Original Article

Misery of Living with Parthenium Dermatitis: Correlation between Clinical Severity and Quality of Life

Abstract

Background: Parthenium dermatitis is caused by friable plant extracts of *Parthenium hysterophorus* and related species. Approximately 40% of cases of plant dermatitis in India are contributed by this single species. **Materials and Methods:** This was a cross-sectional, observational study conducted in the Department of Dermatology of Jhalawar Medical College. Ninety-nine consecutive patch test positive *parthenium dermatitis* human subjects of age more than 16 and either sex were included. The study period was 11 months between September 2019 and August 2020. Sociodemographic, clinical profile parthenium dermatitis severity score (PDSS) and Dermatology life quality index (DLQI) were obtained from each patient. Correlation between PDSS and DLQI was obtained using Pearson's two-tailed coefficients. **Results:** Our study included 62 men and 37 women (1.67:1). The mean age was 51 ± 10.27 years. Mean duration of disease was 8.47 ± 4.45 years, and mean PDSS was 57.25 ± 17.65, mean DLQI was 17.14 ± 5.56. ABCD with CAD was the most common clinical subtype (45.45%). A significant positive correlation was observed between PDSS and DLQI. **Conclusion:** In this study, a significant impairment in quality of life (QoL) was observed in patients with higher score of PDSS and increasing duration, emphasizing that the disease needs specialized care including multiple indoor admission at the time of flare-up of disease.

Keywords: *ABCD, CAD, DLQI, parthenium dermatitis, PDSS*

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Introduction

Parthenium dermatitis is an immunologically mediated allergic contact dermatitis caused by plant extracts of *Parthenium hysterophorus* and related species. It is a chronic disease lasting for months to years and often lifetime with seasonal exacerbations and remissions.

Parthenium has been called as scourge of India since its introduction from tropical America in 1956.[1] It affects humans beings, as well as animals, crop production and biodiversity.[2] *Parthenium hysterophorus* is a member of Compositae family,[3] and dermatitis due to this plant has reached to epidemic proportions, making it to be the most common cause of plant dermatitis in India, accounting for nearly 40% of total cases.[4-6] It is caused due to airborne and direct contact with dry and friable plant particles, most important being trichomes, highest density found on undersurface of leaves of plants containing sesquiterpene lactones (SQL) and other allergens.[7,8] Combined type 1 and type 4 hypersensitivity reaction in patients are involved in the initiation and perpetuation of the dermatitis in sensitized individuals.[9]

Clinically, the dermatitis presents in many puzzling patterns like airborne contact dermatitis, chronic actinic dermatitis, mixed patterns, erythroderma, seborrheic eczema such as atopic eczema, hand and feet dermatitis, perianal dermatitis, prurigo nodularis such as photosensitive lichenoid eruption, vesicular hand eczema and eczema simulating lichen nitidus.[10-12]

Parthenium dermatitis severely adds to patients suffering due to inherent chronicity of disease with occasional flare-ups, work absteenism during severe eczema episodes, social withdrawal, interpersonal relationships and overall quality of life. Therefore, it is the need of the hour to develop guidelines for management protocols, and socioeconomic rehabilitation of patients through awareness programs at the community level.

Quality of life by WHO is defined as individual's perception of their position

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in the context of culture and value system in which they live and in relation to their goals, expectations, standards, and concerns. The primary objective of our study was to determine the impact of disease on quality of life of patients, while the secondary objective was to define disease severity using PDSS and its associations (with QoL).

Materials and Methods

Study design

This was a cross-sectional, observational and prospective study that was conducted in out-patient and in-patient department of our tertiary care center of Southeast region of Rajasthan. Ninety-nine consecutive patients of patch test positive (by Indian Standard battery series) parthenium dermatitis of age more than 16 and either sex were included. The study period was 11 months between September 2019 and July 2020.

Inclusion criteria

a) Patch test positive patients (For Parthenium)
b) Age >16 years age.

Exclusion criteria

a) Patients not giving consent
b) Age <16 years age
c) Pregnancy or lactation
d) Known case of any systemic disease.

Permission from institutional ethical committee and informed written consent from each patient after explaining them about our study were obtained in their own native language, which was recorded in a predesigned proforma including sociodemographic profile, clinical severity at the time of presentation and its effect on various aspects of quality of life.

Airborne-contact dermatitis affects predominantly eyelids, V area of neck, cubital fossa, and popliteal fossa while chronic actinic dermatitis presents with lichenified papules, plaques, or nodules over the exposed area. Other variants classified were ABCD with CAD, exfoliative dermatitis, hand and feet dermatitis. Acute and chronic forms of dermatitis were defined based on duration; <6 weeks/>6 weeks, respectively. First reading pf patch test was done at 48 h, and second at 72–96 h. Topical and systemic corticosteroids were withdrawn before 7 days of patch to avoid false-positive results.

The *Parthenium Dermatitis Severity Index (PDSS)* includes a scoring system based on severity of itching, clinical types of lesions, erythema, and areas of involvement; added together to a scoring ranging 0 to 99. The disease is considered to be mild if PDSS is <50, moderate if PDSS is 50–75 and severe if PDSS >75.[13]

DLQI[14] includes a questionnaire-based scoring system that reflects the impact of a dermatological disease on various aspects of a patient's physical, economic, mental and social life. The total score ranges 0–30.[15] Its validated Hindi version was used in our study after. It is a multiple-choice answer-based questionnaire system with 10 standard questions with each question scoring 0–3. In this questionnaire 0—not at all, 1—a little, 2—a lot, and 3—very much. Total scoring was done by adding points obtained in each question. The questionnaire was further subdivided into six subdomains: symptoms and feelings (question 1 and 2), daily activities (question 3 and 4), leisure (question 5 and 6), personal relationship (question 7), work and school (question 8 & 9), and treatment (question 10). The interpretation of DLQI is 0–1 = no effect, 2–5 = small effect, 6–10 = moderate effect, 11–20 = very large effect, 21–30 = extremely large effect.[16]

Statistical analysis

The data obtained were analyzed on SPSS version 23. For quantitative data mean has been used. We used Pearson's coefficient to find out correlations between variables (PDSS and DLQI) at 5% level of significance. A vale of $P < 0.05$ was considered significant.

Results

Our study included 99 cases. The male-to-female ratio was 1.67:1. The mean age was 51 ± 10.27 years (range 29–75 years). Most common (60;61%) age group affected was 36–55 years. The mean duration of disease was 8.47 ± 4.45 (range 1–30). Most of the patients were from rural area (74;75%), while 25% were from the urban region. Maximum patients were farmers by occupation. The most commonly affected patients were farmers (56;56.56%) by occupation followed by daily wagers (13;13.13%), housewives (6;6.06%), and least were Anganwadi workers, carpenters, and milkmen (1;1.01%). Seasonal variation in this dermatitis was appreciated in 96% patients showing summer-rainy season flare-up of the disease in 74 cases [Figure 1]. There were many patterns of dermatosis, among which the most common pattern was ABCD with CAD (45;45.44%), followed

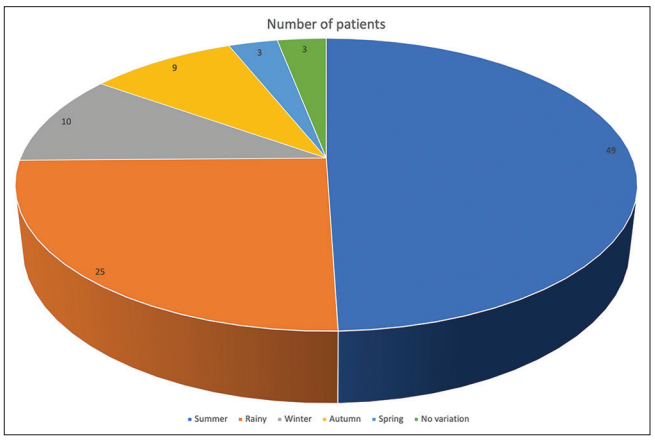

Figure 1: Distribution according to seasonal variation

by ABCD only (21.21%), CAD only (16.16%), atopic dermatitis (7.07%), prurigo nodularis (4.04%), seborrheic dermatitis (3.03%), erythroderma (2.02%), and vesicular feet and hand eczema (1.01%). PDSS varied from 20 to 92 with the mean 57.25 ± 17.65. DLQI varied between 6 and 28 with the mean value of 17.14 ± 5.56 [Table 1]. We did inter-analysis according to the DLQI questions with the maximum scoring and which revealed that parthenium dermatitis affected "symptoms & feelings" followed by "personal relationship". There was no statistically significant effect of age or gender, seasonal variation or occupation on quality of life while duration of disease had an impact on quality of life. A significant positive correlation was observed between PDSS and DLQI (Pearson's correlation).

There was a positive correlation of age of patients in years with PDSS and DLQI ($P < 0.05$).

There was a positive correlation of duration of disease with PDSS and DLQI ($P < 0.05$).

There was a positive correlation between PDSS and DLQI ($P < 0.05$) and according to r value, if PDSS increased, then DLQI also increased.

All patients were on oral prednisolone 10 mg PO, and stopped it before 1 week of patch test.

Discussion

Parthenium dermatitis is the most common cause of allergic plants dermatitis in India, accounting for nearly 40% of cases.[4-6] It has profound implications on financial aspect as well as quality of life in patients affected due to chronicity of disease and seasonally fluctuating severity. In our study, male-to-female ratio was 1.67:1, in agreement to study by Verma *et al*.,[11] which showed it to be more prevalent in men.

In our study, rural-to-urban ratio was 3:1. It was in congruence with previous studies[11] with similar findings of it being more prevalent in people hailing from rural background.

In our study maximum patients were involved in outdoor occupations exposing them to frequent allergens from *P. hysterophorus* growing in wasteland and agricultural land. Among them maximum were farmer by occupation amounting to 56 (56%) cases; other were daily wagers working in part time in farms and other cleaning and road making activities 13 (13.13%); housewives 6 (6.06%); teachers 5 (5.05%); mason and shepherds 4 (4.04%) each; shopkeepers and public health nurse 3 (3.03%) each; gardener 2 (2.02%); Anganwadi worker, carpenter, milkman 1 (1.01%) each.

In our study seasonal flare-up of disease was observed in most of the patients affected, with maximum flare-up observed in summer season in 49 patients (49.49%), followed by rainy season flare-up in 25 (25.25%) cases. Previous studies[11] on parthenium dermatitis also reflect similar findings.

In the present study, mean PDSS was 57.25 ± 17.65 with scores: mild disease in 35 patients, moderate disease in 37 patients, and severe disease in 26 patients.

In our study mean DLQI was 17.14 ± 5.56 with scores: 6–10 in 13 (13.13%), 11–20 in 50 (50.50%), and 21–30 in 36 (36.36%) patients, respectively, reflecting moderate to very large to extremely large effect on quality of life in the persons affected. In a study done by Waranya Boonchai *et al*.[17] mean DLQI 9.5, which was less as compared to our study.

A significant positive correlation was observed between clinical severity (depicted by PDSS) and quality of life.

Table 1: PDSS and DLQI scoring

Parthenium Dermatitis Severity Scoring (PDSS)						
	Frequency			Percentage (%)		
PDSS						
0-50 (mild)	35			35.35		
51-75 (moderate)	37			37.37		
76-99 (severe)	27			26.73		
Mean±SD	57.25±17.65					
Dermatology Life Quality Index (DLQI)						
DLQI Scoring						
0-1 (no effect)	0			0		
2-5 (mild effect)	0			0		
6-10 (moderate effect)	13			13.13		
11-20 (very large effect)	50			50.50		
21-30 (extremely large effect)	36			36.36		
Mean±SD	17.14±5.56					
Inter-analysis of DLQI questionnaire points						
Question number	1,2	3,4	5,6	7	8,9	10
Number of patients	44	22	18	40	22	21
Percentage	44.44%	22.22%	18.18%	40.40%	22.22%	21.21%

We could not find any previous study done earlier to assess QoL in patients with parthenium dermatitis.

Limitations of our study: Small Sample size was taken. As This was hospital-based study, so our sample may not be true representative of exact burden of pathenium dermatitis.

Conclusion

In this study, a significant impairment in quality of life was observed in patients with higher score of PDSS and its positive correlation with increasing duration and age emphasizing that the disease needs specialized care including indoor admission at the time of flare-up of disease.

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Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Lonkar A, Mitchell JC, Calnan CD. Contact dermatitis from Parthenium hysterophorus. Trans St Johns Hosp Dermatol Soc 1974;60:43-53.
2. Evans HC. Parthenium hysterophorus: A review of its weed status and the possibilities for biocontrol. Biocontrol News Information 1997;18:89-98.
3. Lovell CR. Plants and the Skin. Oxford: Blackwell Scientific; 1993.
4. Mitchel JC, Calnan CD. Scourge of India: Parthenium dermatitis. Int J Dermatol 1978;17:303-4.
5. Lonkar A, Jog MK. Dermatitis caused by a plant Parthenium hysterophorus Linn. A preliminary report. Indian J Dermatol Venerol 1968;34:194-6.
6. Sharma VK. Patch testing with the Europian standard series and compositae extracts in patients with airborne contact dermatitis. Contact Dermatitis 2001;44:49-50.
7. Warshaw EM, Zug KA. Sesquiterpene lactone allergy. Am J Contact Dermat 1996;7:1-23.
8. Lonkar A, Nagasampagi BA, Narayanan CR, Landge AB, Sawaikar DD. An antigen from Partheniumhysterophorus Linn. Contact dermatitis 1976;2:151-4.
9. Lakshmi C, Srinivas CR. Type 1 hypersensitivity to Parthenium hysterophorus in patients with parthenium dermatitis. Indian J Dermatol Venereol Leprol 2007;73:103-5.
10. Sharma SC, Kaur S. Contact dermatitis from compositae plants. Indian J Dermatol Venereol Leprol 1990;56:27-30.
11. Verma KK, Sirka CS, Ramam M. Contact dermatitis due to plants: Challenges and prospects. Indian Pract 2001;54:791-6.
12. Sharma VK, Verma P. Parthenium dermatitis in India: Past, present and future. Indian J Dermatol Venereol Leprol 2012;78:560-8.
13. Verma KK, Bansal A, Bhari N, Sethuraman G. Parthenium dermatitis severity score to assess clinical severity of disease. Indian J Dermatol 2017;62:85-7.
14. Basra MK, Fenech R, Gatt RM, Salek MS, Finlay AY. The dermatology life quality index 1994-2007: A comprehensive review of validation data and clinical results. Br J Dermatol 2008;159:997-1035.
15. The World Health Organization Quality of Life assessment (WHOQOL): Position paper from the World Health Organization. Soc Sci Med 1995;41:1403-9.
16. Finlay AY, Khan GK. Dermatology life quality index (DLQI): A simple practical measure for routine clinical use. Clin Exp Dermatol 1994;19:210-6.
17. Boonchai W, Charoenpipatsin N, Winayanuwattikun W, Phaitoonwattanakij S, Sukakul T. Assessment of the quality of life (QoL) of patients with dermatitis and the impact of patch testing on QoL: A study of 519 patients diagnosed with dermatitis. Contact Dermatitis 2020;83:182-8.