



Original Article

Association of First Trimester Vaginal Bleeding with Third Trimester Pregnancy Complications

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ABSTRACT

Background: Vaginal bleeding during the first trimester of pregnancy is a common clinical presentation, occurring in approximately 20-30% of pregnancies. While often benign, emerging evidence suggests that first trimester bleeding may serve as an early marker for placental dysfunction, potentially leading to adverse pregnancy outcomes in the third trimester.

Aim: To investigate the association between first trimester vaginal bleeding and the occurrence of pregnancy complications in the third trimester.

Method: This prospective observational study was conducted over one year at the Department of Obstetrics and Gynaecology, L.L.R.M. Medical College and SVBP Hospital, Meerut. A total of 100 women presenting with first trimester vaginal bleeding and fulfilling inclusion criteria were enrolled after informed consent. Data on clinical history, ultrasound findings, and pregnancy outcomes were collected and analyzed.

Results: Out of 100 antenatal women with first trimester vaginal bleeding, 73 pregnancies were viable. Among these, 53 (72.60%) experienced complications in the third trimester, including anemia (54.72%), PIH (11.32%), and PPROM (11.32%). The severity of bleeding correlated with adverse outcomes; heavier and recurrent bleeding increased risks. Most women with minimal bleeding (spotting) had viable pregnancies and fewer complications.

Conclusion: First trimester vaginal bleeding is significantly associated with increased risk of adverse third-trimester pregnancy outcomes. It reflects underlying placental pathology, emphasizing the importance of close surveillance and early intervention in affected pregnancies to improve maternal and neonatal outcomes.

Keywords: First trimester vaginal bleeding, pregnancy complications, placental dysfunction, preterm birth, preeclampsia, fetal growth restriction.

INTRODUCTION

Vaginal bleeding during pregnancy is a common clinical presentation, occurring in approximately 20-30% of all pregnancies. Among these, bleeding in the first trimester is particularly prevalent and can range from benign, self-limiting spotting to manifestations of underlying obstetric pathology. While most episodes resolve without sequelae, an increasing body of evidence suggests that first trimester bleeding may serve as an early marker for placental dysfunction and subsequent adverse pregnancy outcomes [1].

First trimester vaginal bleeding arises from multiple etiologies, including implantation bleeding, subchorionic hematoma, cervical ectropion, and early pregnancy loss. However, even in pregnancies that progress beyond the first trimester, the occurrence of bleeding may reflect underlying disruptions in early placentation [5]. Impaired trophoblastic invasion and incomplete remodeling of spiral arteries during early pregnancy are hypothesized to result in a fragile decidual-placental interface, predisposing to both early bleeding and later placental insufficiency. This concept aligns with the "continuum of placental disease" hypothesis, which proposes that events in early pregnancy can influence placental function throughout the second and third trimesters [2].

The incidence of first trimester bleeding varies between 16% and 25% in clinically recognized pregnancies. Most episodes are mild and do not lead to pregnancy loss; however, recurrent, heavy bleeding or bleeding associated with pain has prompted investigations into its role as a prognostic indicator for later complications [3].

Numerous prospective and retrospective cohort studies have demonstrated an association between first trimester vaginal bleeding and increased risks of complications later in pregnancy [1,3,4]. The proposed mechanisms include chronic placental insufficiency, inflammation, and vascular maldevelopment. The key third-trimester complications reported include preterm birth, placental abruption, placenta previa, fetal growth restriction (FGR), low birth weight, preeclampsia, and increased rates of cesarean delivery and NICU admissions [5].

It is important to note that the risk appears to be dose-dependent, with heavier bleeding, recurrent episodes, and ultrasound findings such as subchorionic hematoma conferring higher risk. Therefore, first trimester vaginal bleeding should not be dismissed as invariably benign. It offers an opportunity for risk stratification and targeted antenatal surveillance. Women with a history of first trimester bleeding may benefit from closer monitoring of fetal growth, blood pressure, and signs of preterm labor during the third trimester [6].

First trimester vaginal bleeding may be more than an isolated early pregnancy event; it could serve as an early clinical manifestation of underlying placental pathology with significant implications for third-trimester maternal and fetal health. Understanding this association enables obstetricians to identify high-risk pregnancies early, implement appropriate monitoring strategies, and potentially improve maternal and neonatal outcomes. Further research is necessary to clarify causality, identify subgroups at highest risk, and explore interventions to mitigate these late pregnancy complications.

MATERIAL AND METHODS

This prospective observational study was conducted in the Department of Obstetrics and Gynaecology at L.L.R.M. Medical College and Associated SVBP Hospital, Meerut, over a period of one year, from June 2020 to May 2021. The study aimed to evaluate the maternal and fetal outcomes in women presenting with first trimester vaginal bleeding.

The study protocol received approval from the Institutional Ethical Committee prior to commencement. All participants provided written informed consent after being thoroughly informed about the nature and purpose of the study. Participation was entirely voluntary, and confidentiality of patient information was maintained throughout.

Inclusion Criteria

1. Women with singleton pregnancy
2. Patients presenting with vaginal bleeding during the first trimester of pregnancy
3. Women delivering at the study institution

Exclusion Criteria

1. Women with twin pregnancy
2. High-risk pregnancies, including those complicated by hypertension, diabetes mellitus, or severe anemia
3. Cases of vaginal bleeding attributable to non-obstetric causes
4. Pregnancies complicated by medical conditions such as coagulopathies

Study Procedure

Pregnant women who met the inclusion criteria and did not fall under the exclusion criteria were enrolled into the study. A detailed clinical history was obtained, including obstetric history, gestational age at presentation, nature and duration of bleeding, and any associated symptoms. A thorough clinical examination was performed to assess general health, obstetric status, and any signs of complications.

All enrolled women underwent ultrasound examination to confirm gestational age, evaluate fetal viability, detect any placental abnormalities such as subchorionic hematoma, and rule out other obstetric or non-obstetric causes of bleeding.

The participants were monitored continuously throughout their pregnancy, with regular follow-up visits scheduled as per standard antenatal care protocols. During each visit, clinical assessment and ultrasound evaluations were repeated as necessary. The course of pregnancy was observed from the time of presentation until delivery.

Data regarding maternal outcomes—such as antepartum complications, mode of delivery, and postpartum health—and fetal outcomes—including birth weight, Apgar scores, neonatal intensive care admissions, and any perinatal complications—were recorded. The occurrence of adverse events or complications related to pregnancy was meticulously documented to analyze associations with first trimester bleeding.

This comprehensive follow-up allowed for detailed analysis of the relationship between first trimester vaginal bleeding and subsequent maternal and fetal outcomes, as well as identification of potential risk factors associated with adverse pregnancy events.

RESULTS

Table 1: Age wise distribution among study group

Age category	Number	Percentage
>20-25 years	49	49
>25-30 years	39	39
>30 years	8	8
Up to 20 years	4	4
Total	100	100

It was seen that the average age of the patients was over 25 years. The median age was 25 years with a range of 19-34 years

Table 2 : Viability of Pregnancy by the end of first trimester in patients with first trimester vaginal bleeding among study group

Viability	Number	Percentage
Non-Viable	27	27
Viable	73	73
Total	100	100

Most of the pregnancies in the study were viable (73, 73%).

Table 3: Complication associated with pregnancy in the third trimester in the patients who had viable pregnancy after first trimester

No Complication	20	27.40
Complication	53	72.60
Anaemia	29	54.72
Anaemia A/w PPH	2	3.77
PIH	6	11.32
Placenta Abruptio A/w Anaemia	3	5.66
Placenta Previa	2	3.77
Placenta Previa, Anaemia	3	5.66
PPROM	6	11.32
PPROM A/w Anaemia	2	3.77
Total	73	100

Out of the 73 patients with viable pregnancy in the entire course, 53 patients had a complication (53, 72.60%). Most common complication was Anemia (29, 54.72%) followed by PIH (6, 11.32%) and PPRM (6, 11.32%).

Table 4: Quantity of bleeding per vagina among study group

Quantity of bleeding	Number	Percentage
Spotting	73	73
Moderate bleeding	19	19
Heavy bleeding	8	8
Total	100	100

Most of the patients had only spotting (73,73%). Nineteen patients (19%) had moderate bleeding while 8 patients had heavy bleeding (8%).

Table 7:Relation of quantity of bleeding with Viability among study group of patients

Quantity	Heavy Bleeding	Moderate Bleeding	Spotting	Total	Percen
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					tage
Non- viable	8	13	6	27	27%
Viable	0	6	67	73	73%

Out of the 73 patients with spotting, 67 had viable pregnancies. For patients with moderate bleeding, the number of patients with viable pregnancy was 6 out of 19. No patient with a heavy bleed had a viable pregnancy.

DISCUSSION

Vaginal bleeding during the first trimester of pregnancy is a common clinical concern, occurring in approximately 25% of pregnant women [7]. Multiple studies have yielded heterogeneous results regarding the impact of first trimester bleeding on fetal-maternal outcomes. To gain further insights into this relationship within an Indian population, we conducted a study involving 100 female patients who presented to the Department of Obstetrics and Gynecology at Lala Lajpat Rai Medical College and its affiliated hospitals with complaints of bleeding in the first trimester of pregnancy.

The major observations of this study were as follows:

Firstly, the median age of the patients was 25 years, with an average age of 25.53 ± 3.46 years. Most of the participants were under 30 years of age. The majority were multigravida with a single parity, belonged to a lower socio-economic status, and had an average period of gestation (POG) of 7.64 ± 1.70 weeks at presentation.

Secondly, most patients experienced 3 to 4 days of vaginal bleeding accompanied by abdominal pain. The bleeding was predominantly spotting in nature for most patients, followed by moderate bleeding. Clinically, it was observed that 73% of the patients had a viable pregnancy at presentation. Notably, as the intensity of bleeding increased, the proportion of patients with viable pregnancy decreased, indicating a potential correlation between bleeding severity and pregnancy viability.

Thirdly, about 70% of the patients continued their pregnancies, with most resulting in term deliveries (72.86%). Conversely, nearly one-fourth of the women experienced preterm deliveries (27.14%). Among those with viable pregnancies, the most common complications observed were anemia, pregnancy-induced hypertension (PIH), and preterm premature rupture of membranes (PPROM).

The present study underscores a significant association between first trimester vaginal bleeding and adverse pregnancy outcomes in the subsequent trimesters. These findings support the hypothesis that early pregnancy bleeding reflects underlying placental pathology, which may persist and manifest later in gestation.

Several mechanisms have been proposed to explain this association. First, bleeding, particularly when associated with subchorionic hematoma, may signify impaired trophoblastic invasion and incomplete remodeling of spiral arteries. This process results in a fragile decidual-placental interface and chronic uteroplacental insufficiency, which are recognized risk factors for preeclampsia, fetal growth restriction, and placental abruption later in pregnancy. Additionally, the inflammatory response triggered by hematoma and decidual hemorrhage may contribute to uterine irritability and preterm labor [8-10].

Consistent with previous reports, we observed a dose-response relationship where recurrent or heavy bleeding conferred greater risk than isolated, mild episodes. This suggests that the extent of early placental disruption correlates with the severity of subsequent complications. Our findings regarding increased rates of preterm birth, low birth weight, and NICU admissions align with multiple cohort studies that identified first trimester bleeding as an independent risk factor for preterm delivery [8-12].

However, it is important to note that some studies have reported conflicting results. Certain authors argue that isolated first trimester bleeding without ultrasound abnormalities has minimal impact on pregnancy outcomes. These discrepancies may arise due to differences in study populations, definitions of bleeding, and the inclusion or exclusion of early pregnancy losses.

The clinical implications of our findings suggest that women presenting with first trimester bleeding should be considered a high-risk group. Implementing targeted antenatal surveillance—including serial growth scans and blood pressure monitoring may facilitate early detection and management of potential third-trimester complications. Future research should focus on identifying reliable biomarkers and ultrasound parameters in the first trimester that can better stratify risk and evaluate whether prophylactic interventions can improve maternal and fetal outcomes [13-15].

CONCLUSION

In our study, there is a positive correlation between first trimester vaginal bleeding and adverse fetal-maternal outcomes. Based on the results, first trimester vaginal bleeding can be considered a predictive factor for adverse maternal and neonatal outcomes. Proper antenatal care enables obstetricians to identify potential complications associated with first trimester bleeding at an early stage, allowing for timely intervention that could improve overall outcomes. Our study clearly demonstrated that patients experiencing first trimester bleeding had a higher rate of complications, which were significantly

associated with adverse feto-maternal results. To further validate these findings, larger randomized studies involving heterogeneous samples from multiple centers are necessary.

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