Otitis Externa is the infection and/or inflammation of the skin of the outer ear canal, often associated with underlying dermatological conditions. Symptoms include discharge from the ear, reduced hearing, itch, and mild to severe pain. It may present as an acute episode, or may develop into a chronic condition causing significant adverse effects on a patient’s daily activity. Optimal treatment for otitis externa requires suction of the external auditory canal under microscopic vision to remove any cerumen, keratin or infective debris present, allowing thorough inspection of the tympanic membrane and a guided culture swab to establish an accurate microbiological diagnosis. Microsuction also delivers symptomatic relief from the aural blockage and impaction.

Topical preparations are the first-line of treatment for otitis externa, targeting the affected tissue particularly when applied following microsuction clearance. Unfortunately, optimal treatment for many patients is not accessible as it is labour intensive and the necessary equipment is not available in community practices or general emergency departments (ED).

Therefore, a variety of topical and systemic antimicrobials are often given based on an empirical clinical assessment, especially in patients with chronic otitis externa. This can foster microbiological resistance as well as induce hypersensitivity reactions in the skin of the external auditory canal.

Study

The aim of this study was to prospectively audit the implementation of an evidence-based treatment protocol on the management of otitis externa patients in a specialist ED. Otitis externa patients account for 25% of all attendees and frequently require multiple visits.

Additionally, the clinic offered an ideal environment for one-to-one consultant-provided nurse training in the clinical assessment, diagnosis and treatment of these patients.

Patient selection criteria

Six patients were referred from the ED on a first-come first-served basis until the allocated number of slots were filled for any given week.

The criteria for referral were:
- Diagnosis of otitis externa
- Treated at least once in an emergency department and estimated to require further treatments
- Patients with tympanic membrane perforation or middle ear diseases were excluded.

Data was recorded on previous history and treatments for otitis externa, history of water exposure or water sports, efforts to waterproof ears, history of itchy ears, habit of scratching/cleaning ears using fingers, cotton buds or other objects, and history or diagnosis of dry skin or other dermatological condition.

Treatment protocol

A critical element of the treatment protocol was to minimise the incidence of iatrogenic effects of treatments. As some studies have shown steroid-only treatments to be as effective as combination anti-microbial and steroid, the treatment protocol was predicated on meticulous microsuction and the initial use of steroid-only treatment, except in presence of severe otitis externa, or active bacterial or fungal infection, with recent microbiology culture suggest-
Table 1

Microbiological culture comparison between two units

<table>
<thead>
<tr>
<th></th>
<th>2006/7</th>
<th>1989</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>28%</td>
<td>11%</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>17%</td>
<td>11%</td>
</tr>
<tr>
<td>Candida/aspergillus</td>
<td>22%</td>
<td>10%</td>
</tr>
<tr>
<td>No growth/commensals/other</td>
<td>32%</td>
<td>68%</td>
</tr>
</tbody>
</table>

Results

From September 2006 to September 2007 a total of 110 patients with otitis externa were seen in the clinic. There were 56 males (aged 17-75 years) and 54 females (aged 16-81 years). The study found that 59 of the participants (53%) had a unilateral infection, and 51 (47%) had bilateral infection; 68% of all patients had a history of one or more episodes of otitis externa treated in the previous six months.

The number of visits (including number of visits to ED and to the clinic for this particular episode of otitis externa) varied from two to 15, the average being five.

Treatments prescribed prior to attending the clinic

Data included treatments listed on GP referral letters or prescribed in ED within the past six months.
- 457 treatments were recorded
- 64.5% were on antibiotic-based agents (42% topical, 22.5% systemic)
- 66 (60.6%) patients had been prescribed systemic antibiotics in the preceding six months; 28 patients had been prescribed two courses, eight patients had three courses and one patient had four
- Steroid-only drops/ointment were prescribed 110 times, antifungal agents 27 times, and other non anti-microbial agents 25 times.

Treatments prescribed

- Of a total of 417 ears examined, aural toilet only was required on 153 (37%) occasions
- Of 270 ears treated, a topical antimicrobial agent was applied to 19 (7%) ears, antifungal to 43 (16%) ears and other non-microbial treatments were applied/prescribed to 21 (8%) ears. Systemic antibiotics were prescribed in addition to topical therapy for nine (8%) patients
- Steroid-only treatment was applied on 183 (68%) patients (52% ointment, 16% drops).

Swab culture results

A total of 163 ear swabs were analysed for culture and sensitivity.
- 52 (32%) showed no organism growth
- 46 (28%) grew pseudomonas species. Of these, 35 were resistant to neomycin, six were resistant to both neomycin and gentamicin, one was resistant to three antimicrobials (gentamicin, neomycin, erythromycin) and one was resistant to four antimicrobials (neomycin, gentamicin, ciprofloxacin, ofloxacin)
- 28 (17%) grew staphylococcus aureus species. Two patients were found to have MRSA
- Fungal infections accounted for 37 (23%)*, [18 aspergillus species, 19 candida species]. One patient developed a perforated tympanic membrane due to otomycosis
- 10 swabs grew more than one micro-organism.

Factors related to OE

Twenty-five patients (23%) had water exposure, and this was due to: lack of knowledge that moisture is a causative factor; a belief that ears should be washed; failure of waterproofing methods; or regular swimming or water sports. The findings demonstrated that most patients made efforts to prevent water exposure to their ears, although not always successfully.

Forty-two (38%) patients had a history of eczema or psoriasis, or had been informed they had dry skin in the aural canal. Eighty-three (76%) reported scratching or causing trauma due to itch or cleaning attempts.

Discussion

The figures on previous treatments exhibit the variety of empirically based topical antimicrobial treatments used, in some cases as many as eight or nine, thereby exposing the patient to many different antimicrobial agents. These figures may in fact be an underestimation as not all previous treatments were listed on GP referral letters, and as up to 45% of patients self-refer to ED full details were not always available.

The incidence of recurrence was high; 68% had been treated for the condition within the previous six months. The most common causative organisms for otitis externa were pseudomonas aeruginosa and staphylococcus aureus. Culture results from this group of patients showed a similar pattern.

Rowlands suggested that ears that are treated repeatedly with a variety of antimicrobial agents are more susceptible to infection. The high level of positive microbiological culture found in this study would appear to support this. The results exhibit a general increase in the number or pathogenic micro-organisms compared to a similar study of 100 patients with acute otitis externa carried out in the same unit in 1989.

The earlier study included patients with first attack of otitis externa. In this study, 68% of patients had been vigorously treated for the condition in the previous six months. This would imply that repeated topical antibiotics were indeed resulting in increased incidence of infection.

Furthermore, a recent increase in the prevalence of otomycosis has been linked to the extensive use of ototopical antibiotic therapy.

Our findings show a higher incidence of fungal pathogens over the 1989 study and also on other more recent work. Since the study population in these cases comprised patients on first presentation with acute otitis externa, the higher incidence in our study may be attributable to previous frequent topical therapy. Otomycosis can be difficult to eradicate once established.
It can occasionally result in perforation of the tympanic membrane. Treatment requires diligent aural toilet and close follow-up.

Although generally systemic therapy should be reserved for severe infection, or where there is cellulitis of the auricle or surrounding facial skin, 60% of these patients had been prescribed oral antibiotics, and almost 20% on more than one occasion in the preceding six months.

According to Rowland, persistence and recurrence of otitis externa were higher following treatment with oral antibiotics. These figures suggest over-use of systemic antibiotics.

Organisms most often causing otitis externa appear to be developing resistance to common topical therapies, in particular to neomycin and polymyxin B5.

Our findings show reduced susceptibility of pathogens to two frequently prescribed ototopical antibiotics, neomycin and gentamicin.

The National Infection Control Steering Committee set up by HSE in 2007, aims to reduce rates of antibiotic prescribing in Ireland by 20% in three to five years. Provision of comprehensive microsuction facilities within the community could address this issue in the treatment of otitis externa.

Comparison of treatments before and within the clinic exhibits a substantial reduction in the use of topical and oral antibiotics. It is likely that many of these patients would have continued to be treated with stronger agents when steroid-only therapy was in fact sufficient to achieve a resolution.

These results do not dispute the role of antimicrobial therapy in otitis externa, but suggest that their use could be substantially reduced.

We consider, therefore, that not only does microsuction have a superior clinical efficacy over empirical treatment; it also conveys the greater benefits of reducing the incidence of recurrence of otitis externa, of otomycosis, of antibiotic resistance, and of hypersensitivity reactions in the ear.

In relation to aetiological factors, our findings that aural pruritus, exposure to moisture, and skin trauma caused by scratching in this cohort is both expected and consistent with previous authors.

We concur with many authors that associated dermatological changes are a major contributory factor to pruritus. Steroid therapy can help address this underlying dermatitis, bearing in mind the possibility of cutaneous atrophy and bacterial or fungal overgrowth skin associated with prolonged use.

Implications for practice

Previous authors have demonstrating the effectiveness of nurse-led clinics to date and Uppal provides a convincing argument for cost-effectiveness of a nurse-led aural clinic.

We present our experience of the first national nurse-led clinic in the treatment in Ireland of otitis externa, which previously has been the preserve of medical staff.

This has proved a successful pilot study with positive future implications for service delivery. Anecdotal evidence suggests that patient satisfaction with the service is high.

The study concludes that otitis externa is overly treated with antimicrobials in the community. We feel that this empirical treatment is primarily driven by lack of community access to microsuction facilities.

The findings support the view that these agents could be effectively substituted with thorough aural toilet and steroid-only therapy for the majority of non-acute otitis externa. It is likely that this group of patients could be equally, if not better, served in dedicated primary care nurse-led otitis externa clinics with agreed treatment protocols.

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Acknowledgements

Mr David Charles, otolaryngologist and Maura Carroll, CNM2, Royal Victoria Eye and Ear Hospital, Dublin

*percentage of total sample

References on request