Is it Merely Mischief or a Sign? Children with a Foreign Body in the External Acoustic Meatus

Sadece Yaramazlık Mı Yoksa Bir İşaret Mi? Çocuklarda Dış Kulak Yolunda Yabancı Cisim

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ABSTRACT

Objective: The purpose of this study was to determine whether any relationship exists between an external acoustic meatus foreign body and undiagnosed ear disorders in children.

Methods: In this prospectively designed case-control study, 46 sequential children with an external acoustic meatus foreign body comprised the study group and 46 children who do not have ear, nose and throat (ENT) complaints comprised the control group. The study group children were underwent tympanometry after removal of the foreign body, and tympanometry was also performed on the children in the control group. The data included age, sex, side of ear with the foreign body, foreign body type, duration of the presence of the foreign body, the details of its removal, and tympanometry type.

Results: Fifteen (32.6%) children with a foreign body in the external acoustic meatus in the study group had type A tympanometry, seven (15.2%) had type C1, nine (19.6%) had type C2, and fifteen (32.6%) had type B. In contrast, 34 (73.9%) children in the control group had type A tympanometry, five (10.9%) had type C1, three (6.5%) had type C2, and four (8.7%) had type B. The percentage of children with type B tympanometry was significantly higher (p=0.005) in the study group, and the percentage with type A tympanometry was significantly higher (p<0.001) in the control group.

Conclusion: Clinical and statistical evidence suggests that dysfunction of Eustachian tube and serous otitis media may lead to irritation in children's ears, which could prompt them to put something in their ears to ease the irritation. We suggest that all children with a foreign body in the external acoustic meatus should be seen by an otologist to prevent delay in diagnosing middle ear problems. The presence of a foreign body in the external acoustic meatus may point to an ear disease in children and should not be ignored. *(JAREM 2017; 7)*

Keywords: Ear canal, foreign body, otitis media with effusion, eustachian tube, tympanometry

ÖZ

Amaç: Bu çalışmanın amacı, çocuklarda dış kulak yolunda yabancı cisim ile kulak sorunları arasında bir ilişki olup olmadığının saptanmasıdır.

Yöntemler: Bu prospektif kontrollü çalışmada, çalışma grubu dış kulak yolu kanalında yabancı cisim saptanan 46 çocuk, kontrol grubu ise kulak burun boğaz şikayeti olmayan 46 çocuktan oluşturuldu. Yabancı cisim çıkarıldıktan sonra çalışma grubuna ve kontrol grubuna timpanometri uygulandı. Veriler arasında yaş, cinsiyet, yabancı cisim olan kulak, yabancı cisim tipi, yabancı cismin kaldığı süre, yabancı cismin çıkarılmasına ait ayrıntılar ve timpanometri sonuçları yer aldı.

Bulgular: Çalışma grubundaki çocukların 15'i (%32,6) tip A, 7'si (%15,2) tip C1, 9'u (%19,6) tip C2 ve 15'i (%32,6) tip B timpanometriye sahipti. Buna karşın, kontrol grubundaki çocukların 34'ü (%73,9) tip A, 5'i (%10,9) tip C1, 3'ü (%6,5) tip C2 ve 4'ü (%8,7) tip B timpanometriye sahipti. B tipi timpanometriye sahip çocukların yüzdesi, çalışma grubunda anlamlı olarak daha yüksekti (p=0,005) ve A tipi timpanometri yüzdesi kontrol grubunda anlamlı derecede yüksekti (p<0,001).

Sonuç: Klinik ve istatistiksel kanıtlar östaki tüp disfonksiyonu ve efüzyonlu otitis media'nın çocuk kulaklarında tahrişe neden olduğunu ve bu rahatsızlıkları gidermek için kulağına bir şeyler koymalarını sağlayabileceğini göstermektedir. Dış kulak yolları yabancı cisimsi olan tüm çocukların orta kulak problemlerinin teşhisinde gecikmeyi önlemek için bir otolog tarafından görülebilmesini öneriyoruz. Çocuklarda dış kulak yolunda yabancı bir cisim varlığı kulak hastalığına işaret edebilir ve göz ardı edilmemelidir. *(JAREM 2017; 7)*

Anahtar Kelimeler: Kulak yolu, kulakta yabancı cisim, efüzyonlu otitis media, östaki tüpü, timpanometri

INTRODUCTION

Serous otitis media (SOM) is identified as the existence of fluid in the middle ear without middle ear mucosal inflammation. SOM may occur as a spontaneous inflammatory response, because of poor tubal function in the presence of sinonasal disease or after acute otitis media (AOM), typically at between 6 months and 4 years of age (1).

Although SOM usually improves, delay in diagnosis and treatment may result in sequelae and complications because it is a silent process. Therefore, early and appropriate treatment of this disease is crucial. Complications caused by SOM are of three types: speech and language problems, vestibular problems, and middle ear problems. Hearing loss resulting from SOM can lead to improper speech and language development, which in turn

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can contribute to impaired cognitive function and poor school success (2). Studies have shown that vestibular disorders may occur in young children with otitis media (3, 4), and it is known that otitis media causes deterioration in middle ear structures over the long term (5).

In this context, it is meaningful to ask whether the presence of a foreign body in a child's ear simply reflects a meaningless pattern of behavior or whether it may be an indicator of the presence of ear problems. It has been suggested that the presence of an external acoustic meatus foreign body may be a marker for SOM in children (6). Therefore, the purpose of this study was to find out whether a relationship exists between external auditory canal foreign bodies and ear problems.

METHODS

This prospective, controlled study was conducted according to the principles of the Helsinki Declaration at the Department of Otorhinolaryngology, University of Health Sciences Gaziosmanpaşa Taksim Training and Research Hospital. The study protocol was approved by the ethics committee of the hospital (approval number 2016/33). The parents of the children were informed about the characteristics of the research, and written consent for the involvement of the children was received from all parents.

All children who were diagnosed with a foreign body in the external acoustic meatus were recruited. Children with mental or learning difficulties, those who had prior ear surgery, those under 2 years of age, and those with a oral, palatal or nasal surgery history were excluded, as were those in whom serious bleeding occurred in the external acoustic meatus during foreign body removal.

The control group comprised 46 randomly selected children who came to the pediatric outpatient department with non-ear, nose and throat (ENT) complaints (e.g., abdominal disorders) and who had no previous history of foreign body in the external acoustic meatus.

The assessed parameters included age, sex, side of ear with the foreign body, type of the foreign body, duration of the presence of the foreign body, and the removal details.

We evaluated tympanometry results according to the classification system developed by Zeilhuis et al. (7). This classification system is a kind of Jerger's nomenclature (8), and divides tympanometry results into 4 subgroups: type A, type B, type C1, and type C2 (Table 1). Types C1, C2, and B were regarded as abnormal (Table 1).

Table 1. Classifications of tympanogram

	Type	Description (middle ear pressure daPa)
Peaked	A	Between +200 and -99
	C1	Between -100 and -199
	C2	Between -200 and -399
Non-peaked	B	No observable peak between +200 and -600

daPa: dekapascal

Statistical Analysis

Number Cruncher Statistical System 2007 software (NCSS, Kaysville, UT, USA) was used for all analyses. The independent samples t-test was used to analyze quantitative data, and Pearson's chi square test was used to analyze qualitative data. Statistical significance was accepted at $p<0.05$.

RESULTS

Forty-six children who had foreign bodies in the external acoustic meatus comprised the study group and 46 children with non-ENT disorders comprised the control group. Two had foreign bodies in both ears. All children were assessed by an experienced otolaryngologist. The sex ratio ($p=0.999$) and mean age ($p=0.865$) did not differ significantly between the study and control groups. There were 26 were boys (56.5%) and 20 were girls (43.5%) in each group.

Thirty-two (69.6%) cases presented within 3 days of foreign body insertion into the external acoustic meatus. Four children (8.7%) applied to the hospital between 4 and 7 days of foreign body insertion and six (13.0%) after 7 days. In four (8.7%) children, there was no information on how long the foreign body was in the ear. In twenty-five children (54.3%) foreign body was in the right ear, nineteen had one (41.3%) in the left ear, and two (4.3%) had one in both ears. The most frequent foreign body, i.e., a piece of paper, was found in 18 (39.1%) children; other foreign bodies included beads, various types of plastic pieces, pieces of crayon, foods, etc. In two (4.3%) cases, general anesthesia was required, but in 44 (95.7%) cases had the foreign body removed as outpatients. The demographic characteristics of the patients and controls are summarized in Table 2.

As shown in Table 3, 20 (43.5%) children had a history of previous ear complaints within the past 6 months such as hearing loss, discomfort in the ear, or pain.

In the study group, 15 (32.6%) children had type A tympanometry, 7 (15.2) had type C1, 9 (19.6%) had type C2, and 15 (32.6%) had type B tympanometry. In the control group, 34 (73.9%) children had type A tympanometry, 5 (10.9%) had type C1, 3 (6.5%) had type C2, and 4 (8.7%) had type B. The difference between the study and control groups in the percentages of type A and B tympanometry were statically significant. There were statistically significant differences in the percentages of type A and B tympanometry between. The type B tympanometry percentage was significantly higher ($p=0.005$) in the study group and the type A tympanometry percentage was significantly higher ($p<0.001$) in the control group (Table 3) (Figure 1).

In the study group, 9 children had abnormal findings including SOM or Eustachian tube dysfunction (ETD) in the ear with the foreign body and a normal opposite ear, and 22 children had SOM or ETD in both ears (bilateral foreign bodies were detected in 2 children). In the remaining 15 patients, all parameters were within normal limits (Table 4).

DISCUSSION

We found that 67.4% (31/46) of children with external acoustic meatus foreign body had different kinds of middle ear disorders, compared to 26% in the control group (12/46). There was a statistically significant difference in the percentage of type B

Table 2. Demographic and clinical detail

	Study group	Control group	p
Age (years)	5.43±2.47	5.34±2.43	[a]0.865
Gender			
Female	20 (43.5)	20 (43.5)	[b]0.999
Male	26 (56.5)	26 (56.5)	
Ear with foreign body			
Right	25 (54.3)	-	
Left	19 (41.3)	-	
Both	2 (4.3)	-	
Foreign body type			
Bead	9 (19.6)	-	
Paper	18 (39.1)	-	
Pieces of crayons	6 (13.0)	-	
Various plastic pieces	8 (17.4)	-	
Food	5 (10.9)	-	
Duration of presence of foreign body (days)			
1–3	32 (69.6)	-	
4–7	4 (8.7)	-	
> 7	6 (13.0)	-	
Unknown	4 (8.7)	-	
Removal of foreign body			
Outpatient	44 (95.7)	-	
Under general anesthesia	2 (4.3)	-	

Table 3. Audiometric assessment

	Study group	Control group	p
Previous history of ear complaints	20 (43.5)	0	<0.001*
Tympanometry			
Type A	15 (32.6)	34 (73.9)	<0.001*
Type C1	7 (15.2)	5 (10.9)	0.536
Type C2	9 (19.6)	3 (6.5)	0.063
Type B	15 (32.6)	4 (8.7)	0.005*

(p=0.005) tympanometry between the study and control groups. The percentages of type C1 tympanograms (15.2%, 7/46) and type C2 tympanograms (19.6%, 9/46) were higher in the foreign body group than in the control group, but these differences were insignificant. Twenty (43.5%) cases with a foreign body in the external acoustic meatus had a previous history or ear complaints and problems, whereas none of the children in the control group had a history of any ear problem.

Table 4. Foreign body and status of middle ear in patients

Number of patients with foreign body	Status of middle ear
9	Diseased ipsilateral middle ear with normal contra lateral middle ear
22 (2 both ear foreign body)	Bilateral diseased middle ear
15	Normal middle ear

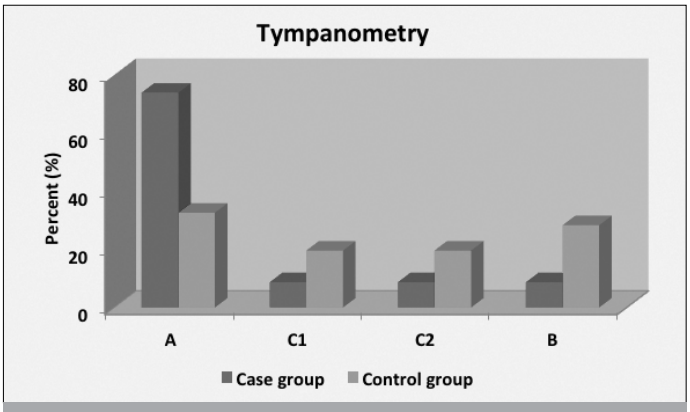

Figure 1. Audiometric assessment

Children with SOM may complain of earache, hearing loss, or tinnitus, and the parents of such children may also report hearing loss, imbalance, or recurrent otitis media. However, in a significant proportion of patients, especially in young children, SOM may be overlooked due to the mild symptoms of the disease (9). This may explain why complications related to this disease are seen frequently.

It has been reported that significant hearing loss may lead to abnormal progress of speech and language (2, 10, 11) and also bring about poor school success as well as poor cognitive function (12, 13). Also, SOM can disrupt middle ear structures and cause permanent sequelae, including perforation of tympanic membrane, chronic suppurative otitis media, tympanosclerosis, adhesive otitis media, necrosis of the middle ear bones, a retraction pocket, cholesteatoma, and sensorineural hearing loss. These complications are very rare in patients who are treated appropriately (14).

Many studies have revealed co-occurrence of foreign bodies in the external acoustic meatus and ear disorders. Some studies have revealed that aural foreign bodies may be an indicator of SOM in children. For the first time in 1972, MacGillivary (15) reported three patients who had OME presenting as an external acoustic meatus foreign body. He stated that an external acoustic meatus foreign body in children may indicate a disorder of the ear, and children who had external acoustic meatus foreign body should be evaluated by an ENT physician. Sarkar et al. (6) investigated 74 children with foreign body in the external acoustic meatus and found that 32.4% of these ears had type A, 13.5% had type C1, 16.3% had type C2, 37.8% had type B tympanometry. Ansley et al. (16) achieved similar results in their study and suggested that

hearing loss, irritation in the external acoustic mea, or otalgia may have prompted the child to put something in the ear. Schulze and Kerschner (17) reported 698 pediatric foreign body in the external acoustic meatus cases and showed that frequently presenting concomitant pathology was otitis media, in 5.3% of cases.

Our study suggests that ETD and SOM may cause irritation in children's ears that may prompt them to put something in the ear to ease the irritation of external acoustic meatus. We propose that all children with an external acoustic meatus foreign body should be seen by an otologist to prevent delay in diagnosing middle ear problems. The results of our study reveal a relationship between the foreign body in the external acoustic meatus and ear disorders and a foreign body in the external acoustic meatus may point to an ear disease and should not be ignored.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of *University of Health Sciences* Gaziosmanpaşa Taksim Training and Research Hospital.

Informed Consent: Written and verbal informed consent was obtained from patients and patients' parents who participated in this study

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