

Original Research Article

Clinical profile of patients with allergic contact dermatitis attending tertiary care hospital

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ABSTRACT

Background: Contact dermatitis is an inflammatory response of the skin to various antigens and irritants. It accounts for a formidable proportion of dermatological consultations. It is associated with significant morbidity, and it is one of the most common reasons for workmen's compensation claims for skin diseases.

Methods: The methodology included detailed history especially of potential sensitizers in the environment, occupation, hobbies, any contact with external application of cosmetics, drugs, ointments. Emphases on past history were recorded regarding the mode of presentation, progression, medication taken and their effect on allergic contact dermatitis.

Results: Allergic contact dermatitis due to *Parthenium hysterophorus* accounts for 80 (64%) cases, allergic contact dermatitis due to wearing apparel and jewellery accounts for 21 (16.8%) cases, due to topical medicaments 10 (8%), allergic contact dermatitis due to cosmetics and occupational (professional) antigen constituting 7 (5.6%) each.

Conclusions: The most common and important mode of contact is from the pollen or dried leaf fragments flying in the air which settles on the skin, clothes and induces allergy which is known as Air borne contact dermatitis, this is more common in men, outdoor professions or those who spent more time in outdoor including freersters, labourers, engineers, sports person, hunters, gardeners and farmers.

Keywords: *Parthenium hysterophorus*, Contact dermatitis, Allergic

INTRODUCTION

A hundred years ago, the present day life man lives would have been unimaginable. In search of satisfying his basic needs man has made progress in leaps and bounds over the past few decades. Progress and enhancements of our scientific knowledge has enabled us to discover newer molecules, synthesize newer compounds and produce new hybrids and complexes, the result of this is that man is exposed to newer antigens and as the number of these increases day by day their complex interaction with the environment as well as man

lead to a fascinating group of newer disorders clubbed together under "contact dermatitis".^{1,2}

Contact dermatitis is an inflammatory response of the skin to various antigens and irritants. It accounts for a formidable proportion of dermatological consultations. It accounts for a formidable proportion of dermatological consultations. It is associated with significant morbidity, and it is one of the most common reasons for workmen's compensation claims for skin diseases. The cost of medical care, the compensation to individuals both from industries and governmental agencies, the incalculable

loss of time, job and productivity human sufferings, social distress are all problems in relation to contact dermatitis.³

The eczematous skin allows the greater penetration of the topical agents and this may be the reason for the development of multiple contact sensitivities. The patient in order to get rid of the troublesome pruritic eczema, try various topical agents in his own or consults many doctors. The continuous application of various topical agents on the diseased skin is apt to produce the contact allergy to that particular agent and the application of some agents is likely to aggravate the persisting eczema, instead of alleviating it.⁴

The incidence of contact dermatitis varies widely from country to country, time to time depending upon the occupation, habits, immediate environment of the patients or populations. Potential sensitizers will give positive reactions in all countries though their ranking may vary example Neomycin is a common sensitizer all over the world, in India nitrofurazone is the commonest. Among the plants they varies from country to country and depends upon the local flora, i.e. poison-ivy and poison-oak dermatitis is very common in North America, *Primulaobconica* is common in Europe and plant *Parthenium hysterophorus* dermatitis has assumed epidemic proportions all over India.^{5,6}

At present patch testing is one of the greatest tool available to the dermatologist, which is a simple *in vivo* test to detect the contact sensitivity or the delayed type of hypersensitivity (DTH) to a given substance. The detailed history and patch testing with suspected allergen, it is possible to find out the offending agent responsible for the contact dermatitis, helpful in the prognosis as well as management of the patient.⁷

Hyderabad, Karnataka area has seen development both industrially as well as population wise which is ideal to study the effect of various contact allergens on hitherto virgin population. Also the increase in affluence of the society, more consumer products are being bought and used including cosmetics perfumes, dyes etc. which have resulted in a rise in the number of patients of contact dermatitis. Hence the study is undertaken to study the clinical profile of allergic contact dermatitis in HK Area.

METHODS

This study was undertaken for a period of three years (January 2013–January 2016) at Bidar, Gulbarga attending the dermatology OPD of Bidar Rural Institute of Medical Sciences, Khaja Banda Nawaz Teaching and General Hospital and those who were hospitalized.

Inclusion criteria

Inclusion criteria was age less than 40 years

Exclusion criteria

Exclusion criteria were seriously ill patients; patients not willing to participate in this study.

The methodology included detailed history especially of potential sensitizers in the environment, occupation, hobbies, any contact with external application of cosmetics, drugs, ointments. Emphases on past history were recorded regarding the mode of presentation, progression, medication taken and their effect on allergic contact dermatitis.

After selecting the patient suspected to have allergic contact dermatitis the findings were recorded in the proforma which also includes the systemic examination of CVS, CNS, GIT and respiratory system to study systemic correlation if any. Investigation were done which included Hb%, TLC, DLC, urine routine and microscopic examination, patch testing and other special investigations if required. The patient was subjected to patch testing after the acute stage has subsided and the patient was on no therapy with topical or systemic steroids prior to patch testing.

The procedure of the patch testing was standard procedure outlined by international contact dermatitis research group and North American contact dermatitis group. The standard test tray and ready-made patches used in the study include the allergens in the syringes supplied by Creative Drugs Ltd, Mumbai containing twenty antigens. In addition to above suspected contactants such as cosmetics, chemicals and others are tested according to the history of the patient.

The upper back was the site for patch testing in all cases the patches were placed on grossly normal, non-hairy skin. The patches were applied in vertical rows with a gap of four centimetres in between to avoid contamination. A record of the antigens applied on various patches and the patches were numbered.

Statistical analysis

Data were presented in terms of proportions, mean and standard deviation (SD).

RESULTS

The present study comprised of 125 cases of clinically suspected allergic contact dermatitis (ACD). The diagnosis was done from detailed history especially of potential sensitizers in the environment, occupation and hobbies. Emphasis on past history was recorded regarding mode of presentation, progression and treatment taken. These patients were subjected to patch testing with the standard allergens available and also with the suspected allergens according to the history of the patients.

Table 1: Age distribution of allergic contact dermatitis in 125 cases.

Sr. No.	Age group (years)	No. of patients
1	0-9	0
2	10-19	7
3	20-29	33
4	30-39	24
5	40-49	23
6	50-59	16
7	60-69	15
8	70 and above	7
	Total	125

It was seen that increased incidence of allergic contact dermatitis was found in the age group of 20-49 yrs. The total number of patients were 80 (64%) out of 125 in the above age group.

Table 2: Sex distribution of allergic contact dermatitis in 125 cases.

Sr. No.	Age group (years)	Male	Female	Total
1	0-9	0	0	0
2	10-19	1	6	7
3	20-29	13	20	33
4	30-39	21	3	24
5	40-49	17	6	23
6	50-59	13	3	16
7	60-69	15	0	15
8	70 and above	7	0	7
	Total	87	38	125

It was also seen that 87 (69.6%) patients were male and (30.4%) patients were female out of 125 cases and M:F ratio was 2.3:1. Though the incidence of allergic contact dermatitis occur at any age group, our study shows no incidence of allergic contact dermatitis in the age group of 0-9 yrs. and only 5.6% after the age of 70.

Table 3: Causative allergen in order of frequency in 125 cases.

Group	No. of cases	%
ACD due to plant- <i>Parthenium hysterophorus</i>	80	64
ACD due to wearing apparel and jewellery	21	16.8
ACD due to topical medicaments	10	8
ACD due to cosmetics	7	5.6
ACD due to occupational antigens	7	5.6

It is found that allergic contact dermatitis due to *Parthenium hysterophorus* accounts for 80 (64%) cases, allergic contact dermatitis due to wearing apparel and

jewellery accounts for 21 (16.8%) cases, due to topical medicaments 10 (8%), allergic contact dermatitis due to cosmetics and occupational (professional) antigen constituting 7 (5.6%) each. The classification of the antigens 9 is a formidable problem and the classification is done based on the circumstances under which the individual get exposed to these antigens or substances.

Table 4: Clinical patterns of allergic contact dermatitis due to parthenium hysterophorus.

Clinical patterns	No. of cases	%
Air-born contact dermatitis	55	68.75
Phytophoto dermatitis	16	20
Exfoliative dermatitis	8	10
Localised (hands)	1	1.25
Total	80	100

The clinical pattern of allergic contact dermatitis due to *Parthenium hysterophorus* was of air born contact dermatitis in 55 (68.75%), phytophotodermatitis in 16 (20%), manifested in exfoliative dermatitis 8 in 8 (10%) and was localized involving only the hands in 1 (1.25%).

Table 5: Correlation between suspected phyterophours allergen and OTS confirmation after patch testing.

Total no. of cases	Patch test	Photo patch test	+ve patch test results
80	64	16	60

The incidence of *Parthenium* dermatitis in 125 cases was 80(64%). The *Parthenium hysterophorus* antigen obtained from 1% water extract of leaf, flowers are subjected to patch testing in which standard occlusion patch test was done in 64 cases and photopatch test was done in 16 cases, the positivity with the patch test was found in 60 (75%).

Table 6: Correlation between suspected antigen as per clinical data and confirmation by patch testing due to wearing apparel and jewellery.

Antigen	No. of cases	Tested	Positive
Nickel-spectacle-1			
Ear ring-8	11	11	6
Wrist watch-1			
Neck lace-1			
Footwear-			
Leather-1	9	9	4
(contact vitiligo)+			
Others-8			
Rubber-1	1	1	1

The incidence of 21 (16.8%) of 125 cases of contact dermatitis were caused by wearing apparel and jewellery

that the incidence of nickel sensitivity was found in 11 cases, the footwear dermatitis in 10 cases. In that 9 cases due to leather and 1 case due to rubber. The source of sensitization for nickel was due to the earrings in 8 cases and from wrist watch, spectacle frame and necklace all 1 case each. The patch test positivity was noted in 6 (54.5%) due to nickel. The scrappings (leather) from the source was cut into fine pieces and are wet with water, then was subjected to standard occlusion patch test, the patch test positivity was noted in 4 (44.4%).

DISCUSSION

Results of the peak age incidence of the present study comparison favors with the study reported by Baruah and Ratansingh i.e. incidence of 57% in the series of 434 cases of contact dermatitis has been noted in the age group of 20-49 yrs.⁸

The plant *Parthenium* dermatitis is noted in many parts of the world, French on 1930 from USA reported the first case of skin hypersensitivity to *Parthenium hysterophorus* in a retired physician from Texas. The plant was spotted for the first time in Pune in 1956, with the import of selected cereal grains from USA and Canada which were cultivated in the farm plots of agricultural college at Pune for experimental purpose. The spread of the plant from here to different parts of Maharashtra and other parts of the country is attributed to the Panshet floods of 1961 which had washed away all grains from the godown in its vicinity. The main areas affected include: Pune, rest of Maharashtra, Bangalore, Hyderabad, UP, Delhi, MP, Haryana. The increase incidence of *Parthenium*-dermatitis in Pune is due to the abundant growth and increased awareness of dermatitis caused by it. There also appears to be geographical variation in the incidence of dermatitis in Argentina, Mexico and West Indies despite being very common in these countries. In contrast it is a major cause of weed dermatitis in Texas and Minnesota.⁹

The most common and important mode of contact is from the pollen or dried leaf fragments flying in the air which settles on the skin, clothes and induces allergy which is known as Air borne contact dermatitis, this is more common in men, outdoor professions or those who spent more time in outdoor including foresters, labourers, engineers, sports person, hunters, gardeners and farmers. The severity and pattern of dermatitis in a particular individual varies depending upon the mode of contact with the plant. The parts which are not covered by clothes are involved which includes the face, neck, hands particularly dorsal aspect, the fingers, forearms, v shaped area of the chest, feet are commonly involved. The other form of dermatitis induced by *Parthenium* include phytophotodermatitis, in which the photo exposed and the photo protected part both gets involved. On the photo exposed parts in its chronicity manifest as thickening, lichenification and hyperpigmentation. The dermatitis may become extensive and manifests in erythroderma.

The lesions may be limited only to the hands in persons handling it and manifests locally. The other patterns being described in one study was of Atopic type, seborrhoeic, photosensitivity and others.¹⁰ The other plants belonging to compositae family that can produce air born contact dermatitis in India are *Dahlia Pinnata*, *Xanthium strumarium* and *Tagetesindica*.

Metals and metallic salts are common skin sensitizers which includes chromium, nickel, cobalt and mercury salts. The commonest cause of allergic contact dermatitis from chromate is cement because of presence of hexavalent chromate as impurity. Other sources of chrome being dyes, paints, leather apparels, welding fumes, cutting fluids and electroplating fluids. The addition of iron sulphate to cement transforms water soluble hexavalent chromium to non-water soluble trivalent chromium which is considered the bases for preventive measures concerning sensitization.¹¹

Nickel is used in making of alloys and its salts used in electroplating processes. Sources of occupational nickel contact dermatitis are electroplating fluids, electronic industry, mechanical tools, ear piercing is the principle inducer of nickel hypersensitivity and the risk is more in females, also in individuals with more than one hole in ear lobes. The prevalence of sensitivity eczema in nickel sensitive patients and in its dominant nature induces pompholyxeczema.¹² Contact allergy to the nickel is a handicap at work, at home, Nickel dermatitis in medical workers occurs due to handling of surgical instruments, tools, jet, acupuncture, stethoscope, artificial dentures, metallic syringes. Other sources being iron-chrome-nickel alloys stainless steel, chromium plated endoprostheses, osteorepair, pacemakers inducing nickel sensitivity.

Rubber and the products from it are present in most of the human activities and the individual exposed to it in domestic, industrial or personal use. The source of rubber till 1950 was from latex, which was extracted mainly from the heveabrasiliensis tree. There is increased incidence of rubber and its products due to the greater use of rubber protective objects (Gloves, Boot, Masks) and the use of rubber in the manufacturing of pesticides clothes and medicaments. The incidence due to rubber dermatitis in case of professional sensitization is less than 20% of sensitization.¹³ The principal sensitizers include mercaptobenzothiazoles, thiurams, guanidine, dithiocarbamates, phenols and amines. The sources of rubber which causes contact dermatitis include rubber shoes, clothes, fingercots, protective glasses. The clinical forms of rubber dermatitis includes eczema (common form), keratosis, purpura, achromia, urticarial. Hydroquinone and its derivatives causes leukoderma used in rubber as antioxidant stabilisers.

Resins are used extensively in electronic and electrical industries they are also used as binders, filters and surface protecting agents the resins which are common

sensitizers are epoxyresins, natural resins (colophony) used in adhesives, printing inks, soldering flux, impregnating papers, electrical cables the other resins include acrylic resins, polyurethane resins, polyvinyl resins, polystyrene resins and formaldehyde resins which include phenol, paratertiary butyl phenol, urea and melamine formadehyde can induces both allergic and irritant reactions. The fumes of epoxyresins and colophony causes air born contact dermatitis. Dermatitis occur from implantation of pace makers due to epoxyresins or due to metals used for casing pacemakers.

The pattern of wearing clothes, shoes, jewellery and other items varies greatly in different parts of the world also in different parts of India. It depends largely on the weather, customs and the economic condition of the individual. People in the warmer areas wear light clothing usually made of cotton, while in cold climate people use more woolen and heavy clothing.

Clothes or textiles may cause dermatitis due to cloth fibre itself, chemicals used during the manufacture, the dyes used for printing or dyeing, the detergents and optical whiteners used for washing the clothes which may remain in clothes due to insufficient rinsing.¹⁴

The fibres used for making the clothes are derived either from the natural fibres such as cotton, silk, wool and linen, or from the synthetic material nylon, rayon, acrylic, acetate and polyesters. Cotton fibres are made up of cellulose, the allergen present is formaldehyde resin. Nylon is a hexamethylenediamine condensation of adipic acid and is made from coal, petroleum, water and air. Nylon is used alone or in combination with other fibres. Contact dermatitis due to nylon is due to dyes or detergents, saran the generic name for certain polyvinylidene resins used in belts, suspender and raincoats can cause dermatitis. Dermatitis due to plastic glass which is a vinylacetate and chloride polymerization product, plastic mittens and table clothes made of vinyl plastic produces allergic contact dermatitis.

Dermatitis due to clothing dyes can occur only if extracted out of fibre, the disperse dye both azo and anthroquinone can produce textile dye dermatitis. The chemicals used for processing the clothes to impart properties such as crease resistance, shrunk resistance wash and wear etc. include formaldehyde and melamine formaldehyde. Nylon stocking dermatitis is due to yellow-azodyes and these cross reacts with paraphenylenediamine and derivatives of PABA. Apart from these elastic bands metallic hooks or buttons fixed on clothing may also cause contact dermatitis due to hypersensitivity to nickel, chromium or other metals.

The clinical pattern confirm to a pattern that coincides with the places of the skin where the garments fits snugly. Variations in the styling of men and women's clothing explains some difference in distribution. The reactions includes allergic reactions, irritant which may result in eczematous, petechial, urticarial or pigmented

eruptions. Woolen garments can cause petechial and purpuric eruptions. Wool can produce contact atopic dermatitis purpuric eruptions in the form of schamber's disease often occurs in areas exposed to woolen undergarments, silk causes mostly contact urticaria, dermatitis which resembles dry atopic dermatitis between 1952 to 1965 formaldehyde resin used for crease-resistant finishes caused numerous cases of textile dermatitis. Since 1970 textile dermatitis has become less uncommon mainly due to change in the methods of manufacture.

CONCLUSION

It was seen that increased incidence of allergic contact dermatitis was found in the age group of 20-49 yrs. The total number of patients were 80 (64%) out of 125 in the above age group. Though the incidence of allergic contact dermatitis occur at any age group, our study shows no incidence of allergic contact dermatitis in the age group of 0-9 yrs and only 5.6% after the age of 70.

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