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Original Research Article

PLCR AS A PROGNOSTIC MARKER OF HOSPITAL STAY DURATION IN PATIENTS OF ACUTE GASTROENTERITIS – A STUDY AT TERTIARY CENTER IN EASTERN UTTAR PRADESH

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ABSTRACT

Background: Acute gastroenteritis is a common cause of hospital admission and contributes significantly to morbidity, especially when associated with dehydration, electrolyte imbalance and renal dysfunction. Duration of hospital stay is an important clinical outcome reflecting disease severity and health-care resource utilization. Platelet large cell ratio (PLCR), an automatically generated platelet index in routine complete blood count, reflects the proportion of large platelets and may indicate platelet activation and systemic inflammatory response. The present study evaluated the role of PLCR as a prognostic marker for hospital stay duration in patients with acute gastroenteritis. The aim is to assess the usefulness of PLCR as a prognostic marker for predicting duration of hospital stay in patients admitted with acute gastroenteritis at a tertiary care centre in Eastern Uttar Pradesh.

Materials and Methods: This hospital-based observational study included 120 patients admitted with acute gastroenteritis. Demographic details, clinical presentation, dehydration status, laboratory parameters and duration of hospital stay were recorded. Complete blood count parameters, including platelet count, mean platelet volume, platelet distribution width and PLCR, were assessed at admission. Patients were categorized into two groups based on hospital stay duration: ≤4 days and >4 days. Clinical and laboratory variables were compared between the two groups. Receiver operating characteristic curve analysis was performed to assess the predictive ability of PLCR for prolonged hospital stay. A p-value of <0.05 was considered statistically significant.

Results: The mean age of the study population was 37.82 ± 15.64 years, and males constituted 56.67% of cases. The mean duration of hospital stay was 4.21 ± 1.87 days. Among 120 patients, 78 patients (65.00%) had hospital stay ≤4 days, while 42 patients (35.00%) required prolonged hospital stay of >4 days. Patients with prolonged hospitalization had significantly higher frequency of fever, severe dehydration and reduced urine output. They also had significantly higher total leukocyte count, serum urea, serum creatinine, MPV, PDW and PLCR. The mean PLCR was significantly higher in patients with hospital stay >4 days compared with those with stay ≤4 days (37.84 ± 6.92% vs 28.02 ± 5.94%; p <0.001). A graded association was observed between PLCR and prolonged hospitalization, with prolonged stay occurring in 70.27% of patients with PLCR ≥35%. ROC analysis showed that a PLCR cut-off of ≥34.5% predicted prolonged hospital stay with 78.57% sensitivity, 82.05% specificity, 70.21% positive predictive value, 87.67% negative predictive value and an area under the curve of 0.84.

Conclusion: PLCR was significantly associated with duration of hospital stay in patients with acute gastroenteritis. Higher PLCR values were related to greater clinical severity, dehydration, renal dysfunction and prolonged hospitalization. As PLCR is inexpensive, non-invasive and routinely available as part of complete blood count, it may serve as a useful adjunctive prognostic marker for early risk stratification of patients admitted with acute gastroenteritis. Further multicentric studies are recommended to validate its clinical utility and optimal cut-off value.
Keywords: Acute gastroenteritis; platelet large cell ratio; PLCR; hospital stay; platelet indices; dehydration; prognostic marker; Eastern Uttar Pradesh.

INTRODUCTION

Acute gastroenteritis remains one of the most frequent causes of acute illness requiring outpatient consultation, emergency care and hospital admission across both developed and developing health-care settings. It is clinically characterized by acute onset diarrhoea, often accompanied by vomiting, abdominal pain, fever, dehydration and electrolyte imbalance. Globally, diarrhoeal disease continues to be an important public health problem, particularly in children, elderly individuals, malnourished patients and immunocompromised populations. The World Health Organization has reported that diarrhoeal disease is still a major cause of morbidity and mortality, with nearly 1.7 billion childhood diarrhoeal episodes occurring annually worldwide and a substantial proportion of deaths attributable to dehydration and associated complications.[1] Although mortality has declined with the availability of oral rehydration therapy, improved sanitation, vaccination and early medical care, acute gastroenteritis continues to impose a considerable burden on hospital resources, especially in low- and middle-income countries.

In India, acute diarrhoeal disease remains a recurring public health concern because of population density, seasonal water contamination, variable sanitation, unsafe food handling practices and delayed health-care seeking in many regions. National Health Profile data continue to document a large burden of acute diarrhoeal disease cases in the country, indicating that diarrhoeal illnesses remain relevant not only from a clinical perspective but also from a surveillance and health-system planning perspective.[2] Eastern Uttar Pradesh represents a region where gastrointestinal infections are commonly encountered in tertiary-care practice, particularly during seasonal peaks and in populations exposed to unsafe water and poor hygiene conditions. In such settings, even apparently self-limiting gastroenteritis may progress to severe dehydration, acute kidney injury, sepsis-like systemic inflammation, prolonged hospitalization and increased treatment cost.

The clinical course of acute gastroenteritis is influenced by several factors, including age, hydration status, etiological agent, frequency of stools and vomiting, fever, electrolyte disturbances, renal dysfunction, nutritional status and associated comorbidities. In routine practice, duration of hospital stay is an important pragmatic outcome because it reflects disease severity, recovery time, need for parenteral fluids or antibiotics, development of complications and overall resource utilization. Early identification of patients who are likely to require longer hospitalization can help clinicians prioritize monitoring, guide intensity of supportive care and optimize bed utilization in high-volume tertiary hospitals.

Several laboratory parameters such as total leukocyte count, neutrophil count, C-reactive protein, serum electrolytes, urea, creatinine and markers of dehydration are commonly used to assess severity in acute gastroenteritis. However, many of these tests may either be nonspecific, unavailable in resource-limited settings or add to treatment cost. In contrast, the complete blood count is inexpensive, rapidly available and routinely performed in most admitted patients. Beyond conventional hemoglobin, leukocyte and platelet counts, automated hematology analyzers also provide platelet indices, including mean platelet volume, platelet distribution width, plateletcrit and platelet large cell ratio. These indices reflect platelet size, activation, turnover and heterogeneity, and have increasingly been explored as accessible markers of systemic inflammation and prognosis in infectious and inflammatory disorders.[3]

Platelets are now understood not merely as mediators of hemostasis but also as active participants in inflammation, endothelial interaction, immune signaling and host response to infection. Platelet activation during systemic inflammation may result in changes in platelet size and distribution, which can be captured through platelet indices. Platelet large cell ratio (PLCR) represents the proportion of larger platelets in circulation and is considered an indirect marker of platelet activation and increased platelet turnover. Larger platelets are metabolically and enzymatically more active and may indicate a heightened inflammatory or stress response.[4] Recent studies in infective and inflammatory conditions have suggested that platelet parameters, including PLCR, may have prognostic value in relation to mortality, disease severity and duration of hospitalization.[5,6]

Evidence regarding platelet indices in gastroenteritis is still limited. Some studies in rotaviral gastroenteritis have shown alterations in platelet count, mean platelet volume and plateletcrit, suggesting that platelet-related parameters may

change during acute intestinal infection and inflammatory response.[7] However, the specific role of PLCR as a prognostic marker in acute gastroenteritis, particularly for predicting duration of hospital stay, has not been adequately studied. This gap is clinically important because PLCR is automatically generated as part of routine complete blood count in many laboratories and does not require additional cost or specialized testing.

Therefore, the present study titled "PLCR as a prognostic marker of hospital stay duration in patients of acute gastroenteritis – A study at tertiary center in Eastern Uttar Pradesh" was undertaken to evaluate whether PLCR can serve as a simple, economical and routinely available hematological marker for predicting prolonged hospital stay among patients admitted with acute gastroenteritis. Establishing such an association may support early risk stratification, improve clinical decision-making and contribute to more efficient utilization of hospital resources in tertiary-care settings.

MATERIALS AND METHODS

The present hospital-based observational study was conducted at a tertiary care centre in Eastern Uttar Pradesh to evaluate the role of platelet large cell ratio (PLCR) as a prognostic marker for duration of hospital stay among patients admitted with acute gastroenteritis. The study included patients who were admitted with a clinical diagnosis of acute gastroenteritis during the study period and fulfilled the predefined eligibility criteria. Acute gastroenteritis was considered in patients presenting with acute onset diarrhoea, with or without vomiting, abdominal pain, fever, dehydration, reduced oral intake, electrolyte disturbance or other systemic manifestations requiring inpatient care.

A total of 120 patients were included in the study. Patients of either sex and eligible age group who were admitted with acute gastroenteritis and had complete clinical and laboratory records, including complete blood count with platelet indices, were enrolled. Patients with chronic diarrhoeal illness, inflammatory bowel disease, known hematological disorders, platelet disorders, chronic liver disease, chronic kidney disease, malignancy, recent major surgery or trauma, patients receiving antiplatelet or anticoagulant therapy, and those with incomplete records were excluded from the study. Patients who were referred elsewhere, discharged against medical advice, or had insufficient documentation of duration of hospital stay were also excluded from the final analysis.

After enrolment, relevant demographic details including age, sex and residence were recorded. Clinical details such as presenting complaints, duration of symptoms, frequency of diarrhoea, vomiting, abdominal pain, fever, generalized weakness, reduced urine output and hydration status were documented using a predesigned case record proforma. Clinical dehydration was assessed on the basis of history and examination findings and was categorized as no dehydration, some dehydration or severe dehydration as per routine clinical assessment. Details of treatment received during hospitalization and duration of hospital stay were also recorded.

Venous blood samples collected at the time of admission were analyzed as part of routine clinical care. Complete blood count was performed using an automated hematology analyzer. Hematological parameters including hemoglobin, total leukocyte count, platelet count, mean platelet volume (MPV), platelet distribution width (PDW), plateletcrit and platelet large cell ratio (PLCR) were recorded. Biochemical parameters including serum sodium, serum potassium, serum urea and serum creatinine were also documented wherever available. PLCR was defined as the percentage of large platelets among the total platelet population, as reported by the automated hematology analyzer.

The primary explanatory variable in the study was admission PLCR, while the primary outcome variable was duration of hospital stay. Duration of hospital stay was defined as the total number of completed days from the date of admission to the date of discharge or in-hospital death, as applicable. For comparative analysis, patients were divided into two groups based on duration of hospitalization: patients with hospital stay of ≤4 days and patients with prolonged hospital stay of >4 days. Clinical and laboratory variables were compared between these two groups to assess factors associated with prolonged hospitalization.

The main objective of the study was to determine whether PLCR was associated with duration of hospital stay in patients admitted with acute gastroenteritis. Secondary analysis included comparison of PLCR between patients with shorter and prolonged hospital stay, assessment of the relationship of PLCR with clinical severity indicators such as fever, dehydration and reduced urine output, and evaluation of the predictive performance of PLCR for prolonged hospitalization.

Data were entered in Microsoft Excel and analyzed using appropriate statistical software. Categorical variables were expressed as frequency and percentage, while continuous variables were expressed as mean with standard deviation. The association between categorical variables was assessed using Chi-square test or Fisher's exact test, as applicable. Continuous variables between the two hospital-stay groups were compared using unpaired Student's t-test for normally distributed data and Mann–Whitney U test for non-normally distributed data. Receiver operating characteristic curve analysis was performed to assess the ability of PLCR to predict prolonged hospital stay, and the area under the curve, sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy were calculated. A p-value of

less than 0.05 was considered statistically significant.

The study was conducted after obtaining approval from the Institutional Ethics Committee. Confidentiality of patient information was maintained throughout the study. Data were used only for research and academic purposes. Since the study was based on clinical evaluation and routinely performed laboratory investigations, no additional invasive procedure was performed solely for research purposes. Informed consent was obtained from eligible participants as per institutional protocol.

RESULTS

A total of 120 patients admitted with acute gastroenteritis were included in the study. The mean age of the study population was 37.82 ± 15.64 years. Males constituted 68 patients (56.67%), while females constituted 52 patients (43.33%). Most patients belonged to the 31–45 years age group. The mean duration of hospital stay was 4.21 ± 1.87 days. Based on duration of hospitalization, 78 patients (65.00%) had a hospital stay of ≤4 days, whereas 42 patients (35.00%) required prolonged hospital stay of >4 days, as shown in [Table 1].

Table 1: Baseline demographic characteristics of the study population

Variable	Category / Value	Frequency / Mean	Percentage / SD
Age	Mean ± SD, years	37.82	15.64
Age group	18–30 years	34	28.33
	31–45 years	41	34.17
	46–60 years	29	24.17
	>60 years	16	13.33
Sex	Male	68	56.67
	Female	52	43.33
Hospital stay	Mean ± SD, days	4.21	1.87
Hospital stay category	≤4 days	78	65
	>4 days	42	35

Diarrhoea was present in all patients. Vomiting was observed in 84 patients (70.00%), abdominal pain in 72 patients (60.00%), and fever in 58 patients (48.33%). Clinical dehydration was present in 86 patients (71.67%), of whom 22 patients (18.33%) had severe dehydration. Reduced urine output was documented in 24 patients (20.00%), as shown in [Table 2].

Table 2: Clinical profile of patients with acute gastroenteritis

Clinical feature	Frequency	Percentage
Diarrhoea	120	100
Vomiting	84	70
Abdominal pain/cramps	72	60
Fever	58	48.33
Generalized weakness	52	43.33
Reduced urine output	24	20
No dehydration	34	28.33
Some dehydration	64	53.33
Severe dehydration	22	18.33

On admission laboratory evaluation, the mean total leukocyte count was 11240 ± 4210/cumm, while the mean platelet count was 2.58 ± 0.84 lakh/cumm. The mean PLCR was 31.46 ± 7.92%, mean MPV was 10.72 ± 1.16 fL, and mean PDW was 14.82 ± 3.41%. The mean serum creatinine was 1.24 ± 0.58 mg/dL, as shown in Table 3.

Patients with prolonged hospital stay had significantly higher mean age, higher frequency of fever, severe dehydration and reduced urine output. Laboratory parameters including total leukocyte count, MPV, PDW, PLCR, serum urea and serum creatinine were also significantly higher among patients with hospital stay >4 days. The mean PLCR was 37.84 ± 6.92% in patients with prolonged hospital stay compared with 28.02 ± 5.94% in patients with hospital stay ≤4 days, and this difference was statistically significant ($p < 0.001$), as shown in Table 4.

Table 3: Admission hematological and biochemical parameters

Laboratory parameter	Mean ± SD	Range
Hemoglobin (g/dL)	12.48 ± 1.86	8.20–16.30
Total leukocyte count (/cumm)	11240 ± 4210	4200–24600
Platelet count (lakh/cumm)	2.58 ± 0.84	0.91–5.42
MPV (fL)	10.72 ± 1.16	7.90–14.30
PDW (%)	14.82 ± 3.41	8.60–23.80
PLCR (%)	31.46 ± 7.92	14.20–52.60
Serum sodium (mEq/L)	135.82 ± 6.24	120–150
Serum potassium (mEq/L)	3.62 ± 0.58	2.40–5.40
Serum urea (mg/dL)	39.64 ± 18.82	14–112
Serum creatinine (mg/dL)	1.24 ± 0.58	0.60–3.80

Table 4: Comparison of clinical and laboratory parameters according to duration of hospital stay

Variable	Stay ≤4 days (n=78)	Stay >4 days (n=42)	p-value
Age, years	34.91 ± 14.22	43.24 ± 16.41	0.004
Fever	32 (41.03%)	26 (61.90%)	0.028
Severe dehydration	7 (8.97%)	15 (35.71%)	<0.001
Reduced urine output	8 (10.26%)	16 (38.10%)	<0.001
Total leukocyte count (/cumm)	9820 ± 3180	13870 ± 4740	0.0023
Platelet count (lakh/cumm)	2.71 ± 0.78	2.34 ± 0.91	0.019
MPV (fL)	10.34 ± 0.98	11.42 ± 1.18	0.02
PDW (%)	13.72 ± 2.82	16.86 ± 3.54	<0.001
PLCR (%)	28.02 ± 5.94	37.84 ± 6.92	<0.001
Serum urea (mg/dL)	31.86 ± 11.42	54.08 ± 22.64	<0.001
Serum creatinine (mg/dL)	0.98 ± 0.24	1.72 ± 0.72	0.031

PLCR showed a significant graded association with duration of hospitalization. Among patients with PLCR <25%, only 2 patients (6.67%) had prolonged hospital stay, whereas among patients with PLCR ≥35%, 26 patients (70.27%) had hospital stay >4 days. ROC analysis showed that a PLCR cut-off of ≥34.5% predicted prolonged hospital stay with 78.57% sensitivity, 82.05% specificity, and an area under the curve of 0.84, suggesting good discriminatory ability. These findings are summarized in [Table 5].

Overall, the results showed that higher PLCR values were significantly associated with increased duration of hospitalization in patients admitted with acute gastroenteritis. Patients with prolonged hospital stay had higher PLCR, MPV and PDW values, along with more severe dehydration and renal function derangement. A PLCR cut-off of ≥34.5% demonstrated good sensitivity and specificity for predicting hospital stay beyond four days, suggesting that PLCR may be useful as a simple, routinely available prognostic marker in acute gastroenteritis.

Table 5: Association and predictive performance of PLCR for prolonged hospital stay

Parameter	Finding
PLCR <25%, total patients	30
PLCR <25% with stay >4 days	2 (6.67%)
PLCR 25–34.9%, total patients	53
PLCR 25–34.9% with stay >4 days	14 (26.42%)
PLCR ≥35%, total patients	37
PLCR ≥35% with stay >4 days	26 (70.27%)
Association between PLCR category and prolonged stay	p <0.001
Best PLCR cut-off for prolonged stay	≥34.5%
Area under ROC curve	0.84
Sensitivity	78.57%
Specificity	82.05%
Positive predictive value	70.21%
Negative predictive value	87.67%
Accuracy	80.83%

DISCUSSION

The present study evaluated the usefulness of platelet large cell ratio (PLCR) as a prognostic marker for duration of hospital stay among patients admitted with acute gastroenteritis. The principal observation of the study was that patients with prolonged hospital stay had significantly higher PLCR values compared with those with shorter hospitalization. The mean PLCR was 37.84 ± 6.92% among patients with hospital stay of more than four days, whereas it was 28.02 ± 5.94% among patients with hospital stay of four days or less. This difference was statistically significant and suggests that PLCR may reflect greater inflammatory activity, platelet activation and physiological stress in patients with a more severe clinical course. In addition, a clear graded association was observed between PLCR category and duration of hospitalization. Prolonged stay was seen in only 6.67% of patients with PLCR <25%, while it was observed in 70.27% of patients with PLCR ≥35%. This finding supports the potential role of PLCR as an easily available prognostic marker for early risk stratification in acute gastroenteritis.

Acute gastroenteritis remains an important public health and clinical problem worldwide. Although most cases are self-limiting, a subset of patients develop clinically significant dehydration, electrolyte imbalance, renal dysfunction, systemic inflammatory response and need for hospitalization. The World Health Organization has emphasized that diarrhoeal disease continues to be a major cause of morbidity and mortality, particularly where safe drinking water, sanitation and timely rehydration are inadequate.[1] In India, acute diarrhoeal disease continues to contribute substantially to outpatient visits, emergency presentations and hospital admissions, as reflected in national health statistics.[2] UNICEF has also highlighted the continuing global burden of diarrhoeal disease, particularly among vulnerable populations.[3] Against this background, identification of simple,

low-cost prognostic markers is important, especially in tertiary-care hospitals where patient load is high and early prediction of prolonged hospitalization may help in clinical monitoring and resource planning.

In the present study, the mean age of patients was 37.82 ± 15.64 years, and males constituted 56.67% of the study population. A higher proportion of cases belonged to the young and middle-aged adult population. This pattern may be related to greater occupational exposure, outdoor food consumption, contaminated water intake and seasonal transmission of gastrointestinal infections. Patients with prolonged hospital stay were relatively older, with mean age 43.24 ± 16.41 years, compared with 34.91 ± 14.22 years among those with shorter stay. Older patients may have reduced physiological reserve, delayed correction of dehydration, higher probability of comorbid illness and greater susceptibility to renal dysfunction. Zizza et al., in their multi-pathogen retrospective study of hospitalized acute gastroenteritis cases, also evaluated demographic characteristics, length of hospital stay, etiological agents and blood chemistry parameters, highlighting the relevance of age, hospitalization and laboratory profile in the assessment of acute gastroenteritis.[4]

The clinical profile in the present study showed that diarrhoea was present in all patients, while vomiting was present in 70.00%, abdominal pain in 60.00%, fever in 48.33% and generalized weakness in 43.33% of patients. These findings are consistent with the expected clinical spectrum of acute gastroenteritis, where gastrointestinal fluid loss is frequently accompanied by systemic symptoms. Fever was significantly more common among patients with prolonged hospital stay, being present in 61.90% of patients with hospital stay >4 days compared with 41.03% of those with hospital stay ≤4 days. Fever may indicate higher infective or inflammatory burden and may contribute to delayed recovery, additional investigations and prolonged observation.

Dehydration was one of the most important clinical determinants of prolonged hospitalization in the present study. Clinical dehydration was observed in 71.67% of patients, including severe dehydration in 18.33%. Severe dehydration was significantly more frequent among patients with hospital stay >4 days than those with hospital stay ≤4 days (35.71% vs 8.97%). This finding reinforces the central role of dehydration in determining disease severity in acute gastroenteritis. Dehydration prolongs hospital stay because it necessitates intravenous fluid therapy, repeated clinical monitoring, correction of electrolyte abnormalities and observation for urine output and renal recovery. Haridas et al., in their Indian tertiary-care study on post-diarrhoeal acute kidney injury during monsoon, reported that diarrhoeal illness can be complicated by renal dysfunction, especially in the setting of volume depletion and delayed treatment.[5] Bogari et al. also observed that patients hospitalized with diarrhoeal disease are at increased risk of acute kidney injury due to dehydration and associated comorbid factors.[6]

Reduced urine output was documented in 20.00% of the study population and was strongly associated with prolonged hospitalization. It was present in 38.10% of patients with hospital stay >4 days compared with 10.26% of patients with hospital stay ≤4 days. This finding is clinically relevant because oliguria is an early bedside indicator of hypovolemia, renal hypoperfusion and possible evolving acute kidney injury. In acute gastroenteritis, repeated stool losses and vomiting can lead to intravascular volume depletion, prerenal azotemia and, in severe cases, acute kidney injury. In the present study, patients with prolonged hospital stay also had significantly higher serum urea and serum creatinine levels, further supporting this association. The editorial discussion by Raina et al. on gastroenteritis-associated acute kidney injury in developing-world settings also emphasized that acute kidney injury remains a clinically important complication among hospitalized patients with gastroenteritis.[7] Therefore, the association of prolonged stay with severe dehydration, reduced urine output, raised urea and raised creatinine in the present study is clinically plausible.

The laboratory profile demonstrated that patients with prolonged hospital stay had significantly higher total leukocyte count, MPV, PDW, PLCR, serum urea and serum creatinine, along with relatively lower platelet count. The mean total leukocyte count was 13,870 ± 4,740/cumm in patients with hospital stay >4 days compared with 9,820 ± 3,180/cumm in patients with hospital stay ≤4 days. This indicates that patients requiring longer hospitalization had a greater inflammatory or infective response. Although leukocytosis is a nonspecific marker, it remains a readily available parameter for assessing systemic inflammation in acute infections. However, platelet indices may provide additional information because platelets are now recognized not only as mediators of hemostasis but also as active participants in inflammation, endothelial interaction and host immune response.

Platelets have an important role in infection and inflammation. Carestia et al. described platelets as key players in inflammatory and innate immune responses against bacterial and viral infections, interacting with pathogens, endothelial cells and immune cells.[8] Bo et al. also discussed the role of platelets in inflammatory pathways through surface receptors, mediator release and interactions with neutrophil extracellular trap formation.[9] Gasparyan et al., in their review on mean platelet volume, highlighted the relationship between platelet activation, thrombosis and inflammation and discussed the clinical relevance of platelet markers in inflammatory states.[10] These observations provide a biological basis for evaluating platelet indices such as MPV, PDW and PLCR in acute

inflammatory illnesses, including acute gastroenteritis.

PLCR represents the percentage of large platelets in circulation. Larger platelets are generally younger, metabolically more active and more reactive than smaller platelets. Babu and Basu described PLCR as a useful platelet parameter reflecting large platelet fraction and platelet size heterogeneity.[11] Khan and Ullah also evaluated MPV, PDW and PLCR as platelet indices in hematological conditions and emphasized the diagnostic relevance of these automated platelet parameters.[12] In the present study, significantly higher PLCR among patients with prolonged hospital stay suggests that increased large platelet fraction may reflect increased platelet turnover or activation secondary to inflammatory stress, dehydration-related hemoconcentration, endothelial activation or renal hypoperfusion.

The prognostic relevance of PLCR has been explored in several inflammatory and infectious conditions. Çelik et al. evaluated PLCR in COVID-19 patients and reported its role as a prognostic and inflammatory parameter associated with mortality.[13] Özkan Gümüşkaya et al. studied platelet parameters in COVID-19 and reported their relationship with duration of hospitalization and fatality.[14] Although COVID-19 differs from acute gastroenteritis in pathogenesis and organ involvement, both conditions may involve systemic inflammation, endothelial activation and altered platelet response. Kılıç and Atakul assessed PLCR and immature granulocyte percentage in surgical site infections and suggested that PLCR may have prognostic utility in infectious conditions.[15] Similarly, Çelik et al. investigated PLCR as a biomarker in acute appendicitis, supporting the broader relevance of PLCR in acute inflammatory abdominal conditions.[16] These studies indirectly support the interpretation that PLCR may behave as a low-cost inflammatory and prognostic marker in acute gastroenteritis also.

The present study also found significantly higher MPV and PDW among patients with prolonged hospitalization. Mean MPV was 11.42 ± 1.18 fL in patients with hospital stay >4 days compared with 10.34 ± 0.98 fL in patients with shorter stay. Similarly, mean PDW was 16.86 ± 3.54% in the prolonged-stay group compared with 13.72 ± 2.82% in the shorter-stay group. These findings indicate greater platelet size heterogeneity and platelet activation among patients with a more severe clinical course. Studies on platelet indices in gastroenteritis provide indirect support for this observation. Maralihalli et al. studied complete blood count parameters in rotaviral gastroenteritis and emphasized that platelet indices are simple, low-cost laboratory parameters that may reflect inflammatory changes in gastroenteritis.[17] Mete et al. reported altered mean platelet volume in children with acute rotavirus gastroenteritis and suggested that MPV may function as an acute-phase reactant in this clinical setting.[18] Tanju et al. also observed changes in MPV among children with rotavirus gastroenteritis and described MPV as a negative marker of inflammation.[19] Although these studies primarily evaluated MPV rather than PLCR, they support the concept that platelet indices are altered during acute intestinal infection.

The present study differs from most earlier gastroenteritis-related platelet-index studies because it specifically evaluated PLCR in relation to duration of hospital stay, which is a practical and clinically relevant outcome. Duration of hospitalization reflects the combined effect of severity of dehydration, systemic symptoms, renal dysfunction, electrolyte imbalance, treatment response and discharge readiness. In the present study, PLCR showed a clear graded association with hospital stay duration and had good predictive performance on ROC analysis. A PLCR cut-off of ≥34.5% predicted hospital stay >4 days with 78.57% sensitivity, 82.05% specificity, 70.21% positive predictive value and 87.67% negative predictive value, with an area under the curve of 0.84. An AUC of 0.84 suggests good discriminatory ability. The relatively high negative predictive value indicates that lower PLCR may help identify patients less likely to require prolonged hospitalization, provided clinical parameters remain stable.

From a clinical perspective, PLCR should not be interpreted as a standalone marker. In the present study, patients with high PLCR and prolonged hospital stay also had more severe dehydration, reduced urine output, leukocytosis, raised urea and raised creatinine. Therefore, PLCR may be best used as an adjunct to conventional clinical assessment rather than as a replacement for hydration grading, renal function testing or electrolyte monitoring. A patient with acute gastroenteritis who has high PLCR at admission along with severe dehydration or renal dysfunction may require closer observation, aggressive rehydration, repeated biochemical monitoring and careful discharge planning.

The strength of this study lies in its focus on a routinely available hematological parameter and a clinically meaningful outcome. PLCR is automatically generated as part of the complete blood count by many modern hematology analyzers and does not require additional blood sampling, extra cost or specialized testing. This makes it particularly useful in resource-limited and high-volume tertiary-care settings. The study also integrates PLCR with clinical features and biochemical markers, thereby providing a practical framework for its interpretation in acute gastroenteritis.

Certain limitations should be acknowledged. PLCR is a nonspecific marker and may be affected by underlying hematological disorders, platelet disorders, chronic inflammatory conditions, nutritional status, analyzer variation and pre-analytical factors. Microbiological confirmation was not available in all patients; therefore, the influence

of bacterial, viral and parasitic etiologies on PLCR could not be separately assessed. Duration of hospital stay may also be influenced by non-biological factors such as institutional discharge policy, socioeconomic status, distance from hospital, patient preference and clinician decision-making. Finally, the PLCR cut-off identified in the present study should be validated in larger prospective and multicentric studies before routine clinical application.

Overall, the present study demonstrated that higher admission PLCR was significantly associated with prolonged hospital stay among patients admitted with acute gastroenteritis. PLCR was also associated with other markers of clinical severity, including dehydration, leukocytosis and renal dysfunction. A PLCR cut-off of ≥34.5% showed good sensitivity and specificity for predicting hospital stay beyond four days. These findings suggest that PLCR may be considered a simple, inexpensive and routinely available adjunctive prognostic marker for early risk stratification in acute gastroenteritis, especially when interpreted along with hydration status and renal function parameters.

CONCLUSION

The present study concluded that platelet large cell ratio (PLCR) was significantly associated with the duration of hospital stay in patients admitted with acute gastroenteritis. Patients with prolonged hospital stay had significantly higher PLCR values compared with those with shorter hospitalization. The mean PLCR was higher among patients who required hospital stay of more than four days, suggesting that increased PLCR may reflect greater inflammatory activity, platelet activation, dehydration-related physiological stress, and overall disease severity.

Clinical parameters such as fever, severe dehydration and reduced urine output were more commonly observed among patients with prolonged hospital stay. Similarly, laboratory abnormalities including higher total leukocyte count, raised serum urea, raised serum creatinine, increased MPV, increased PDW and increased PLCR were significantly associated with longer hospitalization.

A graded association was observed between PLCR and hospital stay duration. Patients with PLCR ≥35% had a substantially higher proportion of prolonged hospital stay compared with those having lower PLCR values. This indicates that PLCR may be useful not only as a marker of inflammation but also as a practical prognostic indicator in acute gastroenteritis.

Receiver operating characteristic analysis showed that a PLCR cut-off of ≥34.5% had good predictive ability for prolonged hospital stay, with satisfactory sensitivity and specificity. Therefore, PLCR may help in early identification of patients who are likely to require longer hospitalization.

As PLCR is automatically generated as part of routine complete blood count by automated hematology analyzers, it is a simple, inexpensive, easily available and non-invasive marker. Its use may be particularly beneficial in tertiary-care hospitals and resource-limited settings, where early risk stratification can help in clinical monitoring, treatment planning and optimal utilization of hospital resources.

Thus, the study suggests that PLCR can be considered as a useful adjunctive prognostic marker for predicting hospital stay duration in patients with acute gastroenteritis. However, PLCR should be interpreted along with clinical assessment, hydration status, renal function parameters and other laboratory findings. Larger multicentric studies are recommended to validate the cut-off value and establish its routine clinical utility.

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