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Original Research Article

Clinical correlation of patch testing in suspected Allergic Contact Dermatitis

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Abstract

Allergic contact dermatitis (ACD) is the classic presentation of delayed type hypersensitivity response to exogenous agents. Rapid urbanization, westernization of lifestyles, poor quality of objects available and extremely relaxed vigilance on adherence to 'product safety guidelines' make any developing country like India highly susceptible to allergic contact dermatitis (ACD). ACD affects social, occupational and psychological performance of an individual and adds to the morbidity. It accounts for 20% of the occupational dermatoses encountered in clinical practice. This was a prospective descriptive study conducted at Department of dermatology at Dr. D. Y. Patil Hospital, Kolhapur from August 2012 to July 2014. This study was conducted to identify the various presentations of ACD and to correlate the patch test results with the clinically suspected allergen. An attempt was also be made to identify the most common allergen in the study population.

Keywords: Allergy, dermatitis, hypersensitivity.

1. Introduction

Allergic contact dermatitis (ACD) is the classic presentation of delayed type hypersensitivity response to exogenous agents.[1] Rapid urbanization, westernization of lifestyles, poor quality of objects available and extremely relaxed vigilance on adherence to 'product safety guidelines' make any developing country like India highly susceptible to allergic contact dermatitis (ACD).[2] ACD affects social, occupational and psychological performance of an individual and adds to the morbidity. It accounts for 20% of the occupational dermatoses encountered in clinical practice.[3] The best treatment for ACD is avoidance of further exposure to the initiating allergen. This makes the identification of the allergen important. Patch test remains the standard test for the diagnosis and identification of ACD.[4] This study was conducted to identify the various presentations of ACD and to correlate the patch test results with the clinically suspected allergen. An attempt was also be made to identify the most common allergen in the study population.

2. Materials and methods

This was a prospective descriptive study conducted at Department of dermatology at Dr. D. Y. Patil Hospital, Kolhapur from August 2012 to July 2014. The study was conducted with aim to correlate the patch test results with the clinical presentation in allergic contact dermatitis, and, to find out commonest allergen in the study population. All patients of Allergic Contact Dermatitis (ACD) diagnosed clinically, from 5 to 65 years of age, of both sexes, who were willing to undergo patch test, were included in study. Patients on long term oral steroids or other immunosuppressive agents for other diseases, patients with systemic allergies, patients having history of anaphylaxis and pregnant and lactating women were excluded from the study. The Study was initiated after approval from Institutional Ethical Committee (IEC). Written informed consent as per National Accreditation Board for Hospitals & Healthcare (NABH) norms was taken from each patient. A detailed history regarding the

occupation of individual, onset of ACD, total duration, aggravating and relieving factors were documented. All the patients were subjected to general, physical and cutaneous examinations. The sites, number, distribution of lesions and type of presentation was recorded. The patients were treated during the acute stage of the disease. Patients were taken up for patch test after the active lesions subsided. Patients were patch tested with the Indian Standard Patch Test Battery approved by the Contact & Occupational Dermatosis Forum of India (CODFI) and procured from Systopic Pvt. Ltd., New Delhi. Patches were removed after 2 days i.e. after 48 hr. The readings were taken 45 minutes to 1 hour after removal of patches. The second reading was taken at the end of 96hrs, after the skin was are left open for 24 hrs. The results were graded using the International Contact Dermatitis Research Group (ICDRG) standard for recording of patch test.

3. Results

A total of 100 cases of Allergic Contact Dermatitis were diagnosed and treated in the department of dermatology during August 2012 to July 2014. Maximum number of people who had Allergic Contact Dermatitis belonged to the age group of 21-30 years. The minimum age being 8 years and maximum being 65 years.**(Table 1)** The percentage of males 59 % (n=59) involved was more than the females 41% (n=41). Analysis of the occupation showed that the groups most commonly affected were housewives 22(22%) and unskilled workers 22(22%). **(Table 2)** The most common site that was involved was Hands 15.7% (n=28) and it was followed by Forehead in 13.4% (n=24) patients. **(Table 3)** Out of the 100 patients who underwent patch test, 63 showed Positive Reactions at the end of 48 hours. Maximum positive results (44%) were Weak positive Reactions, graded according to the ICDRG criteria.**(Table 4)** 31 % (n=31) patients were affected by one allergen while 61 % (n=61) patients were affected by more than one allergen. Parthenium 14.6% (n=23) was the most common allergen followed by Nickel sulphate 13.3% (n=21). **(Table 5)** 68% (n=68) patients there was correlation between clinical evaluation and patch test results. **(Table 6)**

Table 1: Age distribution of patients with ACD

Age distribution	Frequency	Percentage
0-10	2	2%
11-20	9	9%
21-30	28	28%
31-40	23	23%
41-50	18	18%
51-60	15	15%
61-70	4	4%
Total	100	100%

Table 2: Occupation of patients with ACD

Occupation	Frequency	Percentage
Housewife	22	22%
Farmer	21	21%
Student	10	10%
Priest	4	4%
Labourer	8	8%
Skilled Workers*	9	9%
Unskilled Workers**	22	22%
Others***	4	4%
Total	100	100%

*Skilled workers: Engineers, Banker, Teacher, Architect, and Businessman.
**Unskilled workers: Maid, Carpenter, Sweeper, Driver, Welder, Vendor.
***Others: Jeweller, Shopkeepers & chef.

Table 3: Sites commonly affected by ACD

Sites of involvement	Frequency	Percentage
Scalp	8	4.5%
Forehead	24	13.4%
Eyes	1	0.6%
Ears	8	4.5 %
Face	20	11.2%
Neck	21	11.8%
Upper extremities	20	11.2%
Hands	28	15.7%
Chest	2	1.2%
Abdomen	14	7.8%
Back	1	0.6%
Lower extremities	16	8.9%
Feet	16	8.9%
Total	179	100%

Table 4: Patch test readings after 48 hours & 96 hours of application of allergens

ICDGR Criteria*	48 hrs. reading (first reading)		96 hrs reading (second reading)	
	Frequency	%	Frequency	%
No reaction	19	19%	8	8%
Doubtful reaction	18	18%	15	15%
Weak positive reaction	44	44%	45	45%
Strong positive reaction	19	19%	29	29%
Extreme positive reaction	0	0%	3	3%
Total	100	100%	100	100%

*(ICDRG) International Contact Dermatitis Research Group

Table 5: Commonest allergens responsible for ACD

Allergen	Frequency	Percentage
Vaseline	0	0%
Wool alcohol	2	1.3%
Balsam of Peru	8	5.1%
Formaldehyde	12	7.6%
MBT	7	4.4%
Potassium dichromate	9	5.7%
Nickel sulphate	21	13.3%
Cobalt sulphate	12	7.6%
Colophony	10	6.3%
Epoxy resins	4	2.5%
PPD	13	8.2%
Parthenium	23	14.6%
Neomycin sulphate	4	2.5%
Benzocaine	0	0%
Chlorocresol	11	6.9%
Fragrance mix	11	6.9%
Thiuram mix	2	1.3%
Black rubber mix	3	1.9%
Nitrofurazon	4	2.5%
Paraben mix	2	1.3%
Total	158	100%

Table 6: Clinical correlation of ACD with patch test results

Correlation	Frequency	Percentage
Yes	68	68%
No	32	32%
Total	100	100%

4. Discussion

Maximum number of patients who had allergic contact dermatitis belonged to the age group of 21-30 years while minimum number of patients belonged to 0- 10 years age group. Though ACD is less common in children, it is not due to the influence of age or capacity for sensitisation but probably due to lack of exposure. The number of reports of allergic contact dermatitis in children is increasing.[5] Sarma *et al* in his study showed that Age had no significant role on the prevalence of ACD.[2] There are controversies regarding the role of age on the prevalence of allergy. Studies have shown a positive as well as an inverse relationship between age and the total prevalence of allergy.[6] As regards to gender, the male predominance noticed in our study could be due to the increased risk of exposure to allergens in their working environment. Studies in the past on sex prevalence have shown varying results, with male[7] and female[8] dominance. Occupation wise, unskilled workers 49% (n=49) were most commonly affected by ACD. This was followed by housewives in 22% (n=22). Regular exposure to low concentrations of detergents results in sensitization and development of ACD in a substantial proportion of individuals.[9]

As regards to site affected, in the present study, commonest affected site was Hands followed by Forehead (Kumkum dermatitis). This was followed by Neck, Face, Lower extremities and Feet (Parthenium dermatitis). A study of patch test results in kumkum dermatitis showed that commonest positive allergic reaction was to thimerosal (18/25, 72%), followed by gallate mix (12/25, 48%), Paraphenylenediamine, Kathon CG, benzotriazol, tert-butyl hydroquinone and parabens.[10] In the current study, most of the patients who had a kumkum dermatitis showed negative patch test results. This may be because the traditionally recognized allergens in kumkum are absent in standard series. Few patients showed a positive test result to fragrance mix. We observed maximum patients had weak positive reactions. 19 patients showed negative reaction at the end of 48 hours (Day 3) while 8 were negative at the end of 96 hours (Day 5). PPD is known for its ability to cause active sensitization during patch test and late reactions as late as day 7 or 9.[10] But we did not encounter any significant late reactions to PPD.

As regards to allergen, Parthenium 14.6% (n=23) was the most common allergen followed by Nickel sulphate 13.3% (n=21), PPD 8.2% (n=13) Formaldehyde and Cobalt sulphate 7.6% (n=12) each, followed by Chlorocresol 6.9% (n=11) and Fragrance mix 6.9% (n=11). Sharma V K *et al*[11] have reported airborne dermatitis due to parthenium as the leading pattern of ACD. However Bajaj *et al*[12] observed that parthenium dermatitis was under-represented in their study, in spite of being the commonest cause seen in the clinic. In present study, Nickel sulphate was found to be the predominant allergen among females. This was also observed in prior studies with almost 85% (109 out of 129) of nickel-positive patients being women.[12] In the present study, 68% (n=68) patients had clinical correlation with patch tests results. Imran Majid's recent study showed that Clinical relevance was seen in majority of the cases (37 out of 45).[8]

This study highlights importance of patch testing in investigation of patients with suspected allergic contact dermatitis. Cosmetics being common allergens should be used in patch testing.

References

[1]. Hassan I, Anwar P *et al*. Comparison of dermatoses seen in community health camps and a tertiary care centre in Kashmir. *Indian J Dermatol Venereol Leprol*.2014;80:214-20.

[2]. Sarma N, Ghosh S. Clinico-allergological pattern of allergic contact dermatitis among 70 Indian children.

Indian J Dermatol Venereol Leprol 2010;76:38-44.

[3]. Goh CL. An epidemiological comparison between occupational and non-occupational hand eczema. *Br J Dermatol* 1989; 120(1): 77-82.

[4]. Marks JG Jr, Belsito DV, DeLeo VA *et al*; North American Contact Dermatitis Group patch test results 1998-2000. *American Journal of Contact Dermatitis* 2003;14(2): 59-62.

[5]. Bourke J., Coulson I. Guidelines for the management of contact dermatitis:an update.British Association of Dermatologists. *British Journal of Dermatology*. 2009: 160: 946–954.

[6]. Wohrl S, Hemmer W, Focke M, Gotz M, Jarisch R. Patch testing in children, adults and the elderly: Influence of age and sex on the sensitization patterns. *Pediatr Dermatol* 2003;20:119-23.

[7]. Leyden, J. J. and Kligman, A. M. Allergic contact dermatitis: Sex differences. *Contact Dermatitis* 2006; 3: 333–336.

[8]. Imran Majid. Contact allergens in Kashmiri population: Results from a 6years patch testing experience in 550 patients. *Indian Journal of Dermatology, Venerology and Leprology.* 2014:80:1:62-63.

[9]. Austoria AJ, Lakshmi C, Srinivas CR, Anand CV, Mathew AC. Irritancy potential of 17 detergents used commonly by the Indian household. *Indian J Dermatol Venereol Leprol* 2010;76:249-53.

[10]. Nath AK, Thappa DM. Kumkum-induced dermatitis: an analysis of 46 cases. *Clin Exp Dermatol* 2007; 32(4):385-7.

[11]. Sharma VK, Sethuraman G, Garg T, Verma KK, Ramam M. Patch testing with the Indian standard series in New Delhi. *Contact Dermatitis* 2004; 51: 319-21.

[12]. Bajaj AK , Saraswat A, Mukhija G, Rastogi S, Yadav S. Patch test experience with 1000 patients. *Indain J Dermatol Venerol Leprol* 2007; 73(5): 313-318.