DOI: 10.4274/MMJ.galenos.2025.73848
Medeni Med J 2025;40:72-79

Original Article

The Role of Combined C-reactive Protein and Albumin Indices in Predicting Prolonged Hospital Stay in Acute Pancreatitis: A Prospective Observational Study

Akut Pankreatitte Uzamış Hastane Yatışını Öngörmede Kombine C-reaktif Protein ve Albümin İndekslerinin Rolü: Prospektif Gözlemsel Bir Çalışma

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ABSTRACT

Objective: To evaluate the predictive ability of indices based on the combination of C-reactive protein (CRP) and albumin, namely the CRP/albumin ratio (CAR), Glasgow prognostic score (GPS), and modified GPS (mGPS), for prolonged hospital stay in patients with acute pancreatitis.

Methods: This prospective observational study was conducted on patients monitored in the emergency department of a tertiary university hospital. The patients' demographic data, vital signs, laboratory parameters, comorbidities, and length of hospital stay were prospectively recorded. Based on their length of hospital stay, the patients were divided into two groups: prolonged stay (>7 days) and non-prolonged stay. The indices were compared between these groups.

Results: There were statistically significant differences in CAR, GPS, and mGPS between the prolonged and non-prolonged hospital stay groups ($p<0.001$ for all; chi-square test). The area under the curve values of CAR, GPS, and mGPS were calculated as 0.677 [95% confidence interval (CI): 0.601-0.753, $p<0.001$], 0.637 (95% CI: 0.570-0.704, $p<0.001$), and 0.671 (95% CI: 0.602-0.740, $p<0.001$), respectively. According to multivariate analysis, CAR [odds ratio (OR)=1.017, 95% CI (1.003-1.03), p=0.015], GPS [OR=2.894, 95% CI (1.632-5.13), $p<0.001$], and mGPS [OR=3.757, 95% CI (2.108-6.70), $p<0.001$] were found to be independent predictors of prolonged hospital stay.

Conclusions: CAR, GPS, and mGPS are independent predictors of prolonged hospital stay in patients with acute pancreatitis. The findings also suggest that incorporating CRP levels into prognostic calculations may yield more accurate results compared to scores based solely on albumin levels.

Keywords: Emergency departments, acute pancreatitis, C-reactive protein, albumin, hospital stay

ÖZ

Amaç: Bu çalışmanın amacı, C-reaktif protein (CRP) ve albüminin kombinasyonuna dayalı indekslerin-CRP/albümin oranı (CAR), Glasgow prognostik skoru (GPS) ve modifiye GPS (mGPS)-akut pankreatitli hastalarda uzamış hastane yatış süresini öngörmedeki etkinliğini değerlendirmektir.

Yöntemler: Bu prospektif gözlemsel çalışma, üçüncü basamak bir üniversite hastanesinin acil servisinde takip edilen hastalar üzerinde gerçekleştirildi. Hastaların demografik verileri, vital bulguları, laboratuvar parametreleri, eşlik eden hastalıkları ve hastanede kalış süreleri prospektif olarak kaydedildi. Yatış sürelerine göre hastalar iki gruba ayrıldı: uzamış yatış (>7 gün) ve kısa yatış. Belirtilen indeksler bu gruplar arasında karşılaştırıldı.

Bulgular: CAR, GPS ve mGPS değerleri, uzamış ve kısa yatış grupları arasında istatistiksel olarak anlamlı farklılık gösterdi (tüm testler için $p<0,001$; ki-kare testi). CAR, GPS ve mGPS için eğri altındaki alan (AUC) sırasıyla 0,677 [%95 güven aralığı (GA): 0,601-0,753], 0,637 (%95 GA: 0,570-0,704) ve 0,671 (%95 GA: 0,602-0,740) olarak bulundu. Çok değişkenli analizde CAR [olasılık oranı (OA)=1.017, %95 GA: 1.003-1,03, p=0,015), GPS (OA=2,894, %95 GA: 1,632-5,13, $p<0,001$) ve mGPS (OA=3,757, %95 GA: 2,108-6,70, $p<0,001$) bağımsız öngörücüler olarak saptandı.

Sonuçlar: CAR, GPS ve mGPS, akut pankreatitli hastalarda uzamış hastane yatışını öngören bağımsız belirteçlerdir. Bulgular ayrıca, yalnızca albümin düzeylerine dayalı skorlara kıyasla CRP düzeylerinin dahil edilmesinin prognostik doğruluğu artırabileceğini göstermektedir.

Anahtar kelimeler: Acil servis, akut pankreatit, C-reaktif protein, albümin, hastane kalış

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Cite as: Algin A, Ozdemir S, Afacan MA, Yusufoglu K, Ozkan A. The role of combined C-reactive protein and albumin indices in predicting prolonged hospital stay in acute pancreatitis: a prospective observational study. Medeni Med J. 2025;40:72-79

Received: 25 April 2025
Accepted: 05 June 2025
Published: 26 June 2025

INTRODUCTION

Acute pancreatitis (AP) is among the most common gastrointestinal emergencies requiring hospitalization worldwide and represents a significant public health concern due to its high morbidity and mortality rates. While mild forms often resolve spontaneously, severe cases can lead to serious complications such as multiple organ failure and necrotizing pancreatitis, necessitating intensive care[1,2]. The severity of AP can prolong hospital stays, increase treatment costs, and cause productivity loss, particularly among individuals of working age. These outcomes have serious implications not only for individual health but also for healthcare systems and economic burden[3-5].

One of the main challenges in managing AP is predicting which patients will develop severe disease during its early stages. Mortality rates can reach up to 20% in severe AP cases and may exceed 50% in those with sepsis and multiple organ failure[2,4,6,7]. Therefore, early identification of high-risk patients through reliable prognostic biomarkers is of critical importance for establishing appropriate treatment strategies and optimizing patient management[8,9]. Various biomarkers have been investigated to predict the course and prognosis of the disease, with the most frequently studied parameters being C-reactive protein (CRP) and albumin[10,11].

CRP is an acute-phase reactant synthesized by hepatocytes that plays a crucial role in systemic inflammatory responses[12-16]. In patients with AP, CRP levels have been shown to correlate with disease severity, and elevated CRP levels have been particularly associated with complications such as necrotizing pancreatitis, infection, and organ failure. CRP is considered a reliable biomarker for assessing disease severity, especially after the first 48 hours. However, it has also been demonstrated that CRP levels alone may have limited prognostic power and may not be sufficient for precise early-stage prediction[17]. Albumin, on the other hand, is a plasma protein reflecting inflammation and nutritional status, and its reduced levels have been associated with poor prognosis in critical illnesses and inflammatory states[18-21]. In patients with AP, hypoalbuminemia has been linked to enhanced inflammatory response, fluid imbalance, and poor clinical outcomes. Low albumin levels have been shown to increase the risk of mortality and complications, particularly in severe AP cases[20,21].

In recent years, growing attention has been given to the prognostic value of combining different biomarkers, leading to the development of new indices by evaluating CRP and albumin together[11,19]. The CRP/albumin ratio (CAR), Glasgow prognostic score (GPS), and modified GPS (mGPS) have been reported as important prognostic indicators in various inflammatory and critical illnesses[22-24]. However, there is still a lack of literature regarding the clinical relevance of these indices in AP.

This study aimed to evaluate the predictive ability of indices based on the combination of CRP and albumin, namely CAR, GPS, and mGPS, for prolonged hospital stay in patients with AP.

MATERIALS and METHODS

Study Population

This prospective observational study was conducted between February 1, 2023, and July 1, 2023, on patients monitored in the Emergency Department of Health Sciences University Türkiye Umraniye Training and Research Hospital Scientific Research Ethics Committee (approval number: B.10.1.TKH.4.34.H.GP.0.01/135, date: 10.04.2025). Patients diagnosed with AP who were hospitalized and aged over 18 years were included in the study. The diagnosis of AP was based on at least two of the following three criteria: (1) characteristic abdominal pain; (2) serum amylase and/or lipase level greater than three times the upper limit of normal; and (3) imaging findings consistent with AP on ultrasound or contrast-enhanced computed tomography. Patients with missing data (albumin or CRP) were excluded. Patients with chronic pancreatitis, active malignancy, or concomitant severe sepsis were also excluded.

The patients' demographic data (age and sex), vital signs (systolic and diastolic blood pressure, heart rate, and oxygen saturation), laboratory parameters (complete blood count, CRP, albumin, liver and renal function tests, electrolyte levels, and blood gas values), comorbidities, intensive care requirements, and length of hospital stay were prospectively recorded. To assess the inflammatory response, CAR, GPS, and mGPS were calculated (Table 1). The patients were divided into two groups based on length of hospital stay: prolonged stay (>7 days) and non-prolonged stay (≤7 days).

In line with previous literature indicating this threshold as clinically meaningful in predicting complication risk and healthcare utilization in AP, ≥7 days was defined as prolonged[5,8]

Statistical Analysis

Statistical analyses were performed using Jamovi software (v. 2.3.21). The normality of distribution for continuous variables was evaluated using the Shapiro-Wilk test. Non-normally distributed data were presented as median and interquartile range (IQR), and comparisons between groups were made using the Mann-Whitney U test. Categorical variables were expressed as frequencies and percentages, and the chi-square test was used for comparisons. To determine the predictive ability of prognostic scores for prolonged hospital stay, receiver operating characteristic analyses were conducted, and the area under the curve (AUC) values were calculated. Differences between AUC values were evaluated using the DeLong test. Logistic regression analysis was performed to identify independent predictors of prolonged hospital stay. Separate models were created for CAR, GPS, mGPS, and CRP to avoid the effect of collinearity. Model fit measures, including deviance, Akaike Information Criterion, and Nagelkerke's R^2, were also reported. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 152 patients were included in the study. The median age was 58 years, with an IQR of 39 to 74 years. In terms of sex distribution, 61 patients (40%) were female, and 91 patients (60%) were male.

Descriptive data pertaining to the study are presented in Table 2. Based on the duration of hospitalization, the patients were divided into two groups. Of the total 152 patients included in the study, 111 (73%) were classified under the prolonged hospital stay group, while 41 (27%) were categorized under the non-prolonged hospital stay group. The overall median length of hospital stay was 14 days (IQR: 7-23 days) in the whole sample, 19 days (IQR: 13-25 days) in the prolonged stay group, and 4 days (IQR: 3-7 days) in the non-prolonged stay group.

The median diastolic blood pressure was 82 mmHg (IQR: 66-93 mmHg) for all patients in the sample, 78 mmHg (IQR: 64-89 mmHg) in the prolonged stay group, and 85 mmHg (IQR: 74-95 mmHg) in the non-prolonged stay group. This difference between the two groups was statistically significant (p=0.029). The median CRP level was identified as 42 mg/L (IQR: 13-124 mg/L) for all patients. The median CRP level was 61 mg/L (IQR: 22-134 mg/L) in the prolonged stay group and 17 mg/L (IQR: 5-48 mg/L) in the non-prolonged stay group, also indicating a statistically significant difference (p<0.001). CAR, GPS, and mGPS demonstrated statistically significant differences between the two groups (p<0.001 for all; chi-square test). This table presents the comparisons of other parameters between the groups.

The AUC of mGPS in terms of discriminatory performance was measured as 0.671 (95% CI: 0.602-0.740, p<0.001). GPS demonstrated an AUC value of 0.637 (95% CI: 0.570-0.704, p<0.001). CAR exhibited the highest performance among the tested models, with an AUC of 0.677 (95% CI: 0.601-0.753, p<0.001) (Figure 1). Other diagnostic accuracy metrics are shown in Table 3, with the significance of the differences between AUC values given in Table 4.

The multivariate analysis, evaluating whether each parameter, is an independent predictor for prolonged hospital stay, is presented in Table 5.

DISCUSSION

In this prospective study, we evaluated the prognostic value of inflammation-based biomarkers-specifically the CAR, GPS, and mGPS-in predicting prolonged hospital stay among patients diagnosed with AP. Our findings demonstrated that all three parameters were significantly associated with extended hospitalization, with CAR emerging as the most diagnostically accurate tool.

Table 1. Calculation methods for the scoring systems used in the study.

Score	Calculation method	
CRP/albumin ratio	Calculated by dividing the C-reactive protein (mg/L) value by the albumin (g/dL) value.	
Glasgow prognostic score	Calculated based on CRP and albumin levels.	**CRP ≤ 10 mg/L and albumin ≥ 3.5 g/dL → 0 points**
		CRP > 10 mg/L or albumin < 3.5 g/dL → 1 points
		CRP > 10 mg/L and albumin < 3.5 g/dL → 2 points
Modified Glasgow prognostic score	In the mGPS system, a CRP level >10 mg/L receives 1 point even when serum albumin is ≥3.5 g/dL. This reflects the prognostic value of systemic inflammation, independent of the patient's nutritional status.	**CRP ≤ 10 mg/L → 0 points**
		CRP > 10 mg/L and albumin ≥ 3.5 g/dL → 1 points
		CRP > 10 mg/L and albumin < 3.5 g/dL → 2 points

Table 2. Baseline demographic, clinical, laboratory, and prognostic score characteristics of the study groups.				
Characteristic	**Total sample n = 152**	**Non-prolonged hospital stay group n = 41 (27%)**	**Prolonged hospital stay group n = 111 (73%)**	**p-value**
Demographic characteristics				
Age	58 (39-74)	62 (44-74)	58 (36-74)	0.52
Sex				0.36
Female	61 (40%)	14 (34%)	47 (42%)	
Male	91 (60%)	27 (66%)	64 (58%)	
Comorbidities				
Diabetes mellitus	22 (14%)	4 (9.8%)	18 (16%)	0.32
Hypertension	64 (42%)	20 (49%)	44 (40%)	0.31
Coronary artery disease				0.18
Congestive heart failure	5 (3.3%)	3 (7.3%)	2 (1.8%)	0.12
Chronic kidney disease	5 (3.3%)	0 (0%)	5 (4.5%)	0.32
Initial vital parameters				
Systolic blood pressure (mmHg)	131 (122-149)	132 (125-159)	131 (121-147)	0.13
Diastolic blood pressure (mmHg)	**82 (66-93)**	**85 (74-95)**	**78 (64-89)**	**0.029**
Heart rate (beats per minute)	84 (74-96)	87 (78-96)	82 (74-92)	0.26
Oxygen saturation (%)	97 (95-98)	97 (96-99)	97 (94-98)	0.57
Laboratory parameters				
White blood cell count (cells/μL)	13.7 (9.0-15.8)	11.4 (9.0-16.5)	13.7 (9.0-15.8)	0.88
Neutrophil count (cells/μL)	11.2 (6.4-13.8)	9.0 (6.3-14.1)	11.2 (6.4-12.8)	0.89
Lymphocyte count (cells/μL)	1.52 (1.15-2.04)	1.39 (1.09-1.57)	1.53 (1.15-2.14)	0.14
Platelet count (cells/μL)	270 (222-350)	257 (239-350)	270 (221-350)	0.83
Eosinophil count (cells/μL)	0.10 (0.03-0.17)	0.10 (0.01-0.24)	0.10 (0.04-0.17)	0.95
Monocyte count (cells/μL)	0.68 (0.48-0.86)	0.67 (0.49-0.87)	0.68 (0.48-0.86)	0.89
Hemoglobin (g/dL)	14.00 (11.90-15.20)	13.20 (11.90-15.20)	14.10 (11.90-15.20)	0.62
Red cell distribution width (%)	13.85 (12.90-14.90)	13.90 (13.50-14.50)	13.80 (12.90-14.95)	0.48
Aspartate aminotransferase (U/L)	93 (29-156)	72 (26-116)	106 (29-192)	0.16
Alanine aminotransferase (U/L)	71 (32-184)	48 (32-139)	74 (32-196)	0.17
Albumin (g/dL)	4.05 (3.74-4.41)	4.00 (3.90-4.39)	4.05 (3.64-4.41)	0.59
Total bilirubin (mg/dL)	1.22 (0.54-2.01)	1.27 (0.54-2.10)	1.20 (0.54-1.90)	0.99
Direct bilirubin (mg/dL)	0.44 (0.20-1.00)	0.56 (0.30-1.00)	0.43 (0.20-1.00)	0.24
Amylase (U/L)	408 (222-1,054)	338 (212-610)	451 (244-1,111)	0.20
Lipase (U/L)	1,138 (518-1,811)	1,057 (406-1,265)	1,219 (750-2,074)	0.051
Lactate dehydrogenase (U/L)	306 (228-376)	284 (228-315)	313 (240-379)	0.11
Blood urea nitrogen (mg/dL)	32 (26-40)	32 (29-38)	32 (25-41)	0.91
Creatinine (mg/dL)	0.90 (0.76-1.10)	0.89 (0.79-1.02)	0.90 (0.75-1.10)	0.89
Sodium (mEq/L)	135.6 (133.1-139.0)	135.3 (133.0-139.2)	136.0 (133.3-139.0)	0.82
Potassium (mEq/L)	4.21 (4.01-4.60)	4.15 (3.92-4.45)	4.27 (4.03-4.62)	0.065
Calcium (mg/dL)	8.75 (8.50-9.14)	8.70 (8.50-9.10)	8.80 (8.50-9.14)	0.67
Glucose (mg/dL)	118 (95-157)	119 (95-173)	115 (99-150)	0.89
C-reactive protein (mg/L)	**42 (13-124)**	**17 (5-48)**	**61 (22-134)**	**<0.001**
pH	7.40 (7.36-7.43)	7.41 (7.39-7.43)	7.39 (7.34-7.42)	0.14

Table 2. Continued				
Characteristic	**Total sample n = 152**	**Non-prolonged hospital stay group n = 41 (27%)**	**Prolonged hospital stay group n = 111 (73%)**	**p-value**
Partial pressure of carbon dioxide (mmHg)	40 (36-44)	40 (36-44)	40 (37-44)	0.33
Bicarbonate (mEq/L)	23.05 (21.80-25.30)	23.50 (22.10-24.50)	22.80 (21.60-25.40)	0.54
Base excess (mEq/L)	-0.3 (-3.0-1.1)	-0.2 (-1.7-1.1)	-1.2 (-3.0-1.1)	0.42
Lactate (mmol/L)	1.69 (1.35-2.35)	1.84 (1.38-2.39)	1.68 (1.31-2.33)	0.61
C-reactive protein/albumin ratio	**11 (3-29)**	**4 (1-11)**	**13 (5-33)**	**<0.001**
Modified Glasgow prognostic score				**<0.001**
0	32 (21%)	20 (49%)	12 (11%)	
1	91 (60%)	17 (41%)	74 (67%)	
2	29 (19%)	4 (9.8%)	25 (23%)	
Glasgow prognostic score				**<0.001**
0	28 (18%)	16 (39%)	12 (11%)	
1	95 (62%)	21 (51%)	74 (67%)	
2	29 (19%)	4 (9.8%)	25 (23%)	
Outcome measures				
Intensive care unit admission	17 (11%)	5 (12%)	12 (11%)	0.78
Length of hospital stay	**14 (7-23)**	**4 (3-7)**	**19 (13-25)**	**<0.001**

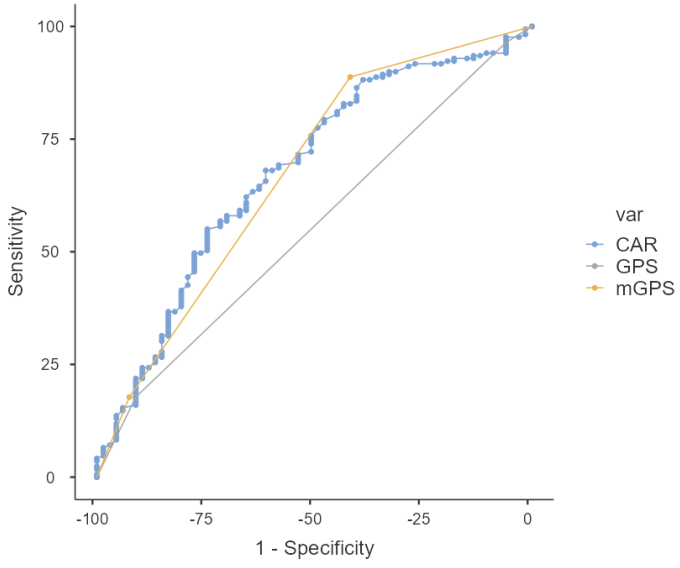

Figure 1. Receiver operating characteristic (ROC) curves of the C-reactive protein/albumin ratio, Glasgow Prognostic Score, and Glasgow prognostic score for predicting prolonged hospital stay.

ROC Curve: Combined

AP is a condition with a highly variable clinical trajectory. While most cases are self-limiting, a subset of patients progresses to severe disease requiring prolonged hospitalization and intensive support. Early risk stratification remains a cornerstone for guiding appropriate clinical management and resource allocation[1-5]. In this regard, systemic inflammation plays a pivotal role in disease progression and complications. Scoring systems such as GPS and mGPS, which integrate inflammatory markers, have previously been applied in oncology and infectious diseases[23-25]. Our results support their broader applicability in inflammatory diseases such as AP.

Among the evaluated scores, CAR demonstrated the strongest association with prolonged length of stay and remained an independent predictor in multivariate logistic regression analysis [odds ratio (OR): 1.017, p=0.015]. This underscores the additive prognostic value of combining CRP, a marker of acute phase response, with albumin, a marker of nutritional and inflammatory status[12,19]. Importantly, CAR offers a simple, cost-effective, and rapidly accessible tool for early risk evaluation, especially valuable features in settings with limited resources or delayed access to imaging.

When comparing GPS and mGPS, our study found that mGPS had significantly superior diagnostic performance, as supported by the DeLong test (p<0.001). This finding suggests that including CRP levels in risk stratification provides enhanced prognostic accuracy compared to albumin-only models. These observations are in line with prior research. For example, Wang et al.[26] demonstrated that GPS predicted 28-day mortality in severe AP patients, in the ICU, and Bardakçı et al.[27] reported that

Table 3. Diagnostic test performance of the parameters for prolonged hospital stay.				
	C-reactive protein/ albumin ratio	**C-reactive protein/ albumin ratio**	**Glasgow prognostic score**	**Modified Glasgow prognostic score**
Area under the curve	0.677	0.677	0.637	0.671
Cut-off	≥2.7	≥11.8*	≥1*	≥1*
Sensitivity	88.2%	55.0%	99.4%	88.8%
Specificity	37.3%	74.6%	1.5%	41.8%
Accuracy	73.7%	60.6%	71.6%	75.4%
Prevalence	71.6%	71.6%	71.6%	71.6%
Positive predictive value	78.0%	84.5%	71.8%	79.4%
Negative predictive value	55.6%	39.7%	50.0%	59.6%
Post-test disease probability	78.0%	84.5%	71.8%	79.4%
Post-test health probability	55.6%	39.7%	50.0%	59.6%
Positive likelihood ratio	1.41	2.17	1.01	1.52
Negative likelihood ratio	0.317	0.603	0.396	0.269
*Optimal cut-off value based on Youden's index				

Table 4. DeLong test for differences between the AUC values of the scoring systems.					
	AUC difference	**Confidence interval (lower)**	**Confidence interval (upper)**	**Correlation**	**p-value**
Modified Glasgow prognostic score vs. Glasgow prognostic score	0.127	0.070	0.185	0.561	**<0.001**
Modified Glasgow prognostic score vs. C-reactive protein to albumin ratio	-0.006	-0.062	0.051	0.707	0.843
Glasgow prognostic score vs. C-reactive protein/albumin ratio	-0.133	-0.205	-0.061	0.406	**<0.001**
AUC: Area under the curve					

mGPS outperformed traditional scores such as Ranson and APACHE II in identifying severe cases[25]. Our study extends these findings by focusing on length of hospital stay as a functional outcome, which is closely tied to disease severity and resource burden.

CAR has also been studied in AP mortality prediction. Kaplan et al.[28] found that CAR values >16.28 were associated with a 19-fold increase in mortality risk, while Zhao et al.[29] reported its association with organ failure and necrosis. In alignment with those studies, our results suggest that CAR is also a reliable predictor of disease severity as reflected by hospitalization length.

From a clinical perspective, inflammation-based biomarkers like CAR, GPS, and mGPS provide practical, low-cost alternatives to complex scoring systems such as APACHE II or Ranson. They allow early triage and may facilitate timely decision-making, especially in high-volume emergency departments or low-resource healthcare environments.

Study Limitations

This study has several limitations. First, it was conducted at a single center, which may restrict the generalizability of the findings. Second, long-term outcomes such as readmission, recurrence, or late complications were not assessed. Third, although laboratory markers were evaluated, integration with radiological and detailed clinical scoring systems (e.g., CTSI) was not performed. Future multicenter studies incorporating longitudinal outcomes and multimodal prognostic approaches are needed to validate and expand upon these results.

CONCLUSION

In conclusion, this study demonstrated that CAR, GPS, and mGPS are independent predictors of prolonged hospital stay in patients with AP. Among them, CAR showed the highest diagnostic performance. The inclusion of CRP in inflammation-based prognostic scores appears to enhance predictive accuracy, supporting the use of mGPS over GPS in this clinical context. Given

Table 5. Multivariate analysis evaluating whether each parameter is an independent predictor of prolonged hospital stay.

Model fit measures			Multivariate analysis							
			Predictor	**Estimate**	**SE**	**Z**	**p-value**	**Odds ratio**	**95% CI (lower)**	**95% CI (upper)**
Model 1	Deviance	264	Intercept	15.895	0.83272	1.91	0.056	4.901	0.958	25.07
	Akaike information criterion	270	Diastolic blood pressure (mmHg)	-0.0132	0.00973	-1.35	0.176	0.987	0.968	1.01
	Nagelkerke's R^2	0.0799	**C-reactive protein/ albumin ratio**	0.0171	0.00698	2.44	**0.015**	1.017	1.003	1.03
Model 2	Deviance	257	Intercept	12.037	0.86482	1.39	0.164	3.333	0.612	18.15
	Akaike information criterion	263	Diastolic blood pressure (mmHg)	-0.0162	0.00983	-1.64	0.100	0.984	0.965	1.00
	Nagelkerke's R^2	0.118	**Glasgow prognostic score**	10.627	0.29242	3.63	**<0.001**	2.894	1.632	5.13
Model 3	Deviance	249	Intercept	0.9906	0.8699	1.14	0.255	2.693	0.489	14.81
	Akaike information criterion	255	Diastolic blood pressure (mmHg)	-0.0157	0.0100	-1.56	0.118	0.984	0.965	1.00
	Nagelkerke's R^2	0.166	**Modified Glasgow prognostic score**	13.237	0.2948	4.49	**<0.001**	3.757	2.108	6.70
Model 4	Deviance	263	Intercept	156.449	0.82812	1.89	0.059	4.780	0.943	24.23
	Akaike information criterion	269	Diastolic blood pressure (mmHg)	-0.01335	0.00966	-1.38	0.167	0.987	0.968	1.01
	Nagelkerke's R^2	0.0849	**C-reactive protein**	0.00506	0.00195	2.59	**0.010**	1.005	1.001	1.01

SE: Standard error, CI: Confidence interval

their simplicity and accessibility, these biomarkers may aid in early risk stratification and decision-making. Nevertheless, further validation through multicenter, prospective studies is warranted before these scores can be routinely adopted into clinical algorithms.

Ethics

Ethics Committee Approval: Approval for this study was received from the Scientific Research Ethics Committee of the Health Sciences University Türkiye Ümraniye Training and Research Hospital (approval number: B.10.1.TKH.4.34.H.GP.0.01/135, date: 10.04.2025).

Informed Consent: Since this study is a prospective observational study, patient consent is not required.

Footnotes

Author Contributions

Concept: A.A., M.A.A., A.O., Design: A.A., M.A.A., A.O., Data Collection and/or Processing: A.A., S.O., Analysis and/or Interpretation: A.A., S.O., K.Y., A.O., Literature Search: A.A., K.Y., Writing: A.A., S.O.

Conflict of Interest: The authors have no conflict of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

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