CASE REPORT

Ear injuries caused by parts of hearing aid

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ABSTRACT

This paper presents two cases of ear injuries caused by parts of hearing aids - a five-year old girl whose tympanic membrane was ruptured by a metal part of the earmold, and a patient with injury and inflammation of outer auditory channel caused by parts of a channel hearing aid. Aid amplifier could serve its purpose only if it is applied and handled with direct coordination with an ORL specialist.

Key words: hearing aid parts, ear injuries

INTRODUCTION

A large percentage of the general population has certain degree of hearing impairment and the frequency varies according to individual age groups. Incidence of hearing impairment is about 2% in youngsters up to 18 years, while for the elderly over 65 years it is over 30% of the total population (1). Persons with the hearing impairment have problems in communication, thus in order to amplify the audio information they are given the hearing aids, if the medical procedures (surgical treatment, drugs application) did not yield adequate results (2).

The hearing amplifier is an electronic device, which amplifies the sound from the environment; it alleviates hearing and consists of the miniature microphone, amplifier and a speaker. The basic types of hearing aids are behind-the-ear and the in-channel ones (3). The advantage of the first one is ability to adjust and resistance to cerumen, while advantage of the in-channel type, which is placed in the external auditory canal, is its “invisibility”, which is very important in terms of psychological aspects for the patients. As far as electronic possibilities are concerned, the aids could be analog and digital, thereby determining the quality of the sound reproduction. The most contemporary hearing aids are miniature “computers” placed in the external auditory canal, which can be automatically adjusted to the instantaneous environmental sound changes, thus enabling better hearing and understanding (4).

There is a very small number of known consequences of wearing the hearing aids. Usually those include a delay in cerumen removal, appearance of eczema of the external channel skin, injuries of the channel skin and its infections (5). Sometimes residual masses could be found coming from earmolds (6). In our practice this was the first time that we came across the fact that built-in the parts of the earmold and in-channel hearing aid fell into the external auditory canal and led to ear injuries, without being noticed by the hearing aid dealers.

CASE REPORT

The first case was a five-year old girl, who suffered meningitis in the second year of life resulting in both-sided hearing impairment, and consequently she has been wearing a behind-the-ear hearing aids ever since. According to her mother, when the new earmolds were made for her girl and after the first time she put it into the right ear, the child immediately started to cry loudly and blood appeared. The mother immediately brought the child for examination and the otomicroscopy showed the presence of fresh blood in the right external auditory canal and in the back quadrant of tympanic membrane a metal foreign object was stuck. It was in the form of a small tube, length of about 0.5 cm and diameter of about 2-3 mm. The foreign object was immediately removed by an instrument, while a rupture remained on the tympanic membrane, which was dealt with in the further procedure. These metal objects were parts of the both earmolds (Figure 1)

The second patient was a 52-year old male, who was wearing the hearing aid due to impaired hearing. He came for a check-up at audiologist after unsuccessful treatment in another institution for more than a month. He had problems in the form of pain and “fullness” in the left ear. He went to a store where he purchased the hearing aid, and as he said, “they changed something”, but the problem still persisted. By clinical exa-
mination and otomicroscopy we established that the left external auditory canal was filled with whitish sediments. The rinsing was performed of the left external auditory canal, which did not help a lot, thus, with the aid of a microscope, we had to use instruments to remove the small white tubes, 2x3 mm, and total of 7 pieces (Figure 2). They were in the hole of the hearing aid. The skin of the auditory canal, especially in the region of the back upper wall was macerated. Local therapy was applied and changes were eliminated.

DISCUSSION

In our first case in the earmold hole there was a metal part which led to the injury when applied into the ear and led to the injury – rupture of the tympanic membrane. In literature, parts of cotton, pieces of paper, jewelry beans, insects as well as silicon plugs are reported as large series of foreign object, and authors emphasize the importance of removing those by an ear, nose and throat (ENT) specialist (7). The most common way of removing those foreign objects is rinsing by a syringe and water (8, 9). Foreign objects localized in sulcus tympanicus are specially difficult to remove, and they can be removed only by instruments (10).

In our second case the object was a plastic part, which was in the in-channel hearing aid and it was falling into the external auditory canal. The aid retailer did not request an examination of the patient and could not resolve the problem on his own.

In order to properly operate with hearing aids, it is necessary to know the ear anatomy. The external auditory canal is of the gristle-bone content, about 25 mm long in adults. It is covered by very thin skin, with very little amount of the sub-skin tissue, especially in the bone part of the channel. The skin is very sensitive, achieving even at the tiniest manipulation or injury. At the end of the auditory canal the tympanic membrane is located, which makes the angle of approximately 45° with the external auditory canal (11). This is the most frequent otoscopic examination result, but one should not forget that there are individual differences. Some of them are the result of changes in ear’s ailments (existence of perforations, retraction of "pockets") or surgical interventions. Thus, prior to any manipulation within the external auditory canal, an otoscopy must be performed, which should be done by an ORL specialist in order to obtain the proper evaluations (12,13).

In Audiological Department of ORL Clinic Krugujevac about 3000 patients are examined annually and about 140 hearing aids are recommended and prescribed. This is the first time in 25 years that we found cases where parts of hearing aids became foreign objects in the external and middle ear and led to injuries. The hearing aids are analog, they have the earmolds that are either ready or custom made to fit the auditory canal, made of plastics and soft to prevent any injuries of the external auditory canal (14). As for individual earmolds, they are indicated primarily due to anatomic characteristics of the external auditory canal, since they close it completely, thus preventing the microphony phenomenon, which influences the perception of the sonic irritation. They are manufactured according to the taken impression, corresponding the size of the external auditory canal, thus no extra parts should be added to keep it in place (15). The impre-
Case report

transmission is made of the silicon mass, so in literature cases were reported where the silicon mixture remained in the external auditory canal or was found in the middle ear (16, 17). Besides, there was a report about three cases describing the residual silicone mass in the external auditory canal, which had to be removed by a specialist (18). Very illustrative is certainly a case of a young Pakistani boy who had a silicon mass in the mastoid nine years after the silicon impression has been performed (19).

The hearing aids are distributed by persons who are well acquainted with their technical possibilities, but they do not know well enough the ear anatomy and physiology of the organ – the ear, where this device should be placed.

It is extremely important that the patients with hearing aids are under the continuous monitoring by an ENT specialist who is the most adequate person to examine the ear by otoscopy, namely the otomicroscopy.

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REFERENCES


Povrede uva izazvane delovima slušnog aparata

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SAŽETAK

U radu su prikazana dva slučaja povrede uva, izazvane delovima slušnog aparata. Kod petogodišnjeg deteta došlo je do rupture bubne opne, izazvane metalnim delom koji je stajao u otvoru individualne olive; a kod drugog pacijenta, delovi koji su stajali u otvoru kanalnog slušnog aparata, doveli su do povrede i zapaljenjske reakcije spoljašnjeg slušnog hodnika. Slušni aparat mogu koristiti svojoj svrsci jedino ukoliko se njima rukuje u direktnoj koordinaciji s ORL specijalistima.

Ključne riječi: delovi slušnog aparata, povrede uva