

Evaluation of Suspected Cosmetic Induced Facial Dermatoses with the Use of Indian Standard Series and Cosmetic Series Patch Test

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ABSTRACT

Introduction: Awareness about skin beauty or cosmetic elegance has received worldwide attention in the present day youth oriented society. Along with careful detailed history and thorough examination patch test is considered cornerstone in diagnosis of allergic contact dermatitis.

Materials and Methods: Fifty patients suspected clinical diagnosis of contact facial dermatitis due to attended the Department of Dermatology, were included in a hospital based study. The patch test was applied on the upper back of using 32 allergens present in Indian cosmetic series and 20 known allergens in Indian standard battery series procured from Systopic Pharmaceutical Ltd, after applying the patch test, the patient was asked to come after 48h and 72h for reading the results of the patch test.

Results: Out of 50 patients there were 32 (64%) females

(housewives 36%) patients and 18 (36%) male (farmers 12%). Itching was the most common presenting symptom in 39 patients (78%) least was hypopigmentation and pain in 2%. Forehead was the most common site of involvement in 25 patients (50%) least were cheeks in 15 patients (30%). Erythema was the commonest morphological presentation seen in 36 patients (72%). Hair dye was suspected in maximum number of patients that is 13 (26%). Most common antigen showing patch test positivity was paraphenylenediamine in nine patients (18%). There are significantly more chances of developing positive test reaction with Indian standard series compared to cosmetic series. ($p=.0053$ using Fischer Exact test).

Conclusion: In India there is no legislation regarding labeling ingredients on cosmetics as in the western countries, so labelling of the contents of cosmetic products should be the main challenge in cosmetic dermatitis is to identify.

Keywords: Allergens, Erythema, Hypopigmentation

INTRODUCTION

Awareness about skin beauty or cosmetic elegance has received worldwide attention in the present day youth oriented society. A recent study found that an average adult uses nine cosmetic products daily. More than 25% of women use 15 or more cosmetic products daily [1].

Food and Drug Administration defines "cosmetic" as an article intended to be rubbed, poured, sprinkled, sprayed on, introduced into or otherwise applied to the human body for cleansing, beautifying, promoting attractiveness, or altering the appearance [2]. Severe adverse effects caused by cosmetics are infrequent compared to their widespread use. However, mild reactions such as itching, pricking and dryness can occur in more than 10% of adult population [3].

Along with careful detailed history and thorough examination patch test is considered cornerstone in diagnosis of allergic contact dermatitis. Along with the allergens it is foremost to include patient's personal cosmetics for patch test. Repeated open application test (ROAT) and usage test are also valuable in the diagnosis of cosmetic dermatitis [4].

AIMS AND OBJECTIVES

To find out the suspected allergens causing cosmetic induced facial dermatoses with the use of Indian Standard Series and Cosmetic Series Patch Test.

MATERIALS AND METHODS

Fifty patients aged more than 16 y of suspected clinical diagnosis of contact facial dermatitis due to cosmetic products who attended the Department of Dermatology, Shri Ram Murti Smarak Institute of Medical Sciences, Bhojipura, Bareilly, India, between May

2012 to April 2013 were included in a hospital based study depending on inclusion and exclusion criteria's as mentioned below. All the patients included in this study who were willing to undergo patch test and regular follow up are included in the study after taking informed consent. Patients with any systemic allergic disease or connective tissue disease and who were on systemic corticosteroids equivalent to 20 mg or more of oral prednisolone or any other immunosuppressive drug or applying potent topical steroids in preceeding 14 days were excluded from the study.

The patch test was applied on the upper back of the all the 50 patients enrolled in this study using 32 allergens present in Indian cosmetic series and 20 known allergens in Indian standard battery series procured from Systopic Pharmaceutical Ltd, approved by Contact and Occupational Forum Of India (CODFI) after taking informed consent [Table/Fig-1]. After applying the patch test, the patient was asked to come after 48h and 72h for reading the results of the patch test. In case of any doubtful reactions, patients were advised to return on fifth day. Out of 50 patients there were 32 (64%) female patients and 18 (36%) male patients. Results obtained were analysed statistically.

RESULTS

Out of 50 patients there were 32 (64%) female patients and 18 (36%) male patients. The age of patient ranged between 16 to 78 y with mean age of 47 y. Occupation wise most of the females were housewives (36%) while most of the males were farmers (12%) followed by skilled workers (10%). Out of 50 patients 21 (42%) belonged to urban region and 29 (58%) belonged to rural region. Itching was the most common presenting symptom in 39 patients (78%) followed by features were redness (52%), burning (40%), hyperpigmentation (38%), swelling (12%), hypopigmentation and

COSMETIC SERIES			
S.NO.	ALLERGENS	CONCENTRATION	VEHICLE
1.	Vaseline	100%	Petrolatum
2.	Ethylenediamine	1%	Petrolatum
3.	Benzyl Alcohol	1%	Petrolatum
4.	Benzyl Salicylate	2%	Petrolatum
5.	Bronopol	0.30%	Petrolatum
6.	Butyl Hydr. Anisole	2%	Petrolatum
7.	Butyl Hydr. Toluene	2%	Petrolatum
8.	Cetyl Alcohol	5%	Petrolatum
9.	Chloroacetamide	0.20%	Petrolatum
10.	Geranium Oil	2%	Petrolatum
11.	2-Hydr.,4-Meth, Benzene	2%	Petrolatum
12.	2(2-Hydr.), 5-Meth, Benzotriazole	1%	Petrolatum
13.	Idazolidinylurea (Germall 115)	2%	Petrolatum
14.	Isopropyl Myristate	20%	Petrolatum
15.	Jasmine Absolute	20%	Petrolatum
16.	Lavender Absolute	2%	Petrolatum
17.	Musk Mix	5%	Petrolatum
18.	Phenyl Salicylate	1%	Petrolatum
19.	Polyoxyethylene Sorbate Oleate (Tween 80)	2%	Petrolatum
20.	Rose Oil	2%	Petrolatum
21.	Sorbiton Sesquio (Arlacel 83)	2%	Petrolatum
22.	Thimerosal	0.10%	Petrolatum
23.	Triclosan	2%	Petrolatum
24.	Triethanolamine	2%	Petrolatum
25.	Vanillin	2%	Petrolatum
26.	Cetrimide	0.50%	Petrolatum
27.	Hexamine	2%	Petrolatum
28.	Chlorhexidine Digluconate	0.5%	Petrolatum
29.	Diazolidinylurea (Germall 11)	2%	Petrolatum
30.	Propylene Glycol	5%	Petrolatum
31.	Kathon Cg	1.3%	Petrolatum
32.	Sorbic Acid	2%	Petrolatum
Indian Standard Series			
S.NO.	ALLERGEN	CONCENTRATION	VEHICLE
1.	Vaseline	100%	Petrolatum
2.	Wool alcohol (lanolin)	30%	Petrolatum
3.	Balsam of peru	10%	Petrolatum
4.	Formaldehyde	2%	Petrolatum
5.	Mercatobenzothiazole	1%	Petrolatum
6.	Potassium dichromate	0.1%	Petrolatum
7.	Nickel sulphate	5%	Petrolatum
8.	Cobalt sulphate	5%	Petrolatum
9.	Colophony	10%	Petrolatum
10.	Epoxy resin	1%	Petrolatum
11.	Parabens mix	9%	Petrolatum
12.	Paraphenylene diamine	1%	Petrolatum

13.	Parthenium	15%	Petrolatum
14.	Neomycin sulphate	20%	Petrolatum
15.	Benzocaine	5%	Petrolatum
16.	Chlorocresol	1%	Petrolatum
17.	Fragrance mix	8%	Petrolatum
18.	Thiuram mix	1%	Petrolatum
19.	Nitrofurazone	1%	Petrolatum
20.	Black rubber mix	0.6%	Petrolatum

[Table/Fig-1]: List of allergens tested

pain in 2%. Forehead was the most common site of involvement in 25 patients (50%), closely followed by periorbital region in 19 patients (38%) and cheeks in 15 patients (30%).

Erythema was the commonest morphological presentation seen in 36 patients (72%) followed by scaling in 30 patients (60%), hyperpigmentation in 23 patients (46%), papules in 14 patients (28%), hypopigmentation, plaque and pustule in one patient each.

Hair dye was suspected in maximum number of patients i.e. 13 (26%) and moisturizing facial cream was suspected in 11 (22%). Other cosmetics suspected were fairness cream in 5 (10%), aloe vera and aftershave lotion and eye lens solution in 4 (8%), eyedrops in 3 (6%), mehendi, sticker bindi, hair oil and lip gloss in 2 (4%) patients each and antiseptic solution, shaving cream, perfumes, eye-shadow, surma and sindoor in 1 patient each.

Positive patch tests to suspected cosmetics were also seen. Most common suspected cosmetic to show patch test positivity was hair dye in 9 patients (18%) followed by aftershave lotion in 3 patients (6%), fairness cream, contact lens solution and lip gloss in 2 patients (4%) each Sticker bindi, perfume and eye shadow in 1 patient (2%) each [Table/Fig-2].

Most common antigen showing patch test positivity was paraphenylenediamine in 9 patients (18%) followed by nickel sulphate and thimerosal in 8 patients each (16%), fragrance mix in 5 patients (10%), triethanolamine in 4 patients (8%), parthenium, cetrimide and musk mix in 3 patients (6%) each, paraben mix, wool alcohol, lavender absolute, perubalsam and neomycin sulphate in 2 patients

Suspected cosmetics	Females	Per centage (%)	Males	Per centage (%)	Total	Per centage (%)
Hair dye	2	4	7	14	9	18
Aftershave lotion	0	0	3	6	3	6
Contact lens solution	2	4	0	0	2	4
Fairness cream	1	2	1	2	2	4
Lip gloss	2	4	0	0	2	4
Sticker bindi	1	2	0	0	1	2
Perfume	1	2	0	0	1	2
Eye shadow	1	2	0	0	1	2

[Table/Fig-2]: Patch test positivity to suspected cosmetics

(4%) each. Cobalt sulphate, nitrofurazone, bronopol, isopropyl myristate, phenyl salicylate, hexamine, propylene glycol and sorbic acid in 1 patient (2%) each [Table/Fig-3].

Patch test positivity was seen in 88% patients. Patch test was positive for one antigen in 60% patients, two antigens in 22% and three or more antigens in 6%. Paraphenylenediamine positivity was significantly associated with male gender ($p=0.0069$ using Fischer Exact test) but similar gender association could not be identified with other allergens.

Suspected cosmetics	Females	Percentage (%)	Males	Percentage (%)	Total	Percentage (%)
Paraphenyline diamine	2	4	7	14	9	18
Thimerosal	7	14	1	2	8	16
Nickel sulphate	7	14	1	2	8	16
Fragrance mix	2	4	3	6	5	10
Triethanolamine	2	4	2	4	4	8
Parthenium	0	0	3	6	3	6
Cetrimide	1	2	2	4	3	6
Musk mix	2	4	1	2	3	6
Paraben mix		2	1	2	2	4
Wool alcohol	2	4	0	0	2	4
Lavender absolute	2	4	0	0	2	4
Perubalsam	2	4	0	0	2	4
Neomycin sulphate	1	2	1	2	2	4
Cobalt sulphate	1	2	0	0	1	2
Nitrofurazone	1	2	0	0	1	2
Bronopol	1	2	0	0	1	2
Isopropyl myristate	1	2	0	0	1	2
Phenyl salicylate	1	2	0	0	1	2
Hexamine	1	2	0	0	1	2

[Table/Fig-3]: Positive patch test to ingredients

Out of 1000 patch tests from Indian standard series, 35 patches were positive while out of 1600 patches from cosmetic series 27 patches were positive. This difference in positivity between these two series was analysed statistically showed that there are significantly more chances of developing positive test reaction with Indian standard series compared to cosmetic series. ($p=.0053$ using Fischer Exact test).

DISCUSSION

The incidence of dermatitis due to cosmetics is increasing because of greater products use [5]. The standard series and cosmetic series can detect more than 80% of the allergens responsible for the cosmetic induced allergic contact dermatitis [6].

In our study most of the females were housewives (36%) while most of the males were farmers (12%) followed by skilled workers (10%). These findings are not similar to study done by Thappa et al., [7] while other studies done earlier reported similar results [8,9].

In the present study 58% patients were from rural areas whereas in other studies urban patients were higher constituting 83.30% and 75% respectively [8,9]. The reason for this demographic change may be the maximum number of patients coming to our hospital from rural region.

Itching was the most common (78%) presenting complaints among our patients which was slightly higher than in other studies [8,9] due to acute or subacute presentation of our cases. Head and neck was the most common (50%) site of involvement which was similar as in other studies [8,10].

In our study hair dye was suspected in maximum number of patients (26%) which was less followed by facial creams (22%) which was more as compared to other study [11].

In present study patch tested the highest number of ingredients (fifty-two) and a large range of cosmetics found positivity in 92% patients which was higher than other studies [8,11,12] which tested lesser number of ingredients and cosmetics.

Patch test positivity to, ingredients alone was seen in 50%, both cosmetics and ingredients in 38% patients and cosmetics alone in 4% which was similar to study done earlier [9]. We found Paraphenylenediamine to be a most common allergen which matches with the study done earlier [9]. Even Patel et al., have showed an upward linear trend in paraphenylenediamine patch test positivity over a period of six years from 1999 to 2004 [13]. Paraphenylenediamine has been identified as the main allergen in reactions to henna based preparations. This might act as a potential source of sensitization to other paraphenylenediamine containing hair preparations [14].

Thimerosal antiseptic and preservative showed patch test positivity in 16% patients in present study as also mentioned by Kumar and Paulose [15]. Vaccination is the possible cause of sensitization in early childhood so relevance of positive patch test need to be evaluated carefully but in our study thimerosal showed positive patch test in a patient of sticker bindi dermatitis which is not clinically relevant as told by Thappa and Nath [7].

Nickelsulphate hexahydrate was positive in 16% patients which match with the study done earlier [11]. Nickel is not listed as ingredients of cosmetics so its presence probably results from contamination in manufacture [16] this result alarms towards the high level of contamination in available cosmetics. Fragrance mix was positive in 10% patients in present study similar results were also reported in few other studies done earlier [10,15].

In present study cetrimide was positive in 6% patients almost similar to the study done in which the reason for these higher findings may be irritant reactions produced by cetrimide and these patients were suspected to be allergic to aftershave lotion and moisturizing facial cream [17].

CONCLUSION

The main challenge in cosmetic dermatitis is to identify the allergen as numbers of cosmetics are being used by the patient serially or simultaneously. Patch testing in this study identified whether or not the patient had contact hypersensitivity to a component. Therefore, we believe patch test plays a role in identifying and removing the allergen from patient's environment at an early stage and thus prevents chronicity of the condition. Also, in India there is no legislation regarding labeling ingredients on cosmetics as in the western countries, so labelling of the contents of cosmetic products should be the main challenge in cosmetic dermatitis is to identify the allergen as numbers of cosmetics are being used by the patient serially or simultaneously.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Apr 21, 2014**
Date of Peer Review: **Nov 12, 2014**
Date of Acceptance: **Jan 12, 2015**
Date of Publishing: **Mar 01, 2015**