Section: Miscellaneous

Original Research Article

CUTANEOUS MANIFESTATIONS IN SYSTEMIC LUPUS ERYTHEMATOSUS: CLINICAL SPECTRUM AND CORRELATION BETWEEN CLASI AND SLEDAI

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ABSTRACT

Background: Cutaneous manifestations are common in systemic lupus erythematosus (SLE) and range from transient photosensitive eruptions to chronic scarring lesions. The relationship between objective skin involvement and systemic disease activity remains incompletely characterized. This study designed to describe the clinical spectrum of cutaneous lupus in a SLE cases and evaluate correlations between skin scores, serology, and renal involvement.
Material and Methods: This cross-sectional analysis of 78 consecutive SLE patients with dermatology documented cutaneous manifestations. Cutaneous disease was categorized as acute cutaneous lupus erythematosus (ACLE), subacute CLE (SCLE), chronic CLE/discoid lupus erythematosus (DLE), other specific CLE, or nonspecific lupus-associated lesions. Skin activity and damage were measured using the Cutaneous Lupus Erythematosus Disease Area and Severity Index (CLASI-A and CLASI-D). Systemic disease activity was assessed with SLEDAI. Serology (anti-dsDNA, anti-Ro/SSA) and complement levels (C3/C4) were recorded. Associations were tested using Pearson/Spearman correlation, Fisher's exact test, and multivariable logistic regression for predictors of lupus nephritis.
Results: Mean age was 29.4 years; 80.8% were female. DLE was the most frequent subtype (42.3%); ACLE and SCLE accounted for 20.5% and 17.9%, respectively. Mean CLASI-A was 5.8±3.3 and mean SLEDAI 6.3±3.6. CLASI-A correlated strongly with SLEDAI ($r \approx 0.88$, $p<0.001$). ACLE patients had higher nephritis prevalence than DLE (≈81% vs 30%; Fisher $p \approx 0.01$). In multivariable analysis, higher CLASI-A, anti-dsDNA positivity and low complement were associated with increased odds of nephritis after adjustment.
Conclusion: In this cohort, objective skin inflammation measured by CLASI paralleled systemic disease activity and identified patients at higher risk of renal involvement, particularly those with ACLE and active serology. Routine dermatologic scoring alongside serologic
monitoring may aid early detection of systemic flares and guide management.
Keywords: Systemic lupus erythematosus, CLASI Index, SLEDA Index.

INTRODUCTION

Systemic lupus erythematosus (SLE) is a multisystem autoimmune disease with protean clinical manifestations in which the skin is both a frequent target and a readily accessible window into underlying immune activity.[1] Mucocutaneous features occur in the majority of patients at some point during the disease course and may be the presenting manifestation in a substantial minority, ranging from transient photosensitive eruptions to chronic scarring lesions that cause lasting disfigurement and psychosocial burden.[2] Accurate characterization of cutaneous lupus erythematosus (CLE) subtypes including acute CLE (ACLE), subacute CLE (SCLE) and chronic CLE (CCLE, notably discoid lupus erythematosus, DLE) is important because morphology, prognosis and systemic associations differ across subtypes.[1,3]

Objective measurement of skin disease has advanced with validated instruments such as the Cutaneous Lupus Erythematosus Disease Area and Severity Index (CLASI), which separates reversible inflammatory activity (CLASI-A) from irreversible damage (CLASI-D) and has demonstrated good reliability and responsiveness in clinical studies.[4] Using standardized skin scores in conjunction with established systemic indices (for example SLEDAI) improves disease monitoring and enables rigorous clinicopathologic correlation, yet the degree to which cutaneous activity parallels systemic activity remains heterogeneous across cohorts.[5]

Serologic markers particularly anti-double-stranded DNA (anti-dsDNA) antibodies and hypocomplementemia are well recognized predictors of renal involvement in SLE, and their presence with rising clinical indices often heralds lupus nephritis.[6,7] Given that certain cutaneous phenotypes (for example generalized ACLE) are frequently observed during systemic flares, integrating skin scores, serology and organ assessment may improve early identification of patients at risk of major organ involvement.[3,6]

Against this background, we conducted a cross-sectional analysis in patients with documented cutaneous manifestations to describe the clinical spectrum of CLE, quantify cutaneous activity and damage using CLASI and compare these with systemic activity (SLEDAI) and examine associations between cutaneous phenotype, serologic markers and lupus nephritis in a tertiary cohort.

MATERIALS AND METHODS

This cross-sectional observational study was conducted at the Departments of Dermatology in association with Department of General Medicine of Prathima Relief Institute of Medical Sciences, Warangal, Telangana between January 2024 and June 2025. A total of 78 consecutive eligible patients with SLE and cutaneous manifestations attending at the study facility during the study period were recruited.

Inclusion Criteria: Cases with ≥ 16 years of age, clinical diagnosis of SLE by 2012 SLICC or 2019 EULAR/ACR classification criteria, presence of clinically documented cutaneous manifestations attributable to lupus (active or chronic), evaluated by a dermatologist, complete record of CLASI (activity and damage) and SLEDAI available in the chart or assessed at the visit and willing to participate were included.

Exclusion Criteria: Primary dermatologic diagnosis other than lupus that fully explains the skin lesions unless lupus was confirmed histologically or clinically, active skin infection at the lesion site at time of scoring, missing CLASI or SLEDAI, drugs that reliably mimic lupus skin disease and cases not willing to participate were excluded.

A standardized case proforma was used to collect the demographic details, disease duration, smoking status, details of medication. All the subjects were undergone necessary laboratory investigations like serum C3 & C4, CBC, serum creatinine, urine analysis, 24-hour urine protein, renal involvement. Primary cutaneous subtype such as ACLE, SCLE, CCLE/DLE, lupus panniculitis, tumid lupus, bullous lupus, neonatal lupus, or lupus-nonspecific lesions. Details of location and distribution and lesion chronicity and presence of prior scarring were collected.

Scoring tools:

- **Cutaneous Lupus Erythematosus Disease Area and Severity Index (CLASI).** Both CLASI Activity (CLASI-A) and CLASI Damage (CLASI-D) were recorded. CLASI was performed by trained dermatologists following the standard instrument. CLASI-A includes erythema, scale/hyperkeratosis, mucous membrane involvement and edema; CLASI-D includes dyspigmentation, scarring and scarring alopecia. For consistency, the same two dermatologists performed the majority of scorings; inter-rater reliability was assessed on a random subset.
- **Systemic Lupus Erythematosus Disease Activity Index (SLEDAI)** was used for global disease activity assessment. SLEDAI components were scored as per published definitions using clinical exam, laboratory values and available investigations at the time of the visit.

Two dermatologists and two rheumatologists conducted scoring and chart abstraction after a training session reviewing CLASI and SLEDAI scoring conventions and using test vignettes. A written manual of operations (MoP) described scoring instructions, definition of variables, and CRF completion rules.

The collected data was analysed using SPSS v.26.0. Continuous variables are reported as Mean±SD; categorical variables as frequency and percentages. Associations were tested using Pearson or Spearman correlation, independent t-test or Mann-Whitney U, and chi-square or Fisher exact tests. ANOVA/Kruskal–Wallis compared multiple groups. Multivariable linear/logistic regression adjusted for confounders. Two-tailed $p<0.05$ was considered significant, with 95% confidence intervals reported.

RESULTS

Table 1: Baseline demographic and clinical characteristics of study participants (n=78)

Demographic details	Frequency (%)
Age (Mean±SD)	29.4 ± 2.38

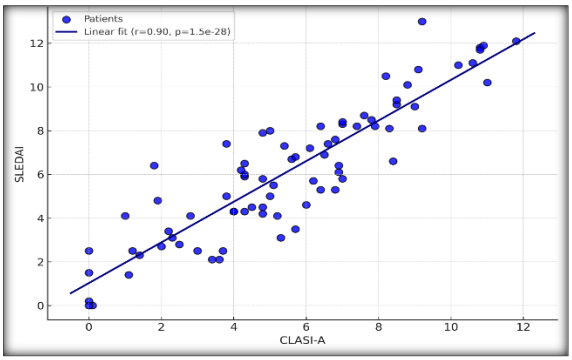
Gender	
Male	15 (19.2%)
Female	63 (80.8%)
Disease duration (Mean±SD)	3.0 ±1.56
Active smokers	12 (15.4%)
Cases on hydroxychloroquine	58 (74.4%)

Mean age of participants was 29.4±2.38 years and females predominated (80.8%), consistent with the known female preponderance in SLE. Average disease duration was 3.0±1.56 years. 5.4% were active smokers, and 74.4% were on hydroxychloroquine, reflecting standard clinical practice (Table 1). Participants were grouped into CLE subtypes: DLE/CCLE (42.3%), ACLE (20.5%), SCLE (17.9%), other CLE (9%), nonspecific lesions (10.3%). ACLE patients had the highest SLEDAI score (9.8±3.8) and a markedly higher frequency of nephritis (81.3%). DLE/CCLE and SCLE patients had intermediate SLEDAI and nephritis prevalence, while nonspecific lesions had lower SLEDAI but moderate nephritis prevalence (37.5%). Overall, mean CLASI-A = 5.79±3.27, CLASI-D = 3.28±2.10, SLEDAI = 6.31±3.63, and nephritis was present in 39.7% of cases. [Table 2]

Table 2: Clinical spectrum and disease scores by cutaneous subtype

Subtype	CLASI-A	CLASI-D	SLEDAI	Nephritis (n=31)
	Mean±SD	Mean±SD	Mean±SD	Frequency (%)
DLE / CCLE (n=33)	5.6 ± 3.1	3.7 ± 1.9	5.9 ± 3.1	10 (30.3)
ACLE (n=16)	6.8 ± 3.5	2.9 ± 1.6	9.8 ± 3.8	13 (81.3)
SCLE (n=14)	5.4 ± 2.9	2.8 ± 1.5	6.4 ± 3.0	4 (28.6)
Other specific CLE (n=7)	4.8 ± 2.7	2.3 ± 1.4	5.1 ± 2.7	1 (14.3)
Nonspecific lesions (n=8)	4.2 ± 2.4	3.1 ± 1.7	4.8 ± 2.3	3 (37.5)

Anti-dsDNA positivity (39.7%) was highest in ACLE (56.3%). Anti-Ro/SSA positivity (35.9%) was most frequent in SCLE (50%), supporting known SCLE–SSA associations. Low complement levels (34.6%) were seen most in ACLE (50%). Lupus nephritis was significantly more common in ACLE (81.3%) than in DLE (30.3%) or SCLE (28.6%) (Table 3). Demonstrates a positive correlation between cutaneous activity (CLASI-A) and overall disease activity (SLEDAI). Suggests that cutaneous activity reflects systemic disease burden, especially in severe subtypes like ACLE. [Graph 1]



Graph 1: CLASI-A versus SLEDAI with fitted regression line

Table 3: Serology and organ involvement overall and by subtype

Measure	Overall	DLE (n=33)	ACLE (n=16)	SCLE (n=14)
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Anti-dsDNA positive	31 (39.7)	10 (30.3)	09 (56.3)	03 (21.4)
Anti-Ro/SSA positive	28 (35.9)	11 (33.3)	04 (25.0)	07 (50.0)
Low complement (C3/ C4)	27 (34.6)	08 (24.2)	08 (50.0)	04 (28.6)
Lupus nephritis (biopsy/clinical)	31 (39.7)	10 (30.3)	13 (81.3)	04 (28.6)

Table 4: ACLE versus DLE in nephritis

Group	Nephritis	Odds ratio (Fisher)	p-value
ACLE	13 (81.3%)	7.44 (approx.)	0.012
DLE	10 (30.3%)	(reference)	—

ACLE patients had a markedly higher odds of nephritis compared to DLE (OR ≈ 7.44, p = 0.012). Indicates ACLE subtype is a strong clinical predictor of renal involvement, highlighting its systemic disease severity. [Table 4]

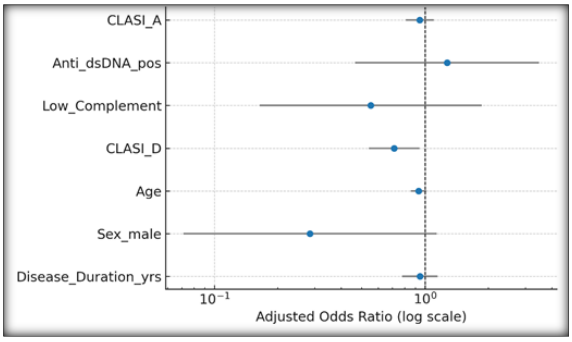


Figure 2: Multivariable logistic regression for predictors of nephritis

DISCUSSION

In this series of 78 SLE patients with cutaneous involvement, our principal finding was that objective cutaneous activity (CLASI-A) tracked closely with global disease activity (SLEDAI), and that acute cutaneous lupus (ACLE) presentations were associated with markedly higher frequency of lupus nephritis than discoid/chronic cutaneous lupus (DLE/CCLE). These results add to a growing literature that positions the skin as not only a site of important morbidity in SLE but also a visible barometer of systemic immune activity, reinforcing the clinical value of structured skin assessment.[1-3]

The CLASI instrument, developed and validated to measure cutaneous lupus activity and damage, has been adopted widely because it separates reversible inflammatory activity (CLASI-A) from irreversible damage (CLASI-D) and demonstrates good inter-rater reliability and responsiveness in trials and cohorts.[1] In our dataset the strong correlation between CLASI-A and SLEDAI mirrors other validation and cohort studies that found CLASI activity correlates with physician global assessments, patient-reported outcomes and, in many cohorts, with serologic measures of activity; this supports use of CLASI both in clinical practice and as a trial endpoint for skin-focused outcomes.[1,8]

The subtype-specific findings particularly the high prevalence of nephritis among ACLE patients are also concordant with prior clinical observations that acute and generalized lupus rashes often accompany systemic flares. ACLE commonly co-exists with serologic activity like anti-dsDNA elevation, complement consumption and systemic organ involvement, whereas DLE tends to be more skin-limited but more likely to leave permanent scarring and dyspigmentation (CLASI-D) if not treated promptly.[2,9] Clinicians should therefore treat extensive or escalating ACLE as a red flag prompting urgent systemic evaluation (urinalysis, renal function tests, complement and anti-dsDNA measurement) and consideration of systemic therapy.

Our multivariable analysis suggested that serologic markers anti-dsDNA positivity and hypocomplementemia contributed independently to the odds of nephritis, consistent with mechanistic and pathological studies that implicate anti-DNA antibodies and immune-complex–mediated complement activation in the pathogenesis of lupus nephritis.[6,13] Experimental and clinicopathologic data show that certain anti-DNA antibodies form nephritogenic immune complexes, activate complement, and promote glomerular deposition and injury explaining why these markers remain core elements of nephritis risk stratification and monitoring.

The well-established link between anti-Ro/SSA antibodies and subacute cutaneous lupus (SCLE) was also reflected in our cohort, where SCLE cases had higher anti-Ro prevalence than some other subtypes. Anti-Ro is strongly associated with photosensitivity, SCLE morphology, and risk of neonatal lupus in pregnant women, and therefore ENA profiling has useful diagnostic, prognostic and counselling roles in patients with cutaneous lupus presentations.[9,12]

Therapeutically, our findings reinforce current practice: rigorous photoprotection and early institution of hydroxychloroquine (HCQ) for active cutaneous disease are recommended, since HCQ remains effective for many CLE patients and may reduce systemic flares as well.[11] Recent randomized and controlled data support HCQ efficacy in cutaneous lupus and multiple reviews indicate favorable risk benefit ratio when dosed appropriately with modern retinal screening. For refractory or systemic disease, newer targeted agents that antagonize the type I interferon pathway have demonstrated meaningful improvement in skin scores (CLASI responses) in phase 3 trials, offering an evidence-based option when conventional therapy fails.[3,14]

CONCLUSION

In conclusion, our analysis supports the clinical utility of objective dermatologic scoring (CLASI) and serologic surveillance in SLE: elevated CLASI-A and the presence of anti-dsDNA and hypocomplementemia identify patients who warrant careful systemic evaluation for organ involvement. Translating these findings into routine dermatology–rheumatology collaborative pathways and prospective predictive tools could expedite detection of renal and other systemic complications and improve outcomes for patients with lupus.

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