

Original Research Article

NOVEL HEMATOLOGICAL INFLAMMATORY MARKERS FOR EVALUATING DISEASE SEVERITY AND MUCOSAL REPAIR IN ULCERATIVE COLITIS

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ABSTRACT

Background: Ulcerative colitis (UC) is a chronic relapsing inflammatory bowel disease characterized by recurrent episodes of mucosal inflammation and varying degrees of disease severity and activity. Accurate evaluation of disease activity is needful for therapeutic decision-making, monitoring treatment response, and estimating disease progression. Although colonoscopy evaluation remains the gold standard for assessment of disease activity, its invasive procedure, cost, and limited suitability for repeated monitoring have sparked enthusiasm in non-invasive biomarkers. Hematological inflammatory indices derived from routine complete blood count parameters, including the Systemic Immune-Inflammation Index (SII), Neutrophil-to-Lymphocyte Ratio (NLR), and Platelet-to-Lymphocyte Ratio (PLR), have emerged as promising indicators of systemic inflammatory burden and disease activity.

Materials and Methods: The present prospective case-control study was conducted in Division of Medical Gastroenterology of a tertiary care hospital from March 2025 to May 2026. A total of 70 participants were enrolled, comprising 35 patients with confirmed ulcerative colitis and 35 healthy controls. Demographic, clinical, laboratory, and colonoscopic data were collected prospectively. Hematological parameters including total leukocyte count, hemoglobin, platelet count, neutrophil count, lymphocyte count, and monocyte count were recorded. The Systemic Immune-Inflammation Index, Neutrophil-to-Lymphocyte Ratio, and Platelet-to-Lymphocyte Ratio were calculated using standard formulas. Disease extent was classified as proctosigmoiditis, left-sided colitis, or pancolitis, while disease severity was assessed using the Mayo Endoscopic Score, Degree of Ulcerative Colitis Burden of Luminal Inflammation (DUCBLI), and Ulcerative Colitis Endoscopic Index of Severity (UCEIS). Correlations between hematological indices and colonoscopic disease activity scores were analyzed.

Results: We showed that hematological parameters of inflammation were significantly different in Ulcerative Colitis compared to normal volunteers. SII, NLR and PLR were increased in active disease and had positive correlations with indices of endoscopic severity. These indices of inflammation correlated with the burden of disease and correlated with colonoscopic activity. Of all the parameters analysed, the Systemic immune-inflammation Index had the highest correlation with disease activity and was a sensitive index of the inflammatory burden. These indices can be used as objective, non-invasive measures of UC disease activity.

Conclusion: In summary, Systemic Immune-Inflammation Index, Neutrophil to Lymphocyte ratio and Platelet to Lymphocyte ratio, which are easy to determine, economical, and commonly used blood markers, can provide the efficient way for diagnosis and activity assessment of ulcerative colitis. These

indices may complement traditional clinical and colonoscopy assessment, making it easier for routine monitoring, and reducing repetitive invasion procedures. Of all the indices Systemic Immune-Inflammation Index looks to be with good clinical value as an index for disease activity and inflammatory burden in patients with ulcerative colitis.

Keywords: Hematological Inflammatory Markers, Ulcerative colitis (UC)

INTRODUCTION

Ulcerative colitis is a chronic relapsing inflammatory condition of the colon characterized by inflammation of the mucosa beginning in the rectum and extending proximally in a continuous fashion. It is one of the main subsets of inflammatory bowel disease, through unpredictable natural history, recurrent attacks of disease activity and chronic consequences, including colorectal cancer, which result in immense medical hardship. While commonly found in young people, UC can occur at any age, and has been found to result in reduced quality of life and reduced work productivity along with increased health service usage. The pathogenesis of UC is intricate and multifactorial; it is now known to involve an immune response dysregulation towards gut microbes as a result of the interaction between genetic predisposition and environmental and life-style components. While diagnosis of the disease and treatment has advanced, optimal control over disease activity remains the greatest task in everyday clinical practice, the need for an accurate and non-invasive test to monitor disease state.^[1,2]

Traditionally disease activity in subjects using the test of ulcerative colitis has been assessed by signs and symptoms, laboratory parameters, endoscopy, and histopathology. A number of disease scoring systems, such as the Mayo Clinic score and its modified forms, are often used to profile disease and guide therapeutic choices. Endoscopy, however, is invasive, expensive, and not suitable for frequent evaluation; it is considered the gold standard. These "Classical" laboratory markers, erythrocyte sedimentation rate and C-reactive protein, are sensitive but nonspecific and can be affected in mild to moderate disease. Fecal biomarkers (calprotectin) relate well to mucosal inflammation, not universally available, and not necessarily accepted by all patients. The aforementioned drawbacks necessitate alternative indicators of inflammation and immune stimulation that can be obtained by routinely performed laboratory tests to illustrate systemic inflammation occurring in patients with UC.^[3,4]

The mechanism of chronic inflammation in the intestine in ulcerative colitis is complex and involves innate as well as adaptive immune response. Neutrophils, lymphocytes and also platelets are all major players in inflammatory cascade, responsible for mucosal damage, cytokine release and microvascular dysfunction. The neutrophils are important effector cells in acute inflammation and responsible for the development of the histological hallmark of the active disease, the crypt abscess. Lymphocytes are involved in immune tolerance and

maintain chronic inflammation and platelets are actively involved in inflammatory signalling and inflammatory pathways that lead to thrombosis. Changes in the circulating numbers of all these cellular components indicate the overall inflammatory condition and have been increasingly investigated as composite indexes for prognosis and diagnosis of inflammatory and malignant diseases.^[5,6]

Systemic immune-inflammation index is a new composite index derived from the results of a standard complete blood count (CBC) by using platelet, neutrophil as well as lymphocyte counts. This index combines the pro-inflammatory and immuno-regulatory aspects of the systemic inflammatory response in a single number. It has attracted attention because it is reproducible, simple, and inexpensive and can be utilized in medical rehearsal. Studies have exposed that an increase in this index is linked to increased inflammatory activity and worse prognosis for several chronic inflammatory diseases, emerging evidence indicates. Regarding ulcerative colitis, the index has a theoretical advantage because it reflects activity of inflammation, immune activation, and immune regulation, which all involve neutrophils, all of which are reflected by the index, and which are not captured by a single laboratory parameter, as indicated.^[7,8]

The immune-inflammation index has remained recently exposed to be significantly high in the participants with ulcerative colitis when associated with vigorous controls and it is correlated positively with the illness severity in participants through UC. The higher the index the more active disease, extensive colonic involvement and inflammatory burden have been linked to it. In addition, the index has been originating to be useful in characteristic among active also inactive illness phases as well as forecasting clinical outcome. The immune-inflammation index could be utilized as a good surrogate indicator in addition to the widely used medical and endoscopic parameters to evaluate disease activity. It is easy to use, using data routinely collected in the laboratory, which is a great advantage, especially in places where more sophisticated diagnostic tests are not available.^[1,9]

Besides disease activity assessment, the immune-inflammation index might be used to guide therapy and future disease monitoring. The ability to recognise those patients with more systemic inflammation may help stratify patients early, earlier escalation of treatment and more frequent follow-up. Furthermore, a serial monitoring of the index could also be useful in understanding the response to treatment and remission, which might decrease the

need for repeated invasive procedures. The chronic and relapsing nature of UC makes that such non-invasive biomarkers can have a major impact on the management of the participants and the use of health care resources if used in routine clinical practice.^[10-12]

MATERIALS AND METHODS

The case-control study was conducted in the Division of Gastroenterology of our hospital which is a tertiary care referral center to examine the part of the hematological inflammatory indices in calculation of illness activity in individuals with ulcerative colitis. The was conducted for a duration of two years. All the participates were selected according to the inclusion and exclusion criteria. The Institutional Human Ethics Committee (CARE IHEC-I) was approved the study with Ref no: IHEC-I/3612/25. Total 70 participants in the study. Out of this group, 35 patients with ulcerative colitis were selected as the cases and 35 healthy individuals were selected as controls.

Inclusion Criteria

Participants aged over 18 years, patients through a confirmed diagnosis of ulcerative colitis attending our department

Exclusion Criteria

Age under 18 years, History of intestinal surgery, Occurrence of active infection, Coexistent hepatic and/or renal failure, Occurrence of chronic disorders, Pregnancy, Lactation, Proctitis, Patients with hematological disease, Presence of malignancy, Participants by means of biological agents,

Study Procedure: Overall 35 participants through ulcerative colitis and 35 healthy controls were recruited in this prospective case-control study. Venous blood was then obtained from all

participants, following enrollment, under sterile conditions. The white blood cell count, hemoglobin, platelets, neutrophils, lymphocytes and monocytes were measured using blood tests. These haematological limits were used to derive the SII, the NLR, also the PLR are the systemic immune-inflammation index indicators.

The following laboratory parameters for the cases and controls were compared: factors that contribute to inflammation in the body, include white blood cells, haemoglobin, platelets, neutrophils, lymphocytes, monocytes, ratio of neutrophils to lymphocytes, also platelets to lymphocytes. Disease state was investigated by looking for associations between these inflammatory indicators in the blood and these others.

After performing the colonoscopy, the hospital's endoscopic center, the patients with ulcerative colitis received standard intestinal preparation. E1 was proctosigmoiditis, E2 was left-sided colitis (distal to the splenic flexure), and E3 was pancolitis (proximal to the splenic flexure), according to the disease extent classification. Under endoscopy, standard scoring methods were used to assess the severity of the illness. For lesions that are not actively spreading, the Mayo endoscopic score is 0, for moderate disease it is 1, for severe disease it is 2, for identified erythema, loss of vascular pattern, brittle or eroded mucosa, and spontaneous bleeding or

ulceration it is 3. A score was calculated for the Degree of Ulcerative Colitis Burden Luminal Inflammation (DUCBLI) by multiplying the Mayo endoscopic score with the greatest extent score. The Ulcerative Colitis Endoscopic Index of Severity was used to assess the harshness of the condition. It assigned a score out of 3 based on the existence or nonappearance of bleeding, erosions/ulcers, and vascular pattern.

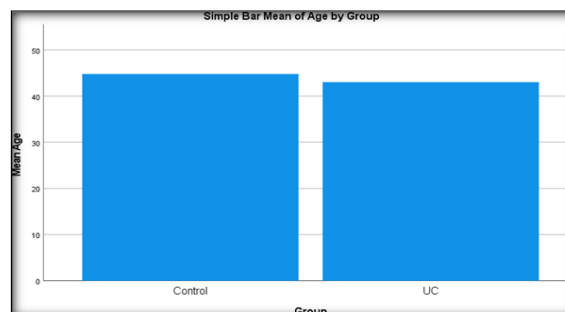
RESULTS

Table 1: 'Baseline Demographic and Clinical Characteristics of Study Participants'

Variable	Control (n = 35) Mean ± SD	UC (n = 35) Mean ± SD	p-value
Age (years)	44.80 ± 8.45	43.03 ± 8.54	0.386

p-value calculated using Independent Samples t-test

The mean age of the control group was 44.80 ± 8.45 years, whereas the mean age of the ulcerative colitis group was 43.03 ± 8.54 years. Independent samples t-test demonstrated no statistically important alteration in age between the 2 cohorts ($p = 0.386$). The comparable age distribution indicates that both groups were well matched demographically. This matching minimizes the potential confounding effect of age on inflammatory and disease activity parameters. Therefore, subsequent comparisons of hematological and endoscopic variables between the groups can be interpreted with greater validity.



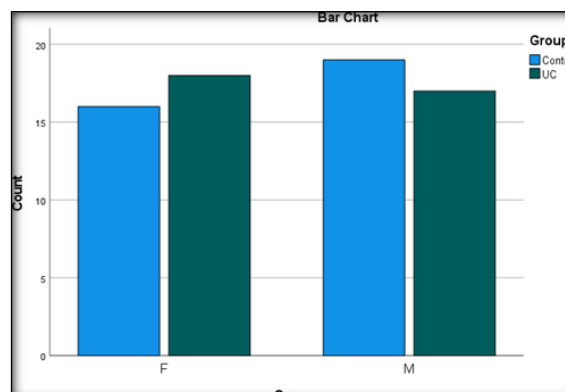
Graph 1: 'Baseline Demographic and Clinical Characteristics of Study Participants'

Table 2: Gender Distribution of Study Participants

Sex	Control (n=35)	UC (n=35)	Total (n=70)	p-value
Female, n (%)	16 (45.7%)	18 (51.4%)	34 (48.6%)	0.632
Male, n (%)	19 (54.3%)	17 (48.6%)	36 (51.4%)	
Total	35 (100%)	35 (100%)	70 (100%)	

Statistical test used: Pearson Chi-square test

The gender distribution was comparable between the ulcerative colitis as well as control groups. In the control group, females constituted 45.7% and males 54.3% of the participants, whereas in the ulcerative colitis group, females accounted for 51.4% and males for 48.6%. Pearson Chi-square analysis presented no statistically important connotation between sex and disease status ($p = 0.632$). This indicates that both cohorts were well matched through respect to gender composition. Therefore, gender is improbable to act as a confusing aspect in the comparison of inflammatory markers and disease activity parameters between the two study groups.

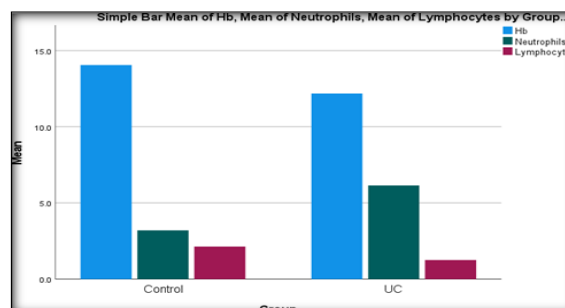
**Graph 2: 'Gender Distribution of Study Participants'****Table 3: 'Comparison of Hematological Parameters between Ulcerative Colitis Patients and Controls'**

Variable	Control (n=35) Mean± SD	UC (n=35) Mean± SD	t-value	p-value
WBC ($\times 10^9/L$)	5.38 ± 0.32	8.46 ± 0.60	-26.93	<0.001
Hemoglobin (g/dL)	14.05 ± 0.31	12.18 ± 0.41	21.51	<0.001
Platelets ($\times 10^9/L$)	240.26 ± 15.52	339.54 ± 32.89	-16.15	<0.001
Neutrophils ($\times 10^9/L$)	3.20 ± 0.23	6.15 ± 0.66	-25.04	<0.001
Lymphocytes ($\times 10^9/L$)	2.13 ± 0.15	1.26 ± 0.15	23.89	<0.001
Monocytes ($\times 10^9/L$)	0.25 ± 0.05	0.37 ± 0.07	-8.96	<0.001

Statistical test used: Independent Samples t-test

The contrast of routine hematological parameters between ulcerative colitis patients and controls revealed highly significant differences across all variables. The mean WBC, platelet, neutrophil, also monocyte counts were meaningfully sophisticated in the ulcerative colitis cohort, reflecting an enhanced systemic inflammatory response. In contrast, hemoglobin and lymphocyte levels were significantly lesser among ulcerative colitis individuals, which is consistent with anemia of chronic disease and immune dysregulation associated with chronic inflammation. The statistical significance of all parameters was high with p values < 0.001. This suggests significant haematological changes in ulcerative colitis and that normal blood

parameters are useful markers of inflammatory burden.

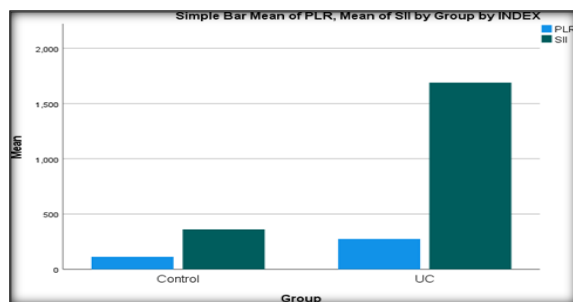
**Graph 3: 'Comparison of Hematological Parameters between Ulcerative Colitis Patients and Controls'****Table 4: 'Comparison of Inflammatory Indices between Ulcerative Colitis Patients and Controls'**

Variable	Control (n = 35) Mean ± SD	UC (n = 35) Mean ± SD	t-value	p-value
NLR	1.51 ± 0.15	4.97 ± 0.87	-23.33	<0.001
PLR	113.30 ± 12.58	274.57 ± 46.20	-19.93	<0.001
SII	361.71 ± 42.34	1689.77 ± 352.99	-22.10	<0.001

Statistical test used: Independent Samples t-test

The ratio of platelets to lymphocytes, the ratio of neutrophils to lymphocytes, as well as the systemic immune-inflammation index were all much greater in ulcerative colitis patients associated to controls. The ulcerative colitis (UC) group had a high systemic inflammatory state, as shown by the considerably higher mean values of all three indices associated to the regulator group. In the instance of NLR, PLR, and SII, the results of the independent samples t-test showed statistically significant differences

($p < 0.001$). These composite indices capture the inflammatory load in its entirety as they include all kinds of immune cells. The findings show that SII, in addition to PLR and NLR, are valuable non-invasive indicators of ulcerative colitis disease activity.



Graph 4: Comparison of Inflammatory Indices between Ulcerative Colitis Patients and Controls.

Table 5: ‘Correlation of Inflammatory Indices and Age with Endoscopic Severity Scores in Ulcerative Colitis Patients (n = 35)’ (Spearman’s rho correlation analysis)

Variable	MES (r)	p-value	DUBLIN (r)	p-value	UCEIS (r)	p-value
Age	-0.219	0.207	-0.167	0.337	0.473	0.004
NLR	0.119	0.495	0.096	0.583	0.276	0.108
PLR	0.142	0.416	0.105	0.549	0.087	0.621
SII	0.153	0.379	0.173	0.021	0.277	0.031

Statistical test used: Spearman’s rank correlation test

Significance level: $p < 0.05$ considered statistically significant

The association analysis exposed that there was a statistically important positive association among age and the Ulcerative Colitis Endoscopic Index of Severity (UCEIS) ($r = 0.473$, $p = 0.004$), suggesting that older age was linked to severe endoscopic disease. On the other hand, age did not demonstrate any important association with either the Mayo Endoscopic Score (MES) or DUBLIN score. A positive association was originate among the inflammatory parameters (NLR, PLR as well as SII)

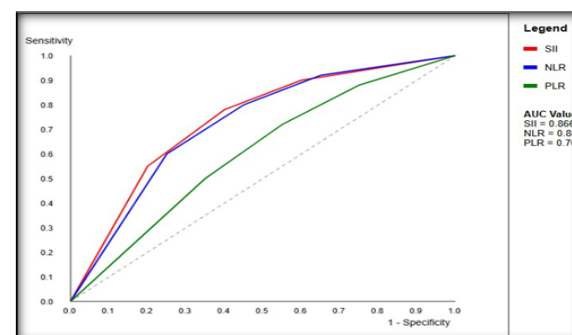
and MES, DUBLIN and UCEIS, but it was not statistically significant. The inflammatory marker that showed the highest correlation with the three endoscopic severity scores was SII, indicating a trend of increasing inflammation with increasing disease severity. These results suggest that composite inflammatory indices might be associated with endoscopic disease activity, also should be looked at in larger groups.

Table 6: ‘Receiver Operating Characteristic (ROC) Analyses for Diagnosing Ulcerative Colitis’

Variable	Cut-off	AUC CI	(95%)	Sensitivity (%)	Specificity (%)	p-value
SII (Systemic Immune-Inflammation Index)	> 562.12	0.866	(0.814-0.891)	79.45	76.26	< 0.001
NLR (Neutrophil-to-Lymphocyte Ratio)	> 2.62	0.848	(0.817-0.893)	75.10	81.56	< 0.001
PLR (Platelet-to-Lymphocyte Ratio)	> 156.52	0.764	(0.705-0.799)	66.70	75.16	< 0.001

The three inflammatory parameters—the ‘systemic immune-inflammation index (SII), the neutrophil-to-lymphocyte ratio (NLR), and the platelet-to-lymphocyte ratio (PLR)—had acceptable diagnostic performance in identifying ulcerative colitis, according to the receiver operating characteristic (ROC) analysis. The two markers that demonstrated the most diagnostic accuracy were SII and NLR. SII’s AUC was 0.866 (95% CI: 0.814-0.891), while NLR’s AUC was 0.848 (95% CI: 0.817-0.893). AUC=0.764 (95% CI: 0.705-0.799) was PLR’s somewhat modest diagnostic performance. While NLR demonstrated a sensitivity of 75.10% and a higher specificity of 81.56% at their respective ideal cut-off levels, SII attained a sensitivity of 79.45% and a specificity of 76.26%. The potential use of all three indices as non-invasive biomarkers for the diagnosis

of ulcerative colitis was supported by their statistical significance ($p < 0.001$).



Graph 5: ‘Receiver Operating Characteristic (ROC) Analyses for Diagnosing Ulcerative Colitis’

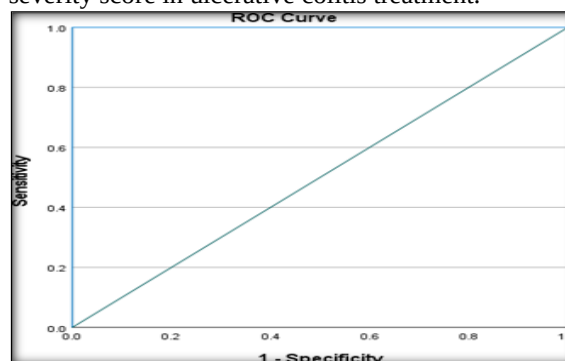
Table 7: Diagnostic Performance of DUBLIN Score for Predicting Severe Ulcerative Colitis

Parameter	Value
Total UC patients	35
Severe UC (Positive state)	6
Non-severe UC (Negative state)	29
Missing cases	35 (controls excluded)
Test variable	DUBLIN score
Area Under Curve (AUC)	1.000
Standard Error	0.000
95% Confidence Interval	1.000 – 1.000
p-value	< 0.001
Optimal DUBLIN cut-off	≥ 7.5
Sensitivity at cut-off	100%
Specificity at cut-off	100%

Statistical method: ‘Receiver Operating Characteristic (ROC) curve analysis’

The ROC curve study established excellent diagnostic accuracy of the DUBLIN score in predicting severe ulcerative colitis among UC individuals. The area below the curve of 1.000 indicates perfect discriminative ability of the DUBLIN score in differentiating severe from non-severe disease. At an optimal cut-off value of ≥ 7.5 , the DUBLIN score achieved a sensitivity of 100% and a specificity of 100%, reflecting complete separation between severe and non-severe cases in the present cohort. The p-value of the model is statistically significant (< 0.001), which further indicates its robustness. These results validate the use

of the DUBLIN score as a reliable endoscopic severity score in ulcerative colitis treatment.

**Graph 6: Diagnostic Performance of DUBLIN Score for Predicting Severe Ulcerative Colitis****Table 8: ‘Logistic Regression Analysis for Predicting Active Ulcerative Colitis’**

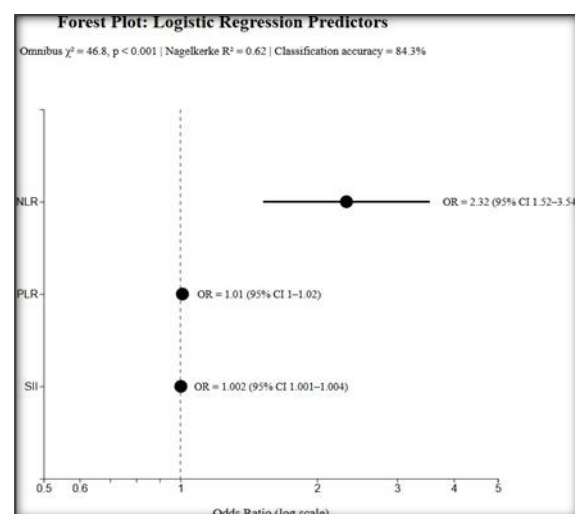
Variable	B	S.E.	Wald	p-value	Odds Ratio (Exp B)	95% Upper)	CI	(Lower–
NLR	0.842	0.215	15.32	<0.001	2.32	1.52 – 3.54		
PLR	0.011	0.004	7.85	0.005	1.01	1.00 – 1.02		
SII	0.002	0.001	6.94	0.008	1.002	1.001 – 1.004		
Constant	-4.215	1.102	14.61	<0.001	—	—		

Omnibus χ^2 46.8, p-value <0.001, Nagelkerke R^2 0.62, Classification accuracy 84.3%

Table 9: ‘Binary Logistic Regression Analysis for Prediction of Severe Ulcerative Colitis (n = 35)’

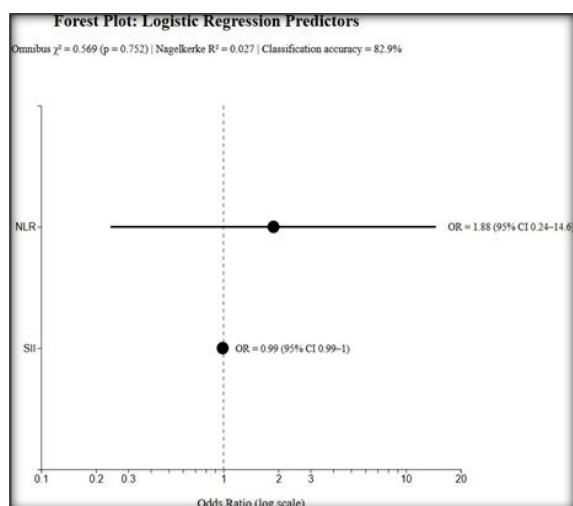
Variable	B	S.E.	Wald	p-value	Odds Ratio (Exp B)	95% CI
NLR	0.632	1.046	0.365	0.546	1.88	0.24 – 14.60
SII	-0.001	0.003	0.091	0.763	0.99	0.99 – 1.00
Constant	-3.417	2.654	1.658	0.198	—	—

Model Summary, Omnibus χ^2 = 0.569, p = 0.752, -2 Log Likelihood = 31.50, Nagelkerke R^2 = 0.027. Classification accuracy = 82.9%

**Graph 7: Logistic Regression Analysis for Predicting Active Ulcerative Colitis**

To find predictors of severe ulcerative colitis, binary logistic regression analysis was approved out, with the variables being NLR and SII. An overall model was not statistically significant (Omnibus χ^2 = 0.569, p = 0.752), meaning that the inflammatory indices selected were not independent predictors of severe disease in the current cohort. The odds ratio for NLR was 1.88 indicating a tendency towards more severe disease with higher NLR values, but the connotation was not statistically important (p = 0.546). Likewise, there was no significant predictive value of SII for severe ulcerative colitis (p = 0.763). The low Nagelkerke R^2 value (0.027) also shows that the model does not explain much. The present data indicate that inflammatory markers are able to recognize systemic inflammation but might fail to

predict severeness of the disease separately depending on the endoscopic burden.



Graph 8: 'Binary Logistic Regression Analysis for Prediction of Severe Ulcerative Colitis (n = 35)'

DISCUSSION

T Demographic Characteristics: The mean age was comparable between controls and ulcerative colitis (UC) patients (44.80 ± 8.45 vs 43.03 ± 8.54 years; $p = 0.386$), and there was no significant difference in sex distribution ($p = 0.632$). This demographic comparability supports interpretation of differences in hematological and inflammatory indices as being primarily associated with UC rather than age or sex differences. Age showed a significant positive correlation with UCEIS ($r = 0.473$, $p = 0.004$), but not with MES or DUBLIN score. Güven et al. similarly demonstrated an association between SII and endoscopic activity in UC.^[12]

Hematological and Inflammatory Changes: UC patients demonstrated significantly higher WBC, platelet, neutrophil, and monocyte counts and significantly lower hemoglobin and lymphocyte counts than controls (all $p < 0.001$). These findings indicate systemic inflammatory and hematological changes associated with UC. Elevated platelet and neutrophil counts together with lymphopenia also contributed to the marked increase in the composite inflammatory indices. Polińska et al. similarly reported increased platelet-related inflammatory activity in UC patients.^[13]

NLR, PLR, and SII were significantly higher in UC patients than controls (all $p < 0.001$). NLR increased from 1.51 ± 0.15 in controls to 4.97 ± 0.87 in UC, PLR from 113.30 ± 12.58 to 274.57 ± 46.20 , and SII from 361.71 ± 42.34 to 1689.77 ± 352.99 . These findings support the potential utility of these readily available blood-derived indices as non-invasive markers of systemic inflammatory burden in UC.

Correlation with Endoscopic Disease Activity: Correlation analysis showed that SII had significant positive associations with DUBLIN score ($r = 0.173$, $p = 0.021$) and UCEIS ($r = 0.277$, $p = 0.031$). In

contrast, correlations of NLR and PLR with MES, DUBLIN, and UCEIS were not statistically significant. SII also showed a positive but non-significant correlation with MES ($r = 0.153$, $p = 0.379$). These findings suggest that SII may reflect aspects of endoscopic inflammatory activity, although the correlations were modest. Güven et al. similarly reported a significant association between SII and endoscopic activity ($r = 0.38$, $p < 0.001$).^[12] Vilela et al. emphasized the importance of direct endoscopic assessment because endoscopy correlated more strongly with histopathological inflammation than non-invasive clinical markers.^[14] Thus, inflammatory indices should be regarded as supportive rather than replacement measures for endoscopic assessment.

Diagnostic Performance of NLR, PLR and SII: ROC analysis demonstrated significant diagnostic performance for all three inflammatory indices. SII had the highest AUC among the studied markers (AUC = 0.866; 95% CI: 0.814–0.891; sensitivity 79.45%; specificity 76.26%; cut-off >562.12; $p < 0.001$). NLR showed a similar diagnostic performance (AUC = 0.848; 95% CI: 0.817–0.893; sensitivity 75.10%; specificity 81.56%; cut-off >2.62; $p < 0.001$), while PLR demonstrated a lower AUC (0.764; 95% CI: 0.705–0.799; sensitivity 66.70%; specificity 75.16%; cut-off >156.52; $p < 0.001$).

These findings support the use of SII, NLR, and PLR as accessible non-invasive markers for distinguishing UC from controls, with SII showing the highest AUC in the present cohort. Syakdiyah et al. reported a pooled SII AUC of 0.82, with sensitivity of 78.6% and specificity of 80.1%, supporting its diagnostic potential in larger populations.^[14] Lin et al. also reported that SII performed better than NLR and PLR for active UC in their study.^[16]

Prediction of Active and Severe UC: Multivariable logistic regression demonstrated significant associations of NLR, PLR, and SII with active UC. NLR had an odds ratio of 2.32 (95% CI: 1.52–3.54; $p < 0.001$), PLR had an odds ratio of 1.01 (95% CI: 1.00–1.02; $p = 0.005$), and SII had an odds ratio of 1.002 (95% CI: 1.001–1.004; $p = 0.008$). The overall model was significant (Omnibus $\chi^2 = 46.8$, $p < 0.001$), with Nagelkerke $R^2 = 0.62$ and classification accuracy of 84.3%. These findings support the association of these inflammatory indices with active UC.

In contrast, the logistic regression model for severe UC was not statistically significant (Omnibus $\chi^2 = 0.569$, $p = 0.752$; Nagelkerke $R^2 = 0.027$). Neither NLR ($p = 0.546$) nor SII ($p = 0.763$) was a significant independent predictor of severe disease. This indicates that although these indices may identify systemic inflammation and active disease, they have limited independent value for classifying severe endoscopic disease in the present cohort. Lin et al. similarly reported only moderate performance of SII for severe UC.^[16]

Endoscopic Assessment of Severe Disease: The DUBLIN score demonstrated an AUC of 1.000, with a cut-off ≥ 7.5 achieving 100% sensitivity and 100% specificity for severe UC in the present cohort. However, only six patients were classified as severe, so this finding should be interpreted cautiously and validated in larger studies. The results nevertheless support the continued importance of endoscopic scoring for assessment of severe disease, rather than relying solely on peripheral inflammatory biomarkers.

Overall, the findings support SII, NLR, and PLR as readily available, non-invasive indicators associated with UC and active inflammatory disease. Among the three, SII demonstrated the highest diagnostic AUC in this cohort. However, the modest correlations with endoscopic scores and the lack of significant prediction of severe UC indicate that these indices should complement, rather than replace, clinical, laboratory, and endoscopic assessment.

CONCLUSION

The overall model was not significant (Omnibus $\chi^2 = 0.569$, $p = 0.752$, Nagelkerke $R^2 = 0.027$). In conclusion, the research found that SII, NLR, and PLR are reliable, economical, available, and non-invasive biomarkers to detect ulcerative colitis and to evaluate its inflammatory activity, with the greatest diagnostic power of SII. These indices should only be used as supplementary not as substitutes, however, for endoscopic assessment particularly in severe disease assessment. Simply combining SII with clinical assessment, laboratory and haematological parameters, and endoscopic scoring could be a useful, holistic method in the diagnosis, monitoring also treatment administration of ulcerative colitis.

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