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Study of the platelet-to-lymphocyte ratio as a prognostic indicator in patients with infections.

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Abstract

Background: *The early diagnosis and accurate prognosis of sepsis are crucial for minimizing both the mortality rate and the associated healthcare costs. Sepsis, a life-threatening condition resulting from the body's response to infection, requires prompt identification and management to improve patient outcomes. Understanding potential biomarkers that can signal severity or predict prognosis is essential for clinicians in making timely and informed decisions.*

Aim: *This study investigates the ratio of platelets to lymphocytes (PLR) as a potential warning indicator in patients suffering from infections, particularly those diagnosed with sepsis. By analyzing this ratio, the research seeks to determine its effectiveness in forecasting patient outcomes and guiding treatment strategies.*

Materials and Methods*: Conducted as a prospective cohort study at Al-Mouassat University Hospital in Damascus, Syria, this research spanned from March 2023 to March 2024. A total of one hundred individuals diagnosed with sepsis were enrolled in the study. Comprehensive demographic, clinical, and laboratory data were collected upon their admission to the hospital. Specifically, a complete blood count was performed at the time of diagnosis to facilitate the calculation of the PLR.*

Results: *The findings revealed a significant increase in the PLR among patients who did not survive compared to those who did survive. This elevation was consistently observed on days one, three, and five following the diagnosis of sepsis, with a p-value of ≤ 0.05 indicating statistical significance. These results suggest that higher PLR values may correlate with poorer outcomes in sepsis patients.*

Conclusion: *The study concludes that in adult patients diagnosed with sepsis, a PLR greater than 230 serves as an effective prognostic indicator for predicting patient outcomes. This threshold can aid healthcare professionals in identifying patients at higher risk of mortality, thereby enabling more targeted interventions and management strategies. The PLR is a simple yet powerful tool that can be readily assessed from routine blood tests, making it a valuable addition to the clinical assessment of sepsis. Further research may explore the integration of PLR into broader clinical protocols to enhance patient care and optimize treatment pathways for those affected by sepsis.*

Keywords: *Platelets to Lymphocytes ratio (PLR), sepsis, outcome, SOFA score.*

Introduction:

Sepsis is defined as a life-threatening organ dysfunction due to an irregular host response to infection. The infectious agent and activated inflammatory mediators disrupt the immune and regulatory systems, disturbing the body's balance [1]. Sepsis represents a significant health burden and is a medical emergency with a concerning mortality rate ranging from 28% to 50%[2] [3] . Each additional organ dysfunction increases the mortality rate by

approximately 20% [4]. The pathophysiology of sepsis involves both immune inflammatory responses and non-immune mechanisms, including metabolic, neuroendocrine, and cardiovascular pathways [5]. Prognosis is associated with the duration and magnitude of the immune inflammatory response, characterized by the activation of immune cells and the production of pro-inflammatory and anti-inflammatory cytokines and chemokines [6]. Additionally, some genetic mutations in certain diseases can lead to abnormal signaling mechanisms that drive an exaggerated immune response in sepsis [7] .

Identifying prognostic and diagnostic biomarkers in sepsis is critically important to avoid negative outcomes and reduce mortality by initiating treatment before irreversible damage occurs. It is believed that a one-hour delay in sepsis treatment is associated with a 7-10% increase in sepsis-related mortality [8]. As a result, intensive efforts have been made to find a biomarker for screening septic patients at risk of death. Among all studied biomarkers, complete blood count (CBC) metrics, including the platelet-to-lymphocyte ratio (PLR), may be valuable tools [9].

The platelet-to-lymphocyte ratio (PLR), as a comprehensive reflection of thrombotic/inflammatory pathways, has predictive significance in a variety of human diseases, including cardiovascular diseases [10], stroke [11], and cancer [12]. According to an increasing number of studies, platelets are involved in the pathophysiological pathways of sepsis and play a key role in organ dysfunction. Platelet activation is triggered by inflammatory thrombotic interactions in sepsis and damaged endothelial cells, and these activated platelets can exacerbate coagulopathy and systemic inflammatory reactions [13]. Low lymphocyte counts have also been linked to shorter survival times in sepsis [14]. In fact, lymphopenia is a common distinguishing feature of immune suppression induced by sepsis, which impairs microbial clearance and predisposes individuals to serious infections, the primary cause of sepsis-related death. Consequently, previous research has suggested that elevated PLR indicates a heightened thrombotic/inflammatory response in the host associated with sepsis mortality [15].

The aim of this study was to determine the relationship between the platelet-to-lymphocyte ratio (PLR) and mortality in patients with sepsis.

Materials and Methods:

First : Study Design:

A prospective cohort study conducted at Al-Assad University Hospital and Al-Mouwasat University Hospital in Damascus between March 2023 and March 2024.

Second: Study Sample:

The study included adult patients (aged 18 years and older) admitted to the emergency department and intensive care units at Al-Assad University Hospital and Al-Mouwasat University Hospital with a diagnosis of sepsis or septic shock. Patients were excluded if they met any of the following criteria:

- Patients with liver failure, malnutrition, or chronic kidney failure.
- Patients with malignant tumors.
- Pregnant women.
- Patients with active bleeding.
- Patients with hematological disorders (including bone marrow diseases) or collagen diseases.
- Patients receiving corticosteroids or immunosuppressive medications.
- Patients who received blood or platelets.
- Patients unwilling to participate in the study (who refused consent).

Thus, the final research sample consisted of 100 patients diagnosed with sepsis or septic shock.

Third: Methodology:

Data in this study were collected prospectively, and all patients (or their relatives when necessary) were fully informed about the study and provided their written informed consent to participate after receiving adequate information.

Sepsis was defined according to the Sepsis-3 definition as a life-threatening organ dysfunction due to an unregulated host response to infection. Organ dysfunction was identified as an acute increase of two or more points in the total Sequential Organ Failure Assessment (SOFA) score due to infection. Septic shock was defined as sepsis with any of the following: the need for vasopressors to maintain a mean arterial pressure of 65 mmHg or a lactate level > 2 mmol/L, provided that the patient does not have hypovolemia (i.e., the patient remains clinically hypovolemic despite adequate intravenous fluid resuscitation). The appropriate volume resuscitation with intravenous fluids was left to the discretion of the attending physician due to variability in the literature on this topic.

The researchers documented the following data through direct communication with the patient or their relatives or by reviewing medical records: age, gender, smoking status, body mass index (BMI), comorbidities, site of infection, vital signs upon admission (heart rate, systolic and diastolic blood pressure, oxygen saturation, temperature, and respiratory rate), and level of consciousness according to the Glasgow Coma Scale.

Data related to the following laboratory analyses were collected: white blood cell count (WBC), hemoglobin, platelets, lymphocytes, neutrophils, and C-reactive protein (CRP). Finally, the following were calculated: SOFA score, platelet-to-lymphocyte ratio (PLR) by dividing the absolute platelet count by the absolute lymphocyte count. CBC results (including PLR) were documented on day three and day five after admission.

Patients were followed throughout their hospital stay to determine the in-hospital mortality rate. The primary outcome was to determine the predictive value of the platelet-to-lymphocyte ratio (PLR) upon admission regarding in-hospital mortality and to compare it with the predictive value of the SOFA score. The secondary outcomes were to determine the optimal threshold for PLR upon admission that distinguishes between surviving and non-surviving patients, to establish the relationship between PLR and SOFA score, and to identify the relationship between changes in platelet and lymphocyte counts and PLR in the first five days of admission on one hand and mortality on the other.

Fourth: Data Analysis and Statistical Study:

The analysis was conducted using SPSS software (version 20) as well as Excel 2013. A predictive value of less than 0.05 was considered statistically significant. For categorical variables, frequency, percentages, and graphical representations were used. For continuous variables, measures of central tendency were applied. For testing the statistical relationships between baseline characteristics, the following statistical methods were used: Student's t-test for testing baseline differences in pathological variables between groups; Chi-square test (X^2-test) for testing baseline differences in categorical variables between groups; Receiver Operating Characteristic (ROC) curve analysis to observe the predictive ability of both PLR and the SOFA score using the Area Under Curve (AUC). The Youden index was used to determine the optimal cutoff point for predicting mortality.

Results:

First: Baseline Characteristics of Study Patients:

In-hospital mortality occurred in 23 patients (23%), while 77 patients (77%) were discharged alive. The average age of patients with sepsis who died in the hospital was significantly higher compared to surviving patients (P=0.035). There was no statistically significant difference in the distribution of males and females, average BMI, smoking status, distribution of medical history, or site of infection between surviving patients and those who died in the hospital. Table (1) presents a comparison of demographic and clinical characteristics according to mortality occurrence.

Table (1): Demographic and Clinical Characteristics of Study Patients

Variable	In-Hospital Death (23 Patients)	No In-Hospital Death (77 Patients)	P-value
Age (years)	68.5 ± 15.6	60.4 ± 16.1	0.035

Male	12 (52.2%)	44 (57.1%)	0.673
Female	11 (47.8%)	33 (42.9%)	0.673
Smoker	7 (30.4%)	23 (29.9%)	0.956
Non-smoker	16 (69.6%)	54 (70.1%)	0.956
Hypertension	8 (34.7%)	22 (28.6%)	0.568
Diabetes	6 (26.1%)	11 (14.3%)	0.186
Stroke History	5 (21.7%)	9 (11.7%)	0.222
Chronic Obstructive Pulmonary Disease	3 (13.1%)	6 (7.8%)	0.44
Ischemic Heart Disease	3 (13.1%)	5 (6.5%)	0.309
BMI (kg/m²)	30 ± 6	29 ± 6	0.484
Respiratory Infection	10 (43.5%)	27 (35.1%)	0.463
Intra-abdominal Infection	7 (30.4%)	28 (36.4%)	0.6
Surgical Site Infection	3 (13.1%)	11 (14.3%)	0.879
Meningitis	2 (8.7%)	8 (10.4%)	0.812
Urinary Sepsis	1 (4.3%)	3 (3.9%)	0.924

There was no statistically significant difference in the average heart rate, respiratory rate, diastolic or systolic blood pressure, or oxygen saturation. However, patients who died in the hospital had a significantly lower average temperature compared to surviving patients (P=0.017). There was no statistically significant difference in the average white blood cell count, hemoglobin, or absolute neutrophil count between sepsis patients who died in the hospital and surviving patients. Conversely, patients who died in the hospital had a significantly lower average platelet count and average lymphocyte count, as well as a significantly higher average CRP compared to surviving patients. The average PLR upon admission for sepsis patients who died in the hospital were significantly higher compared to surviving patients (P<0.0001). Table (2) presents a comparison of average vital signs and laboratory analyses upon admission according to mortality occurrence.

Table (2): Comparison of vital signs and laboratory tests at admission according to in-hospital mortality.

Variable	Death in the Hospital (23 Patients)	No Death in the Hospital (77 Patients)	P-value
Vital Signs at Admission			
Heart Rate (beats/minute)	94.4 ± 22	88.3 ± 21.1	0.231
Respiratory Rate (breaths/minute)	23.4 ± 8.3	21 ± 7.2	0.178
Systolic Blood Pressure (mmHg)	120.7 ± 25.8	126.2 ± 26.7	0.384
Diastolic Blood Pressure (mmHg)	66.7 ± 15.9	67.9 ± 15.6	0.747
Temperature (°C)	36.6 ± 1	37.5 ± 1.7	0.017
Oxygen Saturation (%)	94.4 ± 8.9	96.1 ± 7.6	0.368
Laboratory Tests at Admission			
CRP (mg/dL)	161.9 ± 81.2	83.3 ± 57.1	> 0.0001
WBC (X 10^9/L)	13.4 ± 8.4	12.7 ± 7.2	0.694
Platelets (X 10^9/L)	117.2 ± 49	168 ± 25	> 0.0001

Lymphocytes (X 10^9/L)	0.5 ± 0.23	1.14 ± 0.8	0.0003
Neutrophils (X 10^9/L)	10.4 ± 5.5	9.6 ± 6	0.58
Hemoglobin (g/dL)	11.1 ± 2.4	11.48 ± 2.2	0.452
Platelet to Lymphocyte Ratio (PLR)	331 ± 160	192 ± 30	> 0.0001
Neutrophil to Lymphocyte Ratio (NLR)	11.4 ± 4.2	6.9 ± 3.1	> 0.0001

Second - Severity of Sepsis:

The mean SOFA score at admission for patients who died in the hospital (11.3 ± 5.1) was significantly higher compared to the surviving patients (7 ± 4), (P<0.0001). The prevalence of septic shock was significantly higher among patients who died in the hospital (52.2%) compared to those who survived (20.8%) (P<0.0001) (Table 3).

Table (3): Comparison of the severity of infection according to in-hospital mortality.

Variable	Death in the Hospital (23 Patients)	No Death in the Hospital (77 Patients)	P-value
SOFA Score	11.3 ± 5.1	7 ± 4	> 0.0001
Septic Shock			
Yes	12 (52.2%)	16 (20.8%)	> 0.0001
No	11 (48.8%)	61 (79.2%)	

Third - The Role of Platelet-to-Lymphocyte Ratio at Admission in Predicting Mortality:

The area under the ROC curve for the role of PLR at admission in predicting in-hospital mortality among sepsis patients was (AUC=0.67, 95% confidence interval: 0.6-0.74) (Figure 1), and the best threshold for predicting mortality according to the Youden index was at PLR < 230, which corresponded with a sensitivity of 60% and specificity of 70%.

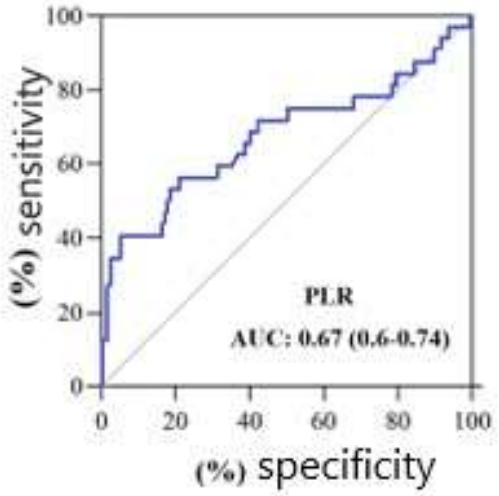

Figure (1): ROC Curve for the Role of PLR at Admission in Predicting In-Hospital Mortality

Fourth- The Role of SOFA Score at Admission in Predicting Mortality:

The area under the ROC curve for the role of SOFA score at admission in predicting in-hospital mortality among sepsis patients was (AUC = 0.891, 95% confidence interval: 0.83-0.93) (Figure 2), and the best threshold for predicting mortality according to the Youden index was at SOFA < 8, which corresponded with a sensitivity of 90% and specificity of 80%.

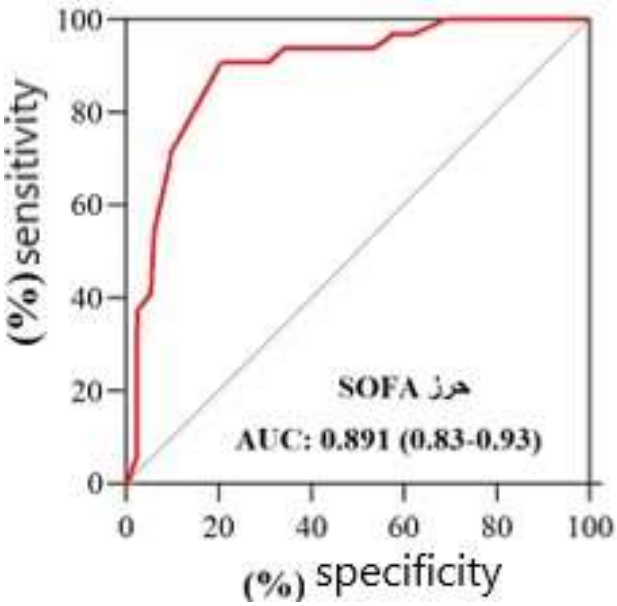

Figure (2): ROC Curve for the Role of SOFA Score at Admission in Predicting In-Hospital Mortality

Fifth - The Correlation Between Platelet-to-Lymphocyte Ratio and SOFA Score at Admission:

A strong positive correlation was found between the platelet-to-lymphocyte ratio (PLR) and SOFA score at admission. Table (4) and Figure (3) illustrate the linear correlation (Spearman) between PLR and SOFA score at admission.

Table (4): Linear Correlation (Spearman) Between PLR and SOFA Score at Admission

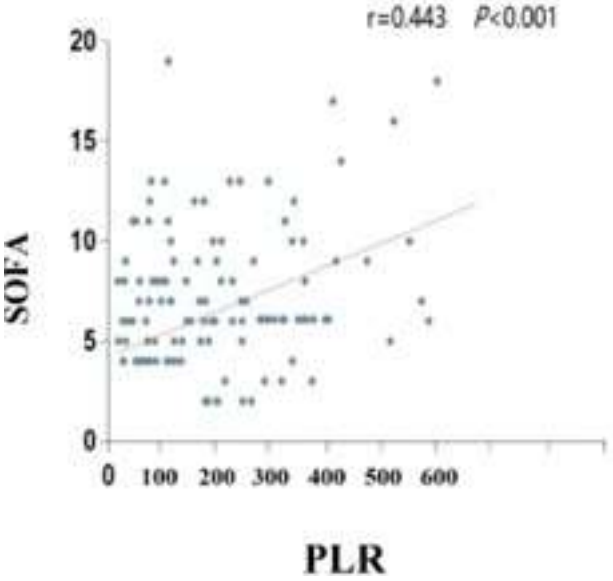

Figure (3): Linear Correlation (Spearman) Between PLR and SOFA Score at Admission

Relationship	Spearman Correlation (r)	P-value	Statistical Significance
PLR and SOFA Score at Admission	0.443	> 0.001	There is a statistically significant positive linear correlation

Sixth - Changes in Values Between Day One, Three, and Five of Admission:

Table (5) shows a comparison of platelet and lymphocyte counts and PLR between day one, three, and five of admission for both sepsis patients who died in the hospital and those who survived. In the group of surviving patients, platelet and lymphocyte counts significantly increased, while the platelet-to-lymphocyte ratio significantly decreased during the first five days of admission. In the group of non-surviving patients, platelet and lymphocyte counts decreased non-significantly, and the platelet-to-lymphocyte ratio remained nearly constant during the first five days of admission.

Table (5): Change in values between the first, third, and fifth days of admission in my research groups.

Group	Analysis	Day 1	Day 3	Day 5	P-value
Survivors					
	Platelets (X10^9/L)	168 ± 25	180 ± 23	200 ± 33	< 0.001
	Lymphocytes (X10^9/L)	1.14 ± 0.8	1.9 ± 0.34	2.6 ± 0.6	< 0.001
	PLR	192 ± 30	95 ± 22	80 ± 23	< 0.001
Non-survivors					
	Platelets (X10^9/L)	117.2 ± 49	107 ± 40	90 ± 36	0.133
	Lymphocytes (X10^9/L)	0.5 ± 0.23	0.45 ± 0.17	0.38 ± 0.1	0.114
	PLR	331 ± 160	323 ± 141	321 ± 140	0.973

On both day three and five of admission, sepsis patients who died in the hospital had a significantly lower average platelet and lymphocyte count and a significantly higher average platelet-to-lymphocyte ratio compared to surviving patients (Table 6).

Table (6): Comparison of platelet, lymphocyte counts, and PLR on the third and fifth day of admission

Variables on Day 3 of Admission	In-Hospital Death (23 Patients)	No In-Hospital Death (77 Patients)	P-value
Platelets (X 10^9/L)	107 ± 40	180 ± 23	< 0.0001
Lymphocytes (X 10^9/L)	0.452 ± 0.17	1.9 ± 0.34	< 0.0001
Platelet-to-Lymphocyte Ratio (PLR)	323 ± 141	95 ± 22	< 0.0001
Variables on Day 5 of Admission	In-Hospital Death (18 Patients)	No In-Hospital Death (77 Patients)	P-value

Platelets (X 10^9/L)	90 ± 36	200 ± 33	< 0.0001
Lymphocytes (X 10^9/L)	0.380 ± 0.1	2.6 ± 0.6	< 0.0001
Platelet-to-Lymphocyte Ratio (PLR)	321 ± 140	80 ± 23	< 0.0001

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Discussion:

It is well known that sepsis represents a widespread global health problem that leaves significant health and economic consequences. Predicting mortality is an important issue in sepsis patients. Biomarkers or laboratory indicators are used to diagnose sepsis and predict clinical outcomes in these patients. Studies around the world continue to search for new criteria [16]. The Platelet-to-Lymphocyte Ratio (PLR) is a quantitative measure determined by dividing the absolute number of platelets by the absolute number of lymphocytes. The aim of this study was to evaluate the prognostic role of the Platelet-to-Lymphocyte Ratio (PLR) in predicting mortality among patients with sepsis.

In the current study, the mean values of both platelet count and lymphocyte count at admission in the group of sepsis patients who died in the hospital were significantly lower compared to the survivors. The Platelet-to-Lymphocyte Ratio (PLR) at admission showed a statistically significant increase in the non-survivor group compared to the survivor group. The results of the current study are consistent with those of Malah et al. in Egypt in 2024, which included 54 sepsis patients. This study showed a decrease in the mean platelet and lymphocyte counts at admission in non-surviving sepsis patients compared to survivors [17] , and the mean PLR was significantly higher in deceased cases compared to survivors. Our findings also align with those of Orak et al., which included 330 sepsis patients, where the Platelet-to-Lymphocyte Ratio (PLR) at admission was higher in deceased patients, while platelet counts were higher in survivors. The study concluded that a decrease in platelet count at admission in patients with sepsis and an increase in PLR are valuable for predicting higher mortality rates [18].

Contrary to our results, Biyikli et al. found no statistically significant differences in PLR between non-survivors and survivors [19] . This can be explained by the different age groups between their study and the current study, as their study included patients over the age of sixty-five.

In the current study, the area under the ROC curve for the role of PLR at admission in predicting in-hospital mortality in sepsis patients was (AUC = 0.67), with the best threshold for predicting mortality at PLR < 230, which corresponded to a sensitivity of 60% and specificity of 70%. However, the highest prognostic role was attributed to the SOFA score at admission (AUC = 0.891), followed by the neutrophil-to-lymphocyte ratio (AUC = 0.78). In a retrospective study conducted by Shen and colleagues on 5,537 sepsis patients, a PLR < 200 at admission was significantly associated with mortality [20]. In another retrospective cohort study by Çakır and colleagues in Turkey in 2021 involving 411 patients admitted to the intensive care unit due to sepsis, the platelet-to-lymphocyte ratio was higher in patients who died compared to survivors. The area under the ROC curve for the role of PLR at admission in predicting in-hospital mortality was (AUC = 0.72), with the best threshold for predicting mortality at PLR < 187.3, which corresponded to a sensitivity of 85% and specificity of 54%. However, the highest prognostic role was attributed to the monocyte-to-lymphocyte ratio (AUC = 0.853), followed by the neutrophil-to-lymphocyte ratio at admission (AUC = 0.825). The study concluded that a high PLR value is associated with mortality in sepsis patients admitted to the intensive care unit [15]. In Malah et al.'s study, the area under the ROC curve for the role of PLR at admission in predicting in-hospital mortality was (AUC = 0.945), with the best threshold for predicting mortality at PLR < 228.9, which corresponded to a sensitivity of 87.5% and specificity of 82.6% [17]. The results of the current study are also consistent with those of Rizal et al., who conducted a retrospective cross-sectional study on 91 sepsis patients and found that the area under the ROC curve for the role of PLR at admission in predicting mortality after 28 days was (AUC = 0.891), with the best threshold for predicting mortality at PLR <

272.22, which corresponded to a sensitivity of 84% and specificity of 80.49% [21].
On the other hand, a study by Fateminayyeri and colleagues in Iran in 2021, which included 260 patients suffering from sepsis, showed no statistically significant difference in the mean platelet-to-lymphocyte ratio (PLR) between the survivor group (349 ± 617) and the deceased group (376 ± 677) (P=0.74). The area under the ROC curve for PLR was (AUC=0.49). However, adding PLR to the APACHE II score criteria was able to improve the accuracy of this method in predicting in-hospital mortality [22].
In sepsis, a number of pro-inflammatory cytokines are produced during the hyper-inflammatory phase, leading to neutrophilia, lymphopenia, and platelet formation in the bone marrow, resulting in an increase in the platelet-to-lymphocyte ratio (PLR). Platelets secrete inflammatory cytokines and interact directly with pathogens and cells in the body, especially neutrophils, T-lymphocytes, natural killer cells, and macrophages. These immune cells contribute to the exacerbation of inflammation. At the same time, a decrease in lymphocyte count indicates immune suppression. This means that an elevated platelet count indicates significant inflammation, while a decrease in lymphocyte count reflects a weak immune response to infection. Consequently, elevated levels of the platelet-to-lymphocyte ratio (PLR) are associated with severe systemic inflammation and may lead to worsening sepsis [20].
In this context, the current study showed a strong positive statistically significant correlation between the platelet-to-lymphocyte ratio (PLR) and the SOFA score at admission (r= 0.443, P<0.001). The results of our study are consistent with those of Malah and colleagues, who also found a strong positive statistically significant correlation between the platelet-to-lymphocyte ratio (PLR) and the SOFA score at admission (r= 0.504, P=0.017) [17]. George and colleagues also reported a positive correlation between the SOFA score and the platelet-to-lymphocyte ratio (PLR), where PLR < 200 was significantly associated with patients having a SOFA score < 10 [23].
In the current study, during the first five days of admission, platelet and lymphocyte counts significantly increased, while the PLR significantly decreased in the survivor group. In contrast, platelet and lymphocyte counts showed no significant decrease and the platelet-to-lymphocyte ratio remained nearly constant in the non-survivor group. Patients with sepsis who died in the hospital had a statistically significantly lower mean for platelet and lymphocyte counts and a higher mean for the platelet-to-lymphocyte ratio compared to survivors on both the third and fifth days of admission.
Our results align with a study by Li and colleagues who conducted research in an intensive care unit on 1,245 patients with septic shock and found that an increase in lymphocyte count was associated with a lower mortality rate within 28 days [24]. Drewry and colleagues found that while absolute lymphocyte counts decreased in both survivors and non-survivors at the onset of sepsis, absolute lymphocyte counts in non-survivors remained persistently low while recovery occurred in lymphocyte counts among survivors [14]. Wang and colleagues reported similar findings in a retrospective cohort study involving 16,401 participants, finding that a decrease in platelet count was significantly associated with the risk of death from sepsis within 28 days [25].
Conclusion:
The mean platelet-to-lymphocyte ratio (PLR) at admission was significantly higher in patients with sepsis who died in the hospital compared to survivors, as well as on the third and fifth days post-admission. PLR at admission showed good prognostic value for predicting in-hospital mortality in sepsis patients (AUC = 0.67), with the best threshold for predicting mortality being PLR < 230, which corresponded to a sensitivity of 60% and specificity of 70%. However, the highest prognostic role was attributed to the SOFA score at admission (AUC= 0.891).
The study demonstrated a strong statistically significant positive correlation between PLR and the SOFA score at admission (r = 0.443, P < 0.001). The study showed a relationship between the improvement of platelet and lymphocyte counts during hospitalization and the improvement of survival outcomes.
Limitations:
One of the strengths of this study is its observational nature and the follow-up of changes in platelet and lymphocyte counts on the third and fifth days of admission. However, there are several limitations to this study: First, the research lacks data on microbial cultures and antibiotic resistance patterns. Second, the effect of treatment on platelet and lymphocyte counts and PLR was not studied.
Recommendations:
The results of this study suggest the routine measurement of platelet and lymphocyte counts and the calculation of the platelet-to-lymphocyte ratio (PLR) for patients with sepsis admitted to the hospital, given the role of this ratio in predicting mortality and thus appropriately triaging patients according to risk. Although the platelet-to-

lymphocyte ratio (PLR) may have less predictive power compared to the SOFA score, it has the advantage of being an easily accessible and cost-effective technique. We recommend conducting future multicenter studies to validate the threshold proposed by this study for PLR (which is < 230) to generalize the findings. We also recommend conducting future studies that address the limitations mentioned above.

Keywords: Platelets to Lymphocytes ratio (PLR), sepsis, outcome, SOFA score.

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