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Original Research Article

Evaluation of thrombocytopenia in systemic lupus erythematosus patients in a tertiary care hospital: clinical implications and prognostic significance

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ABSTRACT

Background: Thrombocytopenia is a common hematological complication in systemic lupus erythematosus (SLE), associated with increased disease severity and adverse outcomes. This study aimed to evaluate the clinical implications and prognostic significance of thrombocytopenia in SLE patients at a tertiary care hospital in Bangladesh.
Methods: A cross-sectional study was conducted at the Sir Salimullah Medical College Mitford Hospital with 42 SLE patients. Data were collected on demographic characteristics, medical history, risk factors, clinical assessments, laboratory findings, and treatment outcomes. Statistical analyses were performed to identify associations between thrombocytopenia, disease severity, and outcomes.
Results: The study population was predominantly female (73.81%) and aged 25-34 years (52.38%). Thrombocytopenia was present with a mean platelet count of 54,523±648.97/µl, and symptoms included easy bruising (35.71%) and petechiae (45.24%). Severe disease activity was observed in 80.95% of patients, with frequent hospitalizations and poor prognostic outcomes significantly associated with thrombocytopenia ($p<0.05$). Shorter disease duration correlated with more severe symptoms ($r=0.52$, $p=0.018$), and fewer disease flares were linked to better prognoses ($r=0.49$, $p=0.015$). Standard therapies yielded limited improvement, with 30.95% showing improvement, 33.33% experiencing no change, and 35.71% worsening.
Conclusions: Thrombocytopenia is a significant marker of disease burden and poor outcomes in SLE patients. Comprehensive monitoring and personalized management strategies are essential to address its clinical and prognostic implications, particularly in resource-constrained settings.

Keywords: Autoimmune disorders, Disease severity, Hematological complications, Prognosis, Systemic lupus erythematosus, Thrombocytopenia

INTRODUCTION

Systemic lupus erythematosus (SLE) is a chronic autoimmune disease with multisystem involvement characterized by complex immune dysregulation. Affecting predominantly young women of childbearing age, SLE can manifest in virtually any organ system, with a wide range of clinical and laboratory abnormalities, resulting in significant morbidity and mortality globally. The prevalence of SLE varies across regions, with rates being disproportionately high in Asian populations, including South Asia, where genetic, environmental, and socioeconomic factors contribute to its severity and outcomes.[1,2] Despite being a recognized healthcare challenge in Bangladesh, the clinical characteristics and complications of SLE in this region remain underexplored. Patients often present with advanced disease due to delays in diagnosis and limited access to specialized care,

highlighting the need for region-specific data to inform clinical management.[3] Among the many manifestations of SLE, thrombocytopenia- a reduction in platelet count below 150,000/µl- is a common hematological abnormality. Studies report that thrombocytopenia affects approximately 20-40% of SLE patients globally and may signify severe disease activity.[4] It results from mechanisms such as immune-mediated platelet destruction by antiplatelet antibodies and impaired platelet production due to bone marrow suppression and cytokine dysregulation.[5,6] In south Asia, the prevalence of thrombocytopenia in SLE patients varies across studies, ranging from 17.9% to 46.5%, depending on the population and diagnostic criteria used.[7,8] However, data specific to the Bangladeshi population are scarce, creating gaps in understanding the local burden of this complication and its implications. Thrombocytopenia in SLE is not only a marker of disease activity but also a predictor of poor prognosis. Patients with thrombocytopenia often exhibit higher rates of renal involvement, neuropsychiatric lupus, and other severe organ damage.[9,10] The dual risks of bleeding and thrombosis complicate clinical management, particularly in settings where resource limitations preclude optimal monitoring and intervention. Moreover, severe thrombocytopenia has been associated with significantly increased mortality, with some studies reporting a fourfold higher risk of death among affected SLE patients.[4] These findings underscore the prognostic significance of thrombocytopenia, emphasizing its role as a key determinant of disease outcomes. The regional context further accentuates the need for focused research. South Asia, including Bangladesh, faces unique challenges in managing SLE due to healthcare disparities, limited specialized care, and delayed diagnosis. Existing studies from Bangladesh suggest that hematological abnormalities are frequently encountered in SLE patients, yet thrombocytopenia remains underrepresented in research despite its critical clinical implications.[1,3] Given the advanced disease stages at which patients typically present in tertiary care settings, it is imperative to investigate thrombocytopenia comprehensively to identify its prevalence, clinical associations, and prognostic impact in the Bangladeshi population. This study aims to evaluate the prevalence and clinical implications of thrombocytopenia in SLE patients treated at a tertiary care hospital in Bangladesh. By examining its association with disease activity, organ involvement, and patient outcomes, the findings will contribute to a better understanding of this hematological complication in a resource-limited setting. Furthermore, the study seeks to bridge the knowledge gap in regional data, providing insights that may guide the development of targeted strategies for improved management of SLE in South Asia.

METHODS

This was a cross-sectional study conducted at Sir Salimullah Medical College Mitford Hospital between the period of January 2024 to June 2024, to evaluate thrombocytopenia in patients with systemic lupus erythematosus (SLE), focusing on its clinical implications and prognostic significance. A total of 42 patients with SLE were included in the study.

All SLE patients who were at the study place during the study period and were willing to participate in the study were included, while patients with chronic disease and unwillingness to participate in the study were excluded. Data collection was performed using a structured questionnaire and medical record reviews. The demographic characteristics, medical history, risk factors, clinical assessment, laboratory findings, disease management, and outcomes were recorded for all participants. Demographic data included age, gender, and BMI. Medical history encompassed disease duration, family history of SLE, presence of other autoimmune diseases, and co-morbidities. Risk factors such as smoking, stress levels, sedentary lifestyle, exposure to occupational or environmental toxins, and history of medication affecting blood counts were assessed. Clinical assessments included recording the current medications, history of thrombocytopenia, recent platelet count, symptoms of thrombocytopenia, and other blood abnormalities. Laboratory investigations included complete blood count parameters (platelet count, hemoglobin, and white blood cell count), antinuclear antibody (ANA) status, anti-dsDNA levels, C3 and C4 levels, and additional diagnostic tests where applicable. Bone marrow biopsy was not performed for any participant. Statistical analyses were conducted using SPSS version 26 to identify associations and correlations between variables, using p values to determine significance and r-values for strength of correlations. Ethical approval was obtained prior to the study, and informed consent was taken from all participants.

RESULTS

Table 1 showed the baseline demographic characteristics of the study population. The majority of participants (52.38%) were aged between 25 and 34 years, followed by 26.19% aged 35-49 years and 21.43% aged 15-24 years. Females constituted the majority of the cohort, accounting for 73.81% of participants, while males represented 26.19%. In terms of body mass index (BMI), most patients (64.29%) were classified as overweight (BMI 25-29.9), followed by 33.33% within the normal range (BMI 18.5-24.9), and only 2.38% with obesity (BMI>30).

Table 2 shows the medical history of the study population. Half of the study population (50.00%) had a disease duration of less than one year, while the other half had a disease duration between one and five years. Only a small proportion of patients (4.76%) reported a family history of systemic lupus erythematosus (SLE). The presence of other autoimmune diseases was uncommon, with mixed connective tissue disease (MCTD) being observed in 4.76% of patients, and combinations such as MCTD with Sjögren's syndrome (SS), rheumatoid arthritis (RA) with SS, and others contributing to smaller percentages.

Notably, rheumatoid arthritis with SS was present in 9.52% of participants. Regarding co-morbidities, hypertension was the most frequently reported (33.33%), followed by cardiovascular diseases (7.14%) and diabetes (4.76%). Other conditions such as hypothyroidism, obesity, and chronic kidney disease (CKD) were reported in 7.14% of participants.

Table 1: Distribution of study population based on demographic characteristics (n=42).

Demographic characteristics	N	%
Age		
15-24	9	21.43
25-34	22	52.38
35-49	11	26.19
Gender		
Male	11	26.19
Female	31	73.81
BMI		
18.5-24.9	14	33.33
25-29.9	27	64.29
>30	1	2.38

Table 2: Distribution of study population based on medical history (n=42).

Medical history	N	%
Disease duration		
<1	21	50.00
1-5	21	50.00
Family history		
Yes	2	4.76
No	39	92.86
Presence of other autoimmune disease		
APS	1	2.38
DM+SS	1	2.38
Hypothyroidism	1	2.38
MCTD	2	4.76
MCTD+SS	1	2.38
RA	1	2.38
RA+SS	4	9.52
Co-morbidities		
Hypertension	14	33.33
Diabetes	2	4.76
Cardiovascular Diseases	3	7.14
Others	3	7.14

In terms of risk factors presented in Table 3, 11.90% of the study population reported a history of smoking, while 14.29% had exposure to occupational or environmental toxins. Stress levels and a sedentary lifestyle were each identified in 4.76% of participants. Notably, all patients had a history of using medications known to affect blood counts. Common medications included NSAIDs, mycophenolate mofetil (MMF), prednisolone, hydroxychloroquine (HCQ), and methotrexate (MTX).

Table 3: Distribution of study population based on risk factors (n=42).

Risk factors	N	%
Smoking	5	11.90
Stress levels	2	4.76
Sedentary lifestyle	2	4.76
Exposure to occupational/ environmental toxins	6	14.29
Medications (known to affect blood counts)	All patients had a history of ingestion of medications that affected blood counts	

Other diagnostics tests renal biopsy, anti-double-stranded DNA (anti-dsDNA) antibodies test, anti-Smith (anti-Sm) antibodies test, anti-smith and anti-ribonucleoprotein (Anti-RNP) antibodies test.

Table 4: Distribution of study population based on clinical assessment and laboratory data (n=42).

Clinical assessment	N	%
Current medications	All patients are on SLE management	
Symptoms of thrombocytopenia		
Easy bruising	15	35.71
Easy bruising +petechiae	19	45.24
Easy bruising +petechiae+others	8	19.05
Other blood abnormalities		
Low RMC	20	47.62
Low WBC	1	2.38
Low RMC+low WBC	15	35.71
Complete blood count		
Platelet count	54523±648.97	
Hemoglobin	7.6±1.23	
White blood cell	7331±108.23	
Antinuclear antibody status	42	100.00
Anti-dsDNA	39	92.86
C3 level	42	100.00
C4 level	36	85.71
bone marrow biopsy	Not done	
Other diagnostics tests	Renal biopsy, anti-double-stranded DNA (anti-dsDNA) antibodies test, anti-Smith (Anti-Sm) antibodies test, anti-smith and anti-ribonucleoprotein (anti-RNP) antibodies test	

The Table 4 showed the distribution of clinical and laboratory parameters among the participants. All patients in the study were undergoing management for systemic lupus erythematosus (SLE) with various therapies, including disease-modifying antirheumatic drugs (DMARDs), corticosteroids, immunosuppressive agents,

NSAIDs, and other lupus-modifying treatments. Symptoms of thrombocytopenia were common, with 35.71% of patients experiencing easy bruising, 45.24% reporting easy bruising accompanied by petechiae, and 19.05% presenting with additional symptoms. Other blood abnormalities were prevalent, with 47.62% of patients having low red blood cell counts (RBC), 2.38% showing low white blood cell (WBC) counts, and 35.71% exhibiting both low RBC and WBC counts. The average platelet count was 54,523±648.97, hemoglobin levels averaged 7.6±1.23, and WBC counts averaged 7,331±108.23. All patients had positive antinuclear antibody (ANA) status, and 92.86% tested positive for anti-double-stranded DNA (anti-dsDNA) antibodies. Complement levels (C3 and C4) were evaluated, with 100.00% of patients having documented C3 levels and 85.71% having documented C4 levels. Bone marrow biopsy was not performed for any participant, but additional diagnostic tests included renal biopsy, anti-Smith antibodies, and anti-RNP antibodies. The comprehensive management strategies aimed to address both SLE and its hematological complications, particularly thrombocytopenia.

Disease management and outcome of the participants was presented in Table 5. Most patients (95.24%) were treated with steroids and immunosuppressants, while 4.76% received additional treatments. Treatment outcomes showed that 30.95% improved, 33.33% had no change, and 35.71% worsened. Hospitalizations were common, with 76.19% hospitalized three or fewer times and 23.81% hospitalized more than three times. Severe disease activity was observed in 80.95% of patients, with mild and moderate activity in 19.05% and 4.76%, respectively. Disease flares occurred once in 14.29% of patients, twice in 23.81%, and three times in 30.95%, while fewer experienced more than three flares. Prognosis showed 30.95% improved, 33.33% reached remission, and 35.71% worsened.

Table 5: Distribution of study population based on disease management and outcome (n=42).

Disease management and outcome	N	%
Treatment type		
Steroids+ immunospuppressants	40	95.24
Steroids+ immunospuppressants + other	2	4.76
Response to treatment		
Improved	13	30.95
No change	14	33.33
Worsen	15	35.71
Hospitalization history		
≤3	32	76.19
>3	10	23.81
Current disease activity		
Mild	8	19.05
Moderate	2	4.76
Severe	34	80.95
Disease fares		
Once	6	14.29
Twice	10	23.81
Thrice	13	30.95
Fourth	0	0.00
Fifth	1	2.38
Sixth	0	0.00
Seventh	1	2.38
Prognostic outcomes		
Improved	13	30.95
Remission	14	33.33
Worsening	15	35.71

Table 6: Association between gender and co-morbidities (n=42).

Gender	Hypertension	Hypertension + diabetes	Cardiovascular diseases	Other	P value
Male	4	0	2	2	0.047*
Female	8	2	1	1	

*Statistically significant

Table 7: Correlation between disease duration and symptoms of thrombocytopenia (n=42).

Disease duration (years)	Easy bruising	Easy bruising + petechiae	Easy bruising + petechiae + others	P value	R-value
<1	7	10	4	0.018*	0.52
1-5	5	6	3		
6-10	2	2	1		
11-15	1	0	0		
>16	0	1	0		

*Statistically significant

An analysis of the association between gender and co-morbidities showed in the Table 6 revealed that hypertension was more common in females (8 cases) than males (4 cases). Hypertension with diabetes was observed only in females (2 cases), while cardiovascular diseases were slightly more frequent in males (2 cases) compared to females (1 case). Other co-morbidities were equally distributed, with 2 cases in males and 1 case in females.

The association between gender and co-morbidities was statistically significant, with a p value of 0.047.

From the correlation showed in Table 7, a significant correlation was observed between disease duration and symptoms of thrombocytopenia (p value =0.018, r-value =0.52). Patients with a disease duration of less than one year predominantly presented with easy bruising (7 cases), easy bruising with petechiae (10 cases), and easy bruising with petechiae and other symptoms (4 cases). As disease duration increased, the frequency of symptoms decreased, with only 5 cases of easy bruising and 6 cases of easy bruising with petechiae in patients with a disease duration of 1-5 years. Symptoms became rare in patients with longer disease durations (6-10 years and beyond).

Table 8: Relationship between current disease activity and hospitalization history (n=42).

Disease activity	≤3 hospitalizations	>3 hospitalizations	P value	R-value
Mild	6	2		
Moderate	1	1	0.033*	0.38
Severe	25	7		

*Statistically significant

Table 9: Correlation between prognostic outcomes and disease flares (n=42).

Disease flares	Prognostic outcome			P value	R-value
	Improved	Remission	Worsening		
Once	4	2	0		
Twice	4	5	1		
Thrice	5	6	2		
Fourth	0	0	0	0.015*	0.49
Fifth	0	1	0		
Sixth	0	0	0		
Seventh	0	0	1		

*Statistically significant

Table 8 observed a significant relationship between current disease activity and hospitalization history (p value =0.033, r-value =0.38). Patients with mild disease activity predominantly had three or fewer hospitalizations (6 cases), with only 2 cases requiring more than three hospitalizations. In moderate disease activity, hospitalizations were evenly distributed (1 case in each group). Severe disease activity was associated with a higher number of hospitalizations, with 25 patients hospitalized three or fewer times and 7 patients hospitalized more than three times. Table 9 observed a significant correlation was between disease flares and prognostic outcomes (p value =0.015, r-value =0.49). Patients with fewer disease flares tended to have better outcomes, with 4 patients improving and 2 achieving remission after one flare, and no cases of worsening. For two flares, 4 patients improved, 5 achieved remission, and 1 experienced worsening. Among those with three flares, 5 showed improvement, 6 achieved remission, and 2 experienced worsening. No improvements or worsening were observed beyond five flares, except for one worsening case in a patient with seven flares.

DISCUSSION

The current study evaluated thrombocytopenia in systemic lupus erythematosus (SLE) patients in a tertiary care hospital, focusing on its clinical implications and prognostic significance. Thrombocytopenia, a common hematological complication in SLE, is increasingly recognized as both a marker of disease severity and a predictor of clinical outcomes. By analyzing demographic, clinical, and laboratory data, this study contributes to a better understanding of the burden and implications of thrombocytopenia in SLE, particularly in a resource-limited setting.

The demographic profile of the study population aligns with global trends, with a predominance of females (73.81%) and most patients aged 25-34 years. SLE disproportionately affects women of childbearing age due to hormonal and immunological factors.[11] While the gender distribution is consistent with previous studies, this study also found a significant association between gender and comorbidities. Females exhibited higher rates of hypertension and hypertension with diabetes compared to males. This reflects findings from Pamuk et al, who noted that female SLE patients are at greater risk of certain comorbidities, including hypertension, while males often present with more severe cardiovascular complications.[12] Thrombocytopenia was highly prevalent in this study, with platelet counts averaging 54,523±648.97/µl, accompanied by symptoms such as easy bruising (35.71%) and petechiae (45.24%). These findings emphasize the importance of hematological monitoring in SLE patients, particularly in those with active disease. Ktona et al similarly reported a strong correlation between

thrombocytopenia and active disease manifestations, highlighting its value as a clinical marker for disease monitoring.[13] Additionally, shorter disease duration was significantly associated with more severe symptoms of thrombocytopenia, consistent with findings from Zhao et al, who identified thrombocytopenia as an early and often severe complication in newly diagnosed SLE patients.[10] Hospitalization patterns in this cohort further underscore the burden of severe disease activity in SLE. Nearly 24% of patients required more than three hospitalizations, and severe disease activity was observed in 80.95% of the population. These findings are in line with Assunção et al, who identified severe disease activity as a primary predictor of frequent hospitalizations in SLE patients.[14] The correlation between severe disease activity and increased hospitalization frequency (p value =0.033, r-value =0.38) underscores the critical need for effective disease control to reduce hospital admissions and associated healthcare costs. Thrombocytopenia also emerged as a significant prognostic marker, with disease flares correlating with worse outcomes. Patients with fewer flares demonstrated better prognostic outcomes, including remission and clinical improvement. Fernández et al similarly highlighted the association between lower flare frequency and improved prognosis in SLE, suggesting that controlling flare activity is essential for long-term disease management.[2] The significant correlation between disease flares and prognostic outcomes (p value =0.015, r-value =0.49) in this study reinforces the importance of early intervention and sustained disease suppression. Treatment strategies in this cohort predominantly involved steroids and immunosuppressants (95.24%). While these remain the mainstay of SLE therapy, only 30.95% of patients showed clinical improvement, and 35.71% experienced worsening symptoms. These findings resonate with Kalunian et al, who emphasized the limitations of standard therapies in managing severe SLE and called for biomarker-guided personalized treatment approaches.[15] Furthermore, the high rates of hospitalization and severe disease activity observed in this study highlight the need for adjunct therapies and closer monitoring. This study adds to the growing body of evidence emphasizing the dual role of thrombocytopenia as a marker of disease severity and a predictor of poor outcomes in SLE. Its significant associations with disease activity, hospitalization rates, and prognosis underscore the need for targeted strategies to address hematological complications. In resource-constrained settings such as Bangladesh, where diagnostic and treatment options may be limited, these findings highlight the importance of early diagnosis, comprehensive monitoring, and individualized therapy to improve patient outcomes.

Limitations

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

This study highlights the critical role of thrombocytopenia as a marker of disease severity and a predictor of clinical outcomes in patients with systemic lupus erythematosus (SLE). The significant association of thrombocytopenia with severe disease activity, frequent hospitalizations, and poor prognostic outcomes underscores its clinical importance. Gender differences in comorbidities and the correlation between disease duration and thrombocytopenia symptoms further emphasize the need for individualized monitoring and management. Despite standard therapies, including steroids and immunosuppressants, treatment response remains suboptimal for many patients, highlighting the necessity for personalized treatment strategies. These findings call for early identification, comprehensive monitoring, and targeted interventions to improve patient outcomes, particularly in resource-limited settings. Further research into region-specific challenges and novel therapeutic approaches is essential to enhance the management of SLE and its complications.

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