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Coronavirus Pandemic

Red cell distribution width and mean platelet volume as mortality markers in patients with COVID-19: a retrospective cohort study

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Abstract

Introduction: This study investigates RDW and MPV as simple, cost-effective markers linked to increased mortality in COVID-19, highlighting their potential prognostic value in viral infections.

Methodology: This retrospective observational study examined hospitalized COVID-19 patients from 2020 to 2022, assessing clinical outcomes such as ICU admission, hospital stay duration, and mortality. It focused on the prognostic value of Red Cell Distribution Width (RDW) and Mean Platelet Volume (MPV), investigating whether elevated levels of these markers could serve as accessible indicators of mortality risk.

Results: The mean age at diagnosis among patients was 48.07 ± 17.33 years. The mean hospital stay was 5.82 ± 5.44 days. Among 1,810 patients, elevated Red Cell Distribution Width (RDW > 15%) and Mean Platelet Volume (MPV > 11.5 fL) were associated with significantly higher mortality rates ($p < 0.01$ and $p = 0.014$, respectively). Logistic regression analysis identified age, male sex, length of hospital stay, WBC count, RDW-CV, glucose, ferritin, and low albumin as independent predictors of mortality. Conversely, MPV, D-dimer, creatinine, calcium, and ALT were not significant mortality predictors. These findings suggest that routine markers, particularly RDW and WBC, may serve as accessible and cost-effective tools for early risk stratification in COVID-19 patients, while others, like MPV, may have limited independent prognostic value in this context.

Conclusions: RDW and MPV, routinely available from blood tests, may help identify early clinical deterioration, supporting timely interventions to improve outcomes.

Key words: COVID-19; viral infection; red cell distribution width; mean platelet volume.

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Introduction

Coronavirus disease 2019 (COVID-19) is a viral illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and predominantly presents as an acute respiratory infection. The disease is primarily characterized by respiratory involvement, ranging from mild upper respiratory symptoms to severe acute respiratory distress syndrome (ARDS) and respiratory failure, particularly in vulnerable populations. Clinically, COVID-19 exhibits a broad spectrum of manifestations. While some individuals remain asymptomatic or exhibit only mild flu-like symptoms, others may develop progressive dyspnea, progress to hypoxia, and require intensive care support [1-3].

Hematological abnormalities are commonly observed during the course of the disease. The most frequent finding is lymphopenia, which is associated with poorer outcomes and severe disease progression. In addition, some patients may also present with thrombocytopenia and leukopenia, although these are observed less frequently. These hematological indices are considered valuable not only for diagnostic support but also for prognostic stratification of COVID-19 severity [4,5].

RDW and MPV are parameters routinely measured in a standard complete blood count (CBC). RDW reflects the degree of variation in the size (anisocytosis) of circulating red blood cells and is commonly used in the differential diagnosis of anemia. Beyond hematological disorders, elevated RDW has also been associated with systemic inflammation and adverse outcomes in various clinical settings, including infections and cardiovascular diseases. MPV, on the other hand, represents the average size of platelets in the bloodstream. It serves as an indicator of platelet activation and production, with larger platelets typically being younger and more reactive. Changes in MPV have been observed in numerous conditions, including sepsis, thrombocytopenia, and inflammatory diseases, making it a potential biomarker for disease activity and prognosis [6-9].

RDW has been associated with all-cause mortality. This association is particularly evident in patients with cardiovascular diseases, pulmonary conditions, sepsis, influenza, and various forms of cancer. Elevated RDW

values are believed to reflect underlying systemic inflammation, oxidative stress, and nutritional deficiencies, all of which may contribute to adverse outcomes in these patient populations [10].

In this study, we aimed to investigate the associations of elevated RDW and MPV levels with mortality, specifically in the context of COVID-19, a viral infection. By focusing on these routinely measured hematological parameters, our objective was to evaluate their potential as accessible and cost-effective prognostic markers that may help predict adverse outcomes in patients with viral infections, particularly SARS-CoV-2 infection.

Methodology

Setting and Participants

This retrospective observational study included 1813 patients who were admitted to our hospital with a confirmed diagnosis of COVID-19 viral infection between the years 2020 and 2022. The primary aim was to evaluate clinical outcomes and laboratory findings associated with disease severity and prognosis. Demographic characteristics such as age and sex were recorded for all participants. Additionally, important clinical data were collected, including admission to the intensive care unit (ICU), total length of hospital stay, and mortality status at discharge.

Patient Characteristics and Procedures

A comprehensive panel of laboratory parameters was assessed to explore potential biomarkers of disease progression. These included complete blood count components such as white blood cell (WBC) count, neutrophils (Neu), lymphocytes, hemoglobin (HGB), hematocrit (HCT), platelet count (PLT), RDW, and MPV. Biochemical markers included glucose, urea, creatinine, sodium (Na), potassium (K), calcium (Ca), and albumin levels. Liver enzymes such as aspartate aminotransferase (AST) and alanine aminotransferase (ALT), along with lactate dehydrogenase (LDH) and C-reactive protein (CRP), were also measured to assess inflammatory and organ function status. All data were obtained from patient records and analyzed retrospectively in compliance with the ethical principles outlined in the Declaration of Helsinki.

Patients were categorized into two groups based on their RDW levels:

- Group 1: RDW > 15 %
- Group 2: RDW ≤ 15 %

Patients were categorized into two groups based on MPV values:

- Group 1: MPV > 11.5 fL
- Group 2: MPV ≤ 11.5 fL

It is pre-specified cut points of RDW-CV ≥15% (common upper reference flag in routine hematology analyzers) and MPV > 11.5 fL (upper reference limit in our laboratory) to privilege higher specificity for early risk-flagging at triage. Patients were stratified into two groups based on their RDW and MPV values, and the relationship between these hematological parameters and in-hospital mortality was subsequently evaluated. This analysis aimed to determine whether elevated RDW or MPV levels could serve as potential prognostic indicators for mortality risk.

Statistical Analysis

To assess whether the variables in our study followed a normal distribution, the Kolmogorov-

Table 1. Baseline clinical and laboratory characteristics at admission.

Parameter	N	Mean	Standard Deviation
Age (Years)	1813	48.07	17.332
Hospital Stay (Days)	1813	5.82	5.438
Blood Cell Count (×10⁹/L)	1813	7.0969	3.95246
Neutrophil Count (×10⁹/L)	1812	4.9812	3.62901
Lymphocyte Count (×10⁹/L)	1813	1.7309	4.26206
Hemoglobin (g/L)	1813	137.09	18.77
Hematocrit (L/L)	1813	0.426	0.052
Platelet Count (× 10⁹/L)	1813	220.3	74.1
Red Cell Distribution Width – Coefficient of Variation (%)	1813	13.77	2.83
Mean Platelet Volume (fL)	1813	10.18	1.12
Glucose (mmol/L)	1813	6.95	3.32
Urea (mmol/L)	1813	5.42	3.74
Creatinine (µmol/L)	1813	86.96	147.68
Sodium (mmol/L)	1813	137.63	3.25
Potassium (mmol/L)	1813	4.09	0.52
Calcium (mmol/L)	1812	2.18	0.17
Albumin (g/L)	1812	39.26	5.18
Aspartate Aminotransferase (U/L)	1813	30.61	38.908
Alanine Aminotransferase (U/L)	1813	28.06	27.876
Lactate Dehydrogenase (U/L)	1812	266.33	123.827
C-Reactive Protein (mg/L)	1813	39.418	55.545

Smirnov test was applied. Variables that conformed to a normal distribution were presented as mean ± SD, while those that did not were reported as median (IQR). For continuous variables with normal distribution, comparisons between groups were performed using the Student's *t*-test. Categorical variables were analyzed using the chi-square test. To identify independent factors associated with mortality, logistic regression analysis was conducted. A *p* of less than 0.05 was considered statistically significant. The program used for statistical analysis was the Statistical Package for Social Sciences (SPSS) version 26.0 (IBM Corp., Armonk, NY, USA).

Results

General Information of Patients

The mean age at diagnosis was 48.07 ± 17.33 years, and the mean hospital stay was 5.82 ± 5.44 days. Hematologic indices were as follows: white blood cell count **7**.10 ± 3.95 ×10⁹/L, neutrophils 4.98 ± 3.63 × 10⁹/L, and lymphocytes 1.73 ± 4.26 ×10⁹/L. HGB was 137.1 ± 18.8 g/L, hematocrit 0.426 ± 0.052 L/L, and platelet count 220.3 ± 74.1 ×10⁹/L. RDW-CV averaged 13.77 ± 2.84%**,** and MPV 10.18 ± 1.12 fL. Biochemistry showed glucose 6.95 ± 3.32 mmol/L, urea 5.42 ± 3.74 mmol/L, and creatinine 86.6 ± 147.6 µmol/L. Electrolytes were sodium 137.63 ± 3.25 mmol/L and potassium 4.09 ± 0.52 mmol/L. Calcium was 2.18 ± 0.17 mmol/L, and albumin 39.26 ± 5.18 g/L. Liver enzymes were aspartate aminotransferase 30.61 ± 38.91 U/L, alanine aminotransferase 28.06 ± 27.88 U/L, and lactate dehydrogenase 266.33 ± 123.83 U/L. C-reactive protein was 39.42 ± 55.55 mg/L (Table 1).

Comparison of Survivors and Non-Survivors

Patients who died were significantly older (72.5 [30–96] years **vs.** 46 [18–98] years, $p < 0.001$) and had longer hospital stays (8 [1–78] days vs. 5 [0–42] days, $p < 0.001$) (Table 2). White blood cell count was higher in non-survivors (9.65 [1.13–66.34] × 10⁹/L vs. 6.07 [0.89–42.7] × 10⁹/L, $p < 0.001$), as were neutrophils (7.14 [0.66–63.9] × 10⁹/L vs. 3.93 [0.15–37.79] ×10⁹/L, $p < 0.001$), while lymphocyte counts were similar (0.80 [0.20–28.79] × 10⁹/L vs. 1.45 [0.11–21.2] × 10⁹/L, $p = 0.605$). Hemoglobin and hematocrit were lower in those who died (130 [57.6–176] g/L vs. 140 [55.6–191] g/L, $p < 0.001$; and 0.405 [0.176–0.601] L/L vs. 0.432 [0.201–0.644] L/L, $p < 0.001$), whereas platelet counts were comparable (218 [48–628] × 10⁹/L vs. 210.8 [22–738] × 10⁹/L, $p = 0.532$). RDW-CV was higher in non-survivors (13.9 [12.5–23.1]% vs. 13.3 [10.6–16.2]%, $p < 0.001$), but MPV did not differ (10.3 [8.4–16.4] fL vs. 10.1 [7.0–17.0] fL, $p = 0.198$). Biochemistry showed higher glucose (7.60 [4.05–29.53] mmol/L vs. 5.88 [2.66–41.30] mmol/L, $p < 0.001$), urea (9.41 [2.50–44.46] mmol/L vs**.** 4.50 [1.67–29.64] mmol/L, $p < 0.001$), and creatinine (99.0 [49.5–902.6] µmol/L vs. 70.7 [26.5–707.2] µmol/L, $p < 0.001$) in non-survivors. AST and LDH were also higher (42.5 [9–1129] U/L vs. 26 [4–669] U/L, $p < 0.001$; 397 [150–1327] U/L vs. 234 [64–2005] U/L, $p < 0.001$), as was CRP (130.0 [0.1–350.0] mg/L vs. 14.1 [0.1–350.0] mg/L, $p < 0.001$). Albumin was lower (32 [7–46] g/L vs. 40 [7–54] g/L, $p < 0.001$), as were sodium (136 [125–175] mmol/L vs. 138 [120–158] mmol/L, $p < 0.001$) and calcium (2.00 [1.50–2.74] mmol/L vs. 2.25 [1.50–2.74] mmol/L, $p < 0.001$). Potassium showed a modest difference (4.0

Table 2. Admission characteristics in discharged vs deceased patients.

Variable	Discharged	Deceased	*p*
Age (years)	46 (18–98)	72.5 (30–96)	< 0.001*
Hospital stay (days)	5 (0–42)	8 (1–78)	< 0.001*
White blood cell count (× 10⁹/L)	6.07 (0.89–42.7)	9.65 (1.13–66.34)	< 0.001*
Neutrophil count (× 10⁹/L)	3.93 (0.15–37.79)	7.14 (0.66–63.9)	< 0.001*
Lymphocyte count (× 10⁹/L)	1.45 (0.11–21.2)	0.8 (0.2–28.79)	0.605*
Hemoglobin (g/L)	**140 (55.6–191)**	**130 (57.6–176)**	< 0.001*
Hematocrit (L/L)	**0.432 (0.201–0.644)**	**0.405 (0.176–0.601)**	< 0.001*
Platelet count (× 10⁹/L)	210.8 (22–738)	218 (48–628)	0.532*
RDW-CV (%)	13.3 (10.6–16.2)	13.9 (12.5–23.1)	< 0.001*
Mean platelet volume (fL)	10.1 (7.0–17.0)	10.3 (8.4–16.4)	0.198*
Glucose (mmol/L)	**5.88 (2.66–41.29)**	**7.60 (4.05–29.53)**	< 0.001*
Urea (mmol/L)	**4.50 (1.67–29.64)**	**9.41 (2.50–44.46)**	< 0.001*
Creatinine (µmol/L)	**70.7 (26.5–707.2)**	**99.0 (49.5–902.6)**	< 0.001*
Sodium (mmol/L)	138 (120–158)	136 (125–175)	< 0.001*
Potassium (mmol/L)	4.0 (3.0–10.0)	4.0 (3.0–8.0)	0.046*
Calcium (mmol/L)	**2.25 (1.50–2.74)**	**2.00 (1.50–2.74)**	< 0.001*
Albumin (g/L)	**40 (7–54)**	**32 (7–46)**	< 0.001*
Aspartate aminotransferase (U/L)	26 (4–669)	42.5 (9–1129)	< 0.001*
Alanine aminotransferase (U/L)	21 (6–442)	22.5 (6–473)	0.671*
Lactate dehydrogenase (U/L)	234 (64–2005)	397 (150–1327)	< 0.001*
C-reactive protein (mg/L)	14.1 (0.1–350.0)	130.0 (0.1–350.0)	< 0.001*

*Mann-Whitney U test.

[3.0–8.0] mmol/L vs. 4.0 [3.0–10.0] mmol/L, p = 0.046). ALT did not differ significantly (22.5 [6–473] U/L vs. 21 [6–442] U/L, p = 0.671).

RDW Group vs. Mortality Outcome

A significant association was observed between RDW levels and patient mortality. When categorized into two groups based on RDW values, patients with RDW > 15 (Group 1) exhibited a notably higher mortality rate, with 21 deaths out of 247 patients (8.5%). In contrast, among patients with RDW ≤ 15 (Group 2), only 59 of 1,563 patients (3.8%) died. Statistical analysis confirmed that this difference was significant ($p < 0.01$), suggesting that elevated RDW is associated with an increased risk of mortality in the studied population. The odds of mortality in patients with RDW > 15 are about 2.37 times higher than in those with RDW ≤ 15 (Table 3). In this cohort, using RDW-CV ≥ 15% to predict mortality yielded a sensitivity of 26.2% (21/80) and a specificity of 86.9% (1,504/1,730). The positive predictive value was 8.5% (21/259), while the negative predictive value was 96.2% (1,504/1,563). Corresponding confusion-matrix counts were TP = 21, FP = 226, TN = 1,504, and FN = 59. Overall discrimination was AUC = 0.680 (Figure 1).

MPV Group vs. Mortality

An analysis of mortality status by MPV groups revealed a statistically significant relationship between elevated MPV levels and increased mortality. In Group 1 (MPV > 11.5), 15 out of 190 patients (7.9%) died, while in Group 2 (MPV ≤ 11.5), 65 out of 1,620 patients (4.0%) died. This difference was statistically significant (p = 0.014, Pearson Chi-Square), indicating that patients with higher MPV values had a significantly greater risk of mortality compared to those with lower MPV levels. The odds of mortality in patients with MPV > 11.5 are about 1.92 times higher than in those with RDW ≤ 11.5 (Table 4). Using mortality as the positive outcome and an MPV > 11.5 fL as the positive

Figure 1. ROC curve for RDW-CV predicting in-hospital mortality.

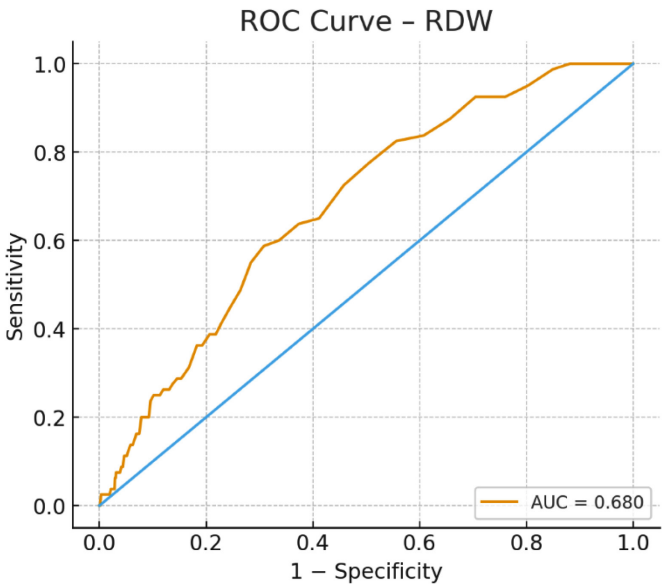

Figure 2. ROC curve for MPV predicting Mortality.

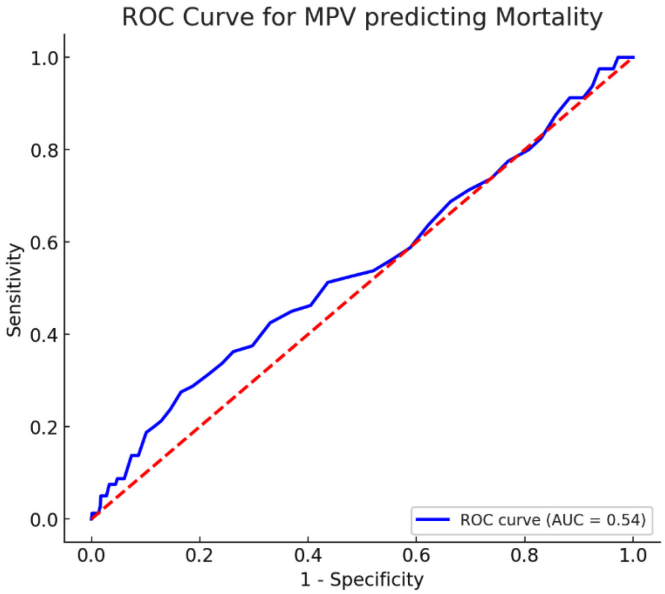

Table 3. Association of RDW with in-hospital mortality.

RDW Group	Discharged	Exitus	Total	*p*	Crude OR (95% CI)	Sensitivity	Specificity
RDW > 15 (Group 1)	226	21	247		**2.37 (1.41–3.99)**	**26.3 %**	**87.1 %**
RDW ≤ 15 (Group 2)	1504	59	1563				
Total	**1730**	**80**	**1810**	**< 0.01**			

RDW: Red Cell Distribution Width, Chi-Square test.

Table 4. Association of MPV with in-hospital mortality.

MPV Group	Discharged	Exitus	Total	*p*	Crude OR (95% CI)	Sensitivity	Specificity
MPV > 11.5	175	15	190		**1.92 (1.06–3.48)**	**18.8 %**	**90.1 %**
MPV ≤ 11.5	1555	65	1620				
Total	**1730**	**80**	**1810**	**0.016**			

MPV: Mean Platelet Volume, Chi-Square test.

test, the analysis showed 15 true positives**,** 175 false positives**,** 1555 true negatives, and 65 false negatives among 1,810 patients. This corresponds to a sensitivity of 18.8%, a specificity of 89.9%**,** a positive predictive value of 7.9%**,** and a negative predictive value of 96.0%**.** These results indicate that while an MPV above 11.5 fL is highly specific for mortality, its very low sensitivity and positive predictive value limit its utility as a standalone predictor. In contrast, the high negative predictive value suggests that an MPV at or below this threshold is useful for ruling out mortality risk. Overall discrimination was modest with an AUC = 0.54 (Figure 2).

Multivariable Logistic Regression

Several clinical and laboratory factors were found to be independently associated with mortality. Older age significantly increased risk, with each additional year raising the odds of death by 7.3% (OR 1.073, 95% CI 1.046–1.100, $p < 0.001$). Male sex was also a strong predictor, conferring more than a twofold increase in mortality risk **(**OR 2.186, 95% CI 1.118–4.278, $p = 0.022$**)**. Longer hospital stay was associated with a 5.7% increase in mortality per day (OR 1.057, 95% CI 1.016–1.100, $p = 0.006$). Among laboratory parameters, elevated white blood cell count **(**OR 1.069, 95% CI 1.005–1.137, $p = 0.033$**)**, higher RDW-CV **(**OR 1.161, 95% CI 1.027–1.313, $p = 0.017$**)**, increased glucose **(**OR 1.005 per mg/dL, 95% CI 1.001–1.008, $p = 0.007$**)**, and greater ferritin levels (OR 1.001 per µg/L, 95% CI 1.000–1.001, $p = 0.029$) were all significant predictors of death. In contrast, serum albumin was protective: each 1 g/L increase reduced mortality risk by about 12% (OR 0.876, 95% CI 0.882–0.933, $p < 0.001$). Other variables—including MPV**,** creatinine**,** calcium**,** ALT, and D-dimer—were not significantly associated with mortality in the adjusted model (Table 5).

Discussion

RDW and MPV are routinely measured parameters in CBC tests. These markers have garnered increasing attention for their potential role as early indicators of disease severity, particularly in viral infections. Elevated levels of RDW and MPV have been associated with adverse clinical outcomes, including higher rates of ICU admission and increased mortality. In the context of COVID-19, numerous studies have reported significantly higher RDW values in patients with severe disease, suggesting that RDW may serve as a valuable prognostic biomarker in the early assessment of critically ill individuals. In this study, we primarily aimed to investigate whether RDW and MPV values at the time of hospital admission could serve as predictive markers for in-hospital mortality [11-13]. Our objective was to determine the prognostic utility of these routinely available hematological parameters in identifying patients at higher risk of adverse outcomes.

In viral infections—particularly COVID-19—several factors such as age, sex, acute kidney injury, and the presence of comorbidities (e.g., hypertension, diabetes, cardiovascular disease) have been shown to significantly influence mortality outcomes. In addition to these clinical factors, numerous laboratory parameters obtained at hospital admission—such as elevated inflammatory markers (CRP, ferritin), abnormal renal function tests, or hematologic indices like RDW and WBC—can also serve as important prognostic indicators of disease severity and mortality [14-18]. In our study, statistically significant differences were observed between patients who survived and those who died in terms of several clinical and laboratory parameters. Specifically, the mortality group showed significantly higher or altered values compared to the discharged group for the following variables: age, length of hospital stays, WBC, neutrophil count, hemoglobin, Hct, RDW-CV, glucose, urea, creatinine, potassium, calcium, albumin, AST, LDH, CRP, D-dimer, and ferritin. The p for these differences were highly significant: $p < 0.001$ for most parameters, with RDW-CV ($p = 0.016$), potassium ($p =$

Table 5. Logistic Regression Results: Predictors of Mortality.

Variable	B	Odds Ratio (Exp(B))	Confidence Intervals	*p*
Age at Diagnosis (Years)	0.070	1.073	1.046-1.100	< 0.001
Sex (Male)	0.782	2.186	1.118-4.278	0.022
Hospital Stay Duration (Days)	0.056	1.057	1.016-1.100	0.006
White Blood Cells × 10^3/µL	0.067	1.069	1.005-1.137	0.033
Red Cell Distribution Width- Coefficient of Variation %	0.150	1.161	1.027-1.313	0.017
Glucose mg/dL	0.005	1.005	1.001-1.008	0.007
Albumin g/L	0.133	0.876	0.882-0.933	< 0.001
Ferritin µg/L	0.001	1.001	1.000-1.001	0.029
Mean Platelet Volume fL	0.008	1.008	.762-1.334	0.954
Creatinine mg/dL	0.095	1.100	0.838-1.444	0.492
Calcium mg/dL	0.346	0.708	0.436-1.150	0.163
Alanine Aminotransferase U/L	0.001	0.999	0.991-1.007	0.810
D-Dimer µ/mL	0.000	1.000	1.000-1.000	0.538

0.022), and AST (p = 0.027) also reaching statistical significance. These findings suggest that multiple hematologic and biochemical markers at admission are strongly associated with in-hospital mortality in this patient cohort.

In our study, RDW and MPV values were divided into two groups based on reference ranges. Patients with elevated RDW and MPV values at admission were categorized as Group 1, while those with values within or below the reference ranges were classified as Group 2. Mortality was found to be statistically significantly higher in Group 1 compared to Group 2 ($p < 0.01$ and p = 0.016, respectively). An elevated RDW may serve as an indicator in patients with viral infections. Previous studies have reported significantly higher RDW levels in individuals with HIV, COVID-19, and HBV compared to the general population. MPV, which reflects the average platelet volume, can be elevated in various conditions, particularly inflammatory states, infections, and malignancies [19-21]. Elevated RDW and MPV values may also reflect ongoing clinical deterioration [22]. Consistent with previous studies, our research found that patients in the high-mortality group exhibited significantly higher RDW and MPV levels. In the logistic regression analysis, RDW-CV emerged as an independent predictor of mortality. Each 1% increase in RDW-CV was associated with a 0.150 increase in the log-odds of death, corresponding to an odds ratio (OR) of 1.161 (p = 0.017). This means that for every one-unit rise in RDW-CV, the odds of mortality increased by approximately 16%, and the association was statistically significant. In contrast, MPV showed no meaningful relationship with mortality; the regression coefficient was B = 0.008, yielding an OR of 1.008 (p = 0.954), indicating no significant effect. These findings suggest that elevated RDW-CV is an independent risk factor for mortality in this cohort, whereas MPV does not provide prognostic value when other variables are accounted for.

In our study's mortality analysis, age at diagnosis was strongly associated with risk, with each one-year increase conferring 7.3% higher odds of death (B = 0.070, OR = 1.073, $p < 0.001$). Male sex more than doubled the risk (B = 0.782, OR = 2.186, p = 0.022). Longer hospital stay was also an adverse factor, with each additional day increasing the odds of mortality by 5.7% (B = 0.056, OR = 1.057, p = 0.006). Among laboratory parameters, WBC (B = 0.067, OR = 1.069, p = 0.033), RDW-CV (B = 0.150, OR = 1.161, p = 0.017), glucose (B = 0.005, OR = 1.005, p = 0.007), and ferritin (B = 0.001, OR = 1.001, p = 0.029) were all significant predictors, indicating that higher levels were associated with greater mortality risk. Conversely, serum albumin had a protective effect, where each 1 g/L increase reduced the odds of death by approximately 12.4% (B = −0.133, OR = 0.876, $p < 0.001$). These findings align with previous research highlighting the prognostic value of these parameters. For instance, a study by Lorente *et al*. demonstrated that elevated RDW at ICU admission is associated with increased 30-day mortality in COVID-19 patients, suggesting RDW as a useful prognostic marker. Similarly, research has shown that the ferritin-to-albumin ratio (FAR) is an independent predictor of 28-day mortality in sepsis patients, emphasizing the combined prognostic significance of elevated ferritin and decreased albumin levels. These studies support the relevance of our findings and underscore the importance of these biomarkers in assessing patient prognosis [23].

One of the principal limitations of our study is its retrospective design, which inherently relies on previously recorded data. This approach can introduce selection bias due to the non-random inclusion of patients and may result in incomplete or inconsistent data collection. Furthermore, retrospective analyses limit the ability to control for confounding variables and preclude the establishment of direct causal relationships between observed factors and clinical outcomes.

Conclusions

In conclusion, complete blood count parameters such as RDW—particularly RDW and MPV—may serve as supportive indicators of clinical deterioration. Increased clinician awareness of these markers may aid in timely decision-making, such as early intensive care unit admission, thereby potentially improving patient outcomes.

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Authors' contributions

All authors took responsibility and took part in the design (J.K), data collection (Ö.F.A), statistical analysis (J.K), writing (J.K), and critical review (İ.S) of the study.

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Conflict of interest

No conflict of interest is declared.

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