Summer-Associated Dermatitis: A Cross-Sectional Study of a Unique Eczematous Dermatosis in South India

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Abstract

Background: In our hospital setup located in the tropical zone, during each summer, we frequently come across a unique eczematous dermatosis among elderly females that typically occur in summer. Aims and Objectives: We carried out this study with the objective of studying the demographic and clinical features of this dermatosis. Materials and Methods: In this hospital-based descriptive study, we enrolled twenty consecutive patients presenting with typical features of the dermatosis of interest, such as itchy eczematous scaly papule and plaques distributed predominantly over flexures, self-limiting in nature, and with summer exacerbation. Detailed history, clinical examination, and laboratory investigations were carried out. Results: All were females with a mean age of 52.35±15.74 years. Mean age at onset of the disease was 50.80±15.77 years. The onset and exacerbation of lesions typically occurred during summer. The mean duration of the disease was 17.75±15.80 months. The typical lesions were multiple well-defined erythematous scaly papules and plaques bilaterally symmetrically distributed predominantly over the flexures. All biopsies showed spongiotic dermatitis picture and direct immunofluorescence was negative in all of them. Conclusion: This unique dermatosis which occurs in elderly females has not been widely reported. With clinical features and results of various investigations, it would be appropriate to call it “summer-associated dermatitis.”

Key Words: Eczema, females, menopause, spongiotic dermatitis, summer

Introduction

In a tropical country like India, summer season has been associated with occurrence of certain infectious and noninfectious dermatoses. Miliaria rubra, polymorphous light eruption which occur in summer, and dermatoses which show summer exacerbation such as Hailey–Hailey disease, Grover’s disease, and Darier’s disease are some of the noninfectious dermatoses common in summer.[1] Beside all these dermatoses, in our hospital setup, during each summer for the past 10 years, we frequently encountered a unique scaly eczematous dermatosis among elderly women which did not fit into any of the known exogenous or endogenous eczema. After an extensive literature search, it is puzzling to notice that there has been no detailed account of such a dermatosis. Hence, we decided to carry out this study with objectives of studying the demographic and clinical features of this unique dermatosis and to elucidate possible etiology.

Materials and Methods

This hospital-based descriptive study was carried out in the Department of Dermatology of our institution during the period April 2014 to October 2015. The data collection spanned over two consecutive summers (as the disease intended to be studied occurred during summer). The study was approved by the Institutional Ethics Committee and reported in accordance with the STROBE guidelines. Written informed consent was obtained from the study participants.

Clinical data collection

Enrollment of patients was done based on the following characteristic features of the dermatosis, with concurrence of two dermatology consultants not involved in the study.

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• Typical eczematous, scaly papules and plaques distributed predominantly over flexural areas
• Onset and exacerbation during summer
• Itching aggravated by sweating
• Complete remission during winter.

All patients with typical above-mentioned features and age above 18 years were considered for inclusion in the study. Elaborate history regarding onset, duration, progression, recurrence, and associated symptoms of the dermatosis was taken. Special attention was given to seasonal variation in its occurrence. We made a detailed account of morphology, site, and pattern of the dermatosis. Differential diagnoses such as adult-onset atopic dermatitis, flexural psoriasis, flexural pityriasis rosea, Pityriasis lichenoides chronica, seborrheic dermatitis, dermatophytosis, Hailey–Hailey diseases, and secondary syphilis; dermatoses which exacerbate during summer such as miliaria rubra, Grover's disease, and polymorphic light eruption were excluded based on clinical and histopathological features.

Investigations

Necessary laboratory investigations were done to identify possible etiology of this dermatosis. Biopsy was done from the lesions after obtaining informed consent. The biopsy specimen was sent for histopathology, direct immunofluorescence (DIF), periodic acid–Schiff (PAS) stain, and modified Brown and Brenn staining. Other investigations done are tabulated [Table 1].

Statistical analysis

Data analysis was done using Epi Info (Epi Info 7. CDC, Atlanta, GA, USA). Patient demographics and clinical characteristics were summarized descriptively. Frequency, proportion, mean, and standard deviation were calculated.

| Table 1: List of other laboratory investigations done |
|-----------------------------------------------------|
| Complete blood count                                |
| Total leukocyte count                               |
| Differential leukocyte count                        |
| Absolute eosinophil count                           |
| Random blood sugar                                  |
| Liver function test                                 |
| Renal function test                                 |
| Venereal disease research laboratory test           |
| HIV ELISA                                           |
| ANA                                                 |
| Scraping and KOH examination for fungus             |
| Scraping for bacterial and fungal culture and sensitivity |
| ANA: Antinuclear antibodies                         |

Results

Sociodemographic features

We enrolled 20 consecutive patients with features of eczematous eruptions who fulfilled the criteria during the study period. All were female with a mean age of 52.35±15.74 years. Fourteen patients belonged to menopausal age group. The youngest patient in our study was 23 year old. All patients were south Indians. Fifteen of them were housewives, four were farmers, and one was an office goer.

Clinical features

Mean age at onset of the disease was 50.80±15.77 years. All patients had the onset of lesions typically during summer and the disease exacerbated during each summer. The mean duration of the disease was 17.75±15.80 months. The median number of episodes was 3, the range being 1 to 10. Each episode lasted for a duration ranging from 1 to 12 weeks with a mean of 4.65±3.66 weeks. The lesions were symptomatic in all patients with 15 patients complaining of itching, one patient with burning sensation alone, and four patients with both the symptoms. All patients reported complete remission during rainy and winter season. None of them reported even a single recurrent episode during winter. None of the patients were known diabetic or hypertensive. None of them had a chronic drug intake or specific drug intake before the onset of lesions. None of them had features suggestive of atopic dermatitis. The typical lesions were multiple well-defined erythematous scaly papules and plaques bilaterally symmetrically distributed [Figure 1]. Few lesions had a violaceous hue. Typical sites involved were axillary, infra-axillary, mammary, submammary areas, lower abdomen, groin, inner aspect of thighs, arms, buttock, and upper back (in the decreasing order of occurrence) [Figures 2 and 3]. Neck was involved in three patients [Figure 4]. One
patient who presented with exacerbation for the second time had lesions over bilateral legs. The mean percentage body surface area involved was 23.50±15.65. The summary of clinical features is given in Table 2. Ten of the enrolled patients reviewed us with at least one recurrent episode during the study period, and all the recurrences were during summer season only.

**Investigations and treatment**

Complete blood count and total leukocyte count were within normal limits in all patients. Ten had elevated absolute eosinophil count (AEC). The mean AEC was 416/µL. Venereal disease research laboratory and HIV ELISA were negative in all patients. Antinuclear antibody (ANA) was negative in all patients. Scraping with KOH examination for fungus was positive in two patients. None of them were positive for fungal culture. Bacterial culture of scraping material in one patient had a heavy growth of *Staphylococcus aureus*.

Fifteen patients gave consent for biopsy. Histopathological examination revealed spongiotic dermatitis picture in all patients. The epidermis showed minimal hyperkeratosis, acanthosis, and spongiosis. Dermis showed perivascular lymphocytic infiltrates. Eccrine coils were normal [Figure 5]. PAS staining and modified Brown and Brenn Gram stains yielded no positive results. DIF was done in fifteen patients and it did not show immunoreactivity in any of the patients. Patients were treated with emollients, topical steroids, and antihistamines which produced relief promptly.

**Discussion**

The dermatosis we studied presented with typical scaly plaques and papules distributed over the axilla, abdomen, groin, inner aspect of thigh, and inframammary area. The dermatosis is distinct by its predilection for females predominantly of menopausal age group; itching and burning sensation; onset and exacerbation during summer. Seasonal occurrence (summer), female preponderance, exanthematous nature of the dermatosis prompted us to do immunological tests such as ANA and DIF. The DIF was duly negative for immunoreactants such as IgG, IgM, IgA, C3, and fibrin. Test for ANA was
Table 2: Clinical characteristics of the dermatoses in each patients

| Age  | Sex   | Total duration since first episode | Number of episodes | Duration of each episode (weeks) | Symptoms                      | Description of lesions                              | Sites involved                          | Skin biopsy              | DIF                        |
|------|-------|-----------------------------------|--------------------|----------------------------------|-------------------------------|-----------------------------------------------|----------------------------------------|--------------------------|----------------------------|
| 38   | Female| 2 years                           | 5                  | 2                                | Itching                       | Scaly papules and plaques                     | Mammary, chest, abd, arms, buttock, thigh | Scaly dermatitis          | Negative                  |
| 25   | Female| 1 week                            | 1                  | 1                                | Itching, burning              | Scaly papules and plaques                     | Deltoid, trunk, mammary, abd             | Spongiotic dermatitis     | Negative                  |
| 72   | Female| 6 months                           | 3                  | 6                                | Itching, burning              | Erythematous scaly plaques and papules       | Axilla, groin, inframammary, upper back  | Spongiotic dermatitis     | Negative                  |
| 23   | Female| 2 weeks                           | 1                  | 2                                | Itching, burning              | Erythematous scaly plaques                   | Axilla, mammary, abd                     | ND                       | ND                        |
| 50   | Female| 6 months                           | 2                  | 4                                | Itching                       | Scaly papules and plaques                     | Neck, mammary, submammary                | Spongiotic dermatitis     | Negative                  |
| 65   | Female| 3 years                            | 3                  | 8                                | Itching, burning              | Scaly papules and plaques                     | Inframammary, axilla, abd                | Spongiotic dermatitis     | Negative                  |
| 49   | Female| 2 years                            | 3                  | 6                                | Itching                       | Papules with excoriation, exfoliation         | Arms, mammary, back                      | ND                       | ND                        |
| 62   | Female| 3 months                           | 1                  | 12                               | Itching                       | Erythematous scaly papules and plaques       | Axilla, arms, thighs                     | Spongiotic dermatitis     | Negative                  |
| 60   | Female| 2 years                            | 4                  | 3                                | Itching                       | Erythematous scaly plaques and plaques       | Neck, arms, thigh, abd, back             | Spongiotic dermatitis     | Negative                  |
| 68   | Female| 2 years                            | 3                  | 4                                | Itching                       | Erythematous scaly plaques                   | Forearms, trunk, thigh                   | Spongiotic dermatitis     | Negative                  |
| 72   | Female| 2 years                            | 3                  | 2                                | Itching                       | Erythematous scaly plaques                   | Thighs, axilla                          | Spongiotic dermatitis     | Negative                  |
| 47   | Female| 2 years                            | 3                  | 12                               | Itching                       | Scaly papules and plaques                     | Axilla, abd, gluteal region, groin, thigh | Spongiotic dermatitis     | Negative                  |
| 39   | Female| 3 years                            | 10                 | 2                                | Severe itching                | Erythematous scaly plaques                   | Abd, forearm, back, lower leg            | Spongiotic dermatitis     | Negative                  |
| 38   | Female| 4 years                            | 4                  | 3                                | Itching                       | Erythematous scaly plaques and plaques       | Neck, axilla, forearm, chest, abd, back   | Chronic dermatitis        | Negative                  |
| 47   | Female| 3 years                            | 3                  | 5                                | Severe itching                | Erythematous scaly plaques and plaques       | Scaly plaques                           | Sub-acute spongiotic dermatitis | Negative                  |
| 65   | Female| 1 month                            | 1                  | 4                                | Itching                       | Erythematous scaly plaques and plaque        | Axilla, mammary, back                    | Spongiotic dermatitis     | Negative                  |
| 32   | Female| 4 days                             | 1                  | 1                                | Burning                       | Erythematous papules and plaque              | Axilla, thighs                          | ND                       | ND                        |
| 60   | Female| 7 days                             | 1                  | 1                                | Itching                       | Hyperpigmented scaly papules and plaques     | Thighs, abd back, chest, extremities      | Spongiotic dermatitis     | Negative                  |
| 70   | Female| 3 months                           | 1                  | 12                               | Itching                       | Scaly hyperpigmented violaceous plaques      | Lower abd, thighs, axilla                | ND                       | ND                        |
| 65   | Female| 3 years                            | 5                  | 3                                | Itching                       | Erythematous, hyperpigmented scaly plaque    | Lower abd, inframammary, axilla, medial aspect of thigh | ND                       | ND                        |

ND: Not done, DIF: Direct immunofluorescence, Abd: Abdomen
also negative. Etiological role of any bacteria and fungus was ruled out with appropriate tests.

The role of any allergen in producing this spongiotic dermatitis could not be ruled out by patch test, as most of the participants had active lesions over skin surfaces traditionally suggested for patch test. Nonexposure to any known occupational or plant allergens in history, pattern of distribution of lesions, and involvement of covered parts of the body refute the possibility of exogenous eczema such as allergic contact dermatitis.

The two positive skin scrapings for fungus showed branched septate hyphae. Considering the hot humid weather and high prevalence of dermatophytosis, these two patients could have been coinfected with dermatophytes. These two patients had widespread lesions over the body and lesions did not respond to antifungal medication.

The possibility of adult- or senile-onset atopic dermatitis was conclusively refuted as disease studied showed predilection for female gender, typical summer exacerbation, and absence of lichenified plaques in all of them, whereas the former presents with inflammatory eczema with lichenification, affecting the flexures and extensors, hands, shoulders, neck, face, and eyelids. Hence, serum immunoglobulin E (IgE) levels were not done. Further differentiating features are tabulated in Table 3.

A similar dermatosis named as tropical eczema reported by Devi et al. presented as oozing lesions to begin with and turned into a scaly dermatosis later on. Some of the patients were reported to have pustules. They reported the dermatoses in two male patients as well. In contrast to these observations, none of our study participants had oozing lesions or pustules and all patients were female. The age distribution was similar in both the

| Table 3: Comparison between adult/senile onset atopic dermatitis, Grover’s disease, and the dermatosis studied |
|---------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| Features                        | Adult/Senile-onset atopic dermatitis[^2,3] | Grover’s disease[^4-4] | Summer-associated dermatitis |
|---------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| Prevalence                      | Rare                                            | Rare                                            | Rare                                            |
| Sex predilection                | Female predilection                            | Male                                            | Female                                          |
| Senile-onset atopic dermatitis  | has male predilection                          |                                                  |                                                  |
| Age distribution (years)        | 20-80 years                                     | 61 (22-100)                                     | 52.35 (mean)                                    |
| Age at onset                    | For adult-onset type 20-40 years                | For senile-onset atopic-type fifth decade       | 50.80±15.77 years                               |
| Symptoms                        | Pruritus                                        | Papules and vesicles                            | Pruritus/burning                                 |
| Morphology                      | Inflammatory eczema with lichenification        |                                                   | Erythematous scaly papules and plaques          |
| Distribution                    | Flexures and extensors, hands, shoulders, neck, face, and eyelids | Trunk and proximal extremities                   | Axillae, mammary and infra-mammary areas, medial thigh (predominantly over flexures) |
| Average duration                | In years                                        | 2-4 weeks                                       | 1-12 (mean 4.75) weeks                          |
| Seasonal exacerbation           | Winter                                          | During summer (doubtful)                        | During summer                                    |
| Course of the disease           | Persistent and long duration                    | Transient eruptive                              | Recurrent and self-limiting                      |
| Key pathology                   | Acute/chronic spongiotic dermatitis             | Persistent pruritic                             |                                                  |
|                                 |                                                 | Chronic asymptomatic                            |                                                  |
|                                 |                                                 | Pemphigus vulgaris-like (acantholytic is the most common) |                                                  |
|                                 |                                                 | Darier’s disease-like                           | Subacute spongiotic dermatitis                   |
|                                 |                                                 | Spongiotic-like                                 |                                                  |
|                                 |                                                 | Hailey-Hailey-like                              |                                                  |
| Immunology                      | Negative DIF                                    | Negative DIF                                    | Negative DIF                                    |
|                                 | Positive serum IgE                              |                                                  |                                                  |
| Treatment                       | Topical/systemic steroids                        | Topical/systemic steroids                        | Topical steroids                                |
|                                 |                                                  |                                                  | Emollients                                       |

DIF: Direct immunofluorescence, IgE: Immunoglobulin E
studies. Most of them were above 40 years of age. The outcome of routine investigations and histopathological examination was similar.

Grover’s disease, miliaria rubra, flexural/eczematosus pityriasis rosea, pityriasis lichenoides chronicum, and dermatophytosis were considered as differential diagnosis. Because of close resemblance of this dermatosis to Grover’s disease, we have tabulated the differentiating features [Table 3]. Other common dermatoses in adults which had preferential involvement of intertriginous/flexural areas are irritant dermatitis, allergic contact dermatitis, intertrigo (Streptococcus, Staphylococcus, Corynebacterium, and Candida infections), tinea cruris, inverse psoriasis, pemphigus vegetans, Hailey–Hailey disease, acute generalized exanthematous pustulosis, symmetric drug-related intertriginous and flexural exanthema, symmetric drug-related intertriginous and flexural exanthema (SDRIFE), and systemic contact dermatitis (SCD).[8] A unique SCD, called as symmetric, was reported by Hausermann et al. recently, wherein there was systemic exposure to allergen(s) without any prior cutaneous sensitization. Patients presented with papules, pustules, and vesicles symmetrically distributed in flexures with relative sparing of palmoplantar surface, scalp, face, and mucosa.[8,9] In comparison to SDRIFE, the dermatosis we studied was characterized by exclusive occurrence in females (predominantly postmenopausal) and lack of history of systemic exposure to any allergen.

A group of patients with eczema, who after exclusion of exogenous causes do not fit into any of the known types of endogenous eczema and they were classified as “unclassified endogenous eczema” (UEE). One of the earliest reports by Charles Calnan of St John’s Hospital for diseases of skin reported an occurrence of UEE to be 20%–30% of all eczema cases he saw. He suggested that it could arise as a result of degenerative changes in skin, as most of the affected patients belonged to old age or late middle life.[10] One of the recent observations reported it to be 32.1% of all eczema cases.[11] The dermatosis which we studied may be one of those UEE. UEE may be localized or generalized and occur on exposed and/or nonexposed parts of the body. The exact pathogenesis of UEE is not known. Elevated IgE levels were found in one-third of such cases in a study, pointing to possible role of atopy in them.[10,11] The rate of positivity for patch testing in UEE cases was 57.9% in a study by Li and Wang.[12] Review of all studies on UEE failed to give a clear account of the morphology, distribution, and pattern of such eczema and thus precluded any correlation of these observations with that of our study.

It is very difficult to postulate a pathogenetic mechanism for this dermatosis with most laboratory investigations yielding negative results. The role of climate is probably very important. This is because all patients reported spontaneous recovery after summer. In our part of the country, summer lasts from April to early June, when maximum temperature frequently hits 41°C (106°F). The average maximum temperature is 36°C (97°F). This is followed by a period of high humidity and occasional rain from June till September. This provides a unique setting where disorders such as miliaria herald the onset of summer. However, in this dermatosis, the eccrine coils were found to be normal in the histopathology, ruling out the role of these glands in the pathogenesis. Tropical climate with higher humidity and temperature may be a facilitating factor for onset and perpetuation of this dermatosis.

The other factors influencing the dermatosis are sex of the patient and hormones. The occurrence of this dermatosis predominantly in females of menopausal age group (around 50 years) points to a possible role of altered sex hormones during menopause. Deficiency of estrogen and androgen in menopause produces many physiological changes in skin and hair. Glands atrophy with resultant decrease in sebum and sweat, thereby leading to dryness of the skin. This affects the skin barrier function and may contribute to the occurrence of eczema.[13-16] In a retrospective study on menopausal dermatoses among Indian women, authors demonstrated eczematous dermatoses to be the most common among these women. The author of the study mentioned that climatic conditions and occupation were strong influencing factors for such an high occurrence of eczema in this group.[17]

Based on the observations made, we would like to put forward the diagnostic criteria for identification of this dermatosis.

1. Recurrent itchy scaly eczematous dermatoses predominantly distributed over flexures
2. Predilection for females of menopausal age group
3. Onset and exacerbation during summer season with absolute symptom-free period during winter
4. Spongiotic dermatitis on histopathological examination
5. Prompt response to topical steroids.

The fact that there have been no reports of this unique dermatosis from other parts of tropical zone is intriguing. Observational studies from the other parts of the country would give a fair idea of existence and prevalence of this dermatosis. It would be more appropriate to call this dermatosis as summer-associated dermatitis.

A small sample size and lack of patch testing among study participants are the limitations of the study. Patch test could not be done owing to the presence of active disease on most sites of the body where patches are usually applied. A prospective follow-up of patients
would have helped to ascertain the natural course of the disease. Lack of hormonal profile of the study subjects precluded further understanding of the role of hormones or lack of it in the disease pathogenesis.

Every geographic area in the world has dermatological disorders which are unique to its location. They occur due to the interplay between environmental and personal factors. Summer-associated dermatitis is one such understudied dermatosis that requires further prospective studies to understand its etiology and pathogenesis.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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