Management of acute otitis externa using aural wick versus local drops

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Abstract

Background and objectives: Acute otitis externa is one the commonest otological disease. In this study we aimed to evaluate its types and the possible predisposing factors as well as comparing the effectiveness between local wick and local drops in treating acute otitis externa.

Methods: A prospective analysis of 100 patients complained of acute otitis externa was performed in the department of Otolaryngology at Rizgary Teaching Hospital in Hawler between August 2005 to January 2006. Male patients were 45%, and the rest 55% were females. Patients were classified into two groups; 50 patients received topical application of cream using aural wick, and the second group of 50 patients treated by topical ear drops.

Results: The commonest predisposing factors were water entrance to the affected ear during bathing and swimming (51%). On culturing, bacteria were found in 64% of patients and fungi in 11%. Topical application using aural wick showed 100% response, whereas only 60% of those received topical ear drops had an immediate response.

Conclusion: Acute diffuse otitis externa is the most frequent type. *Pseudomonas aeruginosa* is the commonest bacterial growth. Aspergillous species is the commonest caused of fungal growth. Response to aural wick treatment is much better than aural drops.

Keywords: Acute otitis externa, boil in the external ear, diffuse otitis externa.

Introduction

Otitis externa is the generic term applied to all inflammatory conditions of the external meatal skin; it may arise primarily in the meatus or be a manifestation of generalized skin diseases. The external auditory canal extends from the concha of the auricle to tympanic membrane; the distance from the bottom of the concha to the tympanic membrane is approximately 2.5 cm. The supporting framework of the canal wall is cartilaginous in the lateral one third and bone in the medial two third.[1,2] The external auditory meatus is lined with keratinized sequamous epithelium which is identical to the skin that covers the rest of the body, the skin covering the cartilaginous portion of external auditory canal has some properties not found elsewhere. It is only skin had process of lateral migration from the center of the ear drum to the outside, the skin is tightly adherent to underlying structures. [2,3] The skin appendages of the cartilaginous portion include not only hair follicle and sweet glands but also specialized sebaceous glands to form cerumen ,The secretion of the cerumenous and sebaceous glands , together with dead epithelial cells which are regularly cast off and replaced , combine to form cerumen (ear wax) a water-repellent substance that coats and impregnates the skin of the ear canal. [4,5] It has been reported that too much or too little cerumen predispose to otitis externa.[6] The skin of the external auditory meatus has a normal commensal flora such as *Staphylococcus epidermidis* (albus), and *Corynebacterium* spp. (diphtheroids). When the skin's natural defense mecha-

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nism breaks down, such as in otitis externa, the resident bacteria multiply because of more favorable environment and other organisms such as *Proteus* and *Pseudomonas* species and *Escherichia coli*, which are normal commensal of other parts of the body, may then flourish. [1,7] Furunculosis is a localized type otitis externa due to gram- positive infection of a hair follicles in the cartilaginous portion of the external canal. Usually caused by *Staphylococcus aureus*, usually single, may be multiple. Recurrence common, Spontaneous evacuation usually occurs in a few days, where as the more generalized infection that extend from the concha to the ear drum named diffuse otitis externa . Fungi are found as saprophytes in the external auditory meatus either primary or secondary superimposed on underlying bacterial infection .Otomycosis is fungal infection of the external canal. [1,2,7] Malignant Otitis externa is an uncommon but progressive debilitating and sometimes fatal infection of the external meatus, surrounding soft tissues and skull base. Usually occurs in elderly, poorly controlled diabetic patients. The infecting organism is *Pseudomonas aeroginosa* in patients with low resistance, but *Staphylococcus epidermidis* and Aspergillus may also be responsible. [1,2]

Methods

A sample of 100 untreated patients were collected. Microorganisms were cultured immediately, at the laboratory unit of Rizgary teaching Hospital, from the external auditory meats using sterilized swab sticks from the outer quarter of the external auditory canal. The material was cultured on different media for aerobic and anaerobic microorganism. All the debris and wax were meticulously removed by suctioning under microscope. 50 patients were treated with aural wick of gauze emulsified by betnosam-N cream (betamethasone 0.1%, neomycin 0.1%). In addition, clortrimazol 1% cream were added to the mixture for to those with suspected fungal infection. Patients were instructed to leave the wick in position and a follow up review was arranged for the next 24 hours to evaluate their condition and response. The wick was replaced in case of persistent otalgia; however, if the pain subsided significantly the treatment by local application of cream (using ear bud) was continued for another few days. In addition, patients with suspected fungal infection were advised to continue on antifungal cream for additional one week. The remaining 50 patients used topical drops and for those with suspected bacterial infection betamethasone N (betamethasone 0.1%, neomycin 0.5%) ear drops were used in addition to adding clotrimazole drops 1% for those with suspected fungal infection. Patients were instructed to use the drops three times daily; two drops a time for one week course and to continue on clotrimazole drops for another week for those with suspected fungal infection. Systemic antibiotics (ciprofloxacin 500mg, twice daily orally for one week course) were only given when in case of diffuse infection, lymph nodes enlargement, and immune compromised patient.

Results

This study comprised of 100 patients with acute otitis externa with age ranging from (11) to (70) years (the mean age is 40.5 years). The peak age incidence of acute Otitis externa was in the third decade (21-30) shown in Figure (1). Male patients were 45%, and the rest 55% were females. The right ear was involved in 40% of patients, left ear in 34%, and 26% of patients had both ear were involved, Figure (2). The commonest predisposing factor was water entrance to the affected ear during bathing and swimming in 51% of patients. Self induced trauma (by cotton bud, match stick, hair clips…ect.) in 30% of patients, and in 15% of patients there were history of chronic suppurative otitis media, Table(1). Sever Otalgia was the cardinal symptom in all our patients at the time of presentation (100%); however, there were other addi -

tional symptoms including hearing loss in 75%, ear irritation in 75%. In 50% of patients there was scanty purulent ear discharge**,** Figure (3). Among 100 total patients, 47% had history of previous otitis externa (usually 2-3 times). 43 patients had self cleaning habits of the ear and frequent bathing and swimming. In addition recurrent attacks were present in those with uncontrolled Diabetes mellitus (2 patients) and those of previous mastoid ear surgery (2 patients).On clinical examination, diffuse otitis externa found in 63% patients, local otitis externa (localized swelling) in 20% patients and fungal debris in 15% patients, In addition features of malignant otitis externa were found in 2 patients (2%) ; both of them of uncontrolled diabetes, Table (2).The cultures yielded Bacterial growth in 64% of patients, fungi in 11% of patients, mixed fungal and bacterial in 12% of patients, whereas in 13% of patients the cultures were negative, Table(3). Among 64% of patients of isolated bacterial cultures, the commonest bacteria was *Pseudomonas aeruginosa* in 24 (37.5%) patients, *Staphylococcus aureus* in 14(21.8%) patients, and *Staphylococcus albus* in 14(21.8%) patients, Table (4). Among 11% of patients of fungal cultures, *Apergillous* species was the commonest fungal organisms found in 7 patients (63.6%), while 3 patients (27.27%) had *Candida albicans* and one patient (9.09 %) had both types. By using wick for the topical cream application, 50% of our patients showed a good response within 24 hours. All 50 patients (100%) satisfied the criteria of improvement in regard to near total relieving of otalgia, in addition to marked improvement of hearing loss (apart from the hearing loss of middle ear causes) . In the second group of (50 patients) were aural drops used, 30 patients responded well to the treatment(60%), while 20 patients showed no improvement (40%) even after few days of using following which the treatment was changed to aural wick with appositive response. Statistically the result was highly significant (X2= 25 d.f.i, P= 0, 0000006), Figure(4).

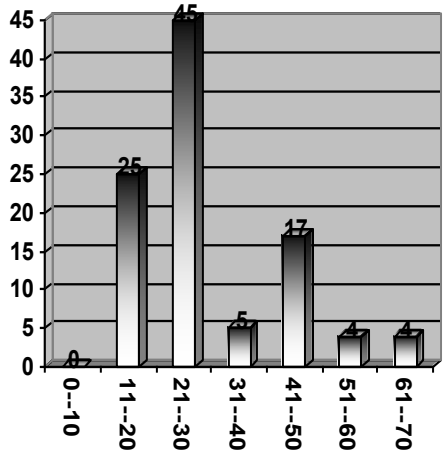

Figure 1: Age distribution

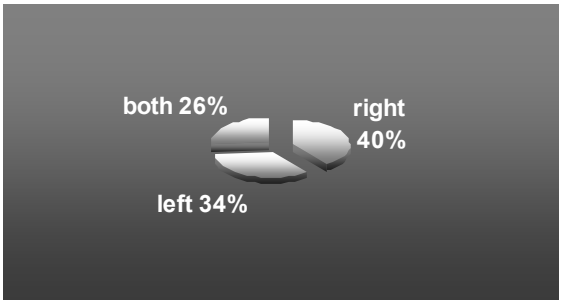

Figure 2: Involved side

Table 1: Predisposing factors in acute otitis externa

Predisposing factors	Percentage of patients
Bathing and Swimming	51
Self cleaning of the ear	30
Chronic suppurative otitis media	15
Ear operation (Mastoid)	2
Diabetes mellitus	2

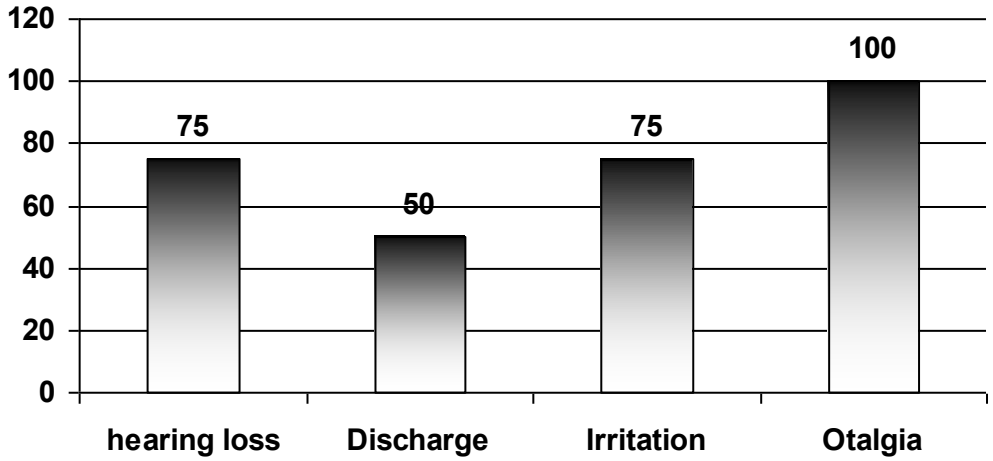

Figure 3: The presenting symptoms of acute otitis externa

Table 2: Types of otitis externa

Types of Otitis externa	Percentage of patients
Diffuse otitis externa	63
Localized otitis externa	20
Fungal debris (otomycosis)	15
Malignant otitis externa	2

Table 3: The organisms found in aural cultures

Cultures growth	Percentage
Bacteria	64
Fungi	11
Mixed (Bacteria+Fungi)	12
Non	13

Table 4: The causative bacteria found in aural cultures

Organism isolated in pure bacterial growth	No. of Patients
Pseudomonas aeruginsa	24
Staphylococcus aureus	14
Stuphylococcus albus	14
Streptococcus viridance	4
E.coli	3
Klebsiella+ Staphylococcus albus	3
Proteus	2

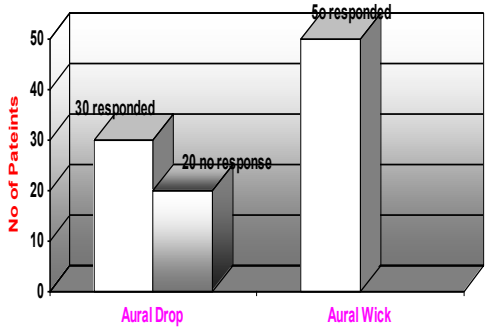

Figure 4: Response to topical treatment

Discussion

Acute otitis externa was common in the third decade and 70% with the highest incidence between 11-30 years of age. Our data is comparable with other results which showed a sharp reduction of infection above 30 years of age. [8-10] TANG (1983) [11] reported that 11-30 years old are commonest age groups probably due to the habit of ear self cleaning in adult life and swimming activities in the early adult life. In our study no significant differences between males (45%) and females (55%) were detected; however significant differences in favor of males were reported by other studies, with no definite explanation. [12] The commonest predisposing factor is exposure to water (51%) followed by self cleaning of the ear (30%). WALLING (1999) [13] documented that acute otitis externa is more likely to affect aquatic athletes as a result to excessive water exposure which result in reduction in cerumen thereby causing drying of the meatus and pruritis which then lead to scratching and trauma to the skin of the external canal. In addition, other studies confirm that self cleaning was the most common predisposing factors because cleaning your ears can remove the protective wax layer and lead to infection, especially if the canal is injured during cleaning. [11,14-16] Regarding the incidence of the involved side, in this study there was no significant difference between right (40%) and left (34%) ear, with unilateral infection being as twice as bilateral infection, the above data has been supported by others who offered no explanation for this difference after analyzing various causative factors. [11] Otalgia was the predominant symptom in acute otitis externa in our study (100%), which is in agreement with previous studies. [1,10,11,17] Scanty purulent ear discharge and exudates was present in 50% of our patients, this in concordant with other studies [18] ,while it disagree with others who stated that purulent discharge is often seen with chronic Otitis externa and Otitis media.[8,19] Among 100 total patients, 47% patients had history of recurrent infection (usually 2-3 times), most of these patients (43 patients) bad self cleaning habit of the ear and frequent bathing and swimming, this result is compatible with (TANG 1983) [11] who showed that 48% of his cases with acute otitis externa has history of recurrent infection and 90% of these patients had the habit of self cleaning of the ear with frequent bathing and swimming. Acute diffuse otitis externa is the most usual type seen on clinical examination in our study, this result was in accordance with others.[11] Regarding pathogens cultured from the ear, bacterial infection (64%) were more than fungal infection (11%) and mixed bacterial and fungal growth was (12%) while negative results found in(15%). Some studies confirmed lesser percentage of fungi than bacteria [20], while others [11,21] defined that fungi as most common pathogens causing otitis externa, and probably factors like humidity and temperate weather might played a major role in making fungal infection more than bacterial infection. Between the isolated bacterial cultures, the predominant one was *Pseudomonas aeruginosa* (24%) followed by *Staphylococcus aureus* (14%). This goes with other studies that reported *Pseudomonas auroginosa* was the commonest bacteria [12,22-24] while other studies like [11,25] disagree with this reporting that the predominant bacterial species causing otitis externa is *Staphylococcus aureus*. In our study we noticed a better results when using topical cream applied by using aural

wick than topical ear drops alone with 100% excellent response when using wick, whereas only 60% of patients treated by drops shows early improvement. KEITH B. HOLTEN, et al. 2001[26], revealed that the combination of ear cleaning, ear wicks, and topical medications is most effective in treating otitis externa and they stated that the use of a single topical drop intervention or oral antibiotics may be effective, but is less well supported. While (Sander,2001) [27], showed that the prevailing treatment for acute otitis externa is still a topical antibiotic drops, however in conditions when the canal is swollen it is necessary to use a wick which act as a vehicle for the drops and to help draw inflammatory fluid from the ear canal. In addition, he added the use of topical rather than oral antibiotic treatment in otitis externa will deliver higher concentrations of the antibiotic to the site of infection which in turn facilitate a rapid clinical and bacteriological cure and the inclusion of steroid with topical antibiotics appear to modestly improve the clinical symptoms when compared with topical antibiotic treatments alone. Similarly, others reported when the canal is quite swollen, a cotton wick specifically designed for this purpose should be placed to facilitate drainage and permit application of topical medications. [28,29] In contrast to others we demonstrates equivalent results with ear cleaning, an ear wick, and any of the choices of topical agents.[30]

Conclusions & recommondation: Acute otitis externa was commoner during the third decade of life, with no significant difference between males & females. Unilateral was as twice as bilateral infection. The commonest predisposing factors were exposure to water followed by self cleaning of the ear. Otalgia is the most predominant symptom. Diffuse infection is the commonest. Bacterial growth is the predominant microorganisms found in cultures, of which *Pseudomonas aeruginosa* is the commonest one. *Aspergillous* species is the frequent fungal growth. It is highly recommend to treat acute otitis externa with aural wick .

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