

Evolution of clinical pattern of parthenium dermatitis: a study of 74 cases

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Our aim was to study the evolution of clinical pattern of parthenium dermatitis. Patients with clinical picture consistent with parthenium dermatitis for 3 years or more along with positive patch test to parthenium were studied. Patients were questioned regarding the site(s) of dermatitis at the onset and change in localization in the following years. Patients were classified into airborne contact dermatitis, chronic actinic dermatitis (CAD) pattern or mixed pattern dermatitis. There were 74 patients (49 men and 25 women) with an age range of 22–70 years and the mean duration of 7.7 years. 60 (39 men and 21 women) patients had airborne contact dermatitis, 5 mixed pattern and 9 CAD pattern at the onset. Of the 60 patients with airborne contact dermatitis, 27 (19 men and 8 women) changed to CAD pattern and 11 (6 men and 5 women) to mixed pattern after an average period of 4.2 years. Of the 19 patients photopatch-tested with parthenium, 3 showed photoallergic reaction and the other 3 showed photoaggravation. Our results suggest that the clinical pattern of parthenium dermatitis undergoes a significant change after the onset, i.e. progresses from airborne contact dermatitis to mixed pattern or CAD pattern.

Key words: airborne contact dermatitis; chronic actinic dermatitis; mixed pattern; photosensitivity; *Parthenium hysterophorus*. © Blackwell Munksgaard, 2005.

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Compositae dermatitis affects 0.7–1.4% of the general population and 4.5% of the occupationally exposed groups. It is one of the top 10 sensitivities in Europe (1). Contact dermatitis due to *Parthenium hysterophorus* is a major dermatological problem in India (2). Ranade, Lonkar and Jog were the first to report parthenium dermatitis at Pune (Maharashtra State), India, in 1968. Since then, it has been widely reported across the Indian subcontinent (3). It can cause a spectrum of clinical patterns, such as airborne contact dermatitis affecting the eyelids and flexural regions, widespread dermatitis and erythroderma, hand and feet dermatitis, photosensitive lichenoid eruptions and prurigo nodularis-like lesions (4–9). During the last few years, we observed that the patients with parthenium dermatitis presenting with lesions over the face, the neck and the flexural areas – cubital and popliteal fossae – subsequently develop localization to the exposed parts. We undertook this hospital-based study to evaluate the change in clinical pattern of parthenium dermatitis after its onset.

Materials and Methods

All patients with clinical picture consistent with parthenium dermatitis for 3 years or more along with patch test positivity to acetone extract of parthenium were recruited. In every case, the detailed history was elicited with special reference to initial localization of the dermatitis and subsequent change in the clinical pattern and if such changing trend was present then the approximate time taken for the same.

Patients were classified into (i) airborne contact dermatitis: diffuse dermatitis involving the face especially the upper eyelids, flexural areas of extremities – cubital and popliteal fossae and sides of the neck (Figs 1 and 2); (ii) chronic actinic dermatitis (CAD) pattern: lichenified papules and plaques or nodules localized to the exposed areas, such as the forehead, the rim of the ears, the cheeks, V of the chest, nape of the neck, dorsa of the forearms and the hands (Fig. 3); (iii) mixed pattern dermatitis: scattered infiltrated scaly papules over the exposed parts along with dermatitis over the eyelids and flexural areas of the extremities and the neck (Fig. 4).



Fig. 1. Airborne contact dermatitis involving the face especially the upper eyelids, the neck and the cubital fossa.

Photopatch test was performed with the acetone extract of *P. hysterophorus* 1 : 100 and 1 : 200 dilutions in 19 patients. The patches were applied in duplicate by using aluminium chambers over the upper back. After 48 hr, one side of the patch was removed and was exposed to 10 J/cm² UVA. After irradiation, the patches from the other side were also removed and both sides were covered with aluminium foil with the help of micropore (3 M Health Care, St. Paul, MN, USA). The reading was taken 48 hr after the exposure. The interpretation of the reading has been provided in Table 1.

Phototesting could not be performed due to lack of facilities.

Results

A total of 74 patients with parthenium dermatitis were enrolled, including 49 men and 25 women, with an age range of 22–70 years (mean: 48.5 years). Maximum 43 patients were in the age group of 30–50 years, 15 between 51 and 60 years and 11 over 60 years. The duration of the dermatitis ranged from 2 to 25 years with a mean of 7.7 years. In 60 patients, the initial pattern of the disease was of airborne contact dermatitis

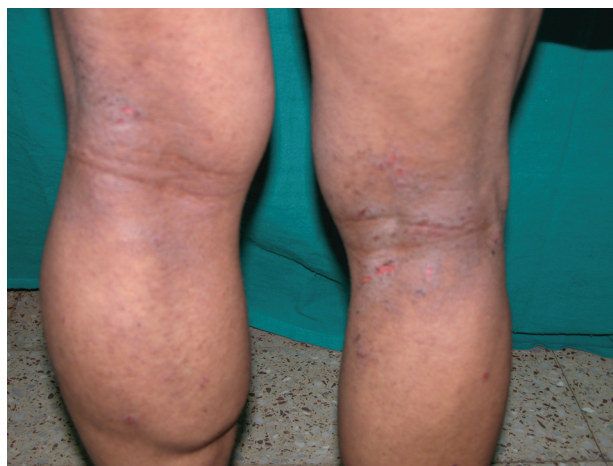


Fig. 2. The same patient showing the involvement of the popliteal fossae.

(photosensitivity was seen in 46 cases, mild 16, moderate 21, severe 9, absent 4, information not



Fig. 3. CAD pattern, lichenified papules and plaques localized to exposed areas – the forehead, the nose, rim of the ears, V of the chest and dorsa of the hands.



Fig. 4. Mixed pattern, scattered infiltrated scaly papules over the exposed parts along with dermatitis over the eyelids and flexural areas of the extremities and the neck.

available in 10 patients), 5 had mixed pattern and the remaining 9 had features of CAD pattern (all had photosensitivity) at the onset. Of the 60 patients with an initial pattern of airborne contact dermatitis, a change in the clinical pattern was observed in 38 patients (25 men and 13 women). 27 patients progressed to develop CAD pattern and 11 patients developed mixed pattern (Table 2). The time taken for such a change in the pattern of the dermatitis ranged from 1 to 15 years with a mean of 4.2 years. After 5 years of follow-up, 28 patients had worsening of the disease, 21 patients had improvement; in 13 patients, the severity of the disease was same as

before. In 12 patients, the information was not available. Of the 72 patients patch-tested, 69 had contact allergy to *P. hysterothorus*. Photopatch testing was performed in 19 patients. Both the patch and photopatch test sides were positive in all the 19 patients. However, in 3 cases, the photopatch was more strongly positive, i.e. the difference of positivity between the patch and photopatch side was more than 1+ and it was classified as photocontact allergy. In another 3 patients, photopatch was more positive, but the difference between the patch and photopatch side was not of 1+ and these were classified as photoaggravation.

Discussion

P. hysterothorus is the commonest cause of plant dermatitis in India (1). It classically causes airborne contact dermatitis. Airborne dermatitis in its acute form is characterized by dermatitis involving the face and flexural areas, such as sides of the neck, cubital and popliteal fossae. Chronic form of airborne dermatitis may simulate CAD or actinic reticuloid (10, 11). The main differential diagnostic criterion is the negative phototest on the non-exposed normal skin in cases of airborne dermatitis. CAD is characterized by the persistence of abnormal phototest on the non-exposed skin of back in patients who are clinically cured on the exposed areas (10).

Parthenium and other compositae are known to cause dermatitis resembling photosensitivity. Tiwari et al. (3) described photosensitivity pattern in 28% of their 50 cases of allergic contact dermatitis due to *P. hysterothorus*. Bhutani and Rao (11) in 1978 reported a case of photocontact dermatitis due to *P. hysterothorus*. Subsequently, Shenoy and Srinivas (12) reported changing pattern of parthenium dermatitis in 9 of 30 patients. All the 9 patients had dermatitis in a photopattern, of whom 4 had lesion only in sun-exposed areas, whereas 5 also had minimal involvement of flexural and shaded areas (11). In a previous series of 8 cases, from our institute, we have

Table 1. Reading taken 48 hr after the exposure

Reaction of non-irradiated side	Reaction of irradiated side	Interpretation
Negative	Negative	Normal
Negative	Positive	Photocontact dermatitis
Positive	Positive (grading remains same, but the intensity of the reaction is more than the other side)	Photo aggravation and contact dermatitis
Positive	Strongly positive (difference in the grading of 1+ or more; e.g. non-irradiated side is + and the irradiated side is ++)	Photocontact and contact dermatitis

Table 2. Evolution of clinical pattern of parthenium dermatitis

Sex	Initial pattern of parthenium dermatitis			Follow-up diagnosis of ABCD (n = 60)			Total
	ABCD	Mixed	CAD pattern	Changed to mixed	Changed to CAD pattern	No change	
Male	39	3	7	6	19	14	39
Female	21	2	2	5	8	8	21
Total	60	5	9	11	27	22	60

ABCD, airborne contact dermatitis; CAD, chronic actinic dermatitis.

described photosensitive lichenoid pattern of parthenium dermatitis characteristically sparing the upper eyelids, retroauricular area and under surface of the chin. All the patients showed patch test positivity to *P. hysterophorus* (8). In the present series of 74 patients with parthenium dermatitis, 38 had change in the clinical pattern, of whom 27 developed CAD pattern, whereas the remaining 11 had a mixed pattern. Photosensitivity dermatitis/actinic reticuloid syndrome (PD – AR) or CAD has been well described with compositae dermatitis especially in men in the age group of 50–70 (12–15). However, it is not clear from these series whether photolocalization was present at onset or evolved over time.

Bell and Johnson in their series of 55 cases with PD – AR syndrome observed contact sensitivity to compositae plant extract in 47 patients. *P. hysterophorus* produced reaction in 30 of 38 tested and *Xanthium strumarium* in 20 of 25 patients patch-tested (13). The same association has also been observed by Menage et al. who have reported 36% patch test positivity to sesquiterpene lactone (SL) mix in 89 patients with CAD (15). The previous series on PD – AR/CAD have documented compositae sensitivity and abnormal sensitivity to UVA on phototesting. In a series of 135 patients with SL sensitivity, phototesting with an irradiation monochromator was performed in 48 patients and 29 had abnormal test results, thus supporting a link between compositae allergy and photosensitivity (14). In a report by Hjorth et al. (16), all the 7 Danish patients were initially diagnosed to have photodermatitis, who eventually proved to suffer from compositae oleoresin dermatitis. Of the 3 cases photopatch-tested, one showed reaction to *Ambrosia trifida*.

American rag weed (*Ambrosia*), another compositae plant, causes the airborne pattern of contact dermatitis. It also has a tendency for accentuation of the dermatitis over the forehead, the neck and the cheeks with less marked involvement in areas shaded by the nose and the chin, suggestive of photocontact dermatitis (17). Chrysanthemum contact sensitivity was seen in 9 of 69 patients with PD/AR syndrome in a series from London (18).

All these results and the observations suggest a definite link between compositae allergy and photosensitivity. SL is the main sensitizer and the photosensitivity may be related to the alpha methylene gamma lactone group of SL, which is directed towards the DNA base thymine and produces intermolecular 2+2 photoadducts. The photochemical property of this molecule is strongly implicated in the pathogenesis of CAD. The other components of compositae, namely thiopenes and acetelenes, are known to cause phytophotodermatitis.

It is very difficult to elicit positive photopatch reaction to parthenium. Shenoi and Srinivas (12) in their report also described very low positivity. Only in 3/30 cases, a slightly stronger response to parthenium in the UV-irradiated site, compared to the non-irradiated site, was observed, which the authors interpreted as non-specific. Such low positivity could be due to the fact that more than 1 antigen or antigenic component may be involved in the process of photosensitivity in parthenium dermatitis (11). Alternatively, it may be due to the simultaneous contact and photocontact dermatitis or aggravation of patch test by UVA due to photosensitivity frequently present in these patients. There are reports of an increased sensitivity to both UVA and UVB in CAD (15). Photolocalization may frequently result from an increased sensitivity to UV light rather than true photocontact sensitization.

It may be concluded that there is a significant change in the clinical pattern of parthenium dermatitis after its onset with a tendency towards localization to the photo-exposed parts, i.e. progresses from airborne contact dermatitis to mixed pattern or CAD pattern.

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