International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 14, No. 2, February 2025 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_14.2.2025.156

Original Research

Assessment of platelet counts, prothrombin time, and international normalised ratio in pregnant women who experience vaginal bleeding in the first trimester

[1]Md. Ashab Anwer, [2]Sandhya Kumari Sinha, [3]Mohammad Ghulam Tabraiz

[1]Senior Resident, Department of Pathology, Jannayak Karpuri Thakur Medical College, Madhepura, Bihar, India
[2]Senior Resident, Department of Pathology, All India Institute of Medical Science, Patna, Bihar, India
[3]Professor, Department of Pathology, Jannayak Karpuri Thakur Medical College, Madhepura, Bihar, India

Corresponding Author
Sandhya Kumari Sinha
Senior Resident, Department of Pathology, All India Institute of Medical Science, Patna, Bihar, India

Received: 21 December, 2024 Accepted: 19 January, 2025 Published: 28 February, 2025

Abstract

Aim: This investigation sought to evaluate the platelet counts,prothrombin time (PT) and international normalised ratio (INR) in pregnant females who have vaginal bleeding in the 1st trimester.

Materials and Methods: For this study 200 female participants were recruited, and blood samples were collected to measure PT, INR, and platelet levels.

Results: The results indicated that twelve percent of the participants had elevated PT levels, 10% demonstrated higher INR levels, and 8% had thrombocytopenia. These abnormalities were associated with adverse clinical results, including persistent haemorrhaging and miscarriage.

Conclusion: The findings underscore the importance of routine haemostatic assessments in managing early pregnancy bleeding to identify and address any coagulation disorders, ultimately improving health results for the foetus as well as the mother.

Recommendations: Additional study including larger cohorts and prolonged durations might provide a more definitive knowledge of the relationship between blood coagulation abnormalities and pregnancy outcomes.

Keywords: Prothrombin time, International Normalized Ratio, Platelet Count, Vaginal Bleeding

Introduction

The coagulation and haemostatic systems experience substantial alterations during pregnancy. These alterations are believed to transpire to equip the mother for the haemostatic demands of childbirth [1]. The physiology of haemostasis entails a precise equilibrium between coagulation and fibrinolytic activity to preserve vascular integrity, with any suppression or amplification of either potentially resulting in thrombosis or bleeding [2].There is an elevation in most clotting factors, a drop in the levels of natural anticoagulants, and a reduction in fibrinolytic activity. The alterations lead to a condition of hypercoagulability [3]. Due to the elevation of most coagulation factors during pregnancy, prothrombin time may be reduced[4].Plateletlevels diminish during pregnancy as a result of heightened breakdown and haemodilution [5].Haemorrhage has a significant role in the aetiology of maternal and foetal mortality. The predominant reason for vaginal bleeding during the 1st trimester is total miscarriage, succeeded by impending miscarriage [6]. In 20–30% of pregnancies, bleeding occurs, increasing the risk of miscarriage[7]. The aetiology of miscarriage includeboth thrombotic and haemorrhagic abnormalities. Thrombotic disorders are rather prevalent, whereas haemorrhagic disorders are few. Foetal loss is most prevalent in the 1st trimester due to thrombotic abnormalities in the initial placental vessels[8].

Materials and Methods

Study Design: This research is a prospective observational study designed to evaluate platelet counts, PT and INR in females experiencing bleeding from vagina in the 1st trimester of gestation.

DOI: 10.69605/ijlbpr_14.2.2025.156

Study Setting: This investigation will be conducted for 1 year at JNKTMCH Madhepura, Bihar, India from 31st March 2023 to 31st March 2024.

Participants: A total of 200 persons will participate in the investigation.

Inclusion Criteria:

- Women who are pregnant and aged between 18 and 45 years.
- Exhibiting bleeding from vagina during the 1sttrimester of gestation.
- Prepared to furnish informed consent.

Exclusion Criteria:

- Females with identified coagulation problems or undergoing anticoagulant treatment.
- Females with long-term medical problems that impact coagulation (e.g., hepatic disease, chronic renal disease).
- Females experiencing numerous pregnancies.
- Individuals who refuse to provide consent for participation.

Data Collection: Upon arrival, participants will get comprehensive physical tests and clinical histories to evaluate their overall health and obstetric condition. Blood will be collected to assess INR, platelet counts and PT.For PT and INR,blood will be collected in citrate tubes and conventional laboratory techniques will assess INR and PT.For evaluating the platelet counts, blood samples will be obtained in EDTA tubes and platelet levels will be assessed using an automated haematology analyser.

Data Analysis: Utilising statistical software to analyse the data contained in a database. Summary of platelet count,PT and INR results employing descriptive statistics (mean, standard deviation and median). Measurements will be assessed for substantial departures from established reference ranges.

Results

200 pregnant women who experienced vaginal bleeding during the first trimester were included in this study. The average age of the participants was 29, with a range of 18 to 45 years. The median gestational age upon presentation was 8 weeks, with a range of 5 to 12 weeks. Two diagnostic tests used to determine how long blood coagulation takes are PT and INR. Table 1 displays the distribution of INR and PT levels among individuals.

Table 1: Prothrombin Time and International Normalised Ratio Values

Parameter	Mean±Standard Deviation(SD)	Median(Range)	Reference Range
INR	1.09±0.09	0.99(0.89-1.29)	0.8-1.2
PT (seconds)	12.49±1.09	12.39(10.79-14.29)	11.0-13.5

The average prothrombin time was 12.49 seconds, with a SD of 1.09 seconds and the average international normalised ratio was 1.09, accompanied by a SD of 0.09. Table 2 summarises the distribution of platelet counts among the subjects.

Table 2:Platelet count

Platelet count	Mean±SD	Median(Range)	Reference Range
Platelet count (x10^3/µL)	255±71	249(150-400)	150-400

255 x10^3/µL was the average platelet count, accompanied by a SD of 71 x10^3/µL.

Table 3: Clinical Outcomes and Haemostatic Anomalies

Abnormal Parameter	Number of participants	Adverse outcomes
Platelet count <150x10^3/µL)	16	12
PT>13.5 seconds	24	16
INR>1.2	20	12

24 subjects (12%) exhibited PT values beyond the standard range.20 participants (10%) exhibited INR readings beyond the recommended range. 16 subjects (8%) exhibited platelet counts that fall below the established reference range, signifying the presence of thrombocytopenia.

Unfavourable clinical consequences, such as protracted bleeding, the requirement for medical or surgical treatment, or unfavourable pregnancy outcomes, like miscarriagewere more likely to occur in individuals with abnormal PT, INR or platelet counts. Table 3 presents a succinct summary of the clinical results associated with deviations in haemostatic criteria.A significant proportion of females with bleeding from vaginain the 1sttrimester ofgestation displayed abnormal platelet levels, INR or PT. No text was provided by the user. Deviant

DOI: 10.69605/ijlbpr_14.2.2025.156

haemostatic interventions were associated with an increased likelihood of adverse clinical outcomes.

Discussion

This study aimed to evaluate platelet counts, PT and INR in females with bleeding from vagina during the 1st trimester of gestation[9]. The findings indicate that a considerable proportion of these females have abnormalities in blood coagulation factors, associated with adverse clinical outcomes. Specifically, 12% of participants demonstrated elevated PT levels, 10% exhibited higher INR levels, and 8% presented with thrombocytopenia. This suggests a potential association between coagulation disorders and haemorrhage in early pregnancy [10,11]. The mean PT and INR values were within standard reference ranges; nevertheless, the presence of outliers underscores the variability in haemostatic responses in expectantfemales. The mean platelet levels also remained within the expected range, although the identification of thrombocytopenia in a subset of individuals is clinically significant [12]. These anomalies may indicate underlying conditions such as hepatic dysfunction, disseminated intravascular coagulationor other haemostatic illnesses that could jeopardise pregnancy [13].

The correlation between aberrant blood clotting metrics and adverse medical outcomes, including persistent haemorrhage or miscarriage, underscores the vital necessity for thorough evaluation of blood coagulation in this patient demographic [14]. Prompt identification and management of coagulation abnormalities can mitigate risks and improve pregnancy outcomes. The study's findings align with previous research highlighting the importance of monitoring pregnant women's blood coagulation, particularly those exhibiting symptoms of bleeding[15-18].A study by Kovac V and Vlaisavljevic V, observed that blood coagulation measures exhibited no alterations in pregnant females experiencing bleeding from vagina [19]. A study by Szecsi PB, Jorgensen M, et al. indicated that PT remains unaltered during pregnancy[20]. A study conducted by Hui C, Lili M, et al. indicated that PT and INR exhibited a tendency to decline in women who were pregnant [21]. Pannala S, Inayatulla K, and Puli Sree Hari discovered that PT was diminished in 98% of healthy expectant females [22].

Conclusion

This investigation underscores the necessity of assessing platelet levels,PT and INR in femaleswho experience bleeding from vagina during the 1st trimester of gestation. The identification of abnormal parameters of coagulation in a substantial proportion of these females, along with the association of these irregularities with adverse clinical results, underscores the imperative to assess haemostasis in initialgestation. These results advocate for the consistent incorporation of coagulation assessments in the clinical care for initialgestational bleeding to enhance the detection and management of possible complications, ultimately resulting in enhanced health results for the foetus and the mother.

Limitation

This study is constrained by a limited participant pool and its observational design, which hinders the ability to conclusively determine causal correlations.

Recommendations

Undertaking further research with larger cohorts and extended durations may provide a more definitive comprehension of the relationship between blood clotting problems and pregnancy outcomes. Moreover, examining the underlying causes of coagulation issues in this specific context may yield significant insights for formulating more targeted therapeutics

References

1. Holmes, VA and Wallace, JMW Hemostasis is normal pregnancy: A Balancing Act. Biochemical Society Transactions, Vol. 33(2005) P.428.
2. Patrick T, Joanne D. Coagulation in pregnancy. Best practice & Research clinical obstetrics and Gynaecology 24 (2010), 339-352.
3. Bremme KA. Haemostatic changes in pregnancy. Best Pract. Res. Clin Haematol 2003;16:153-168.
4. Pannala S, Inayatulla K, Puli S H. Estimation of prothrombin time in pregnancy compared with normal controls. Journal of Evolution of Medical and Dental sciences. 2013:72-77.
5. Boeheen F, Honefeld P, Extermann P. Platelet count at term pregnancy: A reappraisal of the threshold. Obstet Gynecol.2000;95:29-33.
6. Bick RL, Hoppensteadt D. Recurrent Miscarriage syndrome and infertility due to blood coagulation protein (platelet defects: a review and update, Clin. Appl Thromn Hemost. 2005;11(1):1-13.
7. Gris JC, Ripart-Nevcu S, Maugard C. Retrospective evaluation of the prevalence of haemostasis and abnormalities in unexplained primary early recurrent miscarriages. The Numes Obstetricians and Haematologists study. Thromb Haemost.1997;77(6):1096-1103.
8. Mccrae KR. Thrombocytopenia in pregnancy differential diagnosis pathogenesis and management. Blood RCV.2013;17:7-14.
9. Chhabra S, Bhavani M, Gowda S, Singh V, Gupta A, Aggarwal N. Hemostatic profile in women with early pregnancy loss: a casecontrol study. J Obstet Gynaecol Res. 2019;45 (2):429-435.
10. Rodger MA, Paidas M, McLintock C, Middeldorp S, Kahn S, Martinelli I, et al. Inherited thrombophilia and pregnancy complications revisited. Obstet Gynecol. 2008;112(2 Pt 1):3 20-324.
11. Grandone E, Colaizzo D, Lo Bue A, Checola MG, Cittadini E, Margaglione M. Hemostatic gene polymorphisms and the occurrence of fetal growth restriction. Haematologica. 2003;88 (11):1254-1259.
12. Gerhardt A, Scharf RE, Beckmann MW, Struve S, Bender HG, Pillny M, et al. Prothrombin and factor V mutations in women with a history of thrombosis

DOI: 10.69605/ijlbpr_14.2.2025.156

during pregnancy and the puerperium. N Engl J Med. 2000 ;342 (6):374-380.
13. Rey E, Kahn SR, David M, Shrier I. Thrombophilic disorders and fetal loss: a meta-analysis. Lancet. 2003;361(9361):901-908.
14. Rodger MA, Carrier M, Le Gal G, Martinelli I, Perna A, Rey E, et al. Meta-analysis of lowmolecular-weight heparin to prevent recurrent venous thromboembolism in pregnancy. Obstet Gynecol. 2008;112(3):587-593.
15. Bates SM, Greer IA, Middeldorp S, Veenstra DL, Prabulos AM, Vandvik PO, et al. VTE, thrombophilia, antithrombotic therapy, and pregnancy: antithrombotic therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians evidence-based clinical practice guidelines. Chest. 2012;141(2 Suppl): e691S-e736S.
16. Clark P, Walker ID, Langhorne P, Crichton L, Thomson A, Greaves M, et al. SPIN (Scottish Pregnancy Intervention) study: a multicenter, randomized controlled trial of low-molecularweight heparin and low-dose aspirin in women with recurrent miscarriage. Blood. 2010;115 (21):4162-4167.
17. Miyakis S, Lockshin MD, Atsumi T, Branch DW, Brey RL, Cervera R, et al. international consensus statement on an update of the classification criteria for definite antiphospholipid syndrome (APS). J Thromb Haemost. 2006;4 (2):295-306.
18. Giannakopoulos B, Krilis SA. The pathogenesis of the antiphospholipid syndrome. N Engl J Med. 2013;368(11):1033-1044.
19. Kovac V, Vlaisavljevic V, Reljic M. Evaluation of coagulation abnormalities among women with vaginal bleeding in the first trimester of pregnancy. Int J Gynaecol Obstet 2012 Sep;118(3):202-4.
20. Szecsi PB, Jorgensen M. Haemostatic reference intervals in pregnancy, Thromb Haemost. 2010 Apr;103(4):718- 27.
21. Hui C, Lili M. Changes in coagulation and hemodynamics during pregnancy: A prospective longitudinal study of 58 cases. Arch Gynecol Obstet.2012 May;285(5):1231-6.
22. Pannala S, Inayatulla K, Puli S H. Estimation of prothrombin time in pregnancy compared with normal controls. Journal of Evolution of Medical and Dental sciences. 2013:72-77.