Aural Foreign Bodies Among Patients Presenting to Ibn Sina Teaching Hospital, Mukalla, Hadhramout Province, Yemen

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Abstract

Objective To describe the types of aural foreign bodies (FBs) among patients in Ibn Sina Teaching Hospital (ISTH) and to study the patient's symptoms, duration, complications and procedures used to extract them.

Methods A record based descriptive study was looked at patients with aural FBs at ISTH for 5 years between 2009 and 2015. The diagnosis of aural FBs was based on personal history, and otoscopic findings. The data were obtained from the records.

Results Patients with aural FBs were 154, (age 1–70 years). Inorganic aural FBs were 100 (65%) and 54 (35%) were organic. Unilateral purulent aural discharge was in 72 (46.75%) patients, pain in 27 (17.53%), ear bleeding in 12 (7.8%), conductive hearing loss and tinnitus each was 8 (5.19%) and itching in 7 (4.55%). Duration of symptoms was <1 week in 55 (35.7%) cases, 1–2 weeks in 64 (41.6%) and 2–4 weeks in 29 (18.8%). Forceps, syringing, hook and suction were the tools used for removal of the FBs, 56 (36.4%), 40 (26.0%), 36 (23.4%), 14 (9.1%) respectively. FBs were removed under G.A. were 30 (19%). Complications were otitis externa in 38

(24.7%) cases, tympanic membrane perforation in 29 (18.85%) and external meatus laceration in 28 (18.20%).

Conclusion The most common aural FBs found were inorganic (cotton tip, stone and eraser) and organic (fly, lice and bee). Complications were unilateral purulent discharge followed by pain and ear bleeding. FBs duration was from <1 to 4 weeks. The common procedures used were forceps, syringing, hook and suction. Particularly, organic vegetative FBs were removed under general anesthesia.

Keywords Aural · Foreign bodies · Vegetative · Unilateral discharge · Multiple · Button cell · Bullet

Introduction

Foreign bodies (FBs) in the external auditory canal (EAC) are most commonly found in pediatric population and less common in adults [1]. To our knowledge and study literature, this is the first study in our country. Children may insert FBs into their own ears or sometimes their friends might insert them due to high interest of children in pre-school age [1, 2]. This usually occurs when the child is playing with fragmented toys or small materials or when they play with their friends and school classmates.

Sometimes it could be from the children's parents when they try to clean their ears with cotton tips or match sticks and accidentally introducing a FB. In adults insertion of FBs can occur suddenly when they try to do self-cleaning by use of various materials.

The patients with FBs may present asymptotically, or with unilateral purulent ear discharge, ear pain, bleeding from the ear, conductive hearing loss, tinnitus, itching, cough and offensive smell, cerebrospinal fluid leak from

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the ear, vertigo and facial nerve paralysis [3]. Most FBs in the EAC are asymptomatic especially in adults, which are found incidentally during otoscopic examination.

FBs in ear may be organic–inorganic, animate–inanimate, metallic–nonmetallic, hygroscopic–nonhygroscopic, regular or irregular, soft or hard, and so forth, according to their nature [4]. However, tries of removal made outside the healthcare setting by unqualified persons can cause serious complications like trauma to external meatus and tympanic membrane perforation resulting into conductive hearing loss [3]. The method of removal also depends on the type, position of FBs and cooperation of the patient.

Vegetative FB in the external meatus like beans, popcorn, grains etc. is usually difficult to remove and more complicated due to their swelling in the EAC and increasing in volume. While small non-irritative graspable inorganic foreign bodies are usually simple to remove and come out complete without complications [3, 5].

The aim of the study was to describe the type of aural foreign bodies among patients presenting to ISTH and to study the patient's symptoms, duration, complications and procedures used to extract them.

Methodology

A record based descriptive study was carried out at ISTH in Mukalla city, Hadhramout Province, Yemen, looking at aural foreign bodies over a multi-year period at a single medical institution in Yemen between December 2009 and January 2015. Ethical approval to carry out the study is not required from the local Institutional Ethical Committee. Information and patient's data were obtained from the outpatient ENT clinic records and from the hospital records department. The diagnosis of FB was based on anamnesis and otoscopic findings.

The authors collected data that included personal history, sex, age, date of event, date of patient's visit to the specialist, nature of FB, affected side, main symptoms at presentation, duration of FBs in the ear, complications associated with FB, and the removal techniques utilized.

The procedure of removal was chosen based on the age and cooperation of the patient on one hand and location and type of the aural foreign body on the other.

The collected data was saved in Microsoft Office Excel software and later exported to SPSS version 19 for statistical analysis. Results were formulated in tables and calculated in frequencies and percentages. A Chi Square test was used to analyze the association between type of FBs and all variables and between complications associated with FBs and all variables in the study.

Results

The total number of patients with aural FBs was 154, their age ranged from 1 to 70 years, mean was 10.52 ± 11.88 with a median of 6 years. There were 88 (57%) males and 66 (43%) females and the male to female ratio was 1.33:1. Tables 1, 2, and 3 show the demographic characteristics of the patients and the FBs. Ninety one (59%) of the patients were aged between 1 and 7 years old (preschool children), 38 (25%) 8–16 years (students of primary and secondary school), and 25 (16%) were 16 years old and above. The highest incidence of aural organic and inorganic FBs was observed in the age group of 1–7 years which was 91 (59%) patients out of a total of 154 (children and adults). There was male preponderance in all age groups. The majority of the cases 119 (77%) presented within the first and the second week while 35 (23%) visited the ENT clinic in third week and or after.

Of a total of 154 patients, 54 (35%) had inorganic FBs which were found in children aged 1–7 years, 27 (17.53%) in patients who were aged between 8 and 16 years and 19 (12.34%) FBs were observed in patients aged more than 16 years. Organic FBs were found in 54 (35%) patients, 37 (24.3%) of them were observed in preschool children, 11 (7.14%) FBs were in patients aged between 8 and 16 years, and 6 (3.9%) were seen in patients older than 16 years. Living (animate) organic FBs were 30 (19.48%) cases, nonliving (inanimate) and vegetative were 24 (15.58%) cases.

The first three inorganic aural foreign bodies were cotton tip 16 (10.4%) stone and eraser each was 8 (5.2%). While the first three organic FBs were fly, lice and bee 8 (5.2%), 8 (5.2%), and 5 (3.2%) respectively.

Complications due to FBs itself were otitis externa 38 (24.7%), followed by tympanic membrane perforation 29 (18.85%), external meatus laceration 28 (18.20%) and chronic otitis media 3 (1.95%) and 2 (1.3%) facial nerve paralysis. Non-complicated FBs were 54 (35%). In this study we did not find any documentation of complications related to the removal of the FBs implying that all complications were primarily due to the FB itself.

All the 154 patients had the FB removed by one of the following procedures, forceps 56 patients (36.4%), syringing 40 patients (26.0%), hook 36 patients (23.4%), and suction 14 patients (9.1%) respectively. Chi Square test results were shown in Table 1 “*p* values less than 0.05 were considered to indicate statistical significance”. There was a significant statistical difference found between the type of FBs (organic & inorganic) in all parameters (gender $p = 0.061$, age and symptoms at presentation $p = 0.000$, duration of the FB in the canal and complications $p = 0.015$, and procedures $p = 0.019$, while the affected side was statistically insignificant $p = 0.906$). There was a insignificant statistical difference

Table 1 Characteristics of patients, symptoms, duration, complications and utilized removal procedures of 154 cases

	No. (%)	Type of FBs <i>p</i> value	Complications <i>p</i> value
<i>Gender distribution</i>			
Male	88 (57.1)	0.061	0.707
Female	66 (42.9)		
<i>Age distribution and subgroups</i>			
Mean (SD)			
10 (11.88)			
Median 6Y			
<i>Age ranged 1–70 years</i>			
1–7 years	91 (59.16)	0.000	0.786
8–16 years	38 (24.68)		
>16 years	25 (16.16)		
<i>Affected side</i>			
Right ear*	94 (60.26)	0.906	0.393
Left ear*	62 (39.74)		
<i>Type of aural FBs (organic & inorganic)</i>			
Inorganic	100 (65)	–	0.015
Organic	54 (35)		
<i>Main symptoms at presentation</i>			
Unilateral purulent aural discharge	72 (46.75)	0.000	0.865
Pain	27 (17.53)		
Blood discharge	12 (7.8)		
Hearing loss (H.L)	8 (5.19)		
Tinnitus	8 (5.19)		
Itching	7 (4.55)		
Asymptomatic	20 (12.99)		
<i>Duration of FBs in the canal</i>			
<1 week	55 (35.7)	0.015	0.956
1 to 2 weeks	64 (41.6)		
>2 to 4 weeks	29 (18.8)		
>4 weeks	6 (3.9)		
<i>Complications associated with FBs</i>			
Otitis externa	38 (24.7)	0.015	–
External meatus laceration	29 (18.85)		
Tympanic membrane perforation	28 (18.20)		
Otitis media	3 (1.95)		
Vestibular syndrome, CSF leak, VII CN paralysis	2 (1.3)		
Non complicated	54 (35)		
<i>Procedures utilized for removal FBs No. (%)</i>			
Forceps	56 (36.4)	0.019	0.563
Syringing	40 (26.0)		
Hook	36 (23.4)		
Suction	14 (9.1)		
Crocodile	5 (3.2)		
Magnet	3 (1.9)		

*Pearson's Chi squared test (χ^2); *p* values less than 0.05 were considered to indicate statistical significance

Table 2 Distribution of inorganic aural foreign bodies by age in years of a total cases No. 154

Inorganic foreign body	1–7 years	8–16 years	>16 years	No. (%)
Cotton tip	5	7	4	16 (10.4)
Stone	2	1	5	8 (5.2)
Eraser	4	4	0	8 (5.2)
Pencil tip	2	4	0	6 (3.9)
Ear ring	5	0	0	5 (3.2)
Toy fragment	4	1	0	5 (3.2)
Aluminum fragment	0	0	4	4 (2.6)
Bead	4	0	0	4 (2.6)
Clay	4	0	0	4 (2.6)
Chalk	2	1	0	3 (1.9)
Chewing gum	2	1	0	3 (1.9)
Cork	2	1	0	3 (1.9)
Iron fragment	1	1	1	3 (1.9)
Metal ball	2	1	0	3 (1.9)
Paper	2	1	0	3 (1.9)
Powder soap and foam	3	0	0	3 (1.9)
Glass ball	2	0	0	2 (1.3)
Grommet	1	1	0	2 (1.3)
Bilateral button cell*	1	1	0	2 (1.3)
Sand	1	1	0	2 (1.3)
Small nail	1	1	0	2 (1.3)
Sponge	2	0	0	2 (1.3)
Glass	0	0	1	1 (0.6)
Metal disc	1	0	0	1 (0.6)
Glue	0	0	1	1 (0.6)
Matchstick	0	0	1	1 (0.6)
Pin	1	0	0	1 (0.6)
Bilateral multiple cotton tip*	0	0	1	1 (0.6)
Bullet	0	0	1	1 (0.6)
Total	54	27	19	100 (65)

*Total cases no. = 154, while 3 patients had bilateral aural FBs this means that total ears no. = 157 (In three cases the aural FBs were removed from the R and L ear)

observed between complications associated with FBs at all variables except type of FBs, *p* value was less than 0.05.

The majority of the patients were treated in the outpatient department with extraction guided by otoscopy without anesthesia. Patients who had FBs removed under G.A were 30 (19%); most of them were children under the age of 5 years. All procedures were done safely without complications.

Discussion

At a particular stage in the child's development as described by Sigmund Freud, the child derives pleasure from the manipulation of body orifices including the ears, nose and throat [6].

Table 3 Distribution of organic aural foreign bodies by age in years of a total cases No. 154

Organic foreign bodies (animate, inanimate and vegetative)	1–7 years	8–16 years	>16 years	No. (%)
Fly	6	2	0	8 (5.2)
Lice	8	0	0	8 (5.2)
Bee	4	1	0	5 (3.2)
Seed (grain)	5	0	0	5 (3.2)
Ant	4	0	0	4 (2.6)
Wood	0	2	2	4 (2.6)
Bony fragment	2	2	0	4 (2.6)
Unidentified insect	1	1	1	3 (1.9)
Rice	2	0	0	2 (1.3)
Bean	1	1	0	2 (1.3)
Bread	2	0	0	2 (1.3)
Mosquito	2	0	0	2 (1.3)
Hair	0	1	1	2 (1.3)
Garlic	0	0	1	1 (0.6)
worm	0	0	1	1 (0.6)
Popcorn	0	1	0	1 (0.6)
Total	37	11	6	54 (35)

Most FBs in the external meatus are asymptomatic especially in adults, which are found incidentally during otoscopic examination. Others are associated with otologic symptoms like unilateral purulent ear discharge, which is a common presentation in children and was the most frequent symptom in our study. The right side is commonly affected compared to the left side in unilateral FBs, because right-handed individuals have a tendency to insert objects into the right ear [7].

The current study revealed that the right ear was more affected than the left ear, FBs in right ear was 94 (60.26%) while in the left was 62 (39.74%). This is nearly similar to Chinski et al. [8] study that revealed the location of the FBs in the right ear was 52.6% while in the left ear it was 47.4%.

Bilateral aural foreign bodies are rare occurrences and may lead to extra- complications [3]. On the other hand, multiple FBs do occur and are more seen in younger children [9]. In the present study, we found bilateral multiple cotton tips in a seventy-year-old male patient who came with severe ear pain and bilateral purulent ear discharge. FBs were completely removed by forceps in the emergency department without anesthesia or sedation.

In our study, a twelve-year-old boy had inserted two button cells each in every ear. The technique used for the removal of these bilateral FBs was different on each side due to the location of the FBs. In the right side, it was removed surgically by postauricular incision under general

Fig. 1 Instruments used for aural FBs removal **1** Ear speculum **2** Crocodile **3** Curved metal suction tube **4** Right angle hook **5** Small teething forceps (Pinzeta) **6** 100ml aural syringe

anesthesia because it was located more medially. In the left side, it was located laterally and was simply removed without complications using a right angle hook. In the 3rd case with bilateral aural FB, the foreign bodies were removed easily after sedation using right angle hook without complications. The higher male ratio in the cases seen demonstrates the fact that the males are more active and aggressive in these cases of FBs compared to the females [10].

Complete removal of FBs without any complications depends on many factors; nature of the object, co-operation of the patient, age of the patient, the technique chosen for removal, instrument used, anatomical features of the EAC, the experience and skills of the physician and the time interval between insertion of foreign bodies and presentation to the ENT specialist. Despite the fact that proper instrumentation is key to reducing complications in the FB removal procedure, sedation or anaesthesia is required for those who are uncooperative more so in children. Other factors contributing to safe and successful removal of FBs include proper visualization and availability of skilled clinicians [2, 11, 12] (Fig. 1).

Most studies have demonstrated that children form the bulk of the cases of FBs in the ear. Osman W. et al. study had 27 males and 35 females, he reported that foreign body in the ear was seen in 62 patients, 36 of them up to 5 years, 25 were between 6 and 10 years and one patient was aged 11–16 years. Therefore an important preventive measure is to educate the general public so as to reduce the incidence of FBs in the ear [5, 13].

Fornazieri et al. [14] reported in their study that 21 (46.6%) patients (n = 45) required general anesthesia due to difficulties of removing seeds which have an expansibility characteristics in a humid environment hence

occupying most of the meatus and leading to more discomfort to the patient [15]. In our study, the incidence of FBs in the EAC in children was high. Male children between the age of 1–7 years had the highest cases of organic FBs in the ear. The commonly found FB was insects.

Another technique as reported by Dance and Ludemann [15] which can be used for a cooperative patient with a FB that is not accessible with the other usual tools is Cyanoacrylate (superglue) on the wooden end of a cotton-tipped applicator.

Marin and Trainor [16] reported from a study done in the pediatric emergency department (n = 244) that 80% of their patients had successful FB removal while 12% had some form of complications.

FBs in children are very common and occur more often in those below the age of 10 years. It usually happens by themselves or their friends inserting the FBs into the ear. Majority of cases are self-inserted and presentation is usually in a couple of days as the symptoms can only tolerated for a few days. Unilateral FBs is the usual occurrence in otorhinolaryngology practice and bilateral cases remain to be a rare occurrence [2].

In another study the most affected age group was found to be 6–10 years, presentation was mainly 48 h after insertion (79.07%). In this study the commonest FBs in children were seeds while in adults it were cotton tips. In the same study hooks and crocodile were utilized in the removal procedures [16, 17].

Increased morbidity in cases of ear FBs seen in patients who had multiple attempts of removal in the peripheral centers with late or delayed referral to otorhinolaryngologists. Therefore, there is the need for awareness campaign [18, 19].

Initial evaluation of patients with ear FBs should include assessment of patient cooperation level, ability to visualize the FB, type of FB, presence of coexisting otitis externa or trauma to the EAC, previous removal attempts, and equipment available. The majority of patients can be managed in the emergency department under direct visualization in experienced hands. However, referral to otolaryngologist should be an option for patients who are at risk to complicate or have a failed attempt. In adults the foreign body may be inserted during cleaning the ear with matchstick or the cotton tips [19, 20].

Proper management of FBs requires the assistance of specialized physicians. In a study done in Brazil by Mangussi-Gomes reported that “FBS accounted for 827 cases and 5.3% of all patients seen in the ENT emergency unit. Children were affected more frequently, particularly those below the age of 8 years. No statistically significant differences were seen between genders and the foreign bodies were mostly located in the ears (64.4%) followed by the

nasal fossae (19.5%), and the oropharynx (8.9%). Complications were seen in 4.5% of the cases, and 4.4% required general anesthesia to have the FB removed” [20]. In our ENT practice, foreign bodies were more commonly seen in children; the ears were the preferential site of occurrence. Complication rates and use of general anesthesia were low in our practice.

Conclusion

Aural FBs were commonly seen in pediatric population and the common inorganic aural FBs were cotton tip, stone and eraser whereas fly, lice and bee were the organic FBs. The most common symptoms and complications of aural FBs were unilateral purulent discharge followed by pain, ear bleeding, tympanic membrane perforation, external meatus laceration, chronic otitis media and facial nerve paralysis. FBs duration ranged from <1 to 4 weeks. The common procedures that were used for removal of FBs were forceps, syringing, hook and suction. The removal of FBs were carried out under G.A particularly organic vegetative FBs. Early identification and intervention for FBs by experienced physician are the most effective factors in determining the success of complete FBs extraction and avoiding further complications.

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Compliance with Ethical Standards

Conflict of interest Authors have not declared any conflict of interest.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Ethical Standard All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The FBs removal in our institution is a routine procedure, the ethical approval to carry out the study is not required from the local Institutional Ethical Committee.

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