

Original Research Article

Clinical Presentation and Treatment Outcomes of Foreign Bodies in the Ear among Patients Attended at Bugando Medical Centre, Mwanza, Tanzania

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Abstract: Background: Globally, foreign bodies (FBs) in the ear are commonly encountered by otolaryngologists and its removal can result in complications if attempts of removal are made outside the healthcare setting by untrained personnel. This study describes the clinical presentation and treatment outcomes among patients presenting with FB s in the ear at Bugando Medical Centre (BMC). **Methods:** This was a cross sectional study that was conducted at BMC between May 2019 and October 2019. **Results:** A total of 70 patients (M: F ratio = 1.3:1) were studied. The mean age at presentation for children was 5.1[±2.2] years, whereas that of adults was 28.9 [±16.1] years. The FBs were found in the right ear in 44(62.9%) patients, left ear in 25(35.7%) patients and in both ears in 1(1.4%) patient. Cotton was the most common FB in 34.3% of cases. Previous history of failed attempted ear FB removal by peripheral hospitals was reported in 15(21.4%) patients. Methods used in the removal of ear FB were ear syringing in 42(60.0%) patients, forceps extraction in 15(21%) cases, FB removal by suctioning 4(6%) and hooks in 9(15%) patients. Complications observed were external ear canal laceration (n=13; 50.0%), tympanic membrane perforation (n=9; 34.6%), otitis externa (n=3; 11.5%) and chronic otitis media (n=1; 3.8%) and were significantly associated with late presentation (≥ 7 days) (p -value =0.021) and previous history of failed attempted ear FB removal (p -value < 0.001). The outcome of treatment was excellent as all of the ear FBs were successfully removed with good improvement in hearing and clinical relief of symptoms. **Conclusion:** Ear FBs are common at BMC with the highest incidence in children less than 10years. Removal attempts by peripheral hospitals and delayed attending to specialized hospitals predisposes to complications. Parental education on close monitoring of their children to avoid such incidences and the need to immediately seek otorhinolaryngologists to prevent complications are emphasized.

Keywords: foreign bodies (FBs), external ear canal, otorhinolaryngologists.

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INTRODUCTION

Background

Foreign bodies (FBs) in the ear, described as any object introduced in the ear either accidentally or intentionally, are commonly encountered by otolaryngologists, pediatricians and primary care physicians worldwide [1-3]. However, attempts of removal made outside the healthcare setting by untrained persons can result in complications of varying degrees [1, 4, 5]. A foreign body in the ear can involve damage to the tympanic membrane or middle ear by itself or by improper management during removal [3, 6].

FB in the ear may be classified as animate (living) and inanimate (nonliving). The inanimate FBs can further be classified as organic or inorganic and hygroscopic (hydrophilic) or non-hygroscopic (hydrophobic) [5, 7]. FBs can also be classified as metallic or nonmetallic, regular or irregular, soft or hard, and according to their nature [7]. Clinically, the patients usually come with the history of pain in the ear and sense of heaviness in the ear and sometime discharge from the ear. Majority of the patient don't have any complaint but foreign body found in ear during routine ear examination [1, 3, 8, 9].

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Foreign body impaction in the ear, causes an increase in complications and continues to impose a heavy burden on patients and otorhinolaryngologists but has not been audited in our setting to determine whether the complications are due to foreign body or treatment. And for the case hearing loss not clear what type of hearing loss caused by ear foreign body. This knowledge gap prompted the author to analyze this problem in our setting outlining the clinical presentation and treatment outcome of patients with ear foreign bodies at Bugando Medical Centre, a tertiary care hospital in north western Tanzania.

METHODS

Study design, Setting and participants

This was a cross sectional study involving patients with foreign bodies in the ear over a period of six months between May 2019 and October 2019. It included all patients with different varieties of ear foreign bodies presenting to the EMD and the ENT-Head & Neck Surgery department (wards and outpatients) of Bugando Medical Centre within the period of the study.

Recruitment of patients and Data collection

Recruitment of patients to participate in the study was done at the Emergency medicine department and otolaryngological ward, clinic of Bugando Medical Centre. Patients were screened for inclusion criteria and those who met the inclusion criteria were recruited into the study after obtaining a written informed consent from patients, parents or care givers.

Evaluation of patients was largely clinical supported by Otoscopy examination. A detailed history regarding demographic data (age, sex, area of residence, occupation), laterality, mode of presentation, duration of foreign body retained, nature of the foreign body, previous history of attempted removal, method of removal and the development of any complications was obtained from the patients, parents or care givers. The diagnosis of ear foreign bodies in each subject was made based on history and clinical findings by otoscopy then assessed for hearing before foreign body removal and two weeks after foreign body removal by pure tone audiometry. Treatment modalities for the removal of the foreign bodies were noted. Any associated complications from the foreign bodies or with its treatments were also being noted. These complications were diagnosed based on the clinical findings at otoscopy at the time of presentations and following the removal of the foreign bodies and they were attended to and treated accordingly at the time of the study

All recruited patients were first managed in the emergency medicine department (EMD) or Otorhinolaryngology wards and clinic according to the hospital protocol. The use of aural syringing, vacuum suction, and manual instrumentation by the use of Jobson Horne's probe or hook and forceps as was indicated. In a very limited number of patients, especially in children, impacted FB's and mentally retarded patients, general anesthesia were used because of poor cooperation. After extraction of FB patients were admitted in the wards, reexamination of the affected ear was performed immediately and after three days to exclude the possible complication. FB removal was performed either by a consultant otolaryngological surgeon or a senior resident in otolaryngology under the direct supervision of a consultant surgeon.

Data Management and Statistical Data Analysis

The collected data were entered in computer software microsoft excel and transferred to STATA Version 13 for analysis. Data were summarized in form of proportions and frequent tables for categorical variables. Chi-square test was used to test for association between two categorical variables. The association of continuous variables and categorical variables was tested using t-test. Association between variables will be considered significant when *p*-value is less than 0.05. Study variables that were found to be statistically significant in univariate analysis were subjected to multivariate logistic regression analysis. Multivariate logistic regression analysis was used to determine predictor variables that predict the complications and improved hearing

RESULTS

Social-demographic characteristics of study populations

Between May 2019 and October 2019, a total of 70 patients with foreign bodies in their ears were managed at BMC and were recruited for eligibility in the study. Thus, a total of 70 patients, representing 100% of cases were available for the final analysis. The age at presentation for children ranged from 1 to 10 years with a mean age of 5.1(\pm 2.2) years, whereas that of adults ranged from 13 to 67 years with a mean age of 28.9 (\pm 16.1) years. The modal age groups for the children and adults were 0-10 years and 21-30 years, accounting for 34.3% and 25.7% of cases, respectively (Figure 1). Thirty-nine (55.7%) were males and 31 (44.3%) were females, giving a male to female ratio of 1.3:1. The majority of patients, 59 (84.3%) came from the urban areas in Mwanza City.

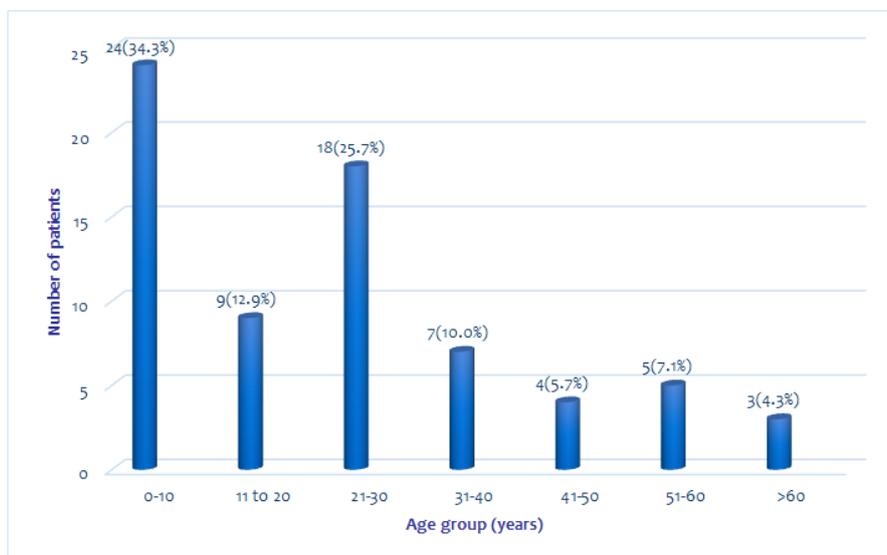


Figure 1: Distribution of patients according to age groups

Clinical Characteristics

The majority of patients, 45(64.3%) presented to the hospital in between one and seven days after ear foreign body lodgment. Pain in the ear was the most frequent presenting symptoms accounting for 82.9% of patients. The foreign bodies were found in the right ear in 44(62.9%) patients, left ear in 25(35.7%) patients and in both ears in 1(1.4%) patient (Table 1). Cotton was

the most common foreign body documented in 34.3% of cases, while the least common ear foreign bodies were beans, button and ground nuts which accounted for 1.4% of cases each, respectively. The types of foreign bodies found in the ears are highlighted in Table 2. Previous history of failed attempted ear foreign body removal in the peripheral hospitals by unskilled personnel was reported in 15 (21.4%) patients.

Table 1: Distribution of patients according to clinical presentation among patients with foreign bodies in ear at BMC

Clinical presentation	Categories	Frequency	Percent
Duration of symptoms (days)	1-7	45	64.3
	8-14	16	22.9
	15-21	7	10.0
	22-28	1	1.4
	>28	1	1.4
Presenting symptoms	Pain in the ear	58	82.9
	Ear discharge	12	17.1
	Ear blockage	9	12.9
	Itching	8	11.4
	Bleeding in the ear	7	10.0
	Sensation of FB in the ear	5	7.1
	Hearing loss	4	5.7
	Incidental finding of FB	1	1.4
	Asymptomatic	1	1.4
Laterality	Right ear	44	62.9
	Left ear	25	35.7
	Bilateral	1	1.4

Table 2: Distribution of patients according to the type of ear foreign body

Types of ear foreign body	Frequency	Percent
Cotton	24	34.3
Plastics	9	12.9
Beads	7	10.0
Papers	6	8.6
Stone	6	8.6
Fruit Seeds	4	5.7
Metals	3	4.3

Types of ear foreign body	Frequency	Percent
Sticks	3	4.3
Ball bearing	3	4.3
Insects	3	4.3
Sands	2	2.9
Remote button	1	1.4
Beans	1	1.4
Ground nuts	1	1.4

Treatment Modalities

The removal of ear foreign bodies were performed by resident doctors in ENT in 63(90.0%) patients, ENT trained nurses in 5(7.1%) patients, ENT registrar and ENT surgeons in 1(1.4%) patient each,

respectively. The procedures were performed in the ENT clinic in 39(55.7%) patients, emergency medicine department in 22(31.4%) patients and in operating theatre under general anesthesia in 9(12.9%) patients (Figure 2).

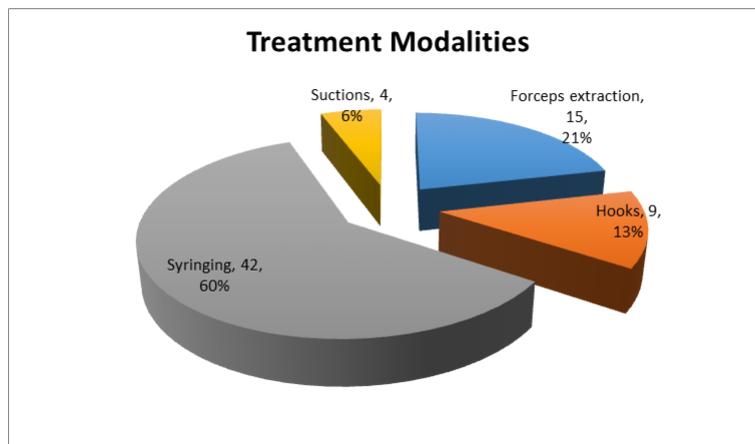


Figure 2: Distribution of patients according to treatment modalities

Treatment outcome and associated factors

All 70 patients in the present study were treated successfully giving an overall success rate of 100.0%. A total of 22(31.4%) patients developed 26 complications, of which external ear canal laceration was the most common complication accounting for 50.0% of cases (Figure 4). Univariate and multivariate logistic regression analyses (Table 3). Out of 70 patients enrolled in this study, 54(77.1%) were subjected to audiometric examination using pure tone

audiometry to assess for hearing loss before and after ear foreign body removal and the remaining 16(22.9%) cases were not assessed because of ear discharge in 12 patients and 4 patients were below the age for pure tone audiometry assessment. (Table 4).The difference in improvement in hearing between intervention (after ear FB body removal) and control groups (before FB body removal) was 14.8% (95% CI [9.8 to 24.3], p < 0.001). After intervention (ear FB removal) there was clinical relief of presenting symptoms.

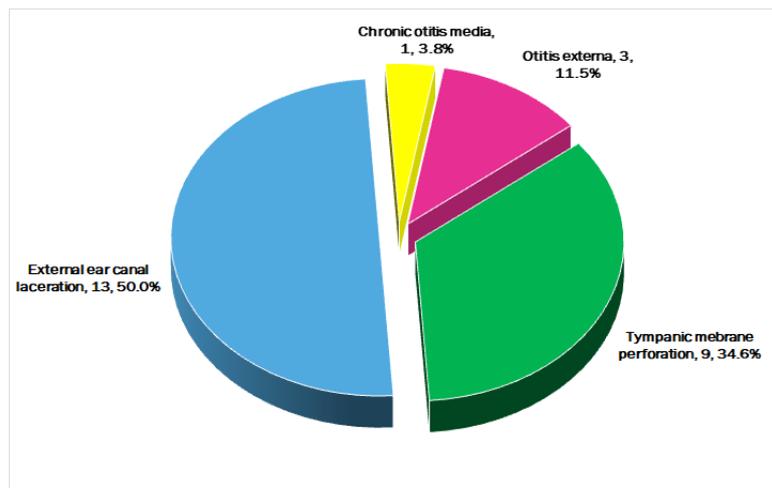


Figure 3: Distribution of patients according to complications

Table 3: Analysis of factors associated with complications according to univariate and multivariate logistic regression analyses

Independent (predictor) variables	Complications		Univariate		Multivariate	
	Present =22 (N/%)	Absent =48 (N/%)	OR[95%CI]	p-value	OR[95%CI]	p-value
Age (years)						
<10	14(58.3)	10(41.7)				
≥10	8(17.4)	38(82.6)	2.3[1.2-7.2]	0.011	2.4[0.9-5.5]	0.704
Sex						
Male	13(33.3)	26(66.6)				
Female	9(29.0)	22(71.0)	1.7[0.2-2.4]	0.781		
Laterality						
Right	14(31.8)	30(68.2)				
Left	7(28.0)	18(72.0)	3.9[0.4-5.1]	0.552		
Bilateral	1(100.0)	0(0.0)	-	-		
Previous attempted FB removal						
Yes	13(86.7)	2(13.3)				
No	9(16.4)	46(83.6)	4.8[1.2-5.7]	0.023	2.8[1.1-8.6]	<0.001
Type of FB						
Living	1(33.3)	2(66.7)				
Non-living	21(31.3)	46(68.7)	1.2[0.9-3.1]	0.990		
Duration of foreign body retained (days)						
<7	8(17.8)	37(82.2)				
≥7	14(56.0)	11(44.0)	0.4[0.1-0.7]	0.014	0.3[0.2-0.9]	0.021
Mode of presentation						
Symptomatic	22(32.4)	46(67.6)				
Asymptomatic	0(0.0)	1(100.0)	-	-		
Incidental finding	0(0.0)	1(100.0)	-	-		
Method of FB removal						
Syringing	10(23.8)	32(76.2)				
Forceps extraction	3(25.0)	9(75.0)	2.1[0.3-4.1]	0.834		
FB removal under GA	6(66.7)	3(33.3)	0.6[0.2-5.3]	0.223		
Hooks	3(42.9)	4(57.1)	1.8[0.9-3.4]	0.911		
Medical personnel performing the procedure						
Resident	21(33.3)	42(66.7)				
Nurses	1(20.0)	4 (80.0)	1.7[0.5-3.5]	0.774		
Registrar	0(0.0)	1(100.0)	-	-		
Surgeon	0(0.0)	1(100.0)	-	-		

Table 4: Results of hearing assessment according to audiometric examination

Results of hearing assessment	Audiometric examination (N=54)	
	Before ear FB removal (N/%)	After ear FB removal (N/%)
Normal hearing	44(81.5)	52 (96.3)
Mild hearing loss	8(14.8)	2(3.7)
Moderate hearing loss	2(3.7)	-

DISCUSSION

Foreign bodies in the ear are commonly encountered by otorhinolaryngologists worldwide and are more common in younger children particularly the under 5's [49, 51, 54]. In our study, the most common age group affected was age < 10 years, similar to results found in many other studies [8, 33, 37, 55, 56]. This

may be due to the tendency of young children to lodge objects into the natural orifices of body, accidentally or intentionally. In this study, male patients were more affected than females. This male preponderance in the current study is in agreement with finding of the others [7, 9, 12, 14, 16, 18, 57, 58]. However, other studies have reported female predominance [55, 59]. The

explanation for male predominance in the present study may be that male children are more active and involved in outdoor activity in our set up and therefore they are more exposed to FBs.

In this study, the majority of patients came from the urban areas in Mwanza City, an observation which is contrary to what is documented in most centers in developing countries where most of patients came from poor families in the rural areas located a considerable distance from the hospitals [9, 10, 16]. The area of residence has an implication on accessibility to health care facilities and awareness of the disease.

In the current study, the clinical presentation of foreign bodies in the ear in our patients is not different from what is reported in literature with pain in the ear, ear discharge, blockade, itching and difficult hearing being common presenting symptoms [1, 6, 11, 13, 18]. In this study, the duration of foreign bodies in the ear before they presented to the hospital was mostly between one to seven days. This observation is contrary to what is seen in developed world where over 90% of the patients present within 24 hour of insertion of foreign body [16, 27, 49]. This finding reflects that health seeking behavior of our patients and care givers for removal of ENT foreign bodies is poor.

In agreement with other studies done elsewhere [16, 37], more than half of the ear FBs in this study were located on the right ear. This is in contrast to other studies which reported that the majority of the foreign bodies were located in the left ear [51, 55]. Afolabi *et al.*, [60] in their study found a significant correlation between the handedness of the patients and the side of lodgment of the FB in the ears, they reported that right handed patients were more likely to place FBs in the right ear, and vice versa. Bearing in mind that the incidence of left handedness in children as reported by Payne [61] is 4.5%, it is unlikely that all children with FB lodgment in the left ear as reported in several studies are left handed. The point being that handedness may not solely account for laterality of foreign body lodgments. Our study did not take into account the handedness of the patients. Laterality can also be affected by the fact that children not only insert objects in their own ears but also into the ears of their siblings and friends.

As reported in other studies [31, 57, 58], our study found that more than twenty percent of patients reported previous history of failed attempted ear foreign body removal in the peripheral hospitals by unskilled personnel. In this study, failed attempts at removing the FBs in the ear by unskilled persons was significantly associated with complications ranging from injuries to the external auditory canals, otitis externa, chronic otitis media to tympanic membrane perforation.

In keeping with other studies [23, 25, 36], our study found that non-living ear FBs were the most common type compared with living type. Of the non-living type, cotton was the most common foreign body, while the least common ear foreign bodies were beans, button and ground nuts. This finding is similar to findings by Amutta *et al.*, [4] who found cotton bud as the dominant FB in the ears, but contrary to Eziyi [62] who reported beads as the most common FBs inserted into the ears.

Various methods of FB removal in the ear have been described in several studies [16, 25]. These include suctioning, syringing, forceps removal, hooks and probes [16]. The choice of technique for FB removal in the ear depends on the exact location, shape, and composition of the foreign body [16, 23, 25]. Removal of foreign body in the ear is not a simple procedure but it needs general anesthesia with the help of microscope and especially designed instrument, so maintaining the integrity of normal anatomy and physiology of external ear [27, 41]. In our study, ear syringing was the most common treatment modality used in the removal of ear foreign body. This treatment pattern is similar to what was described by Parajuli [43] in Nepal who reported ear syringing as the most common method of FB removal in the ear. In some of our young patients <10 years and those who come with complications from previous attempts by unskilled personnel or those who have become unduly sensitized after an initial failed attempt were extracted under general anesthesia. The use of general anesthesia is preferred in very young children and in children of any age with ear FB whose contour, composition, or location predispose to traumatic removal in the ambulatory setting [16].

The complications reported in this study are in agreement with other studies [1, 12, 18, 31, 63]. Our complication rate of 31.4% was found to be high compared with 11% that was reported by Rafique *et al.*, [1] but in sharp contrast to study of Singh *et al.*, [63] who reported 77% complication rate. The high complication rate in this study can be explained by the fact that the majority of our patients presented late to the hospital with complications resulting from failed attempted ear foreign body removal in the peripheral hospitals by unskilled personnel. In this study, external ear canal laceration and tympanic membrane perforation were the most common complications attributing this to injuries to the external auditory canals and tympanic membrane resulting from initial attempts at removing the ear FBs that had been made previously by unskilled persons in the peripheral hospitals, with resultant these complications.

As reported by Rafique *et al.*, [1], Afolabi *et al.*, [60], the outcome of patients in the present study showed that all ear foreign bodies were removed successfully. There was a significant improvement in

hearing as well as clinical relief of presenting symptoms after ear FB removal.

Study Limitations

There are two major limitations in this study that could be addressed in future research. First the study focused on short duration of study and second is small sample size.

CONCLUSION

Ear foreign bodies are more common at BMC, with the highest incidence in children less than 10 years. Males were more affected than females. The majority of FBs were lodged into the right ear and the commonest type of FBs was cotton. Most of patients presented late with complications from initial attempts at removal in the hands of unskilled. Ear FBs were removed under general anesthesia in young patients <10 years and those who come with complications resulting from previous attempts by unskilled personnel and the use of inappropriate instruments.

RECOMMENDATION

We recommend a big study with bigger sample size followed by strategies to employ preventive measures.

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Conflict of Interest: The authors declare no conflict of interest.

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