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Research Article

Cutaneous Manifestations Of Systemic Lupus Erythematosus: A Tertiary Center Study

Dr. Anushka Shree[1], Dr. Jashan Preet Singh[2], Dr. Pranab Kumar Saha[3]

[1]Dept of Dermatology, Mata Gujri Memorial Medical College and LSK Hospital
[2]Dept of Dermatology, Mata Gujri Memorial Medical College and LSK Hospital
[3]Professor, Dept of Dermatology, Mata Gujri Memorial Medical College and LSK Hospital

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Corresponding Author:

Dr. Anushka Shree
Dept of Dermatology, Mata Gujri Memorial Medical College and LSK Hospital

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ABSTRACT

Background: Systemic lupus erythematosus (SLE) is a chronic autoimmune disorder with multisystem involvement, often presenting with cutaneous manifestations. Skin lesions in SLE are diagnostically significant, reflecting disease activity and systemic involvement.
Aim: To evaluate the spectrum of cutaneous manifestations in patients with SLE and correlate clinical findings with histopathological and laboratory parameters.
Materials and Methods: A prospective observational study was conducted over one year (May 2023 – May 2024) at Mata Gujri Memorial Medical College and LSK Hospital, Kishanganj, Bihar. Fifty patients diagnosed with SLE based on American College of Rheumatology (ACR) criteria were enrolled. Detailed demographic, clinical, and laboratory data were collected. Cutaneous examination was performed in all patients, and skin biopsies were obtained in cases requiring histopathological confirmation. Data were analysed using SPSS version 25.0, with $p < 0.05$ considered statistically significant.
Results: Among 50 patients, 42 were female and 8 were male, with a mean age of 28.4 ± 9.2 years. The most common cutaneous manifestations were malar rash (60%), photosensitivity (56%), oral ulcers (40%), and discoid rash (30%). Less frequent manifestations included alopecia (24%), vasculitic lesions (12%), subacute cutaneous lupus erythematosus (8%), and lupus panniculitis (4%). Lesions predominantly involved the face (64%), scalp (24%), limbs (28%), trunk (20%), and oral mucosa (40%). Histopathology revealed interface dermatitis (90%), epidermal atrophy (60%), follicular plugging (40%), dermal perivascular lymphocytic infiltrate (75%), and mucin deposition (25%). Laboratory evaluation showed ANA positivity in 96%, anti-dsDNA in 70%, low C3 in 56%, and low C4 in 50% of patients. Hematologic abnormalities and proteinuria were also noted.
Conclusion: Cutaneous manifestations are highly prevalent in SLE and exhibit distinct clinical and histopathological features. Early recognition and correlation with laboratory findings are crucial for timely diagnosis, monitoring disease activity, and preventing systemic complications. Dermatologic assessment should be an integral component of routine SLE management.

Keywords*: Systemic lupus erythematosus, cutaneous manifestations, malar rash, discoid lupus, histopathology, ANA, photosensitivity.*

INTRODUCTION

Systemic lupus erythematosus (SLE) is a chronic autoimmune disorder characterised by multisystem involvement, with cutaneous manifestations being among the most prevalent and diagnostically significant features. These dermatologic signs not only aid in the initial diagnosis but also reflect disease activity and prognosis. The skin is the second most frequently affected organ system in SLE, with cutaneous manifestations occurring in 70–85% of patients [1].

Cutaneous lupus erythematosus (CLE) encompasses a spectrum of skin lesions, including acute, subacute, and chronic forms. The acute form is often associated with systemic involvement and is characterized by a malar rash, commonly referred to as the "butterfly rash," which is present in approximately 46–65% of patients with SLE [2]. Subacute cutaneous lupus erythematosus (SCLE) presents with annular or polycyclic lesions, while chronic cutaneous lupus erythematosus (CCLE), including discoid lupus erythematosus (DLE), is characterized by scarring and potential for permanent skin damage [2,3].

The pathogenesis of CLE involves immune complex deposition in the skin, leading to inflammation and tissue damage. Histopathologically, common findings include interface dermatitis, epidermal atrophy, follicular plugging, and dermal perivascular lymphocytic infiltrate [4]. The lupus band test, a direct immunofluorescence technique, can be utilized to detect IgG and complement deposits at the dermoepidermal junction, aiding in distinguishing SLE from other dermatologic conditions [5].

Given the high prevalence and diagnostic significance of cutaneous manifestations in SLE, this study aims to evaluate the spectrum of skin lesions in patients diagnosed with SLE at a tertiary care center in Kishanganj, Bihar. By correlating clinical findings with histopathological and laboratory data, the study seeks to enhance understanding of the dermatologic aspects of SLE and contribute to improved patient management.

MATERIAL AND METHODS

Study Design and Setting:

This was a prospective observational study conducted over a period of one year, from May 2023 to May 2024, at **Mata Gujri Memorial Medical College and LSK Hospital, Kishanganj, Bihar**. The study aimed to evaluate the cutaneous manifestations in patients diagnosed with **Systemic Lupus Erythematosus (SLE)**.

Sample Size:

A total of **50 patients** diagnosed with SLE were enrolled in the study based on the **American College of Rheumatology (ACR) criteria for SLE**.

Inclusion Criteria:

- Patients of all age groups diagnosed with SLE according to ACR criteria.
- Both male and female patients.
- Patients providing informed consent for participation.

Exclusion Criteria:

- Patients with overlapping autoimmune disorders.
- Patients with chronic dermatological conditions not related to SLE.
- Patients who did not give consent for clinical examination or skin biopsy (if needed).

Data Collection:

- Detailed **demographic data** (age, sex) and **clinical history** (duration of disease, systemic involvement, prior treatments) were recorded.
- **Cutaneous examination** was performed in all patients to identify and document the type, distribution, and morphology of skin lesions. Photographs were taken where appropriate.
- Laboratory investigations, including **complete blood count, ANA, anti-dsDNA, complement levels**, and other relevant tests, were reviewed.

Histopathological Examination:

- In patients where diagnosis was uncertain or skin biopsy was indicated, **skin biopsies** were performed.
- Specimens were fixed in **10% formalin**, processed, and stained with **Hematoxylin and Eosin (H&E)**.
- Histopathological findings were correlated with clinical manifestations.

Ethical Considerations:

- Written informed consent was obtained from all participants.
- Ethical approval was obtained from the institutional ethics committee of **Mata Gujri Memorial Medical College and LSK Hospital**.

Data Analysis:

- Data were entered in **Microsoft Excel** and analysed using **SPSS version 25.0**.
- Continuous variables were expressed as **mean ± standard deviation (SD)**, and categorical variables were expressed as **frequencies and percentages**.

- Correlation between clinical and histopathological findings was assessed using appropriate statistical tests, with **$p < 0.05$ considered significant**.

RESULTS AND OBSERVATIONS

A total of **50 patients** diagnosed with **Systemic Lupus Erythematosus (SLE)** were included in the study. The mean age was **28.4 ± 9.2 years**, with a female predominance (**42 females, 8 males; female-to-male ratio 5.25:1**). The duration of disease ranged from **6 months to 12 years**.

Table 1: Age and Gender Distribution of Patients

Age Group (years)	Male (n)	Female (n)	Total (n)	Percentage (%)
<20	1	5	6	12
21–30	3	18	21	42
31–40	2	12	14	28
>40	2	7	9	18
Total	8	42	50	100

Table 2: Clinical Cutaneous Manifestations Observed in SLE Patients

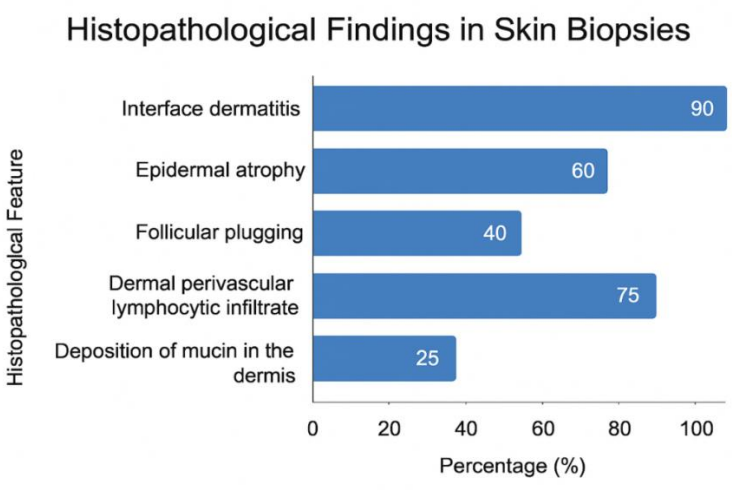
Cutaneous Manifestation	Number of Patients (n)	Percentage (%)
Malar rash (butterfly rash)	30	60
Discoid rash	15	30
Photosensitivity	28	56
Oral ulcers	20	40
Alopecia (scarring/non-scarring)	12	24
Vasculitic lesions	6	12
Subacute cutaneous lupus erythematosus	4	8
Lupus panniculitis	2	4

Table 3: Distribution of Skin Lesions

Site of Involvement	Number of Patients (n)	Percentage (%)
Face (malar and forehead)	32	64
Scalp	12	24
Limbs	14	28
Trunk	10	20
Oral mucosa	20	40

Table 4: Histopathological Findings in Skin Biopsies

Histopathological Feature	Number of Biopsies (n)	Percentage (%)
Interface dermatitis	18	90
Epidermal atrophy	12	60
Follicular plugging	8	40
Dermal perivascular lymphocytic infiltrate	15	75
Deposition of mucin in the dermis	5	25



Figure; 1 Histopathological Findings in Skin Biopsies

Table 5: Haematological Parameters (CBC) in SLE Patients (n = 50)

Parameter	Mean ± SD	No. of Abnormal Cases	Percentage (%)
Haemoglobin (g/dL)	11.2 ± 2.1	20	40
Total Leukocyte Count (×10³/μL)	6.8 ± 2.5	12	24
Platelet Count (×10³/μL)	210 ± 65	8	16

Table 6: Immunological Parameters in SLE Patients (n = 50)

Test	Positive Cases (n)	Percentage (%)
ANA	48	96
Anti-dsDNA	35	70
Low C3	28	56
Low C4	25	50

Table 7: Other Relevant Laboratory Findings

Test	Abnormal Cases (n)	Percentage (%)
Proteinuria (>300 mg/day)	10	20
Elevated Serum Creatinine	6	12
Elevated Liver Enzymes	4	8
Positive Urinalysis (RBCs/WBCs)	12	24

DISCUSSION

In this prospective observational study of 50 patients with systemic lupus erythematosus (SLE), cutaneous manifestations were evaluated and correlated with histopathological and laboratory findings. The mean age of patients was 28.4 ± 9.2 years, consistent with previous studies indicating that SLE predominantly affects young adults, especially women [1,2]. The female-to-male ratio in this study was 5.25:1, which aligns with the well-documented female predominance in SLE, generally reported between 4:1 and 9:1 [1,6].

Clinical Cutaneous Manifestations

The most frequent cutaneous manifestation was the malar rash, observed in 60% of patients. This prevalence is comparable to other studies, where the malar rash has been reported in 46–65% of SLE patients [2,6]. Photosensitivity was present in 56% of cases, highlighting its importance as a diagnostic criterion and its potential role as an early indicator of disease activity [2,7]. Oral ulcers, seen in 40% of patients, were consistent with mucocutaneous involvement reported in the literature [6,8].

Discoid rash, a hallmark of chronic cutaneous lupus erythematosus (CCLE), was observed in 30% of patients. Although less common than acute lesions, discoid lesions are clinically significant due to their potential for scarring and permanent alopecia [3,7]. Alopecia, both scarring and non-scarring, was observed in 24% of patients, reflecting the involvement of scalp hair follicles in active and chronic cutaneous lesions [7]. Vasculitic lesions were rare, present in 12% of cases, consistent with reports suggesting that vasculitis is a less common manifestation of SLE [9]. Subacute cutaneous lupus erythematosus (SCLE) and lupus panniculitis were observed in 8% and 4% of patients, respectively, consistent with the literature that reports SCLE as less frequent but clinically significant due to its photosensitive distribution and potential systemic associations [2,10].

The distribution of lesions primarily involved the face (64%), followed by scalp (24%), limbs (28%), trunk (20%), and oral mucosa (40%). This pattern is consistent with previous studies, which have reported the face and sun-exposed areas as the most common sites, reflecting the role of ultraviolet light as a trigger in SLE [1,2,7].

Histopathological Correlation

Skin biopsies revealed interface dermatitis in 90% of patients, epidermal atrophy in 60%, follicular plugging in 40%, dermal perivascular lymphocytic infiltrate in 75%, and dermal mucin deposition in 25%. These histopathological findings are characteristic of SLE skin lesions and correlate well with clinical subtypes [4,7]. Interface dermatitis is considered a hallmark of lupus erythematosus, resulting from immune-mediated basal keratinocyte damage. Follicular plugging and epidermal atrophy are commonly associated with chronic lesions, such as discoid lupus, and explain the permanent alopecia seen in some patients [4,7,8]. Dermal perivascular lymphocytic infiltrates reflect chronic inflammatory activity, and mucin deposition is indicative of extracellular matrix remodelling triggered by immune dysregulation [4,11].

Laboratory and Immunological Findings

Positive antinuclear antibody (ANA) was observed in 96% of patients, while anti-dsDNA was positive in 70%. Complement levels were reduced in 56% (C3) and 50% (C4), highlighting the role of immune complex-mediated

pathogenesis in SLE [2,8]. Haematological abnormalities, including anaemia (40%), leukopenia (24%), and thrombocytopenia (16%), were observed, consistent with prior studies documenting hematologic involvement as a common systemic feature [1,6]. Proteinuria (>300 mg/day) was present in 20% of patients, emphasising the need for renal monitoring due to the risk of lupus nephritis [2,9].

Pathophysiology and Clinical Implications

Cutaneous manifestations of SLE result from complex interactions between genetic predisposition, environmental triggers (such as ultraviolet light), and immune dysregulation leading to autoantibody production and immune complex deposition in the skin [3,7]. Acute lesions, such as malar rash, indicate active systemic disease, whereas chronic lesions, such as discoid rash and scarring alopecia, reflect longstanding inflammation.

The high prevalence of cutaneous manifestations in SLE underscores the importance of dermatologic evaluation in early diagnosis and disease monitoring. Recognition of specific lesions allows clinicians to anticipate systemic involvement, tailor therapy, and monitor disease activity. For instance, patients with SCLE may require strict photoprotection, whereas those with CCLE may benefit from systemic immunosuppressive therapy to prevent scarring [2,3,10].

Comparison with Previous Studies

Our findings are consistent with prior reports from both Asian and Western populations. Kole and Ghosh (2009) reported malar rash in 58% of Indian patients, while Uva et al. (2012) reported photosensitivity in 55% and oral ulcers in 42% of SLE cases [6,5]. Histopathological patterns in our study were also similar to those described by Baltaci et al. (2009), confirming that interface dermatitis, follicular plugging, and perivascular infiltrates are consistent histologic markers across populations [4].

Limitations

The main limitations of this study include its single-centre design and relatively small sample size, which may limit generalizability. Direct immunofluorescence studies were not performed, which could have added diagnostic precision. Furthermore, the cross-sectional design precludes evaluation of temporal changes in cutaneous lesions over the course of the disease. Future multicenter longitudinal studies incorporating immunofluorescence and molecular markers are recommended to better characterise cutaneous SLE [11,12].

CONCLUSION

This study highlights the diverse spectrum of cutaneous manifestations in SLE and their correlation with histopathological and laboratory findings. Early recognition and accurate diagnosis of skin lesions are essential for effective management and prevention of systemic complications. Dermatologic assessment should be an integral component of routine SLE care, and clinicians should remain vigilant for less common manifestations such as SCLE and lupus panniculitis.

Declaration:

Conflicts of interests: The authors declare no conflicts of interest.

Author contribution: All authors have contributed in the manuscript.

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