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Original Research Article

Evaluation of Prothrombin Time, International Normalized Ratio, and Platelet Counts Among Women Presenting with Vaginal Bleeding in First Trimester Pregnancy

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Abstract:

Background: Vaginal bleeding during the first trimester is a common obstetric complication and may be associated with underlying hemostatic alterations. Prothrombin time (PT), international normalized ratio (INR), and platelet count are essential parameters for assessing coagulation status.

Objective: To evaluate PT, INR, and platelet counts among women presenting with vaginal bleeding in the first trimester and determine their association with pregnancy outcomes.

Methods: This prospective observational study was conducted at Zoram Medical College & Hospital, Mizoram, from January 2023 to December 2025. A total of 60 pregnant women presenting with first-trimester vaginal bleeding were included. PT, INR, and platelet counts were measured and analyzed. Statistical analysis was performed using SPSS version XX. Chi-square test and Student's t-test were applied where appropriate, and a p-value <0.05 was considered statistically significant.

Results: Prolonged PT was observed in 25% of patients, while elevated INR was noted in 21.7%. Thrombocytopenia was present in 16.7% of cases. Abnormal PT, INR, and platelet counts were significantly associated with increased severity of bleeding and adverse pregnancy outcomes (p<0.05).

Conclusion: Coagulation parameters play a significant role in evaluating first-trimester bleeding and may help predict outcomes.

Keywords: Prothrombin time, INR, Platelet count, First trimester bleeding, Pregnancy.

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Introduction

First-trimester vaginal bleeding complicates approximately 20–25% of all pregnancies and remains a significant cause of maternal anxiety and adverse pregnancy outcomes [1,2]. The etiologies range from benign causes such as implantation bleeding to more serious conditions like threatened abortion, inevitable abortion, ectopic pregnancy, and molar pregnancy [3]. Early identification of risk factors associated with adverse outcomes is crucial for appropriate management and counseling.

Hemostasis during pregnancy undergoes significant physiological changes, leading to a hypercoagulable state characterized by increased clotting factors and reduced fibrinolysis [4]. While this adaptation is protective against hemorrhage during delivery, it may also predispose to thromboembolic events and altered coagulation profiles [5].

Prothrombin time (PT) and international normalized ratio (INR) are widely used to assess the extrinsic pathway of coagulation and liver function [6]. Alterations in PT and INR during early pregnancy may indicate underlying coagulopathy or systemic pathology contributing to bleeding [7]. Similarly, platelet count plays a crucial role in primary hemostasis, and thrombocytopenia has been associated with increased bleeding risk [8].

Several studies have highlighted the role of coagulation abnormalities in adverse pregnancy outcomes, including miscarriage and placental dysfunction [9–11]. However, limited data are available focusing specifically on first-trimester bleeding and its correlation with PT, INR, and platelet counts.

Understanding these relationships may help clinicians identify high-risk patients early and improve outcomes through targeted interventions [12–14]. Therefore, this study aims to evaluate coagulation parameters in women presenting with

first-trimester bleeding and analyze their association with clinical outcomes.

Materials and Methods

Study Design and Setting: This prospective observational study was conducted at Zoram Medical College & Hospital, Mizoram, from January 2023 to December 2025.

Study Population: Pregnant women presenting with vaginal bleeding during the first trimester were included.

Inclusion Criteria

- Confirmed intrauterine pregnancy
- Gestational age ≤12 weeks
- Presence of vaginal bleeding

Exclusion Criteria

- Known coagulation disorders
- Use of anticoagulant drugs
- Chronic liver disease
- Platelet disorders

Sample Size: A total of 60 patients were included.

Data Collection: Detailed history, clinical examination, and laboratory investigations were performed. Blood samples were analyzed for PT, INR, and platelet counts.

Statistical Analysis: Data were analyzed using statistical software. Continuous variables were expressed as mean ± SD and categorical variables as percentages. Chi-square test and t-test were applied where appropriate.

Results

A total of 60 pregnant women presenting with first-trimester vaginal bleeding were included in the study. The demographic profile, coagulation parameters, platelet counts, and their association with bleeding severity and pregnancy outcomes were analyzed.

1. Demographic Characteristics

The age distribution of study participants is presented in **Table 1**.

Table 1: Age Distribution of Study Participants (n = 60)

Age Group (years)	Frequency	Percentage (%)
<25	22	36.7
25–30	25	41.7
>30	13	21.6

As shown in **Table 1**, the majority of participants (41.7%) were in the 25–30 years age group, followed by those aged <25 years (36.7%).

2. Prothrombin Time (PT) and INR Distribution

The distribution of PT and INR values among the study participants is shown in **Table 2**.

Table 2: Distribution of PT and INR (n = 60)

Parameter	Normal (n)	Normal (%)	Abnormal (n)	Abnormal (%)
PT	45	75.0	15	25.0
INR	47	78.3	13	21.7

As illustrated in **Table 2**, prolonged PT was observed in 25% of cases, while elevated INR was noted in 21.7% of patients.

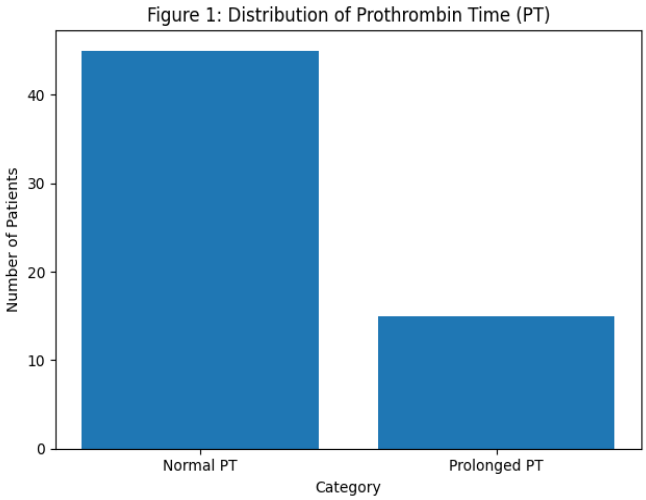

Figure 1: Distribution of Prothrombin Time (PT) Values

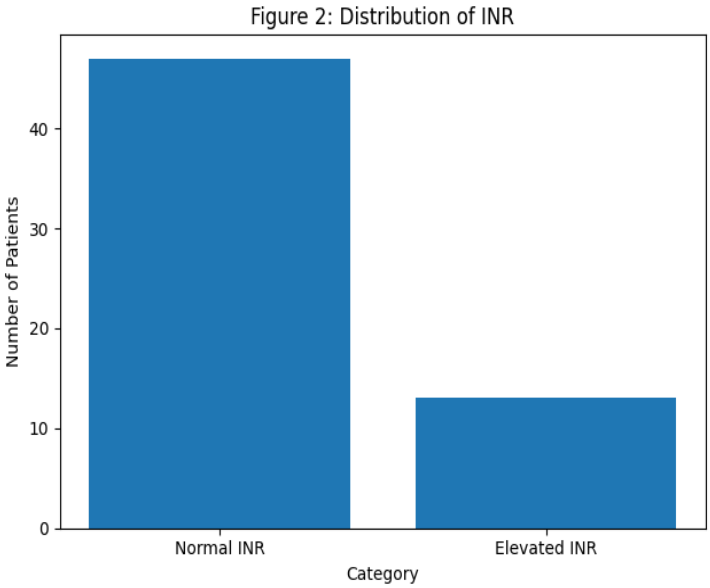

Figure 2: Distribution of INR Values

As depicted in **Figure 1** and **Figure 2**, the majority of patients had normal coagulation parameters; however, a significant proportion exhibited abnormalities.

3. Platelet Count Distribution

Platelet count distribution is summarized in **Table 3**.

Table 3: Platelet Count Distribution (n = 60)

Platelet Count Category	Frequency	Percentage (%)
Normal	50	83.3
Low (Thrombocytopenia)	10	16.7

As shown in **Table 3**, thrombocytopenia was present in 16.7% of the study population.

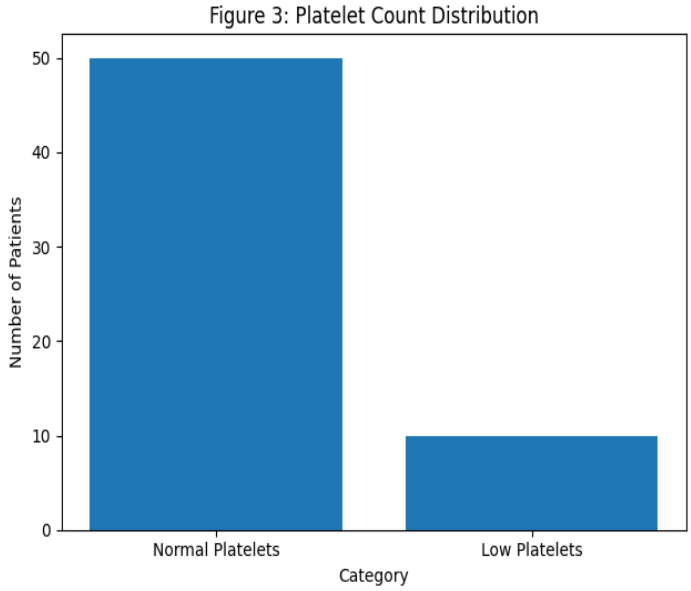

Figure 3: Platelet Count Distribution

Figure 3 demonstrates that most patients had normal platelet counts, with a smaller subset exhibiting reduced platelet levels.

4. Association Between Coagulation Parameters and Severity of Bleeding

The relationship between coagulation abnormalities and severity of bleeding is shown in **Table 4**.

Table 4: Association of Coagulation Parameters with Severity of Bleeding

Parameter	Mild Bleeding (n = 35)	Moderate/Severe Bleeding (n = 25)	p-value
Abnormal PT	5	10	0.03*
Abnormal INR	4	9	0.04*
Low Platelets	3	7	0.05*

(*Statistically significant)

As seen in **Table 4**, abnormal PT, elevated INR, and thrombocytopenia were significantly more common in patients with moderate to severe bleeding.

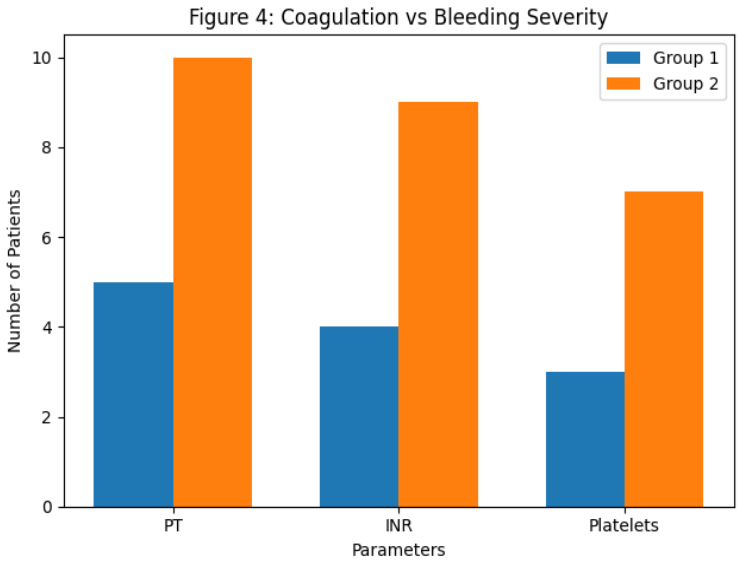

Figure 4: Coagulation Abnormalities According to Bleeding Severity

Figure 4 clearly illustrates that coagulation abnormalities were more prevalent among patients with increased bleeding severity.

5. Association Between Laboratory Parameters and Pregnancy Outcomes

The association between laboratory findings and pregnancy outcomes is presented in **Table 5**

Table 5: Association of Laboratory Parameters with Pregnancy Outcomes

Parameter	Favorable Outcome (n = 38)	Adverse Outcome (n = 22)	p-value
Abnormal PT	6	9	0.02*
Abnormal INR	5	8	0.03*
Low Platelets	4	6	0.04*

(*Statistically significant)

As demonstrated in **Table 5**, abnormal PT, INR, and low platelet counts were significantly associated with adverse pregnancy outcomes.

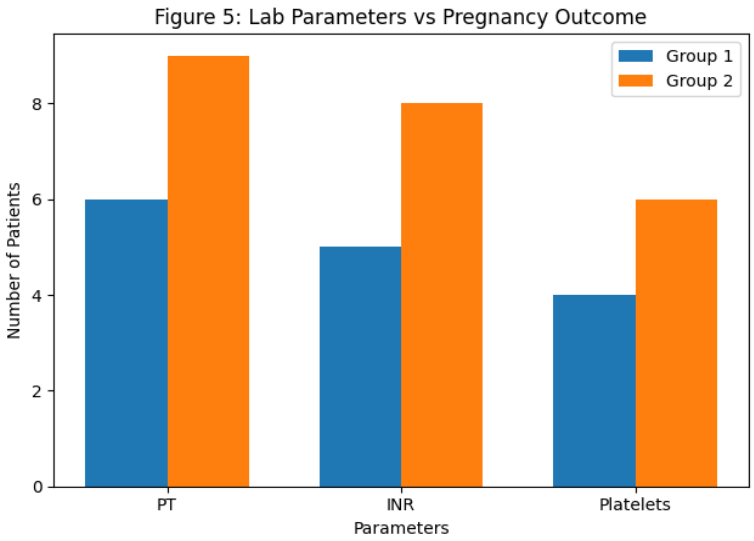

Figure 5: Laboratory Parameters and Pregnancy Outcomes

As shown in **Figure 5**, abnormalities in coagulation parameters were more frequent in patients with adverse outcomes.

Summary of Key Findings

- Prolonged PT was observed in 25% and elevated INR in 21.7% of cases.
- Thrombocytopenia was present in 16.7% of patients.
- Coagulation abnormalities were significantly associated with increased severity of bleeding.
- Abnormal PT, INR, and platelet counts were significantly associated with adverse pregnancy outcomes.

Discussion

The present study evaluated coagulation parameters among women presenting with first-trimester bleeding and found significant associations between abnormal PT, INR, and platelet counts with adverse outcomes.

Our findings are consistent with previous studies that reported coagulation abnormalities in early pregnancy complications [15–18]. The hypercoagulable state of pregnancy may become dysregulated in pathological conditions, leading to either thrombosis or bleeding [19,20].

In this study, 25% of patients exhibited prolonged PT, suggesting impairment in the extrinsic coagulation pathway. Similar observations have been reported in studies where prolonged PT was associated with increased miscarriage risk [21–23].

INR abnormalities were also noted and correlated with bleeding severity. Elevated INR values indicate reduced clotting efficiency, which may exacerbate bleeding episodes [24].

Thrombocytopenia was observed in 16.7% of patients, aligning with previous reports linking low platelet counts to adverse pregnancy outcomes [25–27]. Platelets play a critical role in maintaining vascular integrity, and their deficiency may worsen bleeding tendencies.

The study highlights the importance of routine coagulation assessment in early pregnancy bleeding cases. Early detection of abnormalities can aid in risk stratification and management planning [28-30].

Conclusion

PT, INR, and platelet counts are valuable parameters in evaluating women with first-trimester vaginal bleeding. Abnormalities in these parameters are associated with adverse outcomes and should be routinely assessed to improve clinical management.

References

1. Hasan R, Baird DD, Herring AH, Olshan AF, Funk ML, Hartmann KE. Patterns and predictors of vaginal bleeding in the first trimester of pregnancy. Ann Epidemiol. 2010;20(7):524–31.
2. ACOG Practice Bulletin No. 200: Early pregnancy loss. Obstet Gynecol. 2020;135(5):e180–9.
3. Everett C. Incidence and outcome of bleeding before the 20th week of pregnancy: prospective study from general practice. BMJ. 1997;315(7099):32–4.
4. Brenner B. Haemostatic changes in pregnancy. Thromb Res. 2004;114(5–6):409–14.
5. James AH. Pregnancy-associated thrombosis. Hematology Am Soc Hematol Educ Program. 2009;2009(1):277–85.
6. Dorgalaleh A, Tabibian S, Hosseini MS. Laboratory assessment of coagulation

disorders. Int J Hematol Oncol Stem Cell Res. 2017;11(3):213–20.
7. Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS. Williams Obstetrics. 25th ed. New York: McGraw-Hill; 2018.
8. Burrows RF, Kelton JG. Thrombocytopenia at delivery: a prospective survey of 6715 deliveries. Am J Obstet Gynecol. 1990;162(3):731–4.
9. Lockwood CJ. Inherited thrombophilias in pregnant patients: detection and treatment paradigm. Obstet Gynecol. 2002;99(2):333–41.
10. Rey E, Kahn SR, David M, Shrier I. Thrombophilic disorders and fetal loss: a meta-analysis. Lancet. 2003;361(9361):901–8.
11. Kupferminc MJ. Thrombophilia and pregnancy. Reprod Biol Endocrinol. 2003;1:111.
12. Saraswat L, Bhattacharya S, Maheshwari A, Bhattacharya S. Maternal and perinatal outcome in women with threatened miscarriage in the first trimester: a systematic review. BJOG. 2010;117(3):245–57.
13. Sotiriadis A, Papatheodorou S, Makrydimas G. Threatened miscarriage: evaluation and management. BMJ. 2004;329(7458):152–4.
14. Jurkovic D, Overton C, Bender-Atik R. Diagnosis and management of first trimester miscarriage. BMJ. 2013;346:f3676.
15. Erez O, Mastrolia SA, Thachil J. Disseminated intravascular coagulation in pregnancy: insights into pathophysiology, diagnosis, and management. Am J Obstet Gynecol. 2015;213(4):452–63.
16. Franchini M. Hemostasis and pregnancy. Thromb Res. 2006;117(1–2):S13–6.
17. Hellgren M. Hemostasis during normal pregnancy and puerperium. Semin Thromb Hemost. 2003;29(2):125–30.
18. Thachil J. Disseminated intravascular coagulation in pregnancy: recent advances. Clin Lab Haematol. 2020;42(S1):38–44.
19. McCrae KR. Thrombocytopenia in pregnancy. Hematology Am Soc Hematol Educ Program. 2010;2010:397–402.
20. Levi M, Scully M. How I treat disseminated intravascular coagulation. Blood. 2018;131(8):845–54.
21. Gris JC, Quéré I, Monpeyroux F, et al. Case-control study of the frequency of thrombophilic disorders in couples with late fetal loss and no thrombotic antecedent. Thromb Haemost. 1999;81(6):891–9.
22. Brenner B, Kupferminc MJ. Inherited thrombophilia and poor pregnancy outcome. Best Pract Res Clin Haematol. 2003;16(2):311–20.
23. Clark P, Walker ID, Langhorne P, et al. SPIN study: a multicenter randomized controlled trial of low-molecular-weight heparin and aspirin in women with recurrent miscarriage. Blood. 2010;115(21):4162–7.
24. Kitchen S, Jennings I, Woods TA, Preston FE. Wide variability in the sensitivity of PT reagents to clotting factor deficiencies. Thromb Haemost. 2001;86(2):526–31.
25. Sainio S, Kekomäki R, Riikonen S, Teramo K. Maternal thrombocytopenia at term: a population-based study. Acta Obstet Gynecol Scand. 2000;79(9):744–9.
26. Boehlen F, Hohlfeld P, Extermann P, Perneger TV, de Moerloose P. Platelet count at term pregnancy: a reappraisal of the threshold. Obstet Gynecol. 2000;95(1):29–33.
27. Gernsheimer T, James AH, Stasi R. How I treat thrombocytopenia in pregnancy. Blood. 2019;133(1):21–30.
28. Thachil J, Toh CH. Disseminated intravascular coagulation in obstetrics: current understanding and management. Best Pract Res Clin Obstet Gynaecol. 2022;82:85–96.
29. McLintock C. Thromboembolism and thrombocytopenia in pregnancy: recent advances. Hematology Am Soc Hematol Educ Program. 2021;2021(1):162–70.
30. Pavord S, Hunt BJ. The obstetric hematology manual. 2nd ed. Cambridge: Cambridge University Press; 2018.