

FIRST TRIMESTER VAGINAL BLEEDING: A RADIOLOGIST'S PERSPECTIVE USING TRANSABDOMINAL AND TRANSVAGINAL SONOGRAPHY

Manisha Garg¹, Puran², Arun kumar Gaur³, Vijay Kulshrestha⁴

Received : 19/05/2025
Received in revised form : 06/07/2025
Accepted : 26/07/2025

Keywords:
Ultrasound, First trimester, Vaginal bleeding, Pregnancy viability, Transvaginal sonography.

Corresponding Author:
Dr. Manisha Garg,
Email: manishagarg70@gmail.com

DOI: 10.47009/jamp.2025.7.4.168

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2025; 7 (4); 896-900



¹Resident, Department of Radiodiagnosis, GS Medical College & Hospital, Pilkhuwa, Uttar Pradesh, India.

²Assistant Professor, Department of Radiodiagnosis, GS Medical College & Hospital, Pilkhuwa, Uttar Pradesh, India.

³Associate Professor, Department of Radiodiagnosis, GS Medical College & Hospital, Pilkhuwa, Uttar Pradesh, India.

⁴Department of Radiodiagnosis, GS Medical College & Hospital, Pilkhuwa, Uttar Pradesh, India.

ABSTRACT

Background: Vaginal bleeding during the first trimester is a common obstetric emergency, with a broad range of underlying causes such as threatened abortion, ectopic pregnancy, and gestational trophoblastic disease. Early diagnosis is vital for maternal and fetal outcomes. Ultrasonography (USG), particularly transvaginal sonography (TVS), plays a pivotal role in identifying the cause and guiding clinical management. **Materials and Methods:** This prospective cross-sectional study was conducted at GS Medical College and Hospital, Pilkhuwa, on 150 pregnant women with gestational age less than 12 weeks presenting with vaginal bleeding. Ultrasound evaluation was performed using transabdominal and transvaginal probes. Imaging findings were correlated with clinical diagnosis and outcomes. **Result:** Among the 150 cases, the majority were aged 20–30 years (64%). The most frequent cause was spontaneous abortion (61.3%), followed by ectopic pregnancy (18%) and physical effort (5.3 %). Ultrasound findings included incomplete abortion (39 cases), threatened abortion (44 cases), and ectopic gestation (26 cases). Viable pregnancies were noted in 63 patients, while 87 were non-viable. No significant association was found between bleeding intensity and pregnancy viability ($p=0.383$). Adnexal findings and gestational age showed no statistically significant correlation with outcome. **Conclusion:** Ultrasound, especially TVS, is a highly sensitive and reliable modality for evaluating first-trimester vaginal bleeding. It aids in early diagnosis and categorization of viable vs. non-viable pregnancies. However, clinical symptoms and bleeding severity alone are insufficient for outcome prediction, underscoring the importance of imaging in patient management.

INTRODUCTION

Vaginal bleeding during the first trimester of pregnancy is one of the most frequent causes of obstetric emergency referrals, affecting approximately 20–25% of clinically recognized pregnancies.^[1,2] It encompasses a wide spectrum of etiologies ranging from benign and self-limiting conditions such as implantation bleeding to more severe complications like spontaneous abortion, ectopic pregnancy, and gestational trophoblastic disease. Accurate identification of the underlying cause is essential for determining pregnancy viability and for instituting timely and appropriate clinical management.

Historically, diagnosis relied on clinical history and physical examination. However, these methods alone

are often inadequate in differentiating between viable and non-viable gestations. In modern obstetric imaging, ultrasonography—particularly transvaginal sonography (TVS)—has become the cornerstone for early pregnancy evaluation.^[3] It allows visualization of early gestational structures such as the gestational sac, yolk sac, fetal pole, and cardiac activity, facilitating early detection of normal and abnormal pregnancies.

Advances in ultrasound technology have made it possible to detect an intrauterine gestational sac as early as 29 to 35 days of gestation. Additionally, ultrasonographic signs such as the double decidual sac sign (DSS), intradecidual sign, and measurement criteria like mean sac diameter (MSD) and crown-rump length (CRL) serve as vital parameters for pregnancy dating and viability assessment.^[4,5]

The differential diagnosis of first-trimester bleeding is extensive and includes threatened abortion, incomplete or missed abortion, anembryonic pregnancy, ectopic gestation, gestational trophoblastic disease, and subchorionic hemorrhage. Some of these conditions, such as ectopic pregnancy and molar pregnancy, may be life-threatening if undiagnosed. Therefore, accurate sonographic evaluation is essential to guide clinical decision-making and reduce maternal morbidity and mortality.^[6]

This study was undertaken to systematically evaluate the sonographic findings in pregnant women presenting with first-trimester bleeding and to determine the correlation of these findings with clinical outcomes.

Aim and Objectives

1. To document the various ultrasound findings in patients presenting with first-trimester vaginal bleeding.
2. To assess the percentage of cases with favorable versus adverse outcomes.
3. To compare our findings with other studies done in India and abroad.

MATERIALS AND METHODS

This prospective cross-sectional study was conducted at the Department of Radiodiagnosis, GS Medical College and Hospital, Pilkhuwa, District Hapur, Uttar Pradesh, India. A total of 150 pregnant women with gestational age less than 12 weeks presenting with per vaginal bleeding were included in the study over a period of 15–18 months (May 2023 to November 2024) after obtaining written informed consent.

Inclusion criteria included all pregnant women in the first trimester (less than 12 weeks) presenting with vaginal bleeding. Patients with bleeding unrelated to pregnancy or those beyond 12 weeks of gestation were excluded from the study.

All patients underwent detailed clinical assessment including menstrual history, obstetric history, and associated symptoms like pain or nausea. General and systemic examinations were performed to assess hemodynamic stability.

Ultrasonography was performed using the following ultrasound systems:

- Voluson P8 (Serial No. VP8803805), WIPRO GE HEALTHCARE Pvt. Ltd., INDIA
- Versana Logic F6 (Serial No. 613195WXO), WIPRO GE HEALTHCARE Pvt. Ltd., INDIA
- Logic V5 (Serial No. 524859WXI), WIPRO GE HEALTHCARE Pvt. Ltd., INDIA

A standardized imaging protocol was followed using transabdominal sonography (TAS) with a 2–5 MHz curvilinear probe and transvaginal sonography (TVS) using a high-frequency 5–9 MHz transvaginal probe. TAS was performed with a full bladder to evaluate the uterus, adnexa, and free fluid. TVS was used after bladder evacuation for detailed imaging of

gestational sac, yolk sac, fetal pole, and cardiac activity.

The ultrasound assessment included documentation of

- Gestational sac location, shape, size, and double decidual sign
- Yolk sac and fetal pole visualization
- Crown-rump length (CRL) and fetal heart rate (FHR)
- Presence of subchorionic hemorrhage or retained products
- Identification of adnexal masses or free fluid in pouch of Douglas
- Features suggestive of ectopic or molar pregnancy

Data were recorded in a structured proforma. Pregnancy outcomes were categorized as viable or non-viable based on sonographic and clinical correlation.

Ethical clearance was obtained from the Institutional Ethics Committee of GS Medical College and Hospital prior to the initiation of the study. All imaging was performed by trained radiologists. No financial burden was imposed on the patients.

RESULTS

Out of the 150 women who presented with first-trimester bleeding, abortion was the commonest aetiology (n = 92, 61.3 %), followed by ectopic pregnancy (n = 27, 18 %), bleeding precipitated by sexual intercourse (n = 13, 8.7 %), physical effort (n = 8, 5.3 %) and vesicular mole (n = 10, 6.7 %) as shown in figure 1.

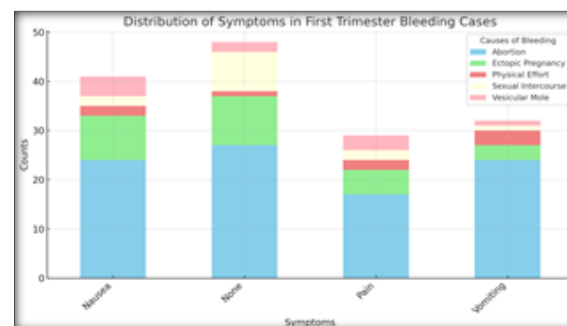


Figure 1: Distribution of Symptoms in First Trimester Bleeding Cases

Demographic profile: Most patients were 20–30 years old (n = 96, 64 %); adolescents < 20 years comprised 11.3 % (n = 17) and women > 30 years 24.7 % (n = 37). Nearly half were house-wives (n = 70, 46.7 %), while teachers (n = 23, 15.3 %) and students (n = 19, 12.7 %) formed the next largest occupational groups. Multiparous / multigravid women constituted 54.7 % (n = 82) of the cohort; primiparous / primigravid women accounted for the remaining 45.3 % (n = 68).

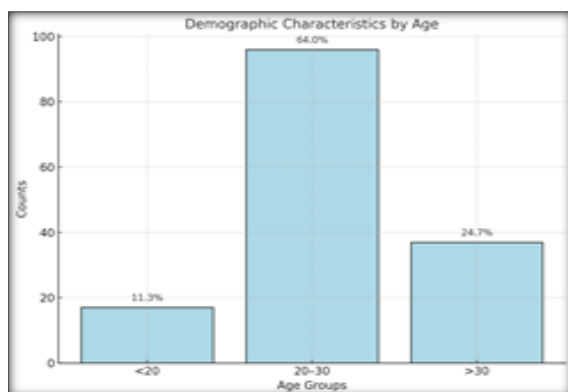


Figure 2: Demographic Characteristics by Age

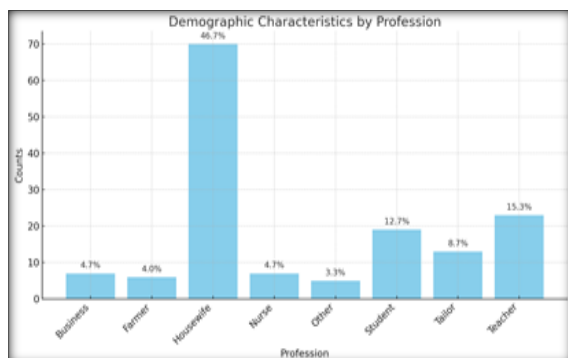


Figure 3: Demographic Characteristics by Profession

Presenting symptoms: Pain abdomen was the leading complaint ($n = 48$, 32 %), followed by nausea ($n = 41$, 27.3 %) and vomiting ($n = 32$, 21.3 %); 29 women (19.3 %) were asymptomatic. Within the abortion subgroup, pain (52.2 %) and nausea (44.6 %) predominated, whereas ectopic pregnancy most often manifested with pain alone.

Pattern and quantity of bleeding: Bleeding was spontaneous in 123 cases (82 %) and precipitated (caused) in 27 (18 %). Spotting was the commonest presentation ($n = 81$, 54 %), with light bleeding in 45 cases (30 %) and heavy bleeding in 24 (16 %).

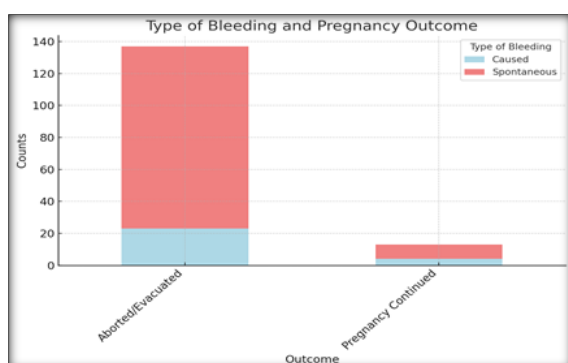


Figure 4: Type of Bleeding and Pregnancy Outcome

Gestational-age distribution: Forty-two women (28 %) presented at ≤ 7 weeks, 75 (50 %) between 8-10 weeks and 33 (22 %) at 10-12 weeks. Abortions clustered at 8-10 weeks (55.4 % of all abortions), while ectopic pregnancies were relatively more common after 10 weeks (40.7 %). Physical-effort-

related bleeding occurred mainly in the earliest gestational group (62.5 %).

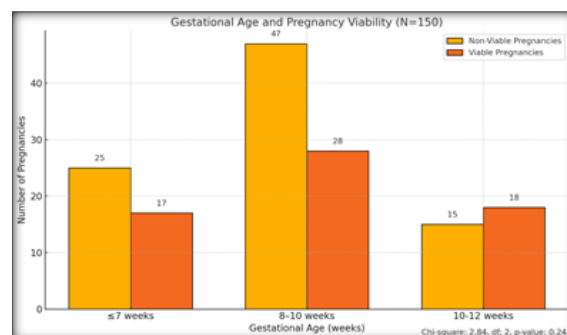


Figure 5: Gestational Age and Pregnancy Viability

Ultrasonographic profile: The two most frequent findings were threatened abortion ($n = 44$, 29.3 %) and incomplete abortion ($n = 39$, 26 %). Other sonographic patterns included ectopic gestation ($n = 26$, 17.3 %), anembryonic gestation ($n = 15$, 10 %), missed abortion ($n = 12$, 8 %), molar pregnancy ($n = 7$, 4.7 %) and complete abortion ($n = 7$, 4.7 %).

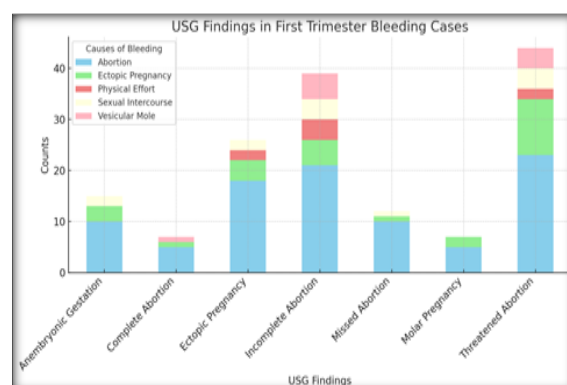


Figure 6: USG Findings in First Trimester Bleeding Cases

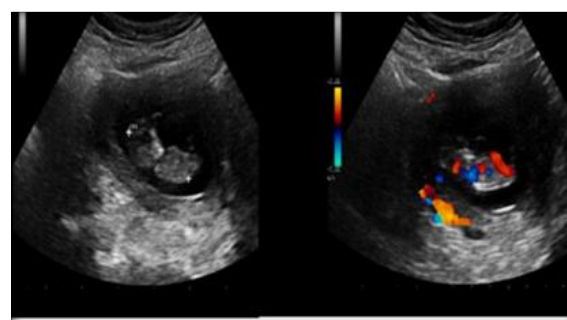


Figure 7: USG image for Threatened Abortion



Figure 8: USG image for Incomplete Abortion

Adnexal findings: A complete adnexal mass was documented in 100 scans (66.7 %), while an adnexal gestational sac was seen in 28 (18.7 %). A live adnexal embryo ($n = 6$, 4 %), a fetal pole in the adnexa ($n = 11$, 7.3 %) and normal adnexa ($n = 5$, 3.3 %) completed the spectrum.

Pregnancy viability and outcome: At initial assessment, 63 pregnancies (42 %) were viable and 87 (58 %) non-viable. Ultimately, 137 pregnancies (91.3 %) ended in abortion or surgical evacuation, whereas 13 (8.7 %) continued beyond the first trimester. Spontaneous bleeding carried a 92.7 % evacuation rate compared with 85.2 % for caused bleeding. Neither symptom pattern, heaviness of bleeding, gestational age nor specific ultrasound category showed a clinically meaningful relation to viability or final outcome.

Key observation: The distribution of bleeding aetiologies differed significantly across gestational-age groups, highlighting a multifactorial interplay between timing of presentation and underlying cause; other clinical and sonographic variables proved of limited prognostic value in this cohort.

DISCUSSION

The present prospective, cross-sectional study evaluated 150 women presenting with first-trimester vaginal bleeding and was designed to delineate the etiological spectrum, ultrasonographic (USG) appearances and short-term pregnancy outcomes. Most patients were aged 20–30 years (64 %), mirroring the reproductive-age peak reported by Shivanagappa et al.^[7] Housewives constituted nearly half of the cohort (46.7 %), followed by teachers (15.3 %) and students (12.7 %), a distribution consistent with the rural–semi-urban socioeconomic profile seen in earlier Indian series. Multiparity and multigravidity were slightly more common (54.7 % each) and have likewise been associated with increased obstetric complications in prior reports.^[7,8] Clinical presentation Nausea, pain and vomiting were the dominant symptoms but showed no significant association with the underlying cause of bleeding ($\chi^2 = 3.14$; $p = 0.374$) or with pregnancy viability ($\chi^2 = 0.22$; $p = 0.974$). Similar non-discriminatory trends have been noted by Paspulati et

al., underscoring the limited standalone value of symptomatology in first-trimester risk stratification. Etiological profile Abortion was the commonest diagnosis (92/150; 61.3 %), with incomplete (42.4 %) and threatened (47.8 %) variants predominating. Ectopic pregnancy accounted for 18 %, while molar gestation and miscellaneous causes were infrequent. A statistically significant relationship existed between cause of bleeding and gestational-age bracket ($\chi^2 = 23.3$; $p = 0.003$), mirroring the temporal clustering of ectopic pregnancies before 10 weeks documented by Thobbi et al.^[9]

Ultrasound findings Incomplete abortion, threatened abortion and anembryonic gestation were the leading USG patterns. Nevertheless, USG category showed no significant correlation with pregnancy viability ($\chi^2 = 7.73$; $p = 0.259$) or ultimate outcome ($\chi^2 = 6.45$; $p = 0.375$). Likewise, adnexal masses or gestational sacs—though pivotal for diagnosing ectopic pregnancy—did not independently predict outcome ($\chi^2 = 2.40$; $p = 0.663$). Spontaneous bleeding predominated (82 %), yet bleeding type, heaviness and gestational age did not exhibit significant interdependencies, reinforcing the multifactorial nature of early-pregnancy bleeding.

Collectively, these observations concur with much of the contemporary literature but highlight the persisting diagnostic grey zone in early-pregnancy haemorrhage. While high-resolution USG remains indispensable for rapid classification of bleeding aetiology, its prognostic performance for pregnancy continuation is inherently limited when used in isolation.

CONCLUSION

Ultrasonography is the first-line, non-invasive modality for evaluating first-trimester vaginal bleeding, accurately differentiating abortion subtypes, ectopic gestations and trophoblastic disease. In the present cohort, abortion—predominantly incomplete and threatened—was the chief aetiology, and spontaneous bleeding the most frequent presentation. Although key demographic trends (age 20–30 years, multiparity) and USG patterns were identified, neither bleeding severity, symptom complex nor isolated sonographic signs reliably predicted pregnancy viability. These findings endorse a composite clinical approach in which USG is interpreted alongside gestational age, biochemical markers and patient history to optimise counselling and management. Larger, multicentric studies integrating serial imaging and quantitative biomarkers are warranted to refine viability prediction models in early-pregnancy bleeding.

Acknowledgments

We would like to express our sincere gratitude to the Department of Radiodiagnosis, GS Medical College and Hospital, Pilkhuwa, for their support during the course of this study. We also extend our appreciation to all the patients who participated in the study.

Conflict of Interest Statement

No conflict declared.

REFERENCES

1. Deutchman M, Tubay AT, Turok D. First trimester bleeding. *Am Fam Physician*. 2009;79(11):985-94.
2. Kaplan BC, Dart RG, Moskos M, Kuligowska E, Chun B, Adel Hamid M, et al. Ectopic pregnancy: prospective study with improved diagnostic accuracy. *Ann Emerg Med*. 1996;28(1):10-7.
3. Eduwen D, Uduma F, Okere P, Abasiattai A, Ezirim E. Obstetric sonography in first trimester bleeding (A single institution study). *Merit Research Journal of Medicine and Medical Sciences*. 2016; 4:356-62.
4. Murugan VA, Murphy BO, Dupuis C, Goldstein A, Kim YH. Role of ultrasound in the evaluation of first-trimester pregnancies in the acute setting. *Ultrasonography*. 2020;39(2):178-89.
5. Mantsevich SN, Yushkov KB. Optimization of piezotransducer dimensions for quasicollinear paratellurite AOTF. *Ultrasonics*. 2021; 112:106335.
6. Timor-Tritsch IE, Yeh MN, Peisner DB, Lesser KB, Slavik TA. The use of transvaginal ultrasonography in the diagnosis of ectopic pregnancy. *Am J Obstet Gynecol*. 1989;161(1):157-61.
7. Shivanagappa M, Sagar SG, Manoli N. Ultrasound evaluation of vaginal bleeding in first trimester of pregnancy: a comparative study with clinical examination. *International journal of scientific study*. 2015;3(7):202-6.
8. Matthias I, Panebianco NL, Maltenfort MG, Dean AJ, Baston C. Effect of Machine Settings on Ultrasound Assessment of B-lines. *J Ultrasound Med*. 2020;40(10):2039-46.
9. Thobbi V, Gururaj Deshpande GD, Afreen U, Ruma Nooreen RN. Ultrasonographic evaluation of first trimester vaginal bleeding. *Al Ameen Journal of Medical Sciences*. 9(2):107-11.