



THE RELATIONSHIP BETWEEN FIRST-TRIMESTER VAGINAL BLEEDING, FETAL GROWTH RESTRICTION, AND ADVERSE PERINATAL OUTCOMES

Shukurkhujaeva Dilduzakhon Norkhuja kizi

Tashkent State Medical University, Tashkent, Uzbekistan

<https://doi.org/10.5281/zenodo.23283940>

Abstract.

Background: First-trimester vaginal bleeding is a common obstetric complication frequently associated with subchorionic hematoma (SCH). Although many affected pregnancies progress normally, early bleeding may reflect underlying placental dysfunction and has been linked to adverse pregnancy outcomes, including fetal growth restriction (FGR). Evidence regarding this association remains inconsistent across studies. **Objective:** To evaluate maternal characteristics and pregnancy outcomes in women with first-trimester vaginal bleeding, with particular emphasis on fetal growth restriction. **Methods:** We conducted this retrospective observational cohort study at the 6th Interdistrict Perinatal Centre, Tashkent, affiliated with Tashkent State Medical University, between March and December 2025. Medical records of 407 singleton pregnancies were reviewed, including 57 women with first-trimester vaginal bleeding and 350 controls without bleeding. We collected data on maternal characteristics, SCH localisation, medication use, and pregnancy outcomes. Outcomes assessed included early pregnancy loss, fetal growth restriction, preterm birth, preeclampsia, placental abruption, gestational diabetes mellitus, intrauterine fetal death, and mode of delivery. **Results:** Baseline maternal characteristics were comparable between groups. Early pregnancy loss and cesarean delivery were more frequent in women with first-trimester bleeding. However, the incidence of fetal growth restriction and other major adverse pregnancy outcomes was low and similar between groups. **Conclusion:** First-trimester vaginal bleeding was associated with an increased risk of early pregnancy loss but was not linked to a significant increase in fetal growth restriction in pregnancies progressing beyond the first trimester. These findings support a conservative, individualised clinical approach.

Keywords: first-trimester vaginal bleeding, subchorionic hematoma, fetal growth restriction, pregnancy outcomes, placental dysfunction, threatened miscarriage, antenatal surveillance

Introduction: First-trimester vaginal bleeding is a frequently encountered obstetric complication and is commonly associated with subchorionic hematoma (SCH) identified on ultrasonography. While many pregnancies complicated by early bleeding progress without sequelae, increasing evidence suggests that first-trimester bleeding—particularly in the presence of SCH—may reflect underlying disturbances in placental implantation and trophoblastic invasion. SCH represents the accumulation of blood between the chorion and decidua, indicative of localised decidual haemorrhage and impaired placental-uterine attachment. Several observational studies have demonstrated that SCH characteristics are associated with adverse pregnancy outcomes such as fetal growth restriction (FGR); however, evidence remains inconsistent and population-dependent for preterm birth, placental abruption, and hypertensive disorders of pregnancy (Günay et al., 2021; Pan et al., 2023). Notably, recent cohort data indicate that SCH detected in the first trimester is independently

associated with an increased risk of FGR, particularly when the hematoma is large or persists into the second trimester (Lou et al., 2025). These findings support the hypothesis that early pregnancy bleeding may serve as an early clinical manifestation of placental dysfunction. Nevertheless, the existing literature remains inconclusive, as some systematic reviews and meta-analyses have reported no significant association between first-trimester SCH and adverse perinatal outcomes, highlighting considerable heterogeneity in study populations and methodologies (Yan et al., 2022). Furthermore, most available evidence originates from high- and middle-income settings, with limited data from low- and middle-income countries, emphasising the need for further well-designed studies in diverse populations.

Methodology

This retrospective observational cohort study was conducted at the 6th Interdistrict Perinatal Center, Tashkent, affiliated with Tashkent State Medical University (TSMU). Medical records of pregnant women who received antenatal care and subsequently delivered at the center between March 2025 and December 2025 were reviewed. A total of 407 pregnant women were included in the study and followed from early pregnancy until delivery or pregnancy termination. The study population was divided into two groups based on the presence of vaginal bleeding during the first trimester of pregnancy. The study group consisted of 57 women who experienced first-trimester vaginal bleeding, while the control group included 350 women without a history of bleeding during the first trimester. Only singleton pregnancies with confirmed intrauterine gestation and complete clinical and outcome data were included. Pregnancies with multiple gestations, known fetal congenital anomalies, or incomplete medical records were excluded from the analysis.

Maternal demographic and obstetric information were collected from hospital medical records, including maternal age, parity, smoking status, and gestational age at diagnosis and at delivery. In women presenting with 1st trimester bleeding, ultrasound reports were reviewed to document the presence and localization of subchorionic hematoma, which was classified as anterior, fundal, posterior, or cervical. Information regarding medications used prior to diagnosis, including progesterone, low-molecular-weight heparin, and aspirin, was also recorded.

Pregnancy outcomes assessed in both groups included early pregnancy loss, fetal growth restriction, preterm birth, preeclampsia, placental abruption, gestational diabetes mellitus, intrauterine fetal death, and mode of delivery. Fetal growth restriction was defined according to standard obstetric criteria based on gestational age and fetal biometric measurements obtained during antenatal ultrasound examinations.

Data analysis was descriptive in nature and was performed using JASP statistical software (Jeffreys's Amazing Statistics Program). Continuous variables were presented as mean $\pm$ standard deviation or median with minimum and maximum values, depending on data distribution. Categorical variables were expressed as absolute numbers and percentages.

Ethical considerations

The study was based on a retrospective analysis of anonymized medical records. Ethical approval and informed consent were waived by the institutional ethics committee, as the study involved no direct patient contact and posed no additional risk to participants. Patient confidentiality was strictly maintained throughout the study.

Results

Baseline maternal characteristics

The baseline maternal characteristics of the study population are summarized in Table 1. A total of 407 pregnant women were included, with 350 women in the control group and 57 women in the first-trimester bleeding group. Maternal age was similar between groups. In the bleeding group, the median gestational age at diagnosis was 8.9 weeks, while the median gestational age at delivery was comparable between the two groups.

Table 1. Baseline maternal characteristics of the study groups

Parameter	Control group (n = 350)	First-trimester bleeding group (n = 57)
Age (years), mean $\pm$ SD (min-max)	27.51 $\pm$ 5.08 (18-39)	27.04 $\pm$ 5.31 (18-39)
Gestational age at diagnosis (weeks), median (min-max)	0,0	8.9 (6.1-13.9)
Gestational age at delivery (weeks), median (min-max)	38.86 (7.14-42.00)	38.29 (8.43-40.71)
Primiparous women, n (%)	171 (48.9)	30 (52.6)
Multiparous women, n (%)	179 (51.1)	27 (47.4)
Smoking during pregnancy, n (%)	26 (7.4)	4 (7.0)

Hematoma characteristics and prior medication use

Among women with first-trimester bleeding, anterior hematoma localization was most frequently observed. Most women in both groups had not received any medication prior to diagnosis, although progesterone use was more common in the bleeding group (Table 2).

Table 2. Hematoma localization and medication use before diagnosis

Parameter	Control group (n = 350)	First-trimester bleeding group (n = 57)
Hematoma localization – anterior, n (%)	0 (0.0)	24 (42.0)
Hematoma localization – fundal, n (%)	0 (0.0)	10 (17.5)
Hematoma localization – posterior, n (%)	0 (0.0)	12 (21.0)
Hematoma localization – cervical, n (%)	0 (0.0)	11 (19.3)
Progesterone use, n (%)	32 (9.1)	9 (15.8)
LMWH use, n (%)	16 (4.6)	2 (3.5)
Aspirin use, n (%)	6 (1.7)	1 (1.8)
No medication, n (%)	296 (84.6)	45 (78.9)

Delivery characteristics

The mode of delivery is presented in Table 3. Vaginal delivery was the predominant mode of childbirth in both groups, although cesarean section was more frequently performed in women with first-trimester bleeding.

Table 3. Mode of delivery

Parameter	Control group (n = 350)	First-trimester bleeding group (n = 57)
Vaginal delivery, n (%)	282 (80.6)	41 (71.9)

Cesarean section, n (%)	68 (19.4)	16 (28.1)
-------------------------	-----------	-----------

Pregnancy outcomes

Pregnancy outcomes are summarized in Table 4. Early pregnancy loss was observed more frequently in the first-trimester bleeding group. The incidence of fetal growth restriction, preterm birth, preeclampsia, placental abruption, and gestational diabetes mellitus was comparable between groups. No cases of intrauterine fetal death were reported in the bleeding group.

Table 4. Pregnancy outcomes

Outcome	Control group (n = 350)	First-trimester bleeding group (n = 57)
Early pregnancy loss, n (%)	12 (3.4)	5 (8.8)
Fetal growth restriction, n (%)	11 (3.1)	2 (3.5)
Preterm birth, n (%)	32 (9.1)	5 (8.8)
Preeclampsia, n (%)	26 (7.4)	5 (8.8)
Placental abruption, n (%)	3 (0.9)	1 (1.8)
Gestational diabetes mellitus, n (%)	17 (4.9)	3 (5.3)
Intrauterine fetal death, n (%)	2 (0.6)	0 (0.0)

Discussion: First-trimester vaginal bleeding is a common obstetric complication and has been increasingly recognized as a potential marker of adverse pregnancy outcomes, particularly fetal growth restriction (FGR). “Although previous studies suggest that early pregnancy bleeding and subchorionic hematoma may reflect placental dysfunction, the findings of the present study did not demonstrate a significant increase in fetal growth restriction or other placental-mediated adverse outcomes in pregnancies progressing beyond the first trimester. Abnormal trophoblastic invasion has been proposed as a possible mechanism linking early bleeding to adverse outcomes such as fetal growth restriction; however, this association was not confirmed in the present cohort (Saraswat et al., 2010; Karimi et al., 2024).

Several studies have demonstrated that the presence and characteristics of SCH influence pregnancy outcomes, with larger or persistent hematomas being associated with an increased risk of FGR and other placental-mediated complications (Günay et al., 2021; Pan et al., 2023; Lou et al., 2025). However, the literature remains heterogeneous, as some systematic reviews have reported no significant association between first-trimester SCH and adverse perinatal outcomes, possibly due to differences in study design, population characteristics, and assessment of hematoma features (Yan et al., 2022).

Overall, first-trimester vaginal bleeding appears to be an early indicator of placental pathology and warrants careful antenatal surveillance. Further prospective studies with standardized definitions are needed to clarify causal relationships and optimize clinical management.

Overall, first-trimester vaginal bleeding may represent a clinical marker warranting careful antenatal surveillance, even though most pregnancies progressing beyond the first trimester have favorable outcomes.

Conclusion

First-trimester vaginal bleeding was associated with an increased risk of early pregnancy loss and a higher rate of cesarean delivery. However, in pregnancies that progressed beyond the

first trimester, early bleeding was not associated with a significant increase in fetal growth restriction or other major adverse pregnancy outcomes. These findings suggest that first-trimester bleeding alone does not necessarily predict impaired fetal growth, despite previous studies reporting an association between subchorionic hematoma and fetal growth restriction

References

- Günay T, Yardımcı OD. How does subchorionic hematoma in the first trimester affect pregnancy outcomes? Arch Med Sci. 2021;17(2):457–463. doi:10.5114/AOMS/113645
- Pan S, Lan Y, Zhou Y, Chen B, Zhou F, Dai D, et al. Associations between the size and duration of asymptomatic subchorionic hematoma and pregnancy outcomes in women with singleton pregnancies. BMC Pregnancy Childbirth. 2023;23:531. doi:10.1186/s12884-023-05831-y
- Lou Y, Chen G, Wang L, Zhao X, Ma J. A nomogram for predicting the risk of fetal growth restriction in singleton pregnancies with subchorionic hematomas detected in the first trimester. BMC Pregnancy Childbirth. 2025;25:124. doi:10.1186/s12884-025-07241-8
- Yan XY, Xu H, Li J, Xu Z, Niu Y, Wang Y. Subchorionic hematoma and risk of preterm delivery: A systematic review and meta-analysis. Am J Obstet Gynecol MFM. 2022;4(6):100791. doi:10.1016/j.ajogmf.2022.100791
- 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):245–257. doi:10.1111/j.1471-0528.2009.02427.x
- Karimi A, Sayehmiri K, Vaismoradi M, Dianatinasab M, Daliri S. Vaginal bleeding in pregnancy and adverse clinical outcomes: A systematic review and meta-analysis. J Obstet Gynaecol. 2024;44(2). doi:10.1080/01443615.2023.2288224
- Kamble PD, Bava A, Shukla M, Nandanvar YS. First trimester bleeding and pregnancy outcome. Int J Reprod Contracept Obstet Gynecol. 2017;6(4):1482–1487. doi:10.18203/2320-1770.IJRCOG20171414
- Sengodan SS, Dhanapal M, Subramanian V. Pregnancy outcome in first trimester bleed. Indian J Appl Res. 2016;6(8):27–29.