

CONTACT DERMATITIS DUE TO PLANTS IN CHANDIGARH

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Two hundred and seven patients (151 males and 56 females) were patch tested with a battery of plants, potassium dichromate and formaldehyde. Sensitivity to *Parthenium hysterophorus*, *Nerium indicum*, *Calotropis procera*, *Eucalyptus* sp and *Mangifera indica* was found in 60.87, 23.64, 15.46 and 12.08% patients respectively. One hundred and twenty six patients (92 males and 34 females) including five teenage girls and one 13-year-old child had parthenium dermatitis. Majority (74.60%) were between 30 to 59 years of age. Dermatitis involving face especially eyelids, neck, cubital and popliteal fossae was the common (82.54%) mode of presentation. Photosensitive pattern was seen in 9.51% and chronic lichenification of extremities in the remaining 7.97% patients. Parthenium dermatitis was seen more frequently in city dwellers, while farmers constituted only 20.7% of all cases. There was frequent patch test positivity to potassium dichromate (24.15%) and formaline (28.02%) in the present patients.

Key words: Contact dermatitis; *Parthenium hysterophorus*; Plants.

The living plants and their natural products are among the most common causes of contact dermatitis.¹ The plant dermatitis can be divided into allergic sensitization, mechanical irritation, chemical irritation, phytophotodermatitis and pseudophytophotodermatitis.² The sensitizing plants differ in various countries and regions. Primula is a common sensitizer in Europe, ragweed in America and Canada,³ and *Parthenium hysterophorus* in India.⁴⁻⁷ An attempt was made to elucidate the common sensitizing plants prevalent in and around Chandigarh, a city in north India.

Materials and Methods

Two hundred and seven consecutive patients suspected of contact dermatitis due to plants were included in this study. The details of history and examination were recorded on a proforma. They were questioned in detail regarding exposure to plants while at work, at home or during the spare time activities like gardening, morning and evening walks, cattle

rearing, helping in fields and bringing fodder for cattle. All the patients were shown parthenium plant or its photograph and questioned about its occurrence around their living and working place and its relation with exacerbations. Patch testing was done with indigenously fabricated patch test unit resembling 'Finn chamber'. It consisted of 12.0 × 5.0 cm strip of Johnson sticking plaster with two parallel rows of five aluminium discs of 7 mm diameter placed at a distance of 2 cm from center of each other. This patch test unit has been described in detail elsewhere.⁸ The patch test battery consisted of *Parthenium hysterophorus*, *Calotropis procera*, *Eucalyptus* sp, *Ficus religiosa*, *Mangifera indica*, *Dalbergia latifolia*, *Nerium indicum*, *Azadirachta indica*, *Lantana camara*, potassium dichromate 0.5% aq and formaline 2.0% aq (Table I). The initial fifty five patients were tested with antigen-impregnated discs kindly supplied by Dr. J.S. Pasricha. Subsequently, the antigens were locally prepared and 5 mm square pieces of fresh leaves were used for patch testing. The whole battery was also tested in 50 normal controls. In addition, plants from the patients' household and surroundings were included whenever feasible. Patch testing was done by standard method⁹ on upper back and readings

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were taken at 48 and 72 hours. Patch tests were performed when patients were free of dermatitis or dermatitis was controlled with 15-20 mg prednisolone daily but the back was clear. However, prednisolone was discontinued 48 hours before testing. Photopatch testing was not carried out in the present study.

Results

There were 151 males and 56 females with an age range of 13-85 years. The mean duration of dermatitis was 3.0 years in male and 2.7 years in females. The common sensitizers were *Parthenium hysterophorus* (60.87%), *Nerium indicum* (23.64%), *Calotropis procera* (15.46%), *Eucalyptus sp* (15.46%), *Mangifera indica* (12.08%), *Ficus religiosa* (6.76%), *Azadirachta indica* (5.45%), *Dalbergia latifolia* (1.82%) and

Lantana camara (1.82%) (Table I). Potassium dichromate and formaline sensitivity was found in 24.15 and 28.02% respectively.

Parthenium hysterophorus was positive in 126 patients which included 92 males and 34 females. The age groups affected are shown in table II and their occupations in table III. The average age in males was 46.38 years (range 13-

Table I. Common sensitizers in 207 patients of contact dermatitis in Chandigarh.

Antigen	Number of patients		
	Tested	Positive (Per-centage)	
1. <i>Parthenium hysterophorus</i> (Carrot weed)	207	126	(60.87)
2. <i>Calotropis procera</i> (Aak)	207	32	(15.46)
3. <i>Eucalyptus sp</i> (Safeda)	207	32	(15.46)
4. <i>Mangifera indica</i> (Aam)	207	25	(12.08)
5. <i>Ficus religiosa</i> (Peepal)	207	14	(6.76)
6. <i>Nerium indicum</i> (Kaner)	55	13	(23.64)
7. <i>Azadirachta indica</i> (Neem)	55	3	(5.45)
8. <i>Dalbergia latifolia</i> (Shisham)	55	1	(1.82)
9. <i>Lantana camara</i> (Lantana)	55	1	(1.82)
10. Potassium dichromate 0.5% aq	207	50	(24.15)
11. Formaline 2.0% aq	207	58	(28.02)

Table II. Age and sex distribution of 126 patients with parthenium dermatitis.

Age in	Number (% age) of			
	Males	Females	Total	
10-19		1(0.79)	5(3.97)	6(4.76)
20-29		3(2.38)	5(3.97)	8(6.35)
30-39		28(22.22)	9(7.14)	37(29.36)
40-49		17(13.50)	9(7.14)	26(20.64)
50-59		26(20.64)	5(3.97)	31(24.61)
60 and above		17(13.49)	1(0.79)	18(14.28)
Total		92(73.02)	34(26.98)	126(100.00)

Table III. Occupations of patients with contact dermatitis due to *Parthenium hysterophorus*

Occupation	Number (%) of patients positive to parthenium	
	Males	Females
I Direct occupational/hobby exposure to parthenium	20(15.87)	5(3.97)
1. Farmers and farm labourer		
2. Gardeners	9(7.14)	0
II Indirect exposure to plant in occupations involving outdoor activities	30(23.81)	0
III No direct exposure to parthenium		
1. Occupations involving indoor activities	33(26.20)	5(3.97)
2. Housewives	—	24(19.04)
Total	92(73.02)	34(26.98)

85 years) and in females, it was 37.1 years (range 17-60 years).

In eighty one patients who were negative to *Parthenium hysterophorus*, the positivity to various other plants was found in 16 patients, and the rest 65 were negative to all plant antigens.

Comments

Members of the *Compositae* family, *Ambrosia* (ragweed), *Parthenium* (feverfew), *Helenium* (sneezeweed), *Artemisia* (sagebrush, wormwood, mugwort), *Eupatorium* (bonset), *Franseria* (poverty weed), *Iva* (marsh elder), *xanthium* (cocklebur), *Artium* (burdock), *Anthemis* (chamomile), *Cynara* (artichoke), *Chrysanthemum* and *Gaillardia* (Tansy and pyrethrum) are common sensitizers.¹⁰ Sesquiterpene lactones are the sensitizing chemicals in compositae family of plants. The presence of an alpha-methylene group exocyclic to the gamma-lactone is the immunochemical requisite for sensitization. Sesquiterpenoids are also found in some members of *Magnolaceae*, *Umbelliferae*, *Aristolochiaceae* and *Frullania*.¹⁰ Parthenin and ambrosin, two major allergens in parthenium, are found in the capitulum and leaves. Parthenin and ambrosin were demonstrated on the trichomes, the small organelle seen by scanning electron-microscopy on the leaf surfaces, phyllaries and achenes.¹¹ Pollen are not a significant cause of parthenium dermatitis¹² but dried up plant parts or trichomes are responsible.¹³ *Parthenium hysterophorus* may cross react with other members of compositae family like *Helenium*, *Iva*, *Dahlia*, *Chrysanthemum* and other parthenium species.

Parthenium hysterophorus, known as 'carrot weed' or 'chatak chandni' in India was introduced with grain seeds from America.⁶ It was first noted by Professor Paranjape in Pune, India in 1951.¹⁴ Now it has been reported from all over Maharashtra, Bangalore,

Hyderabad, Delhi, Madhya Pradesh, Uttar Pradesh and Haryana. It has also been spotted in Rajasthan, Kerala, and in Kashmir.¹⁵ The present authors have seen it in Chandigarh and adjoining parts of Haryana (Panchkula) and Panjab state (Ropar). Curiously, the same species is common in Argentina, Mexico and the West Indies but has caused no major outbreaks of dermatitis there, although it is a major cause of weed dermatitis in Texas and Minnesota, epidemics have not been a feature.¹⁶ However, it produced an epidemic contact dermatitis in Pune, India.^{4,7} *Parthenium* dermatitis has also been reported from New Delhi^{5, 6, 15} and Indore.¹⁵ It has also been reported to cause photocontact dermatitis.¹⁷ The clinical picture of parthenium dermatitis was described in detail by Lonkar et al.⁴ Initially, it affects the face especially eyelids and/or neck, and later cubital and popliteal fossae are affected. Initial picture of acute eczematous dermatitis with oozing and swelling, later becomes chronic lichenified dermatitis punctuated with acute exacerbations. The classic pattern, photosensitive pattern and chronic lichenified dermatitis of extremities were seen in 82.54, 9.51 and 7.95% patients respectively. Tiwari et al⁷ described classical pattern in 48%, photosensitive pattern in 28% patients and 10% had seborrheic pattern, while rest 14% had no specific pattern. The dermatitis simulating photodermatitis has been reported with compositae family of plants.¹³

In three patients the classic pattern of dermatitis changed to photosensitive pattern after treatment with systemic corticosteroids. The dermatitis of eyelids, flexures of extremities and neck cleared leaving behind a photosensitive pattern. Moreover, all the patients with localisation of dermatitis over the exposed parts had a previous history of dermatitis involving the flexures, hence suggesting that photosensitive pattern of parthenium dermatitis is a part of the natural course of the disease. The male predominance reported in

other studies^{7, 16} was less striking in the present series. Majority (74.61%) of patients were between 30 to 59 years of age. One male child (13 years) and five teenage girls were affected unlike the contention of Lonkar¹² who stated that children and younger women are not affected. The child aged 13 years was suffering from dermatitis involving the face, neck, cubital and popliteal fossae for the last three years. He has been hospitalised twice with the diagnosis of atopic dermatitis when spontaneous improvement after admission was noted. Patch test confirmed the suspicion of parthenium dermatitis. Parthenium plant was growing in abundance around the patient's house where this child used to play. Siddiqui et al⁶ from New Delhi also described two cases below 20 years of age but none below 16 years in a series of 24 cases.

Summer aggravation was seen in 55.35% patients, and winter and spring exacerbation in 5.35 and 35.7% patients respectively and in the rest no seasonal variation was apparent. Tiwari et al⁷ reported summer aggravation in only 28.2% patients. Authors believe that a person with above description of contact dermatitis with summer exacerbation in this region is most likely to be parthenium sensitive than those with winter exacerbation, though exacerbation in any season is known.⁷ Majority of patients (61.90%) hailed from urban areas. However, Siddiqui et al⁶ reported that parthenium dermatitis occurs with equal frequency in both rural and urban dwellers. Chandigarh, Haryana, Panjab and Himachal Pradesh accounted for 57.93, 16.66, 21.34 and 3.96% patients respectively. Nineteen of 21 patients from Haryana belonged to Panchkula, 20 of 27 patients from Panjab to Ropar correlating with the high density of parthenium weed in the region.

Farmers constituted 20.7% cases, other outdoor workers 26.9%, and those with gardening hobbies 3.97%, the rest gave no history of direct contact. It highlights the risk of sensitization even in such persons in an area with

a dense growth of parthenium.

Out of four controls positive to parthenium, one on specific questioning admitted past history of mild dermatitis involving the eyelids and flexures, while the rest had no such history. They were residents of Chandigarh and were not involved in any profession or hobbies dealing with plants. However, it is possible that they had unknowingly come to contact with parthenium plant because of its abundance and developed sensitivity. Though the sample is small, it would give six percent prevalence of latent parthenium sensitivity in Chandigarh.

Formaldehyde was positive in 28.02% of the 207 patients tested. In 10 patients it was positive with potassium dichromate when patch test with all plants were negative but no clinical correlation could be made. Similar observations were made by Marcussen¹⁸ who stated that 75% of formaldehyde tests cannot be correlated and only 20% of such positive reactions can be related with actual instances of formaldehyde dermatitis. However formaldehyde is extensively distributed and exposure can occur with wash and wear apparel, paper, cosmetics, medicine and industry. Potassium dichromate was positive in 24.15% of 207 cases tested. In ten patients who were negative to parthenium, potassium dichromate was positive alone or with formaldehyde. Three of them were having photosensitive pattern of dermatitis. It could reflect sensitivity to cement or dust. Fisher² states that it may be difficult to correlate positive patch test reactions to dichromates to the clinical dermatitis because of subtle and widespread exposure to this metal salt.

Since a significant number (31.4%) were negative to all plants tested, there is need for testing with other members of compositae family and other plants prevalent in the region. Similar findings were reported by Bajaj et al.¹⁹ He found 44.7% patients negative to all the plant antigens tested in his series of 47 patients.

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