IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 9 Ver. 8 (September. 2018), PP 14-19
www.iosrjournals.org

Clinico-Etiological Study of Contact Dermatitis Due To Cosmetics

Dr Kumara Harsha, DrYatendraSingh Chahar,
DrPramodKumar Singh
Corresponding Author:Drkumaraiharsha

Abstract
AIM- To study the prevalence and various clinical presentations of contact dermatitis due to cosmetics and also to specify the ingredients in cosmetics causing contact dermatitis by patch testing.
*METHODS- All clinically suspected cases of contact dermatitis due to cosmetics, attending the Out Patient Department of Dermatology, Venreology and Leprosy, S.N. Medical College, Agra from March 2016 to March 2017 constituted the subject material for this study i.e a total of 136 patients but 44 patients didn't give consent for patch test, and 4 patients didn't come for follow-up, so finally **88 patients** were included in the study.*
RESULT AND CONCLUSION-

- *136 cases were suspected to have contact dermatitis due to cosmetics out of 1620 patients who attended the contact dermatitis clinic of our department from march 2016 to march 2017 giving a relative prevalence of 8.39%.*
- *Female preponderance was seen with Maximum no. of cases (42.05%) were in 30-39 year age group. The most common type of adverse reaction to cosmetics seen in patients was allergic contact dermatitis in 45.45% . The other less common reactions were hyperpigmentation in 29.54% (26 cases), irritant contact dermatitis in 11.36% (10 cases), depigmentation in 11.36% (10 cases), contact urticaria in 9.09% (8 cases).*
- *PPD was the most common antigen showing positive patch test result in 28% cases, followed by neomycin sulfate and Para Tertiary Butyl Phenol.*
- *Most common cause of cosmetic dermatitis due to cosmetics was hair dye in 38.63% , followed by facial creams, sindhoor ,lipstick, nail cosmetics,stickerbindis, fragrances, mascara, and hair removal cream in the following order of frequency.*

Keywords:*Cosmetics, contact dermatitis, patch test*

Date of Submission: 06-09-2018 Date of acceptance: 21-09-2018

I. Introduction

The cosmetics are substances or mixtures of substances for application to external surfaces of the human body such as skin surface, hair, lips, teeth, or mucosa of the oral cavity with the only or principle aim of cleaning, perfuming, or modifying its appearance, and/ or masking body odors.One of the major concerns with use of cosmetics today is risk of developing contact dermatitis.The incidence of dermatitis from - cosmetics depends upon the degree of - sensitivity influenced by potency ,amount, and - persistence of allergen, duration of exposure and its irritant properties. Since all cosmetics - and toiletries have to be protected against bacteriological contamination and decomposition and since most consumers require their cosmetics to smell nice, there are potentially sensitizing preservatives and fragrances in most cosmetics.

The prevalence of contact allergy is rising worldwide. Substances that are responsible for contact dermatitis can be irritant, as chemical or physical agents that causes irritant contact dermatitis , or sensitizers, which causes a tissue inflammation damage with allergic mechanism (allergic contact dermatitis). We reviewed cases of allergic contact dermatitis to cosmetics diagnosed in our dermatology department over a period of one year with a view to assess the role of commonly used cosmetics in causing adverse reactions by clinical evaluation and subjecting them to patch testing.

The use of cosmetics and skin care products for grooming of both men and women has seen tremendous rise in the world over in the last few years. Fairness creams/ lotions are perhaps the most commonly used cosmetics for daily use particularly in India. But currently there is lack of information regarding its adverse effects and its clinical spectrum. Therefore the current study is planned to find out the prevalence, determinants and clinical spectrum of contact dermatitis due to cosmetics in patients of contact dermatitis visiting dermatology outpatient department of tertiary care hospital.

II. Literature Survey

Dogra, Minocha and Kaur in 2003 observed the incidence of contact allergic dermatitis to be 3.3% with various cosmetics used by the patient. Multiple sensitivities were seen with various cosmetics and their ingredients in few cases. The most common type of adverse reaction to cosmetics seen in their patients was contact allergic dermatitis in 59.2% mainly to hair dyes, shaving creams, and lipsticks. Photoallergic dermatitis was seen in 35%, only to hair dyes and lipsticks. PPD is found dermatitis was seen in 35%, only to hair dyes and lipsticks. PPD is found to be a very strong sensitizer and a common contact allergen in hair dyes, in 35-42% of cases.

Amiyakumarnath et al.(2007) Seventy-one patients with various types of cosmetic dermatoses were seen. Mean age of the patients was 42.9 years with female to male ratio of 1.6:1. *Kumkum* alone was the responsible cosmetic product in 41 patients (57.7%). Sticker *bindi* alone was incriminated in eight patients (11.3%), *kumkum* and sticker *bindi* both in five patients (7%), hair dye in eight patients (11.3%), lightening creams in four patients (5.6%) and after-shave (11.3%), lightening creams in four patients (5.6%) and after-shave lotion, nail polish, moisturizing cream, tilak and toothpaste in one patient each.

Another study by Silva EA et al, (2012) was aimed at finding the frequency of sensitization to cosmetics components in patients with suspected allergic contact dermatitis and to identifying main sensitizers related to occupational contact dermatitis. Among the 147 patients studied sensitization to cosmetics components occurred in 31.29% of the cases, 14 0f those (19.18%) equally corresponding to butylatedhydroxytoluene and triethanolamide substances, 13 (17.81%) to ammonium thioglycolate, 9 (12.33%) to sorbic acid, 8 (10.95%) to tosilamide, 6 (8.22%) to germall. The other elements tested showed indices of 5% or less. A higher frequency of contact dermatitis to cosmetics was observed in women and the age mostly affected was concordant with the age range of greatest proffesional activity of the population.

III. Methods

All clinically suspected cases of contact dermatitis due to cosmetics, attending the Out Patient Department of Dermatology, Venreology and Leprosy, S.N. Medical College, Agra from March 2016 to March 2017 constituted the subject material for this study i.e a total of 136 patients but 44 patients didn't give consent for patch test, and 4 patients didn't come for follow-up, so finally **88 patients** were included in the study.

Selection of patients

Inclusion criteria

1. Patients having contact dermatitis due to cosmetic products.
2. Patients willing to give written informed consent and follow study related procedures.

Exclusion criteria

1. Patients with contact dermatitis due to known reasons other than cosmetics.
2. Patients with concomitant serious clinical illness.
3. Pregnant or lactating females
4. Patients who are on systemic corticosteroids equivalent to 20 mg of oral prednisolone or any other immunosuppressive drugs or applying potent topical corticosteroids in the preceeding 14 days.

Method of patch test

Patch test was done as per the guidelines of '**Contact and Occupational Dermatoses Forum of India'**[27] **(**as explained in review of literature)

Antigens used

Patch testing was performed with Finn Chamber with cosmetic tray containing 32 basic ingredients provided by Systopic Laboratories, New Delhi, few separate antigens purchased separately and few cosmetics were used as such:

Table No :1 Cosmetic series ingredients

Sr	Compounds	Conc (%)	Vehicle
1	Vaseline	100	Petrolatum
2	Ethylenediamine	1	Petrolatum
3	Benzyl alcohol	1	Petrolatum
4	Benzyl salicylate	2	Petrolatum
5	Bronopol	0.25	Petrolatum
6	Butyl Hydroxy Anisole (BHA)	2	Petrolatum
7	Butyl HydroxyToluence (BHT)	2	Petrolatum
8	Cetyl Alcohol	5	Petrolatum
9	Chloroacetamide		Petrolatum

10	Geranium oil	2	Petrolatum
11	2- Hydr – 4 Meth. Bethbenz	2	Petrolatum
12	2(2- Hydr -5 Meth Benzotriazole)	1	Petrolatum
13	Imidazolidinylurea (Germall 115)	2	Petrolatum
14	Isopropyl Myristate	20	Petrolatum
15	Jassmine absolute	2	Petrolatum
16	Lavender absolute	2	Petrolatum
17	Musk mix	2	Petrolatum
18	Phenyl salicylate		Petrolatum
19	Polyoxyethylenesooleate (Tween 80)	2	Petrolatum
20	Rose oil	2	Petrolatum
21	Sorbitansesquio	2	Petrolatum
22	Thiomersal	0.1	Petrolatum
23	Triclosan	2	Petrolatum
24	Triethanolamine	2	Petrolatum
25	Vanilin	10	Petrolatum
26	Cetrimide	0.5	Petrolatum
27	Hexamine	2	Petrolatum
28	ChlorhexidineDigluxonate	0.5	Petrolatum
29	Diazolidinylurea (Germall II)	2	Petrolatum
30	Propylene Glycol	5	Petrolatum
31	Kathon CG	1.3	Petrolatum
32	Sorbic Acid	2	Petrolatum

Table No 3:Individual Antigens used

Sr	Compounds	Conc (%)	Vehicle
1	Para phenylenediamine	1	Petrolatum
2	Para tertiary butyl phenol	1	
3	Formaldehyde	2	aqua
4	Neomycin sulfate	20	Petrolatum

Table No 4:The following cosmetics and the particular brand used by the patient were included for patch testing:

1. Hair dye • Godrej hair dye • Nupurmehendi	**3.Nail polish** • Lakme • Blue Heaven • Nail polish remover
2.Kumkum • Sindoor powder • Liquid sindoor	**4.Eye makeup** • Blue Heaven mascara
1. Lipstick • Elle 18 lipstick	**6.Facial cream** • Betnovate • Skin lite
2. Veet hair removal cream	

Procedure employed for patch testing

The protocol established by the ICDRG and CODFI was used (as mentioned before in review of literature) .Aluminium patch chambers were filled three fourths with antigens and were separated and placed on back and numbered in order of antigens applied.

Time of reading

Patients were called 48 hours after application of patches. Reading was taken after 45 minutes of removing the patches (to avoid missing weak reactions and avoiding the skin depressions). Later these sites were marked with skin marker with numbering on one side of the chambers and patient was called 24 hours later for a second reading (i.e after 72 hours of application of patches). In case where doubtful or irritant reactions were suspected patient was again called after 24 hours (i.e after 96 hours of application of patches).

Recording of results

The patch tested sites were examined carefully and changes were graded as according to criteria laid by ICDRG:

GRADING OF REACTION	REACTION SEEN ON PATCH TEST SITE
?	Doubtful reaction :faintmacular erythema only
+	Weak (non vesicular) positive reaction: erythema with papules
++	Strong (vesicular) positive reaction: erythema, infiltration, papules

	with vesicles
+++	Exreme positive reaction: vesicles with ulceration and edema
-	Negative reaction
IR	Irritant reaction of different types

IV. Result

Out of 1620 clinically suspected cases of contact dermatitis who attended the Out Patient Department of Dermatology, Venreology and Leprosy, S.N. Medical College, Agra during the study period, 136 of the cases were suspected to have contact dermatitis due to use of cosmetics on clinical grounds giving a relative prevalence of 8.39%.

Table 1. Distribution according to age

Age groups	No.	%
10 to19 yrs	4	4.55
20-29 yrs	22	25.00
30-39 yrs	37	42.05
40-49 yrs	18	20.45
≥50	7	7.95
Total	88	100.00

The youngest patient was 18 years old and oldest was 60 years old with a mean age of 34.69 (with standard deviation of +/- 9.367) . Maximum number of cases i.e 67.05% of cases belonged to 20-39 years of age group with peak incidence (42.05%) in 30-39 years followed by (25.00%) in 20-29 years.

Table 3. Distribution according to sex

Sex	No.	%
Male	19	21.59
Female	69	78.41
Total	88	100.00

More than three fourth of the cases were females, as it is obvious that use of cosmetics is more among females.Most common cosmetic used among both female and male is the use of hair dye.

Table 4. Rural and urban distribution of patients

	No.	%
Rural	23	26.14
Urban	65	73.86
Total	88	100.00

Almost three-fourth of the patients belonged to cities and urban areas as the use of cosmetic products is more among people residing in urban areas. Also they are more aware regarding their health problems and thus visit more frequently to access health care facilities.

Table 5.Educational profile of patients

Education status	No.	%
Illiterate	18	20.45
Secondary	38	43.18
Graduate or above	32	36.36
Total	88	100.00

Most of our patients 79.54% had completed their high school and were educated.

Presenting complaints and lesions seen

An array of lesions due to contact dermatitis to cosmetics, were seen as mentioned in the table 6.

Table 6. Presenting Complaints due to cosmetics

Complaints	Bindi	Sindoor	Hair dye	Lipstick	Mascara	Nail cosmetics	Hair removal cream	Fragrance	Facial cream	Total	% out of 88
Hyper pigmentation	4	3	6	6				1	6	26	29.54
Depigmentation	2	6		2						10	11.36
Erythema	1	1	22		2	2	1	4	6	39	44.31
Edema			4							4	4.54
Hypopigmentation			2							2	2.27
Vesicular eruption			2							2	2.27
Itching		1	15			4		5	10	35	39.77
Nail breakage						2				2	2.27

Though more than one kind of lesions and complaints were present in many patients, the most common complaint observed was erythema (44.31%), followed by itching (39.77%) and hyperpigmentation (29.54%).

Table 10: Type of adverse reaction to cosmetics

	Bindi	Sindoor	Hair dye	Lips tick	Mas cara	Nail cosm etics	Hair remova l cream	Fragr ance	Facial cream	Total	% outof 88
Hyper pigmentation	4	3	6	6				1	6	26	29.54
Depigmentation	2	6		2						10	11.36
ACD	3	3	20	2		2	1	3	6	40	45.45
ICD			6			4				10	11.36
Hypopigmentation			2							2	2.27
Contact urticaria			4		2			2		8	9.09
Nail breakage						2				2	2.27

Contact dermatitis due to cosmetics is on the rise nowadays and cases are increasing day by day. An Goosens et al. reported trends in frequency of cosmetic dermatitis over five year periods that is 15.5% in 1990-1994, 16.7% in 1995-1999, 19.5% in 2000-2004, 21.8% in 2005-2009 and 25.1% in 2010-2014. In our study 136 patients were clinically suspected to have contact dermatitis due to cosmetics out of 1620 patients of contact dermatitis i.e prevalence of 8.39% was seen.

V.Discussion

Contact dermatitis due to cosmetics is predominantly seen in females. The reason is quite obvious that cosmetics are used far more commonly by females as compared to males. In our study only 19 patients were male and 69 patients were females.Laguna C et al also observed that that out of 202 patients having contact dermatitis due to cosmetics 170 were women and 32 were men.Silva EA et al. also observed higher frequency of contact dermatitis to cosmetics in women.

Age group most commonly effected by cosmetic dermatitis in our study was 20-39 years of age group with a mean age of 34.69.This distribution is very obvious as people in this age group are more concerned about their looks. Amiyakumarnath et al.reported that of seventy-one patients with various types of cosmetic dermatoses mean age of the patients was 42.9 years with female to male ratio of 1.6:1.

Use of cosmetics is tremendously increasing in cities and urban areas. A Dogra et al. observed that cases residing in urban area showed more positivity (83.80%) as compared to rural area (16.19%). It was more in working women specially beauticians, nurses and para-medical workers followed by housewives/girls, students etc.Almost same was the case in our study too as 73.86% of patients resided in city and 26.14% were villagers or of suburban areas.Same holds true for educational status also as it was seen that even the literate ones use cosmetics uncautiously.

A Dogra et al. reported that the most common type of adverse reaction to cosmetics seen in the patients was allergic contact dermatitis in 59.2% (29/49 cases).The other less common reactions were irritant contact dermatitis (15 cases),hyperpigmentation (8 cases), hypopigmentation (6 cases), contact urticaria(5 cases),etc. Almost similar pattern was observed in our study, allergic contact dermatitis in 45.45% (40/88 cases), hyperpigmentation in 29.54% (26 cases), irritant contact dermatitis in 11.36% (10 cases), depigmentation in 11.36% (10 cases), contact urticaria in 9.09% (8 cases).

Depending upon the type of cosmetics used and site of application various types of lesions and complaints were encountered. Though more than one kind of lesions and complaints were present in many patients, the most common complaint observed was erythema (44.31%), followed by itching (39.77%) and hyperpigmentation (29.54%).Edema and papulovesicular eruptions were also seen in few patients using hair dyes.These types of reactions have been reported in the past by many authors like Wen hung chung et al , Mc Fadden J P et al . Onder et al also reported a case of a 38-year-old female teacher who developed a severe angioedema of her eyelids, face scalp and tongue with in hours of using a commercial product of henna, which she applied on her hair.

Rook(1998) estimated that 1-3% of the population is allergic to a cosmetic on their ingredients whereas De Groot (1987) reported 3.4% positive patch tests (67/1781) with patients own cosmetic products. According to A Dogra et al. out of 2065 patches applied, positive results were obtained in 3.2% (66/2065) patches with various antigens in standard cosmetic kit and 3.3% (69/2065) patches with various cosmetics. In our study, Out of 3184 patches applied, positive results was obtained in 1.5% (48/3184) patches with various antigens used and 0.75% (24/3184) patches with various cosmetics.

PPD is a very strong sensitizer and a common allergen showing positive patch test result in our study. Pasricha has shown positive patch test with PPD in 42% cases (61/144) and 40% (57/144) with hair dyes.Dogra et al showed 35% sensitivity with PPD in hair dyes. In our study, out of 34 patients suspected to have contact dermatitis due to hair dyes, 58.82% (20/34 cases) showed positive patch test result to PPD while 47% (16/34 cases) showed positive patch test result with commercial hair dye preparation.

In our study out of 20 patients who were positive for PPD,9 patients gave +3 and +2 reactions combined reaction on patch test i.e 45%.In a larger study conducted by A. Schnuch et al , altogether 83989 patients were patch tested with 1% PPD in petrolatum during the study period, with 3518 positive results. Out of these positive reactions 30.2% were +3 and 32.3% were +2 reactions.

Neomycin sulfate appears to be next common allergen showing positive patch test result in our study.Out of 72 positive patch test result, 5 cases showed positive result with neomycin sulfate i.e, 6.9%.Ak Bajaj et al showed 7% positivity with neomycin out of all allergens tested.Neomycin is an antibacterial that is commonly found in combination with topical corticosteroids.Non prescription availability of this combination in India, is commonly used by women for cosmetic purpose.

Para tertiary butyl phenol showed positive result in 3.4% (3/72 positive patch test result). PTBP is a phenol formaldehyde resin that is mainly used as adhesive in sticker bindis. Out of 7 patients suspected to have contact dermatitis to bindi, 3 patients showed positive patch test result with PTBP.Thus a strong causal association was present between PTBP and bindis.

In our study most common preservatives showing positive patch test result were propylene glycol in 4% (3/72), thiomersal in 2.7% (2/72), kathon CG (methylchloroisothiazolinone) in 2.7% (2/72) and formaldehyde in 1.3% (1/72). Sumitkar et al.[43]Thiomerosol, used extensively as preservative in United States was found to be the commonest sensitizer.

Among cosmetic products used as such maximum positive results were obtained with commercial hair dye preparation in 18% (13/72), commercial preparation of so called 'natural henna' sold commonly in the market (nupurmehndi), was seen in 4% (3/72), commercially available sindhoor in 4% (3/72), nail polish in 2.7% (2/72), lipstick in 1.3% (1/72) and hair removal cream in 1.3% (1/72).

According to Pasricha, most common cause of contact dermatitis due to cosmetics in India is hair dye.Mehta et al [44]suspected sticker bindi, hair dye and face creams to be the most common causes in that order of frequency.Kumar et al reported face creams as the most common (30%) cause of cosmetic dermatitis, followed by hair dye (16%) and soaps(14%).In our study hair dye was the most common cause of cosmetic dermatoses in 38.63% (34/88 cases), followed by facial creams in 13.63% (12/88 cases), sindhoor in 11.36% (10/88 cases),lipstick in 9% (8/88 cases), nail cosmetics in 9%(8/88 cases), sticker bindis in 7.95% (7/88 cases), fragrances in 5.68%(5/88 cases), mascara in 2.27% (2/88 cases), and hair removal cream in 1.13% (1/88 case).

VI.Conclusion

Based on the data observed in present study with 136 patients of contact dermatitis due to cosmetics, out of which 88 underwent patch test, it can be concluded that:

1. A relative prevalence of 8.39% is found among 1600 patients of contact dermatitis who attended the outpatient department.
2. Peak incidence was noted in 30-39 years of age group and overall female preponderance was seen (78%).
3. Most common presenting complaints were erythema, itching and hyperpigmentation.
4. PPD was the most common antigen showing positive patch test result in 28% cases, followed by neomycin sulfate and PTBP.
5. Most common cause of cosmetic dermatitis due to cosmetics was hair dye in 38.63% , followed by facial creams, sindhoor ,lipstick, nail cosmetics,stickerbindis, fragrances, mascara, and hair removal cream in the following order of frequency.

Drkumariharsha, "Clinico-Etiological Study of Contact Dermatitis Due To Cosmetics"IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 9, 2018, pp14-19.