

Clinicoepidemiological Study of Parthenium Dermatitis in Relation to Patch Testing

J Thadeus, A Santhiya Vadhana

Department of Skin and STD, Government Thoothukudi Medical College, Thoothukudi, Tamil Nadu, India

Abstract

Introduction: Parthenium dermatitis is an immunoinflammatory disease caused by *Parthenium hysterophorus* and is the most common cause of plant dermatitis in India. It is caused by airborne dry and friable plant particles including trichomes, and the most important allergens responsible for allergic contact dermatitis (ACD) are sesquiterpene lactones.

Aim: This study aims to study the clinicoepidemiological pattern of parthenium dermatitis and do patch testing to determine the causative agent.

Materials and Methods: A total of 100 patients clinically diagnosed as ACD to parthenium were included in the study. Patch test was performed for all 100 patients who were included in the study. For patients with acute eczema, patch test was done after 2 weeks when the lesions got cleared.

Results: Of 100 patients studied, males (75%) were more affected. Age group of 31–40 years was more affected. ACD pattern was dominant 36% followed by CAD pattern. 92% of them were patch test positive.

Conclusion: Parthenium dermatitis still poses a significant problem in India. Different presentations of the disease vary with age, sex, and geography. One should be aware of it and use patch testing for aid in diagnosis.

Key words: Allergic Contact Dermatitis to Parthenium, Parthenium Dermatitis, *Parthenium hysterophorus*, Patch Test

INTRODUCTION

Allergic contact dermatitis (ACD) is an inflammatory disorder which is T-cell mediated that occurs at the challenged site with a specific substance of low molecular weight in an already sensitized individual.^[1] Contact dermatitis is one of the most common skin disorders all over the world which accounts for 4–7% of all dermatological consultations.^[2] Haptens are capable of triggering the Type IV hypersensitivity reaction after single or multiple exposures. ACD occurs due to the breakdown of cutaneous immune tolerance to haptens. The common allergens vary from place to

place and from time to time. Parthenium dermatitis is common in India. The gold standard method for identifying the causative allergen of ACD is the patch testing.^[3-5]

Through prospective study was focusing on determining the incidence of ACD to parthenium and the causative allergen of ACD by patch testing and analyzing the morphological patterns of presentation. We did an analysis of clinicoetiologic correlation of ACD with patch testing, and the implications are herewith discussed. The main aim of the study was to study the various morphological patterns of ACD with parthenium allergens, to determine the proportion of positive patch tests in adults with ACD, and to assess the clinical severity of disease in correlation with patch tests grading.

Aim

This study aims to study the clinicoepidemiological pattern of parthenium dermatitis and do patch testing to determine the causative agent.

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Corresponding Author: Dr. A Santhiya Vadhana, Department of Skin and STD, Government Thoothukudi Medical College, Thoothukudi, Tamil Nadu, India. E-mail: santhiya.darena@gmail.com

MATERIALS AND METHODS

This is an observational, prospective, single group, open-labeled clinical study. A total of 100 patients clinically diagnosed as ACD to parthenium who attended the Department of Dermatology, Thoothukudi Medical College Hospital, from June 2018 to August 2018 were included in the study. Patients in the age group of 18–70 years both males and females were included in the study. A total of 100 patients clinically diagnosed as ACD were recruited in the study. Both informed and written consent were obtained from patients to include them in the study, to do patch tests, and to take clinical photographs. A thorough clinical history, the nature, and duration of symptoms contact with any specific allergen with respect to their occupation and present clinical scenario. Furthermore, history about associated medical illness, personal, and family history of atopy were obtained. A detailed dermatological examination was carried out. The morphological pattern, the extent of skin lesions, and the presence of oozing, crusting, and lichenification were noted down. Skin lesions other than ACD were also recorded. Patients were subjected to routine blood investigations including complete hemogram, LFT, RFT, and blood sugar. Patch test was performed for all 100 patients who were included in the study. For patients with acute eczema, patch test was done after 2 weeks when the lesions got cleared.

We did a patch test using INDIAN STANDARD SERIES BATTERY, which was commercially available at Systopic Laboratories, New Delhi. These allergens were applied on Finn chambers and strapped on the back of the patients with hypoallergenic tapes. The patches were kept undisturbed for 48 h. Patients were advised to avoid strenuous hard work, showering, and sunlight exposure. After 48 h, the Finn chambers were removed, and the squares representing each chamber was marked using a marker pen. Reading was taken after half an hour. A second reading was taken after 72 h to confirm the presence of allergic reaction. Patch test results were interpreted according to the International Contact Dermatitis Research Group criteria. Clinical photographs were taken at the time of the clinical diagnosis of ACD, during patch tests procedure and at the time of reading patch tests.

The patients were treated with topical emollients, immune modulators, and topical and systemic steroids. Patients were followed up periodically, and they were advised to avoid exposure to the particular allergen(s) and the importance of changing their occupation if needed.

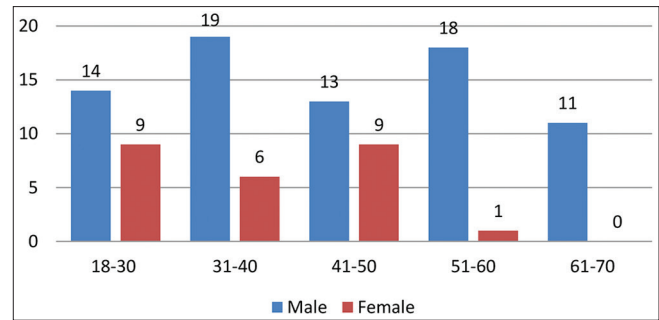


Figure 1: The age- and sex-wise distribution of patients

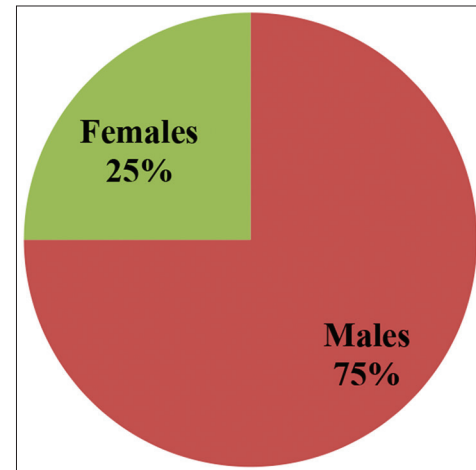


Figure 2: Sex distribution of patients

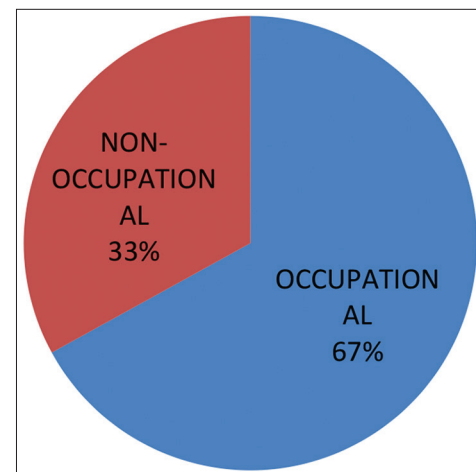


Figure 3: Occupational versus non-occupational causes

RESULTS

In our study, the incidence of ACD to parthenium was found out to be 4.94% (100 of 2024 patients).

In our study, of 100 patients, the male-to-female ratio was 3:1 Figure 2.

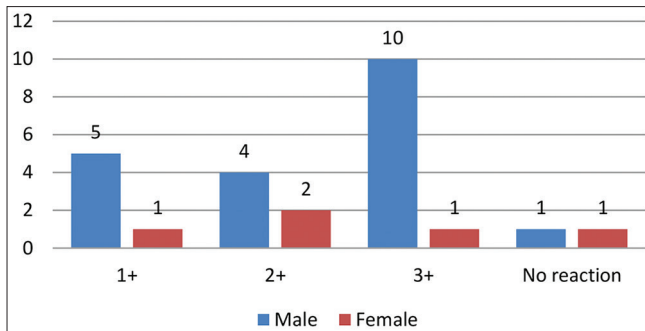


Figure 4: Distribution of patch test grading



Figure 5: Airborne contact dermatitis pattern



Figure 6: Exfoliative dermatitis due to parthenium

ACD was found to be highest in the age group of 31–40 years followed by <30 years age group Figure 1. The youngest patient in the study was 18 years, and the oldest was 70 years. The mean age observed in the study was 42.56 years with standard deviation of 13.94 years. ACD was found to be common in the fourth decade among males.

Parthenium hysterophorus containing sesquiterpene lactones were implicated. All the patients were related to agricultural occupation Figure 3.

ABCD Figure 5 was the most common pattern (36%) of parthenium dermatitis observed in our study similar to the observation made by Sharma and Verma (81%). Even though ABCD was the most common pattern found in both studies, the difference in percentage may be due to the population group selected for the study.

Morphological Patterns of ACD with Parthenium

- Chronic actinic dermatitis pattern 25%.
- Mixed pattern (CAD and ABCD) 14%.
- Erythrodermic type 3% Figure 6.
- Hand and foot type 10%.
- Atopic dermatitis, prurigo nodularis 7%.
- Photosensitive lichenoid type 5%.

In our study, two-third of cases were of occupational (67%) in origin, and the remaining 33% were non-occupationally related. The majority were in agricultural occupation.

Seasonal variation was present in 22% of cases. Among the 22 cases, 15 cases were ACD to parthenium group which had summer/spring exacerbation. The reason for the seasonal variation and dermatitis increased during summer or autumn is, the pollens are destroyed in the months of winter, and the fauna grows well during the period of summer and spring and the dispersion of the pollen grains into the atmosphere.

In our study, 92% of patients showed one or more positive reactions in patch testing.

In our study, 24% had 1+ reading, 24% had 2+ reading, 44% had 3+ reading, and no reaction was observed in 8%. The patch tests readings were taken on day 2 and 4, and the results were same on both days Figure 4.

DISCUSSION

Incidence of ACD to parthenium was similar to the study by Sudashree *et al.* which showed incidence around 4–7%.^[6] In a study done by Narendra and Srinivas, where men outnumbered women.^[7] In another study by Priya *et al.*, the male-to-female ratio was 1.27:1.^[8] Moreover, the reason for this may be men is employed in preference to women. The age group observed was similar to the study done by Singhal and Singha which showed the most common age group affected as 20–39 years.^[9] Our result was in contrast with the observation made by Sudhashree *et al.*, where their mean age was 34.3 years, with a standard deviation of 11.8 years (range, 9–67 years). Males outnumbered

females (2.6:1) in our study population similar to the study done by Singh and Singh (5.5:1).^[11] The most common age group involved was middle-aged or elderly males similar to the observation made by Sharma and Verma.^[12] These patients were involved in open-air events like farming work, and they were lightly clothed. The mean duration noted in our study was 2.65 years, but in the study done by Sharma and Verma, the mean duration observed was 7.7 years. ABCD pattern was the most common pattern observed in the study. The hands and feet were the most common sites involved in the study done by Sharma *et al.* Even though the percentage varies in both studies, the most common pattern observed was similar in both groups. A study done by Brutti *et al.*, where 29% were occupational in origin and 71% were non-occupational in origin.^[12] The reason for the difference noted is, in our study group, the population were laborers doing masonry and agricultural work. Another clinical diagnosis of ACD cases showed 100% positivity rate, with respect to specific allergens such as footwear, plaster, oils and greases, and paints and as such the number of patients was less in the study group. Our tropical climate may be partly responsible for this phenomenon.

CONCLUSION

Parthenium dermatitis has a great socioeconomic impact on the patients. Patch testing is a very useful scientific diagnostic tool that unravels the causative allergen and thus by avoiding the allergen, decrease the management cost, and better quality of life. Although parthenium is causing many allergic problems, the weed has not been managed below the threshold level and still creating nuisance in India, and more needs to be done by scientists,

agriculturists, and government to work jointly for managing this troublesome weed. Control of parthenium has been tried by various methods, but no single management option would be adequate to manage parthenium, and there is a need to integrate various management options. Successful management of this weed can only be achieved by an integrated approach with biological control as the key element.

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