International Journal of Women's Health

Dovepress
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ORIGINAL RESEARCH

Predictive Potential of Red Blood Cell Distribution Width and Platelet Ratio (RDW/PLT) in Early Pregnancy Loss

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Objective: This study aimed to evaluate the diagnostic value of the ratio of red blood cell distribution width (RDW) to platelet count (PLT) in the diagnosis of incomplete abortion in patients presenting to obstetric practice.

Methods: This retrospective study includes 289 patients. Of these, 126 were in the incomplete abortion group and 163 were in the elective abortion group, which was terminated without medical indication. Patients who were not between 5 and 12 weeks of gestation, those with signs of infection, those with chronic disease or those taking regular medication, and those without complete blood count data were excluded from the study. Hemoglobin, RDW and PLT values recorded at the time of the initial pregnancy diagnosis were examined. Blood samples were obtained during the initial pregnancy visit before the diagnosis of incomplete abortion and prior to curettage in the elective abortion group. The RDW/PLT ratio was subsequently calculated and included in the statistical analyses. Receiver operating characteristic (ROC) analysis was used to assess the risk of incomplete abortion, and binary logistic regression analysis was used to examine independent predictors. The level of statistical significance was set at $p<0.050$.

Results: A total of 289 patients were included in the study, comprising 126 patients with incomplete abortion and 163 women undergoing elective abortion. The incomplete abortion and elective abortion groups showed similar baseline characteristics. In binary logistic regression analysis, gestational age, RDW, PLT, and the RDW/PLT ratio were significant predictors of incomplete abortion in the univariate model. In the multivariate model, only maternal age, gestational age, and the RDW/PLT ratio remained independently associated with incomplete abortion. ROC analysis demonstrated no diagnostic value for hemoglobin, while RDW and PLT showed moderate predictive performance. The RDW/PLT ratio exhibited the highest discriminatory ability (AUC = 0.824), with a cut-off value of ≥0.054 yielding 71.4% sensitivity and 79.1% specificity. The overall diagnostic accuracy of the RDW/PLT ratio index was 75.78%.

Conclusion: This study demonstrates that the RDW/PLT ratio is a simple and accessible hematological marker that may represent a complementary hematological marker associated with early pregnancy loss risk. The findings suggest that this index may provide complementary support to clinical decision-making processes.

Keywords: early pregnancy loss, incomplete abortion, RDW/PLT ratio, red blood cell distribution width, good health and well-being

Introduction

Early pregnancy loss, ie. intrauterine loss of the first trimester, is a condition that gynecologists often encounter.[1] Globally, an average of 23 million cases of miscarriage are reported each year.[2] The American College of Obstetricians and Gynecologists (ACOG) estimates the incidence of miscarriages at around 10%, while the UK National Institute for Health and Care Excellence (NICE) reports a rate of around 20%.[3] Early pregnancy losses are classified into specific subtypes such as threatened, incomplete, inevitable, complete and missed.[4] Common risk factors for all these types include advanced maternal age, history of previous pregnancy loss, infections, smoking and alcohol use, pesticide exposure and psychological stress. Chromosomal abnormalities such as embryo aneuploidy play a role in the etiology of approximately half of early pregnancy losses.[5,6]

https://doi.org/10.2147/IJWH.S593786
Received: 22 January 2026
Accepted: 20 March 2026
Published: 18 April 2026

Abortion is a costly health problem with far-reaching impacts not only on the individual but also on society and health systems. It causes deep psychological trauma for the individuals who experience the loss, as well as feelings of anxiety and uncertainty about the next pregnancy in couples.[2,7] For these reasons, it is of great importance to predict early pregnancy loss with predictive findings before it is diagnosed and to conduct more research in this field. Currently, biomarkers and diagnostic methods that can reliably predict this condition at an early stage have not yet been sufficiently developed.

Complete blood counts are routinely performed in all clinics in women diagnosed with pregnancy. Using red blood cell distribution width (RDW), platelet count (PLT) and various indices based on the ratios of these two parameters, studies examining the predictive power of these values and their relationship with disease severity, especially in inflammatory and septic diseases, are increasing in the literature.[8–11]

Several hematology-derived inflammatory indices—including the neutrophil-to-lymphocyte ratio, platelet-to-lymphocyte ratio, systemic immune-inflammation index, and related composite markers—have been investigated in early pregnancy loss, with varying discriminatory performance and limited consistency across cohorts.[12,13] While these indices primarily reflect leukocyte-driven immune imbalance, RDW and platelet count capture complementary dimensions of inflammation and thromboinflammatory activity that may be relevant to implantation and early placentation.[12] Accordingly, the RDW/PLT ratio may offer incremental value by integrating erythrocyte size heterogeneity with platelet dynamics using parameters that are routinely available in standard complete blood counts.[14] However, evidence regarding RDW/PLT in early pregnancy loss remains scarce, and its potential contribution beyond established clinical predictors requires cautious evaluation.

RDW reflects variability in erythrocyte size and has recently been recognized as a marker associated with systemic inflammation and oxidative stress.[15] Platelets are also involved in inflammatory and thrombotic pathways that may influence placental development and early pregnancy physiology.[16] Therefore, indices derived from RDW and platelet counts may provide additional insight into inflammatory processes associated with pregnancy outcomes.[16,17]

In this study, we aimed to evaluate whether the RDW/PLT ratio could serve as a potential biomarker for the diagnosis of incomplete abortion. To ensure clinical relevance and minimize selection bias, we compared patients diagnosed with incomplete abortion to a control group consisting of healthy early pregnancies electively terminated for non-medical reasons, as this group represents an appropriate physiological baseline in the absence of pathology. To the best of our knowledge, this is the first study in the literature to specifically assess the RDW/PLT ratio in the context of early pregnancy loss.

Materials and Methods

Patient Selection

This study was conducted with a retrospective design. All data were obtained through the data recording system and patient files of Yozgat Bozok University Faculty of Medicine Hospital. Patients diagnosed with incomplete abortion and women with elective abortion group (non-medical indication) who were admitted to the gynecology and obstetrics clinic between January 1, 2023 and October 1, 2025 were included.

Patients diagnosed with incomplete abortion were included in the study in accordance with universally accepted definitions and diagnostic criteria recognized in the international literature.[1] The elective abortion group (non-medical indication) comprised elective termination requests made at the patient's own request without any medical justification up to the 10th week of pregnancy, in accordance with national legal regulations, and this group was used as the control group.

Exclusion criteria were determined as follows: patients who underwent abortion due to other medical diagnoses; women under the age of 18 or over the age of 50; those with a gestational age of less than 5 weeks + 0 days or more than 12 weeks + 0 days in order to ensure physiological comparability; those with active signs of infection; those with known additional chronic diseases; those taking regular chronic medication; those receiving anticoagulant therapy; those smoking more than five cigarettes per day; women who had received a blood transfusion in the past six months; and patients who did not have a complete blood count result related to pregnancy before being diagnosed with incomplete abortion or before undergoing curettage.

Sample size calculation: Sample size was calculated using G*Power 3.1 based on similar hematological index studies reported in the literature, assuming a medium effect size (Cohen's d = 0.50), $\alpha = 0.05$, and power $(1–\beta) = 0.80$. This calculation indicated that a minimum of 128 patients were required.[18] During the study period, 289 patients met the eligibility criteria and were included in the study: 126 in the incomplete abortion group and 163 in the elective abortion group.

The study was approved by the Local Ethics Committee of Yozgat Bozok University (2025-GOKAEK-258-2025.-04.30–463). All authors involved in the study fully complied with the principles of the Declaration of Helsinki. As the study was conducted in a tertiary referral training and research hospital, all patients routinely provided written informed consent at admission, allowing their anonymized clinical data to be used for research purposes.

Data Collection

This retrospective study reviewed the medical records of 289 women who underwent curettage procedures at Yozgat Bozok University Faculty of Medicine Hospital. Data on the patients' demographic characteristics, medical history, pregnancy-related clinical information, laboratory results and administered treatment were systematically obtained from the records. This process was conducted in accordance with relevant medical record regulations and privacy principles to ensure patient confidentiality.

After excluding cases that met the exclusion criteria, data from patients who met the inclusion criteria were included in the study. Demographic characteristics of these patients (age, gestational age (weeks), BMI recorded at the time of initial pregnancy diagnosis, gravida, parity, history of previous abortions) and complete blood count (CBC) results from the initial pregnancy diagnosis visit were recorded for the study.

CBC results evaluated in both groups were obtained from blood samples taken from patients during their initial visit for pregnancy, prior to the diagnosis of incomplete abortion and before curettage was performed in the control group. Hemoglobin (g/dL), RDW (%), and platelet count ($\times 10^9$/L) values were recorded at this visit; additionally, the RDW/PLT ratio was calculated and added to the research dataset for use in intergroup comparisons. Since the RDW/PLT index fluctuated within a very small range as a raw value, it was rescaled using the formula RDW/PLT index = (RDW/PLT) × 100 for use in statistical analyses.

The data collection process was conducted in strict compliance with patient privacy and anonymity principles, in accordance with relevant medical record regulations and institutional standards.

Curettage Procedure

All patients included in this study underwent curettage by manual vacuum aspiration. All procedures were performed under sterile operating room conditions. Two hours before curettage, a single dose of misoprostol pharmaceutical agent was administered sublingually to each patient. No complications were found in any of the patients in retrospective review. Pathologic examination reports of the curettage materials were evaluated to confirm the presence of additional findings.

Statistical Analysis

The data were analyzed using IBM SPSS V23 software (Armonk, NY, USA). Independent risk factors affecting incomplete abortion were examined using Binary Logistic Regression Analysis. ROC Analysis was used to determine the cutoff value for predicting incomplete abortion for the variables. Analysis results were presented as mean ± standard deviation for quantitative variables. The significance level was set at $p<0.050$.

Continuous variables were summarized as mean ± standard deviation and compared between groups using the independent samples *t*-test or the Mann–Whitney *U*-test depending on distributional assumptions. Categorical variables were compared using the chi-square test or Fisher's exact test, as appropriate. Univariate logistic regression was first performed for clinically relevant candidate variables (maternal age, gestational age, body mass index, gravidity, parity, previous abortion history, hemoglobin, RDW, platelet count, and RDW/PLT ratio index). Variables with $p < 0.10$ in univariate analysis and variables considered clinically important were evaluated for inclusion in the multivariate logistic regression model. Because RDW, platelet count, and the RDW/PLT ratio index are mathematically related, these

parameters were not entered simultaneously into the same multivariate model to reduce collinearity; the final model retained the RDW/PLT ratio index as the primary hematological predictor.

Multicollinearity was assessed using variance inflation factors, and model fit was evaluated using the Hosmer–Lemeshow goodness-of-fit test. Discrimination was summarized using receiver operating characteristic analysis with area under the curve estimates and corresponding 95% confidence intervals.

Records with missing key exposure or outcome data were excluded during screening; therefore, no imputation was performed. Given the retrospective single-center design, no internal or external validation was undertaken and the reported cut-off value should be interpreted as exploratory.

Results

The incomplete abortion group and the elective abortion group (non-medical indication) showed similar characteristics in terms of age, BMI, number of previous abortions, and hemoglobin values (Table 1).

Binary Logistic Regression Analysis was used to examine the independent variables affecting the risk of incomplete abortion. In the univariate model, a one-unit increase in gestational age (in weeks) was found to increase the risk of incomplete abortion by 1.489 times ($p<0.001$). The likelihood of incomplete abortion was found to decrease as gravidity increased. (OR = 0.717; $p<0.001$). An inverse relationship was also found between increasing parity and the risk of incomplete abortion (OR = 0.573; $p<0.001$). An increase in RDW was associated with an increased risk of incomplete abortion (OR = 1.372; $p<0.001$). Conversely, an increase in platelet count was found to reduce the risk of incomplete abortion (OR = 0.977; $p<0.001$). A one-unit increase in the RDW/PLT ratio index was found to significantly increase the risk of incomplete abortion by 2.994 times ($p < 0.001$) (Table 1).

In the multiple model, a one-unit increase in age was found to increase the risk of incomplete abortion by 1.067 times ($p = 0.034$). A one-unit increase in gestational age (in weeks) was found to increase the risk of incomplete abortion by 1.551 times ($p<0.001$). A one-unit increase in the RDW/PLT ratio index was found to increase the risk of incomplete

Table 1 Logistic Regression Analysis of Variables Associated with Incomplete Abortion

	Groups		Univariate		Multiple	
	Elective Abortion Group (non-Medical Indication) (n=163)	**Incomplete Abortion (n=126)**	**OR (95% CI)**	**p**	**OR (95% CI)**	**p**
Age	32.21 ± 6.16	32.5 ± 6.01	1.008 (0.97–1.047)	0.686	1.067 (1.005–1.132)	**0.034**
Gestational Age (weeks)	6.52 ± 1.22	7.54 ± 1.96	1.489 (1.271–1.743)	**<0.001**	1.551 (1.252–1.921)	**<0.001**
BMI	26.52 ± 4.68	26.71 ± 4.48	1.009 (0.959–1.061)	0.734	1.018 (0.949–1.092)	0.620
Gravida	3.45 ± 1.42	2.76 ± 1.53	0.717 (0.603–0.851)	**<0.001**	0.666 (0.298–1.49)	0.323
Parity	2.06 ± 1.23	1.28 ± 1.15	0.573 (0.462–0.71)	**<0.001**	0.693 (0.307–1.564)	0.377
Number of Previous Abortions	0.36 ± 0.66	0.46 ± 1.01	1.155 (0.867–1.538)	0.324	1.445 (0.603–3.463)	0.409
Hemoglobin (g/dL)	13.1 ± 1.27	12.98 ± 1.17	0.926 (0.766–1.119)	0.426	1.237 (0.949–1.612)	0.116
RDW (%)	14.07 ± 1.64	15.06 ± 1.93	1.372 (1.192–1.579)	**<0.001**	–	–
Platelet Count (×10^9/L)	314.65 ± 62.6	250.56 ± 41.92	0.977 (0.971–0.983)	**<0.001**	–	–
RDW/PLT Ratio Index*	0.05 ± 0.01	0.06 ± 0.01	2.994 (2.295–3.905)	**<0.001**	3.178 (2.335–4.324)	**<0.001**

Notes: Cox&Snell R^2=40.4%; Nagelkerke R^2=54.2%; Mean ± Standard deviation. *RDW/PLT Ratio Index values were very low, so values were multiplied by 100 and added to the model; Bold values indicate statistical significance ($p < 0.05$).
Abbreviations: RDW, Red Cell Distribution Width; PLT, Platelet Count.

Table 2 Determining the Cutoff Value for Variables in Predicting Incomplete Abortion Using ROC Analysis

	AUC (95% CI)	p	Cutoff	Sensitivity	Specificity	PPV	NPV	Accuracy
Hemoglobin (g/dL)	0.454 (0.387–0.521)	0.178	–	–	–	–	–	–
RDW (%)	0.650 (0.584–0.716) [a]	**<0.001**	≥16.1	37.30%	92.64%	79.66%	65.65%	68.51%
Platelet Count (×10^9/L)	0.804 (0.754–0.854) [b]	**<0.001**	≤259.5	69.84%	80.37%	73.33%	77.51%	75.78%
RDW/PLT Ratio Index	0.824 (0.776–0.872) [b]	**<0.001**	≥0.054	71.43%	79.14%	72.58%	78.18%	75.78%

Notes: Bold values indicate statistical significance (p < 0.05); a: Statistically significant difference between RDW and platelet count; b: Statistically significant difference between RDW and RDW/PLT ratio index.

Abbreviations: RDW, Red Cell Distribution Width; PLT, Platelet Count; AUC, Area Under the Curve; PPV, Positive Predictive Value; NPV, Negative Predictive Value.

abortion 3.178-fold (p<0.001). No other variables were found to have a statistically significant effect on the risk of incomplete abortion (p>0.050) (Table 1).

No statistically significant area under the curve (AUC) value was found for hemoglobin levels in predicting incomplete abortion (AUC = 0.454; p = 0.178) (Table 2).

However, a statistically significant AUC value was found for RDW (%) in predicting incomplete abortion (AUC = 0.650; p < 0.001). An RDW value of ≥16.1% indicates incomplete abortion. The corresponding sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy were 37.30%, 92.64%, 79.66%, 65.65% and 68.51% respectively (Table 2).

A statistically significant AUC value was found for platelet count in predicting incomplete abortion (AUC = 0.804; p < 0.001). A platelet count of ≤259.5 indicates incomplete abortion. The respective sensitivity, specificity, PPV, NPV and accuracy values were 69.84%, 80.37%, 73.33%, 77.51% and 75.78% (Table 2).

A statistically significant AUC value was found for the RDW/PLT ratio index in predicting incomplete abortion (AUC = 0.824; p < 0.001). An RDW/PLT ratio index value of ≥0.054 indicates incomplete abortion. The respective sensitivity, specificity, PPV and NPV were 71.43%, 79.14%, 72.58% and 78.18% (Table 2).

When evaluating which of the variables RDW (%), platelet count, and RDW/platelet ratio index better predicted incomplete abortion, a statistically significant difference was observed between them. Here, a difference was observed between RDW (%) and platelet count in predicting incomplete abortion (p<0.001). A difference was observed between RDW (%) and the RDW/PLT ratio index (p<0.001). Platelet count and the RDW/PLT ratio index did not differ (p=0.172) (Table 2).

The ROC curve created for variables in predicting incomplete abortion is presented in Figure 1.

Discussion

To our knowledge, this is the first study to examine the RDW/PLT ratio in the context of early pregnancy loss. The RDW/PLT value was found to be significantly higher in the blood samples taken before the diagnosis of incomplete abortion compared to the control group. This supports the potential role of the RDW/PLT ratio as an auxiliary marker in obstetric practice.

Although RDW, platelet count, and the RDW/PLT ratio demonstrated relatively similar AUC values, the composite RDW/PLT index integrates information from both erythrocyte heterogeneity and platelet dynamics. This combined index may better reflect the inflammatory and thromboinflammatory processes involved in early pregnancy loss. Therefore, even when individual parameters show comparable discrimination, their combination may provide a more biologically meaningful indicator of the underlying pathophysiological mechanisms.[19,20]

RDW is a haematological parameter that reflects the volumetric distribution of red blood cells, indicating the diversity of erythrocyte size, ie. anisocytosis.[21] In addition, the current literature suggests that RDW is not only an indicator of anaemia, but can also increase in many systemic and inflammatory diseases, reflecting the underlying inflammatory burden.[11,22–27] Our results suggest that the higher RDW/PLT ratio observed in complete blood counts taken before incomplete abortion reflects an inflammatory predisposition present in early pregnancy rather than an inflammatory response coinciding with the onset of abortion. In the literature, it has been reported that proinflammatory cytokines (eg.,

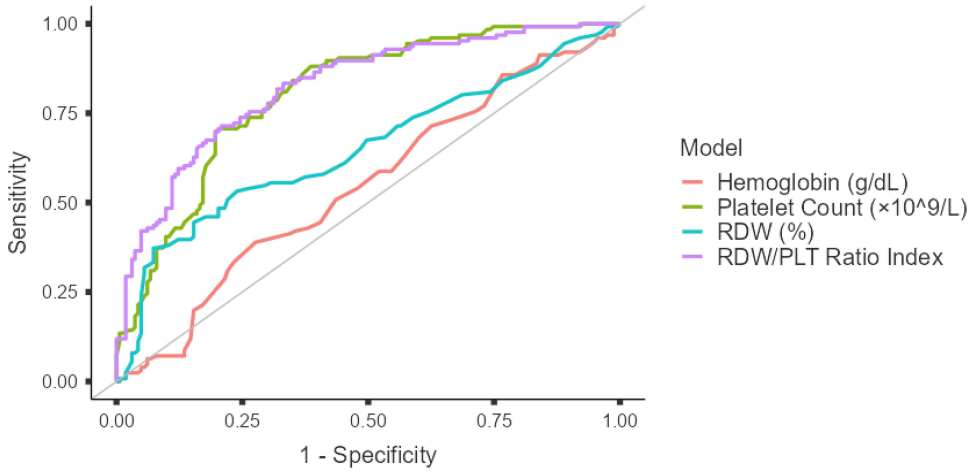

Figure 1 ROC curve for predicting incomplete abortion using RDW, platelet count, and RDW/PLT ratio index.

IL-6 and TNF-alpha) increase before clinical loss occurs in cases such as early pregnancy loss and recurrent pregnancy loss, and that these cytokines may contribute to an increase in RDW by affecting erythropoiesis.[19,28–30] Similarly, various clinical studies have demonstrated that the inflammatory response can alter platelet levels by affecting activation and consumption, potentially resulting in an increased RDW/PLT ratio in cases of systemic inflammation.[20,29]

Jagodić and colleagues investigated the relationship between the Bedside Acute Pancreatitis Severity Index (BISAP) and the RDW/PLT ratio in patients with acute pancreatitis and reported that RDW values increased as the BISAP score rose; consequently, the RDW/PLT ratio could be used as a meaningful biomarker for predicting disease severity.[11] In our analyses, we found that a one-unit increase in RDW increased the risk of incomplete abortion by 1.372 times, while a one-unit increase in the RDW/PLT ratio index increased the risk of incomplete abortion by 2.994 times (Table 1). Although acute pancreatitis and incomplete abortion are clinically distinct diseases, the biological mechanisms explaining this similar increase in the RDW/PLT ratio share certain commonalities. As demonstrated in acute pancreatitis, increases in proinflammatory cytokines such as IL-6 and TNF-alpha can affect erythrocyte maturation, leading to an increase in RDW, and can also cause changes in PLT levels through platelet activation and consumption.[19,31] Studies on early pregnancy loss and recurrent pregnancy loss have also shown that elevated inflammatory cytokines in early pregnancy may reflect a potential inflammatory predisposition.[32] In light of this information, the higher RDW/PLT ratio observed in the incomplete abortion group in our study can be considered a hematological indicator of inflammatory or thromboinflammatory processes that may be present in the early stages. Therefore, the increase in the RDW/PLT ratio in different clinical conditions may reflect common hematological manifestations of the inflammatory response rather than the diseases themselves.

Çetinkaya et al showed that the RDW/PLT ratio with a cut-off value of 0.000067 showed an area under the ROC curve of 0.783 (95% CI: 0.688–0.878) in a total of 102 acute pancreatitis patients included in their study of patients diagnosed with acute pancreatitis, suggesting that this parameter has a significant discriminative power in predicting mortality. The results suggest that the RDW/PLT ratio has the potential to predict the risk of death in approximately 80% of patients.[33] According to our results, RDW/PLT has an 82.4% predictive value for incomplete abortion (Table 2). These results are similar, which supports the idea that the RDW/PLT index could be a general biomarker for the underlying inflammatory burden rather than for a specific disease. Therefore, RDW/PLT may be a potential auxiliary parameter in the assessment of early pregnancy loss; however, strengthening this relationship will be possible with more comprehensive studies in the future.

In a large-sample American study examining the relationship between RDW/PLT ratio and cardiovascular diseases, it was reported that both RDW value and RDW/PLT ratio were significantly associated with increased incidence of cardiovascular diseases. The study emphasized that the results obtained by excluding potential confounding variables such as smoking were more reliable. However, the researchers defined the relationship between RDW/PLT ratio and

disease incidence as U-shaped; that is, they suggested that a further increase in RDW/PLT ratio above a certain threshold value may be associated with a decrease in disease incidence contrary to what is expected.[34] We also used smoking as an exclusion criterion in our study; although our results are consistent with the aforementioned study in terms of RDW and RDW/PLT ratio, our sample size is insufficient to answer the question whether the effect of increasing RDW/PLT ratio on early pregnancy loss can be reversed. In fact, in the patients included in our study, cases where RDW and PLT values exceeded the reference ranges were rarely encountered. The main reason for this rarity may be the exclusion of conditions that may directly affect RDW or PLT values such as active infection, systemic inflammatory disease and smoking.

Early pregnancy loss is often associated with placental ischemia–reperfusion injury and oxidative stress, both of which disrupt trophoblast invasion, villous development, and placental hemodynamics.[35] Pregnancy is a physiological state of increased reactive oxygen species (ROS) production; however, an imbalance in oxidative stress can trigger trophoblast apoptosis and defective implantation. Oxidative stress has been shown to alter erythrocyte membrane integrity and erythropoiesis, potentially leading to anisocytosis and increased RDW values.[35] This mechanism provides a plausible biological explanation for the elevated RDW/PLT ratio observed in the present study.

Pregnancy is a hypercoagulable state, with progressive increases in fibrinogen and D-dimer levels. In some cases, this physiological adaptation may predispose to pathological uteroplacental thrombosis. Microthrombotic events have been reported in placental histopathology of early pregnancy loss, supporting the hypothesis that platelet consumption could be a secondary marker of such processes.[36] The inverse relationship between our secondary findings of platelet count and the occurrence of incomplete abortion is consistent with these hypotheses (Table 1).

Studies using hematology-based inflammatory indices to predict early pregnancy loss are increasing. Parameters such as the neutrophil/lymphocyte ratio (NLR), platelet/lymphocyte ratio (PLR), monocyte/lymphocyte ratio (MLR), derived neutrophil/lymphocyte ratio (dNLR), systemic immune-inflammatory index (SII), systemic inflammation response index (SIRI), and neutrophil/lymphocyte-platelet ratio (NLPR) may reflect inflammatory imbalance in early pregnancy and may be useful in determining the risk of early pregnancy loss.[37–39] A common feature of these indices is that they evaluate different immune components together, ranging from neutrophil-lymphocyte balance to platelet activity. Although most of these parameters in the literature have been associated with early pregnancy loss, the RDW/PLT ratio, which includes both red blood cell distribution and platelet count, has not been evaluated for this purpose until now. In our study, the finding that the RDW/PLT ratio was significantly higher in cases with incomplete abortion suggests that this composite index may reflect early hematological manifestations of the inflammatory response. Similar to inflammation markers such as NLPR, MLR, or NLR examined in previous studies, RDW/PLT may also be associated with immunothrombotic processes in the pathophysiology of early pregnancy loss. In this regard, RDW/PLT emerges as a new and complementary biomarker candidate that can be evaluated in predicting early pregnancy loss, in addition to the indices defined in the current literature.

The choice of an elective termination group as the control cohort was intended to approximate a physiological early pregnancy baseline without miscarriage pathology; however, this selection may introduce selection-related differences that are not fully measurable in a retrospective dataset. Although we attempted to minimize confounding by applying strict exclusion criteria and by adjusting for key clinical variables in multivariable analyses, residual confounding from unmeasured factors (eg., subclinical infection, nutritional deficiencies, and unrecorded medication use) cannot be excluded. In addition, the predictive estimates and the proposed cut-off value were not internally or externally validated; therefore, the reported diagnostic performance should be interpreted as exploratory and hypothesis-generating.

Limitations

The main limitation of this study is its retrospective design, which restricts the ability to assess causal relationships. The relatively limited sample size may reduce the generalizability of the findings. Its reliance on a single-center, unvalidated dataset also limits the applicability of the results to broader populations. The evaluation of single-time-point hemogram values obtained only at the initial visit during early pregnancy makes it difficult to reflect time-dependent changes in inflammatory parameters. Furthermore, even if exclusion criteria were rigorously applied, it may not be possible to

completely control for potential confounding factors that could affect the RDW/PLT ratio, such as subclinical infection, nutritional status, or unrecognized medication use. For these reasons, large-sample, prospective, and multicenter studies are needed to validate the current findings.

Conclusion

Our study suggests that the RDW/PLT ratio is a simple, accessible, and cost-effective hematological parameter that may provide complementary information in the assessment of incomplete abortion risk in early pregnancy. This composite index may reflect underlying inflammatory and thromboinflammatory processes associated with early pregnancy loss. However, these findings should be considered hypothesis-generating, and further validation in larger prospective and multicenter studies is required before routine clinical application.

Abbreviations

RDW, Red Cell Distribution Width; PLT, Platelet Count; ROC, Receiver Operating Characteristic; AUC, Area Under the Curve; ACOG, American College of Obstetricians and Gynecologists; NICE, National Institute for Health and Care Excellence; UK, United Kingdom; CBC, Complete Blood Count; IBM SPSS, International Business Machines Statistical Package for the Social Sciences; BMI, Body Mass Index; OR, Odds Ratio; PPV, Positive Predictive Value; NPV, Negative Predictive Value; TNF, Tumor Necrosis Factor; NLR, Neutrophil-to-Lymphocyte Ratio; MLR, Monocyte-to-Lymphocyte Ratio; dNLR, Derived Neutrophil-to-Lymphocyte Ratio; SII, Systemic Immune-Inflammation Index; SIRI, Systemic Inflammation Response Index; NLPR, Neutrophil-to-Lymphocyte Platelet Ratio.

Acknowledgement

Preliminary findings of this study were presented as a Turkish-language abstract at the 7th Black Sea Obstetrics Congress, held in Turkey on June 13–15, 2025. The conference proceedings can be accessed at https://karadenizjinekoloji.org/.

Funding

This study was supported by the Scientific Research Projects Unit of Yozgat Bozok University (Project Code: TED-2026-2139).

Disclosure

The authors report no conflicts of interest in this work.

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