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Main Article

New treatment strategy and assessment questionnaire for external auditory canal pruritis: topical pimecrolimus therapy and Modified Itch Severity Scale

B Acar, H Karabulut, Y Sahin, M A Babademez, A S Karadag*, R M Karasen

Abstract

Objective: We aimed to compare the efficacy of topical pimecrolimus versus hydrocortisone in treating external auditory canal pruritis, using the Modified Itch Severity Scale as an assessment tool.

Methods: We included in the study 40 patients with isolated itching of the external auditory canal who had not received any benefit from previous topical and systemic treatments. Topical 1 per cent pimecrolimus or topical hydrocortisone was applied to each patient's external auditory canal for three months. A Modified Itch Severity Scale was developed and used to assess treatment response.

Results: Compared with itching scores on initial assessment, the scores of patients receiving topical pimecrolimus had decreased by 52.3 per cent by the third week of treatment and by 77.6 per cent by the third month, whereas the scores of patients receiving topical hydrocortisone had decreased by 34.4 per cent by the third week and by 64.2 per cent by the third month.

Conclusions: Topical pimecrolimus appears to be as effective as topical hydrocortisone in relieving external auditory canal pruritis. We used a novel scoring system, the Modified Itch Severity Scale, to evaluate external auditory canal pruritus; this is the first self-reporting questionnaire for the quantification of external auditory canal pruritus severity. Further studies are needed to validate this scoring system.

Key words: Otitis Externa; Pruritis; Pimecrolimus; Hydrocortisone

Introduction

Otolaryngologists frequently encounter patients with isolated itching of the external auditory canal – sometimes termed 'itchy ear syndrome' in the literature.[1] The itching severity varies from mild to severe enough to disrupt sleep. History-taking and otolaryngological examination of such patients (including microscopic ear examination) reveals no signs or symptoms of active bacterial infection, active dermatological disease (e.g. psoriasis or atopic dermatitis) or otomycosis.

Many otolaryngologists generally treat this condition with steroids with topically low potency (e.g. hydrocortisone) or with combined treatments (e.g. topical acetic acid 2.4 per cent). These treatments are effective in some patients, but complaints continue in others. Most treated patients report recurrent symptoms. Long term use of topical corticosteroids is contraindicated, since they cause thinning of the epidermis and decreased microvascularity and keratinocyte numbers.[2] Therefore, chronic topical corticosteroid use should be avoided in patients with very thin external auditory canal skin.

Pimecrolimus is a new, topical, macrolide, immunosuppressive agent which has been used successfully in the treatment of chronic inflammatory skin disease.[3–5] It was isolated from the *Streptomyces tsukubaensis* fungus by the Fujisawa Pharmaceutical Company (Osaka, Japan) in 1984. Pimecrolimus was initially used orally and intravenously to prevent organ rejection in patients undergoing transplantation. Pimecrolimus has also been shown to be effective for atopic dermatitis. Although its exact mechanism of action is unknown, pimecrolimus may bind macrophilin and cause calcineurin inhibition; thus, it may prevent secretion of early cytokines (interferon γ and interleukins 2, 4 and 10) by blocking T cell activation.[6] Another mechanism of action is to prevent degranulation of mast cells and secretion of inflammatory agents due to immunoglobulin E stimulus.

The efficacy of treatment for isolated external auditory canal itching is not usually assessed in detail (e.g. via use of a visual analog scale). Previous studies have focused on patients' perception of this symptom, or on its effect on daily life. Therefore,

From the Departments of Otorhinolaryngology and *Dermatology, Kecioren Training and Research Hospital, Ankara, Turkey.
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we believed that a standardised, practical questionnaire was required to quantify the severity of external auditory canal pruritis and its effect on the patient, for use in both clinical evaluation and research.[7] An ideal instrument would accurately assess patients' perceptions of pruritus severity, and would allow comparison between patients as well as assessment of treatment effectiveness.

In this study, we assessed the efficacy of topical pimecrolimus as treatment for isolated external auditory canal itching. We used a modification of the Itch Severity Scale developed by Majeski *et al.*, which mainly assessed the frequency and type of itching, and its psychological and sleep effects.[8]

Materials and methods

Patients

We included in the study a total of 43 patients referred to our out-patient clinic with the complaint of recurrent external auditory canal itching. All patients had previously received topical and systemic treatments, without benefit. The patients had no pathological findings in their otoscopic examination (e.g. fungal or bacterial infection, or dermatological disease).

The patient were examined in our centre by an experienced dermatologist for coexisting atopic and contact dermatitis, according to a routine procedure, and skin prick testing was performed.

Patients were randomised to receive either topical pimecrolimus 1 per cent ($n = 20$; group one) or topical hydrocortisone ($n = 20$; group two). Patients were followed up for three months.

Modified Itch Severity Scale

We modified the Itch Severity Scale developed by Majeski *et al.* to assess itching.[8] Our modified questionnaire assessed five of the seven parameters addressed by Majeski and colleagues' original scale, namely: day time incidence, itch type, itch severity, effect on sleep and effect on general psychological state. Marks for these five parameters were then summed together and multiplied by three to obtain the total score; thus, patients' total Modified Itch Severity Scale scores could range from zero (no pruritus) to 15 (most severe pruritus).

The two parameters rejected from Majeski and colleagues' original scale were excluded as they were unsuitable for assessment of external auditory canal itching.

Questionnaires were administered to the patients by the same physicians during the initial assessment, the third week of treatment and the third month of treatment. Questionnaire results were assessed by two different, independent physicians blinded to individual patients' identities.

Statistical analyses

All statistical analyses were performed using the Statistical Package for the Social Sciences version 10.0 software program (SPSS Inc, Chicago, Illinois, USA). All statistical tests were two-tailed, with 0.05 used as the threshold level of significance unless otherwise stated. Descriptive statistics were calculated and statistical comparison of the subjective scores from the questionnaires was performed using non-parametric analysis (Wilcoxon test).

TABLE I

PATIENT CHARACTERISTICS

Characteristic	Group 1*	Group 2†	*p*
Male (*n*)	1	3	>0.05
Female (*n*)	19	17	>0.05
Age (mean ± SD; y)	44.6 ± 12.24	43.30 ± 12.83	>0.05

*$n = 20$; †$n = 20$. SD = standard deviation; y = years

Results

The gender and age characteristics of both groups are presented in Table I. Group one (pimecrolimus treatment) comprised 5 per cent men and 95 per cent women, while group two (hydrocortisone treatment) comprised 15 per cent men and 85 per cent women. Patients' ages in groups one and two ranged from 24 to 68 and from 28 to 69 years, respectively. There were no statistically significant differences between the two groups with respect to gender and age.

One patient's treatment was stopped as they were allergic to topical pimecrolimus. " and "Two other patients showed no improvement in their symptoms during treatment. Compared with itching scores at initial assessment, group one patients' itching scores had decreased by 52.3 per cent by the third week of treatment and by 77.6 per cent by the third month of treatment, whereas itching scores in group two patients had decreased by 34.4 per cent by the third week and by 64.2 per cent by the third month (Table II). These differences in consecutive itching scores were statistically significant within both groups ($p < 0.001$, $p < 0.001$, respectively) (Figure 1). Although the mean itching score at the end of treatment was lower in group one compared with group two, this difference was statistically insignificant ($p > 0.05$).

Discussion

Chronic ear itching is a complex problem with many different aetiologies.[1] The differential diagnosis includes external auditory canal carcinoma, contact dermatitis, seborrhoeic dermatitis, psoriasis, dermatomycosis and dermatophytid reaction.[9]

TABLE II

MODIFIED ITCH SEVERITY SCALE SCORES OVER TREATMENT PERIOD

Score*	Baseline	3 weeks	3 months
Group 1	8.50 ± 7.66	4.05 ± 1.82	1.90 ± 1.29
Group 2	7.55 ± 1.63	4.95 ± 2.78	2.70 ± 2.67
p†	0.88	0.233	0.239

*Mean ± standard deviation. †Wilcoxon test; group 1 *vs* group 2 at each time point

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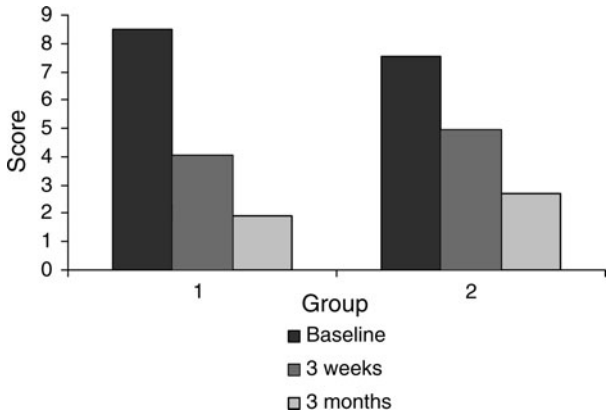

FIG. 1

Modified Itch Severity Scale scores over treatment period for each group, showing a decrease in itching score in both groups.

Primary ear itching constitutes a feeling of itching occurring in the absence of localised or systemic disease, such as diabetes mellitus, hepatic and renal conditions, and lymphoma, leukaemia and other malignancies. There is no underlying cause. Despite repeated warnings by the clinician, infection as a result of local trauma by the patient may still occur.[6] There may be pathogenic microbial colonisation of the external auditory canal in healthy individuals with isolated ear itching.[10,11]

Symptoms are more frequently seen in middle-aged and elderly women. Thus, in our study there were more women (95 per cent) than men. Patients with this condition often cannot obtain relief from their itching despite repeated treatment, and such treatment failure is worrying for both patient and clinician. Previous studies mostly involved patients diagnosed with chronic otitis externa, contact dermatitis and atopic dermatitis.[3,6,12]

The treatment approach for these patients includes diagnosis and control of predisposing factors, such as: increased moisture in the external auditory canal; changes in cerumen pH; presence of foreign objects (e.g. ear plugs and hearing devices); sensitivity to contact allergens (e.g. nickel earrings); trauma caused by objects used for external auditory canal hygiene; congenital or acquired obstruction in the external auditory canal (e.g. exocytosis); and systemic disease (e.g. diabetes mellitus).[13]

Avoidance of allergens is important for the efficacy of treatment. Patients should change any shampoos or hair care products which may cause allergic reactions. These patients should not use hair care products which may induce contact dermatitis due to product colouring, fragrance, or constituent proteins, lanolin, parabens or formaldehydes.[14] Patients must be clearly instructed not to manipulate their external auditory canal.

Many medications are used for the treatment of itching in the external auditory canal. Frequently used medical treatments include asacetic acid 2–4 per cent, topical hydrocortisone, topical triamcinolone, mineral oil, silver nitrate gel and oral antihistamines.[15] Recently, laser treatment has been reported to have better results than classical medical treatment.[16] Some authors have reported satisfactory results with steroid solutions.[17] Although such treatments are successful in some patients, a large number obtain no relief.

Low potency steroids have been reported as an effective treatment method for chronic ear itching. However, long term use of topical corticosteroids is contraindicated, as they cause epidermal thinning and a decrease in microvascularity and keratinocyte numbers.[2]

Pimecrolimus, a new agent, has recently been successfully used in the topical treatment of chronic ear itching.[6,18] It has been shown to be topically effective in the treatment of atopic and non-atopic pruritis.[7] Pimecrolimus should not be used in children who are immunosuppressed or younger than two years. The European Society of Dermatology reported that animal studies of the drug showed no definite proof of an increase in cancer risk.

Very few studies have investigated chronic external auditory canal itching. We believe that one of the biggest shortcomings of the few published studies has been the use of inadequate questionnaires for symptom assessment.[7] Recent studies evaluating pruritus have tended to focus on itch intensity, often overlooking how the symptom is perceived by the patient. This is an important aspect, in light of the subjective nature of itching. In the current study, we aimed to create a detailed itch assessment scale which evaluated the interaction of itching with such factors as daytime incidence, sleep and psychological influences. We compared the efficacy of topical pimecrolimus versus topical hydrocortisone, using a modification of Majeski and colleagues' Itch Severity Scale and scoring method, itself based on an interviewer-administered pruritus assessment method developed by Yosipovitch *et al.*[8,19]

- **Patients with isolated itching of the external auditory canal are frequently encountered by otolaryngologists**
- **Pimecrolimus is a macrolide immunosuppressive agent which has been used successfully in the topical treatment of chronic inflammatory skin diseases**
- **In this study, topical pimecrolimus was more effective than topical hydrocortisone in relieving external auditory canal pruritis**
- **A Modified Itch Severity Scale questionnaire was used for assessment of external auditory canal pruritis severity; this tool was a useful outcome measure**

In our study, there was a statistically significant difference in itch scores, comparing baseline measures with results after three weeks' and three months' treatment, for both the topical pimecrolimus and topical hydrocortisone treatment groups. There was no statistically significant difference in patients' itch scores for topical pimecrolimus versus topical

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steroid treatment. However, there was a trend towards greater patient response to topical pimecrolimus versus topical steroid treatment. Moreover, topical pimecrolimus has far fewer side effects compared with topical steroids.[19]

Conclusion

We recommend use of the Modified Itch Severity Scale, which is, to our knowledge, the first self-reporting questionnaire for the quantification of external auditory canal pruritus severity. This scale is practical, reliable and convenient for clinical use, and may be useful for comparing pruritus severity and treatment efficacy. Difficulties may be encountered in treating external auditory canal pruritus from time to time. Given the epidermal thinning effect of long term topical corticosteroid use, topical pimecrolimus has a great advantage, being of equal efficacy whilst having an incidence of epidermal thining of only 1 per cent.

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Appendix 1. Modified Itch Severity Scale questionnaire for external auditory canal pruritis

(1) For each part of the day, what is the frequency of appearance of the itch? (Please mark with 'X' in the box that corresponds to your answer.)

	Never itchy	Occasionally itchy	Often itchy	Always itchy
Morning				
Noon				
Evening				
Night				

(2) To what extent do each of the following describe the itch?

	Not at all	To a small extent	To a moderate extent	To a great extent
Stinging				
Stabbing				
Burning				
Annoying				
Unbearable				
Worrisome				

(3) Please indicate the intensity of itch for each of the following:

	None	Weak	Moderate	Strong	Very strong
Itch in its average state					
Itch in its worst state					
Itch in its best state					

(4) Please indicate how often any of the following happens:

	Never	Sometimes	Almost always
Difficulty falling asleep due to itch			
Awakening due to itch			
Use of sleep medications			

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(5) Has your mood changed because of the itch? (You may circle more than one answer.)

(a) No change
(b) Depressed
(c) More agitated
(d) Difficulty in concentration
(e) Anxious

Address for correspondence:
Dr Baran Acar,
Department of Otorhinolaryngology,
Kecioren Training and Research Hospital,
Pınarbaşı mahallesi sanatoryum caddesi Ardahan sok no 1,
Keçiören,
06310, Ankara, Turkey.

Fax: +90 312 356 90 22
E-mail: drbaranacar@gmail.com

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