exclusion criteria;

- Patients without history, or symptoms and/or signs of FBS insertion, ingestion or aspiration OR diagnosis of FB

Those not consenting to be included in the study

4.6. Ethical clearance

The study was ethically cleared by MUHAS research and publication committee. The patients were explained about the study and were requested to participate all consenting patients were recruited into the study. However no patient was denied of appropriate and adequate treatment upon not consenting. The information gathered about the patient was kept confidential and could only be available to interested parties only with permission of the investigator and the patient

4.7 Material and methods

A Descriptive cross-sectional hospital based study of patients who attended out patient clinic or admitted to the MNH Otorhinolaryngology Unit between March 2007 and October 2007 with a diagnosis of FBS in the nose, or ear, or oropharynx, or oesophagus, or larynx, trachea and bronchi underwent a complete otorhinolaryngological examination followed by FB removal, the initial clinical assessment and the FB removal procedure was performed by one of the registrar Doctor who was be on call or the investigator or by one of the

senior Otolaryngologist of the MNH

A specific protocol form (a questionnaire) was filled in for all cases which included the following points: age; sex; main complaint; associated symptoms; duration of the condition; location; nature of the FB; strategy and complications. Data was collected by the investigator based on the interview of the patient or child caretaker. One of the following instruments was being used to remove ear FBs: a curette, an alligator forceps, ear syringing or irrigation and bayonet forceps or a suction machine. Instruments that were used for nasal FB included: alligator forceps or a curette and nasal speculum, for pharyngeal FBs will be: a Hartmann forceps a bayonet forceps or digital maneuvers, always with local anesthesia with 4% Lidocaine. Alcohol was instilled in the external auditory canal prior to removing live FBs. General anesthesia was used in irritable children and adult and in case of oesophageal and tracheal bronchi FBS with either oesophagoscope or bronchoscope respectively. All patients were followed by investigator until when discharged.

4. 8 Data analysis and dissemination;

All data obtained were analyzed using Epi-info -6 programme.

CHAPTER FIVE

5.0 Results

Table 1; Incidence of FBS by sex

Sex	No. with FBS	Total no. attended ORL	incidence of FBS (%)
Male	59 (52.21%)	2324	2.54
Female	54 (47.79%)	2276	2.37
Total	113 (100)	4600	2.46

This study included 113 cases of otorhinolaryngological FBs .The overall incidence of foreign bodies in the aerodigestive tract and the ear was 2.46% of all the patients attended ORL services during study period (113/4600). It was 2.54% in male (59/2324), and 2.37% in female (54/2276). Gender distribution among patients with FBS was 59 male (52.21%) and 54 female (47.79%) **[Table1]**

Table 2; Incidence of FBS by age groups

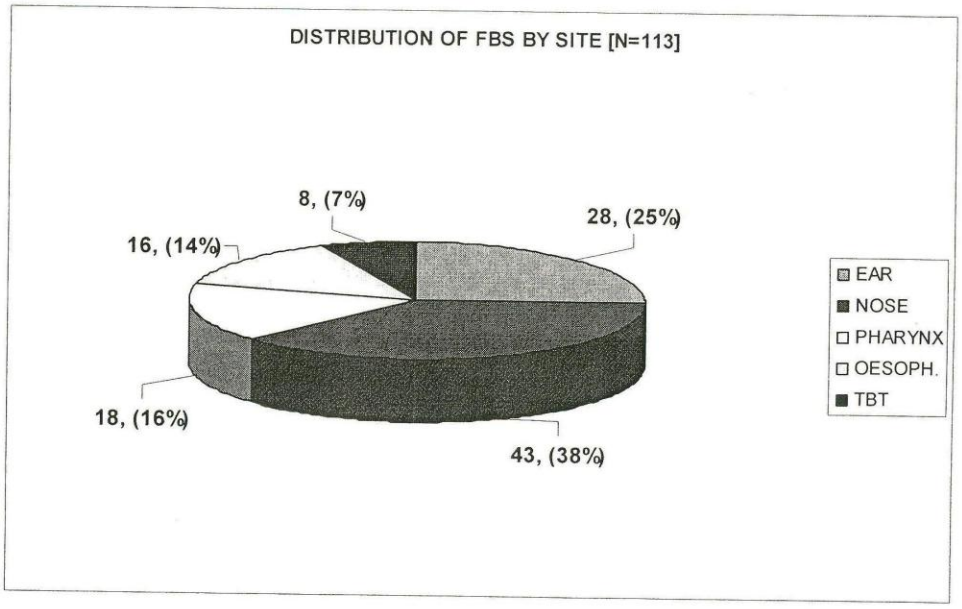
AGE GROUP (yrs)	No. with FBS (%)	Total no. attended ORL	Incidence of FBS (%)
0-4	74 (65.49)	1129	6.56
5-9	20 (17.7)	473	0.04
10-14	5 (4.43)	158	0.03
15-19	4 (3.54)	417	0,009
20-24	1 (0.9)	139	0,007
25>	9 (7.97)	2284	0.004
TOTAL	113(100)	4600	2.46

The highest foreign body incidence was 6.56% in the age group between 0 to 4years (74/1129) and the lowest incidence was 0.004% in age group 25 years and above (9/22840) **[Table 2].**

Table 3; FBS according to age group and site

AGE GROUPS (YRS)	SITES					TOTAL
	EAR (%)	NOSE (%)	PHARYNX (%)	OESOPHAGUS (%)	TBT (%)	
0-4	11(14.87)	38 (51.35)	13 (17.57)	9(12.16)	3 (4.05)	74 (100)
5-9	9(45)	3 (15)	1(5)	2 (10)	5 (25)	20 (100)
10-14	2 (40)	1 (20)	0	2 (40)	0	5 (100)
15-19	3 (75)	1 (25)	0	0	0	4 (100)
20-24	1 (100)	0	0	0	0	1(100)
25>	2(22.22)	0	4 (44.44)	3 (33.33)	0	9 (100)
TOTAL	28 (24.8)	43 (38.1)	18 (15.9)	16 (14.2)	8 (7.1)	113(100)

Fig. 1

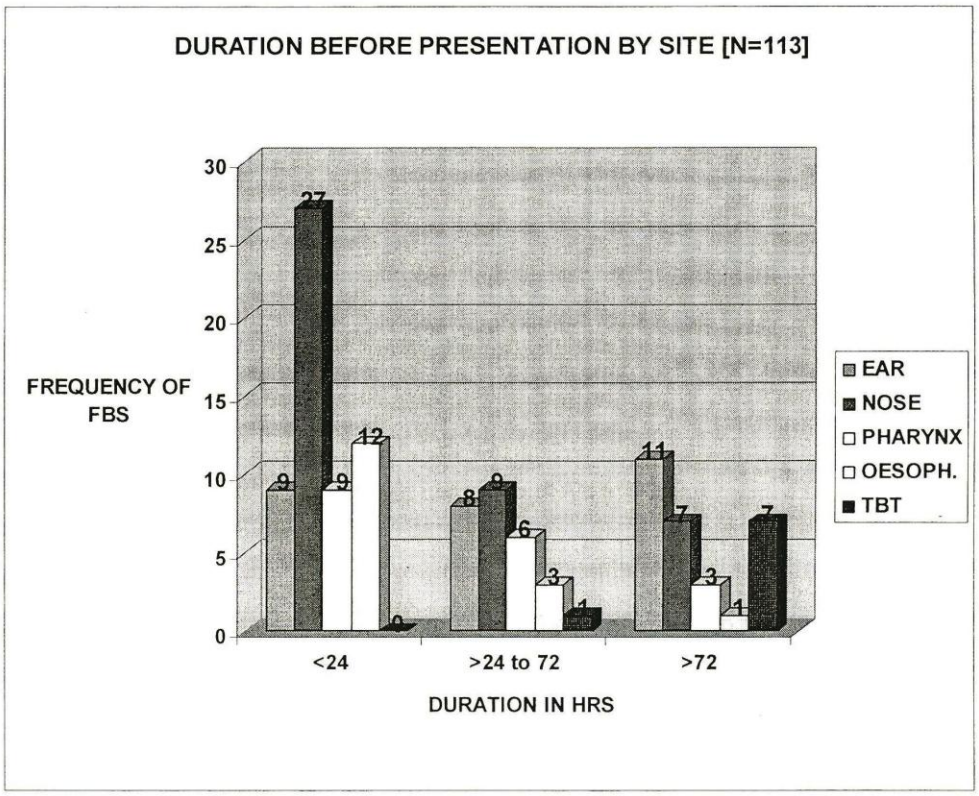


Among the patients with FBs 43 cases (38.1%) were in the nose, 28 cases (24.8%) in the ear, 18 cases (15.9%) in the pharynx, 16 cases (14.2%) in the oesophagus and 8 cases (7.1%) in the TBT. Age varied from 1 to 58 years (mean 7 years). The 0-4 year group was the most frequently affected with 74 cases (65.48%). The 0-4 year group was the most frequently affected groups for FBs in the nose, with 38 cases (51.35%) and the least affected site was TBT with 3 cases (4.05%). The 20-24 years group was the least affected age group with one case (0.9%) of all FBS cases [**Table 2, 3,Fig.1**]

Table 4; Duration before presentation according to site

DURATION (in hours)	**EAR** (%)	**NOSE** (%)	**PHARYNX** (%)	**OESOPHAGUS** (%)	**TBT** (%)	**TOTAL** (%)
Less than 24	9 (32.14)	27(62.79)	9 (50.0)	12 (75.0)	0 (0)	57 (50.44)
Above 24 to 72	8 (28.57)	9 (20.93)	6 (33.33)	3 (18.75)	1(12.5)	27 (23.89)
More than 72	11(39.28)	7 (16.27)	3 (16.67)	1 (6.25)	7 (87.5)	29 (25.66)
TOTAL	28 (100)	43 (100)	18 (100)	16 (100)	8 (100)	113 (100)

Fig.2



The location of FBs was as follows: Of the 28 FBs in the ear, 19 (67.86%) were placed in the right ear, 9 (32.14%) in the left ear. For FBs in the nose 28 (65.12%) were placed in the right nostril and 15 (34.88%) in the left nostril. Of 18 pharyngeal FBs 13 (72.22%) were in the hypopharynx and 5 (27.78%) in the oropharynx (in the tonsil).Of 16 oesophageal FBs 5 (31.25%) were in the cervical oesophagus, 6 (37.5%) were in mid oesophagus and 5 (31.25%) were

in the lower oesophagus. Of 8 TBT 3 (37.5%) were in the right main bronchus, 2 (25%) were at the carina, 2 (25%) were in the trachea and 1 (12.5%) was in the left main bronchus.

The average FB duration time was 3.63 days; 57 cases (50.44%) were seen within 24 hours, 27 cases (23.89%) between 25 to 72hrs and 29 cases (25.66%) beyond 72hrs. Most of the nasal, pharyngeal, and oesopharygeal FBs were presented before 24hrs with 27 cases (62.79%), 12 cases (75.0%), and 9 cases (50.0%) respectively.

Most of the TBT and the ear FBs cases presented beyond 72hrs that is 7 cases (87.5%) and 11 cases (39.28%) respectively **[Table 4,Fig.2].**

Chart I; Types of FB

Type	Frequency (%)
Bean seed*	22(19.46)
Coin	21(18.58)
Bead *	12(10.62)
Metallic object	7(6.2)
Button Battery	7(6.2)
Baobab seed *	6(5.31)
Ground nuts *	6(5.31)
Fishbone	5(4.43)
Piece of match stick	4(3.54)
Stone	3(2.66)
Piece of sponge	3(2.66)
Cotton buds	3(2.66)
Insect **	2(1.78)
Piece of glass	2(1.78)
Meat bone	2(1.78)
Maize seed *	1(0.89)
Ear ring	1(0.89)
Piece of rubber	1(0.89)
Meat bolus *	1(0.89)
Ball pen cap	1(0.89)
Plastic object	1(0.89)
Piece of cigarette	1(0.89)
Tracheostomy tube inner canula	1(0.89)
TOTAL	**113(100)**

Key;* 0rganic inanimate FBs, ** animate FBs

Chart II Frequency of FBS according site

REGION (%)	TYPES OF FB	FREQUENCY
EAR [N= 28]	Bead	7(25.0)
	Bean seed	4(14.29)
	Piece of match stick	4(14.29)
	Cotton buds	3(10.71)
	Insect (cockroaches)	2(7.14)
	Stone	2(7.14)
	Metallic object	2(7.14)
	Piece of sponge	1(3.57)
	Piece of rubber	1(3.57)
	Button battery	1(3.57)
	Baobab seed	1(3.57)
NOSE [N= 43]	Bean seed	17(39.53)
	Button battery	6(13.95)
	Ba0bab seed	5(11.63)
	Bead	5(11.63)
	Ground nuts	4(9.30)
	Piece of sponge	2(4.65)
	Maize seed	1(2.33)
	Metallic object	1(2.33)
	Piece of cigarette	1(2.33)
	Stone	1(2.33)
PHARYNX [N= 18]	Coin	11(61.11)
	Fish bone	3(16.67)
	Metallic object	2(11.11)
	Piece of glass	1(5.56)
	Plastic object	1(5.56)
OESOPHAGUS [N= 16]	Coin	10(62.5)
	Fish bone	2(12.5)
	Meat bone	2(12.5)
	Meat bolus	1(6.25)
	Piece of glass	1(6.25)
TBT [N= 8]	Groundnut seed	2(25)
	Metallic object	2(25)
	Ball pen cap	1(12.5)
	Tracheostomy tube canula	1(12.5)
	Ear ring	1(12.5)
	Bean seed	1(12.5)

FBs were classified as animate, inanimate organic and inorganic. In the ear there were 5 (17.86%) inanimate organic FBs, 21 (75%) inorganic FBs and 2 (7.14%) animate FBs. In the nose there were 27 (62.79%) inanimate organic FBs and 16 (37.20%) inorganic FBs. In the oesophagus there were 15 (93.75%) inorganic FBs and 1(6.25%) inanimate organic FBs.

All pharyngeal FBs were inorganic, In the TBT there were 3(37.50 %) inanimate organic FBs and 5(62.50%) inorganic FBs **[CHART I&II]** Bean seed was the most frequent object in the nose, with 17 cases (39.53%), followed by button battery, with 6 cases (13.95%).

The most frequent FB in the ear was bead, with 7 cases (25%), followed by bean seed, with 4 cases (11.20%), The most frequent FB in the pharynx was coin, with 11 cases (61.11%) followed by fishbone 3 cases (16.67%). Coin was also the most frequent FB in the oesophagus ,with 10 case (62.5%),followed by fishbone and meat bone with 2 cases each (12.5%) , meat bolus and piece of glass with 1 case each (6.25%) .Groundnuts seeds and metallic object were the most frequent FBs in the TBT with 2 (25%) cases each. [**Chart II]**

Chart III; clinical presentation according to site

REGION (%)	PRESENTATIONS	FREQUENCY
EAR [N= 28]	Ear pain	27 (96.43)
	Ear blockage	20(71.43
	FBs placement	14(50.00)
	Ear discharge	9(32.14)
	Ear bleeding	3(10.71)
NOSE [N= 43]	Unilateral purulent rhinorrhea	30(69.77)
	FBs placement	24(55.81)
	Nasal obstruction	13(30.23)
	Nasal bleeding	7(16.28)
PHARYNX [N= 18]	Odynophagia	12(66.67)
	Pain	7(38.89)
	Dysphagia	6(33.33)
	Excessive salvation	3(16.67)
OESOPHAGUS [N= 16]	Dysphagia	10(62.5)
	Odynophagia	5(31.25)
	FBs ingestion	4(25)
	Vomiting	3(18.75)
	Pain	2(12.5)
TBT [N= 8]	Difficult in breathing	8(100)
	Decrease air entry	6(75)
	Stridor	5(62.5)
	Coughing and choking	4(50.0)
	Wheezing	4(50.0)

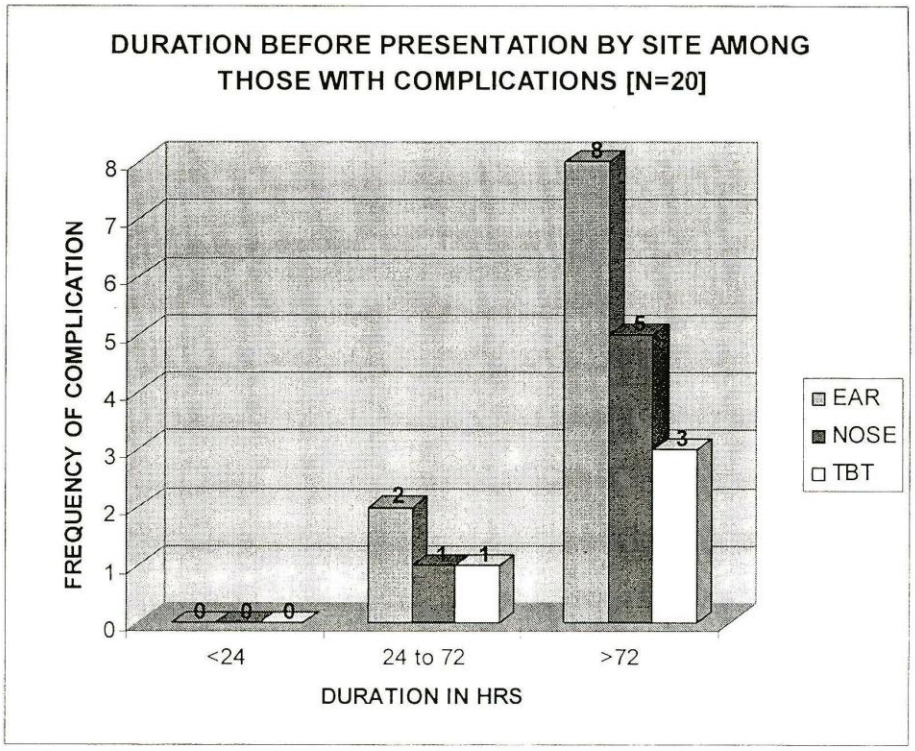
The most common symptoms in nasal FBs was unilateral purulent rhinorrhea 30 cases (69.77%), ear FBs was ear pain 27 cases (96.43%), pharyngeal FBs was Odynophagia in 12 cases(66.67%) oesophageal FBs was dysphagia 10 cases (62.50%) and TBT FBs was difficult in breathing 8 cases (100%) **[Chart III]**

Table 5; Frequency of pts who had complications according to site

COMPLICATIONS	NOSE	EAR	PHARYNX	OESOPHAGUS	TBT	TOTAL
YES	6 (13.95)	10(35.71)	0 (0)	0 (0)	4 (50)	20(17.7)
NO	37 (86.05)	18(64.29)	18 (100)	16 (100)	4 (50)	93(82.3)
TOTAL	43(100)	28 (100)	18 (100)	16 (100)	8(100)	113(100)

Complications resulting from delayed duration before presentation were seen in 20 cases (17.7%). Among TBT FBs patients 4cases (50%) had complication, ear FBs 10 cases (37.71%) and nasal FB 6 cases (13.95%). **[Table5]**

Fig.3



Majority involved those patients who presented beyond 72hrs duration with 16 cases (80%) **[Table 5, Fig.3].** Pharyngeal and oesophageal FBs did not present with complications.

Chart IV; Frequency of complication according to site

REGION	COMPLICATIONS	FREQUENCY (%)
EAR [N= 10]	otitis externa	10 (100)
NOSE [N= 6]	rhinovestibulitis	5 (83.3)
	Rhinosinusitis	1 (16.7)
PHARYNX [N= 0]	nil	0
OESOPHAGUS [N= 0]	nil	0
TBT [N= 4]	bronchopneumonia	4 (100)
	atelectasia	1 (25)
	Lung abscess	1 (25)
	Surgical Emphysema	1 (25)

The commonest complication in FBs in the ear was Otitis externa 10 cases (100%);in nasal FBs the commonest complication was rhinovestibulitis 5 (83.3%); in TBT FBs complications were bronchopneumonia 4 cases (100%),atelectasis , lung abscess and surgical emphysema each with 1 case (25%) **[Chart IV].**

5.1 DISCUSSION

In this study there was a slight predominance of FBs in men (52.21%) compared to women (47.79%), this is similar to results published by other authors, [103] [30]. Foreign bodies in the nose were the commonest (38.05%) seen .These were followed by FBs in the ear (24.78%), pharynx (15.93%), esophagus (14.16%) and TBT tree (7.08%).

A study by Higo et al. in Japan on pediatric aerodigestive tract FBs (excluding ear FBs) showed nose as the most involved site (39.4%).[97]. It was followed by pharynx (38.4%), esophagus (12.9%) and LTB tree (6.5%). Thus it can be seen that the trend of frequency is similar that of this study,

Nasal FBs were most frequent in children as seen in this study 38(51.35%) in the age group 0-4 years as those by Das and Higo et al in the age group 2-4 years [97,28] The incidence fell with age, no FBs in the nose were seen in patients over 25 years of age. The high frequency in children reflects the sense of curiosity and self-discovery typical of that age group, with growth and cognitive development, placing FBs in the nose becomes rare and is seen only in psychiatric patients [105].

The clinical presentations of nasal FBs depended on the type of FB and the duration of impaction. Generally these types of clinical presentations predominate. These are a history of nasal FB (which is usually visible in the nasal cavity) or unilateral offensive purulent nasal discharge. The later presentation is usually the commonest and in this study it was 69.77% while the former was 55.81%. Other less common clinical presentations included nasal bleeding and nasal obstruction. Bean seeds were the commonest nasal FBs encountered in this study.

Higo et al. reported plastic toys as the most common nasal FBs[97]. In this series patients probably came from more affluent background than the patients in this study most of them came from the low social economic status. Most of the nasal FBs were removed easily at the clinic without major complications. Most of the FBs in the nose presented within 24hours in this study, however, there was one case with a sponge for 21 days which presented with rhinovestibulitis.

Foreign bodies in the ear are the second commonest ENT FBs in Bressler an Shelton study[70], This correlates well with this study in which they constituted 24.8% of the entire ENT FBs. Despite being of fairly common occurrence, there are few studies in the literatures regarding ear FBs and their appropriate management .[104, 106]

The highest incidence was in the 0-4 years, within this age group, there were 11 cases (39.28%) which is similar to Das who reported a higher incidence of FBs in the ear in the 2–4 years age group[30] . FB was introduced accidentally in the ear in patients over 25 years of age during scratching with cotton buds (2 cases). The most common clinical presentation for FBs in the ear in this study was pain (96.43%). The two cases with insects in the external auditory canal were over 12 years of age.FB duration at presentation was less than 24 hours in 50.44% of cases in this study which was similar to the study by Ikino et al.[105] Nose and ear FBs are more frequently encounted in the right side .

This is most likely due to the fact that most of the population is right-handed. Thompson et al. noted only a minor predominance of FBs in the right ear (52%) [103] The most predominant FBs in the age group 25years and above were pharyngeal FBs (44.44%) followed by oesophageal FBs (33..33%).Most of the pharyngeal and oesophagus FBs presented in less than 24hours,This could be explained by the resulting discomfort due to the FB in this site. The most common pharyngeal-oesophageal FBs seen in this study were coin (61.11%) in the pharynx almost all were at the postcricoid space (62.5%). In the oesophagus they were mostly in the upper part immediately below the cricopharyngeal sphincter followed by mid oesophagus

The size of the Tanzanian coin is big this may explain the unusual high percentage of coin in the pharynx. Fish bones were the second commonest pharyngeal-oesophagus FBs with majority of the cases been in the pharynx. This has been a common finding in most studies on pharyngeal FBs [107,108]. Most pharyngeal FBs are easily visible by direct examination.

Hence, they can easily be removed while the invisible ones warranted the use of rigid or flexible scopes. Some fish bones may be so small and buried in the tongue or pharyngeal mucosa that they may be missed. Radiological finding is not obvious in most fish bones and is usually unreliable [107 109]. In this study none of fish bones showed FB opacification. This depend on the type of fish.[109,110] Radiography for fish bones is therefore recommended (i) when clinical examination reveals no FB, (ii) when endoscopy is anticipated and (iii) to see deeper soft tissues in cases with complications. CT scan is usually indicated in the last situation[111]. Contrast-enhanced CT provides excellent anatomic detail for evaluating complications in deep tissues of the neck and associated vascular injuries[108].

Plain radiograph, however, is very useful for pharyngeal FBs other than fish bones, such as metallic objects. The most frequent symptom in oropharyngeal FBs cases in this study was odynophagia (66.67%) which motivated patients to seek medical help earlier.

This study demonstrated a higher incidence of TBT FBs in the 5-9 year age group with 5 cases (62.5%). This is in agreement with many other studies on TBT FB [112, 113, 114, 115, 18].Most of the inhaled FBs were organic materials.

In this study groundnuts 2 (25%) cases and metallic object 2 (25%) cases were the commonly encountered TBT FBs. Mu et al. reported watermelon seed.[115] and McGuire et al. reported peanut[18] as the commonest inhaled FBs. This confirms that seeds are the commonest TBT FBs. The difference in the type of seed reflects the eating habits of people in different countries. As would be expected from anatomical consideration, inhaled FBs were more commonly located in the right rather than the left bronchus. This study finding are consistent with those obtained by previous authors [115, 18] However, the lodgment site of an inhaled FB is also determined by its size and shape, for example tracheostomy tube inner cannula trapped in the trachea as seen in this study. Once the FB passes through the laryngeal inlet it usually lodged in the right main bronchus. FBs in the left main bronchus are very rare unless they were multiple and they were also present in the right bronchus.[100] A positive history of FB inhalation was rarely obtained in this study. Hence, a high index of suspicion is essential for early diagnosis and management

Complications of FBs in the ear were seen in 10 patients (35.71%) of all ear FBs, of these 8 cases (80%) of all ear FB with complication presented beyond 72 hours. This similar to those reported in literature[104]. In this group all patients presented with acute Otitis externa.

This situation generated the debate of whether Otitis externa was a result of the FB duration in the external auditory canal or was the cause for the patient to place a FB in the ear to relieve symptoms. Otitis externa was the most frequent complication in the study by Bressler et al., with a 7.1% incidence[70]. Laceration of the external auditory canal was not seen in this study and there was no perforation of the tympanic membrane.

Six nasal FB cases (12.5%) of all the nasal FBs developed complications, 5 cases of rhinovestibulitis and 1 case of rhinosinusitis. Of these 5 cases (83.3%) of all nasal FB with complication presented beyond 72 hours. The complication rate for nose FBs was similar to those reported in literature[104].

Most of TBT FBs presented late that is beyond 72hours. Four TBT FB cases (50%) of all TBT FBs developed complications. One case with groundnuts in the right bronchus presented 26 days after inhalation and had lung abscess, other complications were bronchopneumonia, atelectasis and surgical emphysema Harboyan and Nassif reported a series of 225 cases of tracheabronchial bodies of

which two presented with surgical emphysema. They concluded that surgical emphysema is a rare mode of presentation [116]. Agarwal *et al* have reported a case of surgical emphysema due to smooth foreign body in the bronchus [117].

Banerjee *et al* in their series of 223 children with laryngotracheobronchial foreign bodies reported three cases presenting as surgical emphysema though they did not mention their clinical outcome in particular [113] The pathogenesis of surgical emphysema can be explained as: Aspiration of a foreign body in a child induces severe bouts of coughing which in turn results in pressure build up in the bronchus. Consequently microtears appear up in the vulnerable bronchial mucosa through which air escapes.[117]

This explains surgical emphysema in case of smooth bronchial foreign body.

No complications were seen in pharyngeal and oesophageal FB cases. Of the 20 cases with complications, 16 cases (80%) presented more than 72hours since FB placement.

5.2 CONCLUSION;

Pharyngeal foreign bodies were more predominant in patients over 25 years of age, the main symptom was odynophagia, which motivated an earlier search for medical service. The oesophageal FB were most frequent in the 0-4 age group with coin being the most frequent FB.

Foreign bodies in the ear were more frequent in older children and adolescence that is in the age group 0-4 years, with bead as the most common material. Nasal foreign bodies were more frequent in the 0-4 year age group with bean seeds being the most common FB. The main symptom of nasal FBs was unilateral purulent rhinorrhea. Foreign bodies in tracheabronchial tree can present with varied symptomatology. Not very often the history is contributory and diagnosis depends on high index of clinical suspicion, clinical signs and radiological findings. So whenever a patient especially a child presents with surgical emphysema of the face, neck and anterior chest wall along with cough and respiratory distress one should strongly suspect a tracheabronchial foreign body.

Most cases of foreign bodies which presented early had no complications; however those who presented late were associated with complications in particular those in the TBT. This emphasizes the need to educate caretaker on taking care of the children and presenting them promptly to a health facility in the event of foreign bodies accidents. Since most of the foreign bodies' accidents are preventable health education to the public should be emphasized

6. Most of the pharyngoeosophaeal FBS were coins and this could be explained by the size of our local coin which is big so easy to stack, so there is a need for the Government to manufacture small sized coin in order to prevent these accidents

7. It is recommended that more research should be undertaken which should involve a larger sample to investigate further on the FBS accidents and their management options

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