COSMETICS AND THE ETIOLOGY OF CONTACT DERMATITIS

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Cosmetics are a frequent cause for skin inflammations nowadays. They cause allergic or irritant contact dermatitis, as well as contact urticaria. Amidst the variety of daily used cosmetics, the most frequent allergens are hair dye, fragrances, shampoos or other toiletries, hair perm chemicals. The most frequent irritators are detergents or hair dye. The precise solution of the etiopathogenesis of the contact dermatitis, caused by cosmetics, is of vital importance for an well-grounded preventive strategy for both domestic and occupational conditions. The research covers 150 patients with contact dermatitis (allergic and irritant) and contact urticaria. The etiology was established with the help of: medical history, dynamic clinical observation, indoor epicutaneous tests (the chamber test). Of all the tested patients, 89 had allergic contact dermatitis, 52 had irritant contact dermatitis, and 9 - contact urticaria. With the allergic contact dermatitis, the most frequent cause was detergents (30.98%), followed by paraphenylenediamine (23.57%), hair perm chemicals (14.63%), Paraben Mix (9.75%). With the irritant contact dermatitis, the etiological cause was pre-dominantly the detergent (80.76%) and paraphenylenediamine (19.28%).

Key words: allergic contact dermatitis, contact urticaria, cosmetics, toiletries, irritant contact dermatitis.

Cosmetics are a frequent cause for contact dermatitis (CD) nowadays (34), provoking various skin reactions: allergic contact dermatitis (ACD) or irritant contact dermatitis (ICD), and contact urticaria (CU). Amidst the variety of the daily used cosmetics, the most frequent allergens are hair dye (4,14,18), fragrances (1,33), shampoos, soaps or other toiletries (4), hair perm chemicals (31,33), and the most frequent irritators – detergents (10,11,17), hair dye (26). The cosmetics most often cause domestic CD, but they can cause occupational CD, mainly among hairdressers (8,28,31). The hairdressers suffer occupational exposure both to the allergenic and irritating effects of cosmetics (35); in addition they are exposed to respiratory sensitization (20) or to additional allergization to cosmetics when nickel allergy is involved (21).

There are a number of hazards for the development of domestic ICD (22) or occupational ICD (17): daily contact with detergents and water of the skin, occlusion (17), atopy – in 20% of the hairdressers (20). Besides the link between ACD and ICD is complicated (9): the skin irritation and the ICD damage the skin surface barrier against the access and penetration of allergic substances (24). Atopy is also a factor predisposing for ACD (24).

MATERIALS AND METHODS

The research covers 150 patients with CD, observed and tested for a period of three years at the Clinic of Dermatology and Venerology – Varna. Out of them, 89 patients were with ACD, 52 – with ICD, and 9 – with CU. The etiopathogenetic clarification of each case relied on: de-

tailed medical history (to determine the link of the clinical acuteness with the effect of the cosmetic item), the dynamic clinical observation (toward professional cosmetic effect) and the allergic tests through the method of the covered epicutaneous tests (the chamber method). Substances included in the standard row (20 allergens) were used and other substances selected according to the concrete data of the patients (various cosmetic products). Samples from the epicutaneous tests were taken on the 48th hour from the moment of their administration.

The interpretation of the positive epicutaneous tests for ACD included also a comparison with the medical history and clinical data. The epicutaneous diagnostics of ICD was based on the clinical picture, medical history, observation in dynamics, exclusion of the positive epicutaneous samples.

RESULTS AND DISCUSSION

With all the tested patients with CD the etiological cause was established. Their distribution according to etiological and pathogenetic diagnosis was the following (Table 1): ACD was diagnosed in 89 patients (59.3%) of all the tested, ICD – in 52 patients (34.6%) and allergic contact urticaria – in 9 patients (6.0%).

The analysis of the received 123 positive skin samples with cosmetics in patients with ACD and CU show the following distribution (table 2): greater etiological significance for the appearance of ACD have detergents (30.89%), paraphenylenediamine (23.57%), hair perm chemicals (14.63%), preservatives (9.75%), followed by fragrances

(7.31%), formaldehyde (8.94%) and Peruvian Balsam (4.87%).

The distribution of the irritant etiological causes in patients with ICD was the following (Table 3): a very high frequency was shown by detergents (80.76%), followed by Paraphenylenediamine (19.23%).

With 15 patients of all the tested (10%) the occupational nature of the CD was established –11 patients with ACD and 4 patients with ICD. In this case the occupational noxae were limited within the sphere of detergents, hair dye and hair perm chemicals.

Table 1. Distribution of patients with contact dermatitis caused by cosmetics according to clinical and pathogenetic diagnoses (n=150)

Diagnosis	Total Number of Patients	%	Number of patients with positive epicutaneous samples	%
Allergic Contact Dermatitis	89	59.3	89	90.8
Irritant Contact Dermatitis	52	34.6		
Contact Urticaria	9	6.0	9	9.2
Total	150	100	98	100

The results for contact sensitization to detergents correlate with the data in literature (4,17,35). The detergents as irritants cause more problems. They cause itching, temporary reddening, skin tension even before particular clinical manifestations (7); they can cause irritant dermatitis and especially occupationally they can cause susceptibility to sensitization (28). On the other hand, it is known that the critical limitation of the surfactants, as well as additives in detergents can reduce their irritant potential considerably (2), which is a perspective for the use of mild detergents as cocamidopropyl betaine and lauryl glycosides in the composition of washing cosmetic products. Yet even mild soaps are likely to possess a certain irritant potential (22). The detergents for women's hygiene are also determined as potential irritants (11).

Paraphenylenediamine in the hair dye is described in literature as a very frequent cause of domestic ACD (4,14,18), as well as a cause for occupational ACD (16). Conde-Salazar (1995) states that 45% of the positive skin samples of this allergen are found among hair-dressers, Spoor (1974) points out that 70% are occupational and domestic. The hair dye causes CU (3), even CU associated with ACD by Paraphenylenediamine (8). The results of the research are analogical to the data in literature. It should be remembered that Paraphenylenediamine can cause photo-allergic reaction (32), which required the inclusion of photo-protectors

in the hair dye in the contemporary cosmetic industry. Hair dye is less likely to cause irritant effect on the skin (26).

Table 2. Etiology of the Allergic Contact Dermatitis caused by cosmetics (123 positive epicutaneous samples)

Allergens	Positive epicutaneous samples	%
Paraphenylenediamine - hair dyes	29	23.57
Parfum Mix - shampoos, creams, lotions, make-up, toilet water, balsams, hair gels	9	7.31
Paraben Mix - shampoos, creams, lotions, make-up, toilet water, balsams, hair gels	12	9.75
Formaldehyde - shampoos, body lotions, moisturizers	11	8.94
Peruvian Balsam - face creams, moisturizers	6	4.87
Detergents - shampoos, soaps, intimate hygiene products, liquid soaps, hair dye, hair conditioners	38	30.89
Perm Chemical	18	14.63
Total	123	100

The results for ACD by hair perm products are lower than those in literature – 20% (31). The sensitization to those cosmetic products is of high frequency (4, 33), as glycerylmonothioglycat is described as allergen, and ammoniumthioglycat – as irritant (31).

The group of fragrances Parfum Mix, contained in almost all cosmetic products is basically allergizing and show considerable frequency with ACD (4), from 6.8% to 19.9% (3). In medicinal and natural cosmetics, fragrances cause ACD extremely often in children (19).

Table 3. Etiology of the Irritant Contact Dermatitis caused by cosmetics in 52 patients

Irritants	Number of patients with established irritant agent	%
Paraphenylenediamine - hair dyes	10	19.23
Detergents - shampoos, shower gels, intimate hygiene products, liquid soaps	42	80.76
Total	52	100

The preservatives (Parabel Mix), existing in all cosmetic products, cause mainly sensibilizing effect on the skin and they most often cause ACD (4), especially the phenoxyethanol (23). Fragrances, as well as preservatives, contained in the photo-protective products can cause also a photo-allergic reaction (4).

The formaldehyde is contained in the formula of various shampoos, body lotions, moisturizing cosmetics and also causes ACD (1). There are described cases of co-reaction between glutaraldehyde (a disinfectant) and formaldehyde (27), which requires that this connection be searched in the etiological clarification of cases with sensibilization to formaldehyde.

The sensibilization index of the Peruvian balsam is comparatively low – 5% (3), which correlates with the research results and explains its limited use in the contemporary cosmetic industry.

CONCLUSIONS

In the etiology of domestic and occupational ACD, of vital importance are detergents, hair dye, hair perm chemicals and fragrances, and with ICD – the cosmetics found in detergents, and hair dye.

The precise solution of the etiopathogenesis of the CD caused by cosmetics during domestic or occupational contact is of vital importance for a well-grounded prophylactic strategy for every individual case and for a particular circle of hazardous professions.

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