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Original Research Article

Epidemio-allergological study in 47 patients of allergic contact dermatitis to cosmetic products

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Abstract

Contact dermatitis to cosmetics is a common problem in the general population. Identifying and avoiding the causative allergens can pose a challenge to both the patient and the dermatologist. This study was conducted over a period of two years (January 2010 to January 2012) at the outpatient department of A.J. Institute of Medical Sciences, Mangalore, a tertiary health care centre of Southern Karnataka to detect the various allergens in cosmetic products. Forty seven patients suffering from allergic contact dermatitis to cosmetic products were enrolled in the study. In the present study Male: Female ratio was 1:1.7. Allergens most often responsible for contact dermatitis in a cosmetic user were fragrance mix (36.2%), paraben (23.4%), quaternium-15 (8.5%). The cosmetic products most often implicated in causing allergic contact dermatitis were moisturizers (34%), perfumes and deodorants (29.8%), hair dyes (19.1%) and sunscreen (17%). This study highlights the need for careful choosing of cosmetics so as to avoid its allergic manifestations.

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1. Introduction

Contact dermatitis to cosmetics is a common problem in the general population. Cosmetics have been defined as any preparation applied to the skin, hair or nails for the purpose of cleaning, enhancing appearance, giving a pleasant smell or providing protection. The various products which were included in this study were perfumes, deodorants, moisturizers, sunscreens and hair dyes. Identifying and avoiding the causative allergens can pose a challenge to both the patient and the dermatologist. The cosmetics industry, with the support of the United States Food and

Drug Administration (USFDA) in 1976 established an expert panel to review the toxicology of more than 4000 ingredients used in cosmetics. Upto this time, about 1200 cosmetic ingredients have been reviewed, with almost 110 certified as safe for cosmetic use, about 100 with insufficient data and 9 deemed unsafe.¹

2. Materials and methods

Forty seven patients suffering from allergic contact dermatitis to cosmetic products were enrolled in the study over a period of two years (January 2010 to January 2012) at the outpatient

dermatology department of A.J. Institute of Medical Sciences, Mangalore, India. All the patients were subjected to detailed history taking, clinical examination and patch testing for diagnosis. Relevant laboratory investigations were done. Informed written consent in patient's own language was taken before the patch testing. Positive results were obtained with the Indian standard battery series.

3. Results

In the period of two years, 47 patients were enrolled in the study on the basis of positive patch test results. Of whom 30 patients were females

and 17 patients were males. Male: Female ratio was 1:1.7. Allergens most often responsible for contact dermatitis in a cosmetic user were fragrance mix (36.2%), paraben (23.4%), quaternium-15 (8.5%) as illustrated in Table 1. Among the active or category-specific ingredients, positive patch test results were seen with paraphenylenediamine (hair dyes) and balsum of Peru (perfumes and deodorants). Positive results were obtained with the Indian standard battery series. The cosmetic products most often implicated in causing allergic contact dermatitis were moisturizers (34%), perfumes and deodorants (29.8%), hair dyes (19.1%) and sunscreen (17%) as depicted in Table 2.

Table 1: Percentage of patients showing positive patch test to different allergens present in cosmetics

Allergens	No. of patients (positive patch test)	Percentage
Fragrance mix	17	36.2%
Paraben	11	23.4%
Quaternium-15	4	8.5%
Balsum of Peru	6	12.8%
Paraphenylenediamine	9	19.1%
Total	47	100%

The “para” groups include para-amino benzoic acid (PABA), whose esters form local anaesthetics and paraphenylenediamine (PPDA), used in hair dyes. Rudzki and Kleniewska point out that some authorities include the paraben in the “para” groups.² Paraben allergy is most common when exposure occurs on damaged

skin.³ The parabens are rated second only to water as the ingredient most commonly used in cosmetic formulation.⁴ As a general rule, “leave-on” products such as moisturizers and make up are safe for closed patch testing, whereas “rinse-off” products may frequently irritate. A German survey confirms this strategy.⁵

Table 2: Percentage of patients showing contact allergy to various cosmetic products

Cosmetic products	No. of patients (contact allergy)	%
Moisturizers	16	34.0
Perfumes & deodorants	14	29.8
Hair dyes	9	19.1
Sunscreen	8	17.0

Among moisturizers and sunscreen, common allergens found were fragrance mix, quaternium-15 and paraben. Among perfumes and deodorants, common allergens found were balsum of Peru and fragrance mix. Among hair dye, common allergen found was paraphenylenediamine.

4. Discussion

In this study 47 patients suffering from allergic contact dermatitis to cosmetic products were enrolled. In the present study Male:Female ratio was 1: 1.7. Laguna et al. in their study reported Male:Female ratio to be 1:5.3.⁶ Duarte and Campos-Lage found 87% female patients in their private practice with complaints of reaction to cosmetics.⁷ Kohl et al. reported 300 patients with cosmetic ingredient allergy.⁸ They found positive patch tests to fragrances in 54% and preservatives in 32% of patients. de Groot et al. from Netherlands identified 119 patients with contact allergy to cosmetic products.⁹ The majority of reactions were due to preservatives (32%) and fragrances (27%). In the present study positive patch test to fragrances was 36.2% and to preservatives was 31.9%.

The North American Contact Dermatitis Group in 1985 reported 713 patients with presumed reactions to cosmetics or skin care products.¹⁰ Fragrance, preservatives (quaternium-15, imidazolidinyl urea and parabens), paraphenylenediamine and glyceryl monothioglycolate were the most common identified allergic sensitizers in the descending order of frequency.¹⁰ Whereas in the present study, 17 patients reacted to fragrance mix and 11 patients reacted to paraben. The reactions, due to fragrance, may or may not be triggered by light.¹¹

In the present study, the most common allergen implicated was fragrance mix (36.2%) and most common cosmetic product causing allergic contact dermatitis was moisturizers (34%). The

vast majority of cases of allergy to hair dyes are caused by PPDA. It was introduced in the 1880s and has been problematic ever since.^{12,13} Rastogi et al. have noted that after dyeing procedures, significant amount of unconsumed allergic components remain.¹⁴ Broeckx in Belgium reported 7.2% of more than 5000 patients reactive to PPDA.¹⁵ PPDA allergy can be a significant occupational problem or hair dressers. One report showed an astounding 58% incidence of allergy among hair dressers.¹⁶ In this present study hair dye allergy was found in 19.1% patients.

Several patients have been reported who experienced immediate hypersensitivity reactions to PPDA and this spectrum of reactions to hair dyes should now be considered as a diagnostic possibility in appropriate patients.¹⁷ In the present study, positive patch test to quaternium-15 was found in 8.5% of patients. This quaternary ammonium compound presents in a roll-on deodorant has produced an allergic axillary dermatitis.¹⁸ Parker and Taylor studied 89 patients allergic to Quaternium 15 over a 5 year period.¹⁹ They found neither atopy nor gender had any bearing on Quaternium allergy. Wohrl et al. in 2001 reported balsum of Peru as allergen in 5.4% of patients with contact allergy to cosmetics.²⁰ In the present study, positive patch test result to balsam of Peru is 12.8%.

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