

# Evaluation of Contact Sensitivity in Patients with Isolated Itching of the External Auditory Canal

Baran Acar, MD, Ayse Serap Karadag, MD, Hayriye Karabulut, MD, Mehmet Ali Babademez, MD, Murat Zaim, MD, and Rıza Murat Karasen, MD

**Objective:** This study was designed to demonstrate the frequency of sensitivity to European standard patch test allergens in patients with isolated itching of the external auditory canal (EAC).

**Study Design:** A prospective case-control study.

**Methods:** Fifty-six female patients with the complaint of recurrent EAC itching and 30 female controls without pruritis of the ears were patch-tested with 25 allergens of the European standard series.

**Results:** Twenty-four patients (25.5%) had one or more positive patch test reactions. In 21.4% of patients, nickel sulphate was the most frequent sensitizer, but there was no statistically significant difference in the nickel sensitization rate between patients and controls ( $p > .05$ ). Sensitivity rates were much lower for the other allergens. There was no association between contact sensitivity to fragrances and to preservatives and patients with pruritis of the ears.

**Conclusion:** Our results do not demonstrate that most patients with pruritic ears probably suffer from allergic contact dermatitis.

**Key words:** ear pruritus, itchy ear syndrome, patch test

Isolated itching of the external auditory canal (EAC) is diagnosed in cases in which no etiology, such as diabetes mellitus, hepatic and renal conditions, and lymphoma, leukemia, and other malignancies, can be found. Only a few clinical trials on primary ear itching have been undertaken, although it is the complaint most commonly received by otolaryngologists,<sup>1</sup> mostly from middle-aged and elderly women.<sup>2</sup> There are no so many treatment modalities for relieving itching because of normal EAC examinations. So treatment is unsuccessful in some patients, and pruritus recurs. Some authors have claimed that patients with pruritic ears probably suffer from allergic contact dermatitis (ACD).<sup>1</sup>

The patch test is the gold standard diagnostic tool in the confirmation and diagnosis of ACD.<sup>3</sup> In this study, we sought to determine allergen sensitivity and the frequency

of sensitivity to European standard patch test allergens in patients with isolated itching of the EAC.

## Methods

After obtaining approval from the Institutional Review Board, 56 female patients with recurrent EAC itching and 30 female controls without pruritis of the ears were enrolled in the study.

Exclusion criteria were as follows: (1) the diagnosis of contact dermatitis and other dermatoses; (2) systemic disorders such as atopic dermatitis; (3) otoscopic evidence of a perforated tympanic membrane or other middle ear pathology and fungal or bacterial infection; (4) long-term topical steroid use; and (5) for the control group, otorrhea and ear itching. Patients were asked not to take any influencing drugs, antihistamines, immunosuppressives or systemic corticosteroids for at least 4 weeks before and during testing. The participant was patch-tested with 25 allergens of the European standard series. The allergens were applied with Finn Chambers on Scanpor tape to the upper back of the patients. The strips were removed after 2 days, and the reading was recorded after 30 minutes. The sites were re-examined after 4 days. One dermatologist participated in reading the tests. The results were evaluated according to the standard scoring system recommended by the International Contact Dermatitis Research Group.<sup>4</sup>

Baran Acar, Hayriye Karabulut, Mehmet Ali, Murat Zaim, and Rıza Murat Karasen: Department of Otorhinolaryngology, and Ayse Serap Karadag: Department of Dermatology, Kecioren Training and Research Hospital, Ankara, Turkey.

Address reprint requests to: Baran Acar, MD, Department of Otorhinolaryngology, Kecioren Training and Research Hospital, Pinarbasi mahallesi Sanatoryum caddesi Ardahan sok. no: 1, Kecioren 06310, Ankara, Turkey; e-mail: drbaranacar@gmail.com.

DOI 10.2310/7070.2011.100181

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All statistical analyses were performed with SPSS 15.0 for Windows (SPSS Inc, Chicago, IL). The chi-square test was used for the comparisons. A two-tailed *p* value less than .05 indicated statistical significance.

## Results

Fifty-six patients with the complaint of ear itching and 30 controls without symptoms of pruritus who were evaluated between January 1, 2009, and November 1, 2009, were identified as potential study candidates. Symptoms are more frequently seen in women. Thus, female subjects were enrolled for the purpose of homogenizing the group of subjects in our study.

The patients were from 33 years of age to 45 years of age (mean age  $39.15 \pm 3.41$  years). The average age of the controls was  $39.33 \pm 3.29$  years (range 33–45 years). There were no statistically significant differences between the two groups with respect to age.

Twenty-four patients (25.5%) had one or more positive patch test reactions. The most common allergens were

nickel sulphate (16.3%), potassium dichromate (3.6%), colophony (7.1%), and balsam of Peru (3.6%). Contact sensitivity to potassium dichromate, colophony, and balsam of Peru was noted only in patients. On the other hand, the control group had only contact sensitivity to nickel sulphate. Table 1 shows the distribution of the responsible allergens according to both groups. Although the sensitivity rate for nickel sulphate was higher in the patient group compared to the control group, this difference was statistically insignificant (*p* > .05).

## Discussion

Pruritis of the ears is the symptom of itching without any obvious skin changes other than those induced by scratching, which some authors have termed “itchy ear syndrome.”<sup>5</sup> Isolated itching of the EAC must be distinguished from all other forms of pruritus for which an underlying cause can be ascertained. Pruritus may also be a major manifestation of diabetes mellitus, hepatic and renal conditions, and lymphoma, leukemia, and other

**Table 1.** Distribution of Positive Patch Test Reactions in Controls and Patients

Allergen	Positive Reaction in Controls		Positive Reaction in Patients		p Value
		% (n = 56)		% (n = 56)	
Bufexamac					
Cetyl alcohol					
Dibromodicyanobutane					
Dispersion					
Lylal (hydroxyisohexyl 3-cyclohexene carboxaldehyde)					
Propolis					
P-tert-butylphenol					
Venice turpentine					
Bis-diethyldithiocarbamate-zinc					
Potassium dichromate			2	3.6	NS
Thiuram mix					
Cobalt chloride					
Formaldehyde					
Colophony			4	7.1	NS
Balsam of Peru			2	3.6	NS
N-Isopropyl-N-phenyl-p-phenylenediamine					
Wool alcohols (lanolin alcohols)					
Mercapto mix					
Epoxy resin					
Paraben mix					
Fragrance mix					
Methylchloroisothiazolinone/methylisothiazolinone					
Nickel sulphate	2	6.7	12	21.4	NS
Mercaptobenzothiazole					
Sesquiterpene lactone mix					

NS = not significant.

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4 malignancies. Therefore, it must be emphasized that underlying causes must be actively sought and ruled out in each case. Primer pruritis of the ears appears to have become more common in middle-aged and elderly women. Compulsive scratching may lead to secondary otitis externa of the infective bacterial type.

Most otolaryngologists probably treat pruritic EACs with ear drops containing a keratolytic substance, salicylic acid 2% in alcohol, a low-potency topical steroid.<sup>6</sup> If pruritus interferes with sleep, antihistamines can be helpful. When no cause for itching has been established, treatment remains largely symptomatic, which contributes to treatment failure and recurrence. Treatment failure is worrying for both patients and clinicians. In most patients with essential pruritus, the condition is believed to be ACD in origin.<sup>1</sup> On the basis of this belief, ACD occurs in individuals previously exposed and immunologically sensitized to a particular chemical, such as the contents of hair care products (cocamidopropyl betaine, fragrances, protein, lanolin, parabens, or formaldehyde). Keratinocytes are also activated by haptens to secrete immunomodulatory cytokines. The clinical result is itching and irritation of the skin.

ACD is considered a type IV delayed hypersensitivity reaction in which T lymphocytes are involved. ACD is generally caused by compounds of low molecular weight less than 500 Da (haptens), which combine with protein to form haptens and penetrate the skin. Langerhans cells are prominent antigen-presenting cells of the skin immune system.<sup>7</sup> Langerhans cells are activated by the release of cytokines from activated keratinocytes with antigens. They are capable of stimulating potent T lymphocytes in draining lymph nodes.<sup>8</sup> ACD occurs when sensitized T cells are re-exposed.<sup>9</sup>

5 In our study, 24 patients (25.5%) were found to have one or more positive patch test reactions. Nickel sulphate was the most common allergen in our study (16.3%). The findings are in accordance with the data of most of the recent ACD studies. Nickel sulphate is the most common sensitizer in Europe and North America.<sup>10-12</sup> The high nickel sensitivity rate is explained by early ear piercing. As noted in our results, patients had a higher positivity rate compared to controls. However, because of statistically insignificant differences, the relationship between patients and nickel sensitization is still debatable.

Our study also revealed low-sensitivity rates to preservatives. No positive reactions to the other allergens, such as paraben mix, fragrance mix, and formaldehyde, were observed. On the basis of our results, we can suggest

that contact sensitivity does not play a significant role in the etiology of isolated EAC itching.

## Conclusion

The purpose of this study was to obtain a preliminary evaluation of the etiology of patients with pruritic ears. Patch test results in patients with isolated EAC itching do not support a diagnosis of ACD. We concluded that further histopathologic and psychological studies of patients with pruritus are required, particularly to determinate somatization disorder.

## Acknowledgement

Financial disclosure of authors and reviewers: None reported. 6

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