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CLINICAL AND IMMUNOLOGICAL PROFILE OF FEBRILE SYSTEMIC LUPUS ERYTHEMATOSUS PATIENTS IN A TERTIARY CARE HOSPITAL IN NORTHEAST INDIA

Dr. Rakibul Islam*	Postgraduate Trainee, Department of Medicine, Assam Medical College and Hospital, Dibrugarh *Corresponding Author
Prof (Dr.) Prasanta Dihingia	Professor, Department of Medicine, Assam Medical College and Hospital, Dibrugarh
Dr. Rima Moni Doley	Associate Professor, Department of Medicine, Assam Medical College and Hospital, Dibrugarh
Dr. Sreemanta Madhab Baruah	Associate Professor, Department of Medicine, Assam Medical College and Hospital, Dibrugarh

ABSTRACT **Background:** Systemic Lupus Erythematosus (SLE) is a multisystem autoimmune disease with diverse clinical and immunological manifestations. Fever is common but often challenging to attribute to either disease flare or infection, making accurate diagnosis critical for appropriate management. **Objective:** To evaluate the clinical and immunological profiles of febrile SLE patients in a tertiary care hospital in Northeast India. **Methods:** This cross-sectional observational study was conducted in the Department of Medicine, Assam Medical College and Hospital, Dibrugarh, from November 2023 to October 2024. Sixty consecutive patients meeting the 2012 SLICC criteria for SLE and presenting with fever (≥37.7°C) were analyzed. Clinical data, laboratory findings, and disease activity (SLEDAI-2K) index [11] were documented and statistically analyzed using SPSS v21.0. **Results:** The mean age was 27.9 ± 10.5 years, with females comprising 91.7%. Fever was due to disease flare in 78.3% and infection in 21.7% of patients. Common clinical features included arthritis/arthralgia (76.7%), mucocutaneous lesions (65%), hematological abnormalities (56.7%), and renal involvement (30%). ANA positivity was universal, while anti-dsDNA and hypocomplementemia [1,4] were seen in 70% and 60% of patients, respectively. **Conclusion:** Febrile SLE in this region is mainly flare-related, with musculoskeletal, mucocutaneous, and hematological features being predominant. Integration of clinical and immunological parameters is essential for timely and accurate diagnosis.

KEYWORDS :

INTRODUCTION

Systemic Lupus Erythematosus (SLE) is a chronic autoimmune disease that affects multiple organs and has a relapsing-remitting course [1]. With a female-to-male ratio ranging from 6:1 to 10:1, it primarily affects women who are of reproductive age [1,12]. Autoantibody formation and immune complex-mediated inflammation are the results of intricate interplay between immunological dysregulation, environmental stimuli, hormonal effects, and genetic predisposition [8].

Globally, the epidemiology of SLE varies [7,9,10,12], with higher prevalence reported among Asian, African American, and Hispanic populations compared to Caucasians. In India, regional variations are evident, and the clinical spectrum often reflects differences in genetic and environmental factors.

Fever is one of the most frequent and early clinical manifestations [3,5,9,10] of SLE, observed in approximately 36–86% of patients. However, its etiology is often difficult to ascertain, as fever may arise from an active disease flare or from infections [6], particularly in patients on immunosuppressive therapy. Misdiagnosis can have serious consequences: under-treatment of a flare may worsen disease activity, while inappropriate immunosuppression in an undiagnosed infection may lead to life-threatening complications.

Enhancing diagnostic precision and customizing treatment plans require an understanding of the clinical and immunological characteristics of febrile SLE patients in particular geographic areas. This study aims to examine how febrile SLE patients in Northeast India appear, offering insights that could guide future research in comparable resource-constrained contexts as well as clinical practice.

METHODS

This cross-sectional observational analysis was carried out over the course of a year, from November 2023 to October 2024, in the Assam Medical College and Hospital's Department of Medicine in Dibrugarh.

Patient Selection

The study comprised 60 patients who were 13 years of age or older, had fever (defined as an axillary temperature ≥37.7°C), and met the 2012 SLICC (Systemic Lupus International Collaborating Clinics) classification criteria for SLE [2]. Patients with insufficient clinical or laboratory data or those refusing to give their consent were not included.

Data Collection

A structured proforma was used to record demographic details, clinical symptoms, comorbidities, disease duration, and current medications. Detailed physical examination and systemic evaluation were performed upon admission.

Laboratory Investigations

Routine tests included complete blood count, liver and renal function tests, urinalysis, and inflammatory markers such as ESR and CRP. Immunological investigations comprised:

- Antinuclear Antibody (ANA): tested by indirect immuno-fluorescence.
- Anti-double stranded DNA (anti-dsDNA): measured by ELISA.
- Complement levels (C3 and C4): quantified using nephelometry.
- Extractable Nuclear Antigen (ENA) profile where clinically indicated.

Microbiological assessments: Such as blood, urine, and sputum cultures—along with imaging studies (chest X-ray, ultrasound, or CT) were conducted to identify infectious sources where infection was suspected.

Ethical Considerations

The Institutional Ethics Committee granted ethical approval. Prior to their involvement, all patients provided written informed consent.

Statistical Analysis

SPSS v21.0 was used to enter and analyze the data (IBM Corp., Chicago, IL). While categorical data were reported as frequency and percentage, quantitative variables were expressed as mean ± standard deviation (SD). Statistical significance was defined as a p-value of less than 0.05.

RESULTS

The study included 60 patients in total. Mean age in the study group was 27.9 ± 10.5 years, and a significant female predominance (91.7%) was observed, consistent with the established epidemiology of SLE.

The average duration of illness was 15 ± 6.8 months, reflecting a mix of newly diagnosed and follow-up cases presenting with febrile episodes.

Etiology of Fever

Out of the total, 47 patients (78.3%) had fever attributable to SLE flare, while 13 patients (21.7%) had fever due to infection. Among those with infection, urinary tract infections (38.5%), bloodstream infections (30.8%), and respiratory tract infections (30.8%) were the predominant causes.

Clinical Manifestations:

- Arthritis or arthralgia was observed in 76.7% of patients, making it the most frequent symptom.
- Mucocutaneous features, including malar rash, oral ulcers, and photosensitivity, were present in 65%.
- Renal involvement was documented in 30%, characterized by proteinuria and/or impaired renal function.
- Neuropsychiatric manifestations (such as seizures or psychosis) were less common, occurring in 15%.
- Hematological abnormalities, including anemia, leukopenia, or thrombocytopenia, were noted in 56.7%.

Immunological Profile:

- ANA positivity was universal (100%).
- Anti-dsDNA antibodies were present in 70% of cases.
- Hypocomplementemia (low C3 and/or C4) was seen in 60%.
- Antiphospholipid antibodies were detected in 18%, indicating possible overlap with antiphospholipid syndrome.
- ENA antibodies were present in 12% of patients.

Table 1: Baseline Characteristics of Study Population (N=60)

Baeline	Value
Age (years)	27.9 ± 10.5
Female (%)	91.7%
BMI (kg/m²)	22.03 ± 2.06
Duration of SLE (months)	15 ± 6.8
Mean SLEDAI-2K score	8.67 ± 4.3

Table 2: Clinical Manifestations of Febrile SLE Patients

Clinical Feature	Frequency (%)
Arthritis/Arthralgia	76.7%
Mucocutaneous lesions	65%
Renal involvement	30%
Neuropsychiatric features	15%
Hematological abnormalities	56.7%

Table 3: Immunological Profile of Febrile SLE Patients

Immunological Marker	Frequency (%)
ANA	100%
Anti-dsDNA	70%
Hypocomplementemia (C3/C4)	60%
Antiphospholipid antibodies	18%
ENA antibodies	12%

Discussion

This study describes the clinical and immunological profile of febrile SLE patients in a tertiary care hospital in Northeast India. The majority were young females (91.7%) with a mean age of 27.9 years, consistent with global and Indian epidemiological trends. Common clinical features included arthritis (76.7%), mucocutaneous lesions (65%), and hematological abnormalities (56.7%) [9,10], aligning with findings from South India and East Asia, reinforcing the consistency of SLE manifestations across populations.

A key finding was that 78.3% of febrile episodes were due to disease flare, and only 21.7% due to infections, highlighting the diagnostic challenge of distinguishing autoimmune activity from infections. This distinction is clinically significant.

Immunologically, 70% of patients were anti-dsDNA positive [1,4], and 60% showed hypocomplementemia [1,4] (C3 and/or C4), both indicating active disease. These biomarkers, when combined with clinical assessment, are essential for guiding treatment.

Infections—primarily bloodstream, respiratory, and urinary—were consistent with previous studies and reflect immunosuppression and disease-related vulnerability. These findings underscore the need for region-specific antimicrobial strategies, especially in resource-limited tertiary care settings.

Our data support prior work by Sinha et al. [3] and Yu et al. [6], advocating for an integrated clinical, microbiological, and immunological approach to managing febrile SLE. Importantly, this study adds valuable regional insights from Northeast India to the broader literature.

Limitations

This study is cross-sectional and single-center study, thus the results might not apply to a larger population. Additionally, the very small sample size can restrict statistical power for analysis of subgroups. Furthermore, the chance of misclassifying flare as an infection cannot be completely ruled out, even with thorough clinical and laboratory evaluations. Validation and extension of these findings are necessary for future multicentric, prospective research with larger cohorts and biomarker-driven diagnostic algorithms.

CONCLUSION

In Northeast India, febrile SLE patients typically exhibit musculoskeletal, mucocutaneous, and hematological symptoms together with a high proportion of anti-dsDNA positive and hypocomplementemia [1,4], which typically indicates moderate disease activity. A thorough clinical evaluation backed by laboratory and immunological markers is crucial, as the majority of febrile episodes were caused by illness flares rather than infections.

A thorough, multidisciplinary strategy that incorporates infection screening, biomarker analysis, and clinical assessment is necessary for precise diagnosis and the best possible care. In order to enhance diagnostic algorithms and patient outcomes in febrile SLE presentations, these findings underscore the necessity of bigger prospective studies and region-specific clinical guidelines.

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