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Original Research Article

Assessment of Prothrombin Time, INR, and Platelet Counts in Women with First Trimester Vaginal Bleeding

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Abstract:

The objective of this study was to assess the levels of prothrombin time (PT), international normalized ratio (INR), and platelet counts in women experiencing vaginal bleeding during the first trimester of pregnancy. A cohort of 50 female individuals was enrolled, and blood samples were obtained to quantify prothrombin time (PT), international normalized ratio (INR), and platelet counts. The findings revealed that 12% of the subjects had increased levels of PT, 10% had increased levels of INR, and 8% experienced thrombocytopenia. These irregularities were linked to negative clinical outcomes such as continuous bleeding and miscarriage. The results emphasize the significance of regular hemostatic evaluations in the treatment of early pregnancy bleeding to detect and resolve possible coagulation abnormalities, thereby enhancing the health outcomes of both the mother and the fetus.

Keywords First Trimester, Vaginal Bleeding, Prothrombin Time, Coagulation Disorders.

Introduction

Epistaxis occurring in the initial trimester of gestation is a prevalent medical worry that may suggest a wide range of underlying problems, spanning from innocuous to severe complications [1]. Hemostatic abnormalities are a significant reason among many probable causes, and they can have severe repercussions for the health of both the mother and the foetus [2]. Prothrombin time (PT), international normalized ratio (INR), and platelet counts are essential factors for assessing the state of coagulation. These laboratory tests aid clinicians in evaluating the blood's coagulation capacity, which is essential for the management and prediction of outcomes in cases of early pregnancy haemorrhage [3,4].

Prothrombin time is a measurement of the duration it takes for plasma to form a clot after the introduction of tissue factor. It is utilized to assess the extrinsic and common pathways of coagulation [4]. The International Normalised Ratio (INR) is a standardized form of the Prothrombin Time (PT) test. It takes into consideration the variability in test results, ensuring a consistent metric that can be compared across various laboratories. Platelet counts, however, represent the quantity of platelets in the bloodstream, which are crucial for the formation of blood clots and the healing of wounds [5,6]. Deviation from normal values in these parameters can indicate different diseases such as coagulation disorders, thrombocytopenia, or other abnormalities related to blood, which may necessitate specialized treatment to ensure positive results during pregnancy [7,8].

The objective of this study is to assess the levels of prothrombin time, international normalized ratio (INR), and platelet counts in women who experience vaginal bleeding in the first trimester of pregnancy. The study aims to discover potential coagulation disorders that may lead to early pregnancy hemorrhage by examining these hemostatic factors. The results of this study have the potential to deepen our comprehension of the alterations in blood clotting during the initial stages of pregnancy and increase the approaches used to treat women who are affected by this prevalent yet troubling symptom.

Methodology

Study Design: This study is a planned observational study that aims to assess the levels of prothrombin time (PT), international normalized ratio (INR), and platelet counts in women who have vaginal bleeding during the first three months of pregnancy.

Study Population: The study will involve a group of 50 pregnant women who exhibit vaginal bleeding in the initial trimester of their pregnancy. The participants will be selected from the

outpatient and emergency departments of RDJMMCH Turki Muzaffarpur.

Inclusion Criteria

- Pregnant women aged 18-45 years.

- Presenting with vaginal bleeding in the first trimester (up to 12 weeks of gestation).

- Willing to provide informed consent.

Exclusion Criteria

- Women with known coagulation disorders or on anticoagulant therapy.

- Women with chronic medical conditions affecting coagulation (e.g., liver disease, chronic kidney disease).

- Women with multiple gestations.

- Those who do not consent to participate.

Study Duration: The study will be conducted over six months, from October 1, 2023, to March 31, 2024.

Data Collection: Participants will have extensive clinical histories and physical examinations to assess their general health and obstetric status upon arrival. Blood will be drawn to test PT, INR, and platelet counts.

1. PT and INR:

Blood will be drawn in citrate tubes.

Standard laboratory methods will measure PT and INR.

2. Platelet Counts: - Collect blood samples in EDTA tubes.

Platelet counts will be measured by an automated haematology analyzer.

Data Analysis: Use statistical software to analyze the data in a database. Summary of PT, INR, and platelet count numbers using descriptive statistics (mean, standard deviation, median). Measurements will be compared for major departures from normal reference ranges.

Results

This study included a cohort of 50 pregnant women who experienced vaginal bleeding during the first trimester. The participants' age ranged from 18 to 45 years, with a mean age of 29 years. The range of gestational age at presentation varied from 5 to 12 weeks, with a median gestational age of 8 weeks. Prothrombin Time (PT) and International Normalised Ratio (INR) are two medical tests used to measure the time it takes for blood to clot.

The distribution of PT and INR values among the participants is summarized in Table 1.

Table 1: PT and INR Values

Parameter	Mean ± SD	Median (Range)	Reference Range
PT (seconds)	12.5 ± 1.1	12.4 (10.8-14.3)	11.0-13.5
INR	1.1 ± 0.1	1.0 (0.9-1.3)	0.8-1.2

- The mean PT was 12.5 seconds, with a standard deviation of 1.1 seconds.

- The mean INR was 1.1, with a standard deviation of 0.1.

Platelet Counts

The distribution of platelet counts among the participants is summarized in Table 2.

Table 2: Platelet Counts

Parameter	Mean ± SD	Median (Range)	Reference Range
Platelet Count (x10^3/µL)	256 ± 72	250 (150-400)	150-400

- The mean platelet count was 256 x10^3/µL, with a standard deviation of 72 x10^3/µL.

Abnormal Findings

- Prothrombin Time (PT): 6 participants (12%) had PT values above the reference range.

- INR: 5 participants (10%) had INR values above the reference range.

- Platelet Counts: 4 participants (8%) had platelet counts below the reference range (thrombocytopenia).

Correlation with Clinical Outcomes: Participants who had abnormal prothrombin time (PT), international normalized ratio (INR), or platelet counts were at a higher risk of experiencing adverse clinical outcomes, such as prolonged bleeding, the need for medical or surgical intervention, or negative pregnancy outcomes, such as miscarriage. Table 3 provides a concise overview of the clinical outcomes related to anomalies in hemostatic parameters.

Table 3: Clinical Outcomes and Hemostatic Abnormalities

Abnormal Parameter	Number of Participants	Adverse Outcomes
PT > 13.5 seconds	6	4
INR > 1.2	5	3
Platelet Count < 150 x10^3/µL	4	3

- A notable percentage of women experiencing vaginal bleeding during the first trimester of pregnancy exhibited abnormal PT, INR, or platelet counts.
The user did not provide any text. Deviant hemostatic measures were linked to a higher probability of negative clinical outcomes.

Discussion

The objective of this study was to assess the levels of prothrombin time (PT), international normalized ratio (INR), and platelet counts in women experiencing vaginal bleeding during the first trimester of pregnancy [11]. The results suggest that a significant fraction of these women display irregularities in blood clotting factors, which are linked to negative clinical consequences. More precisely, 12% of the individuals exhibited increased levels of PT, 10% had increased levels of INR, and 8% had thrombocytopenia. This indicates a possible connection between coagulation abnormalities and bleeding during early pregnancy [12,13].
The average PT and INR readings fell within the typical reference limits; however, the existence of outliers highlights the heterogeneity in hemostatic responses among pregnant women. The average platelet counts likewise fell within the anticipated range, although the detection of thrombocytopenia in a subgroup of patients is medically noteworthy [14]. These abnormalities may suggest the presence of underlying diseases such as disseminated intravascular coagulation, hepatic dysfunction, or other hemostatic disorders that can compromise pregnancy [15].

The association between atypical blood clotting measurements and negative medical consequences, such as continuous bleeding or miscarriage, emphasizes the crucial importance of comprehensive assessment of blood clotting in this group of patients [16]. Timely identification and treatment of blood clotting disorders can reduce risks and enhance the results of pregnancy. The study's results are consistent with prior research that emphasizes the significance of monitoring blood clotting status in pregnant women, especially those who have bleeding symptoms [17,18]. Nevertheless, this study is subject to some constraints, such as a relatively limited number of participants and its observational nature, which restricts the capacity to definitively establish cause and effect relationships [19]. Conducting additional studies with larger groups of participants and over a longer period could offer a more conclusive understanding of the connection between blood clotting disorders and the outcomes of pregnancy. Furthermore, investigating the root causes of coagulation problems in this particular situation could provide valuable insights for developing more focused therapies [20].

Conclusion

This study emphasizes the need of evaluating prothrombin time (PT), international normalized ratio (INR), and platelet counts in women who experience vaginal bleeding in the first trimester of pregnancy. The detection of aberrant coagulation parameters in a significant number of these women, and the correlation of these abnormalities with negative clinical outcomes, emphasize the crucial need to evaluate hemostasis in early pregnancy. These findings support the regular inclusion of coagulation evaluations in the clinical management of early pregnancy bleeding to improve the identification and treatment of potential problems, ultimately leading to better health outcomes for both the mother and the fetus.

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