Section: Radiodiagnosis

Original Research Article

ROLE OF ULTRASONOGRAPHY IN FIRST TRIMESTER VAGINAL BLEEDING- A CROSS SECTIONAL STUDY

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ABSTRACT

Background: Aim: The aim of this study was to evaluate the role of ultrasonography in the diagnosis of patients presenting with bleeding per vagina in the first trimester of pregnancy, to evaluate the various causes that could lead to first-trimester vaginal bleeding and to correlate the findings on ultrasonography with clinical examination findings of patients with vaginal bleeding.

Materials and Methods: This cross-sectional study was conducted at the Department of Radiodiagnosis at Rohilkhand Medical College & Hospital, Bareilly, over a one-year period. The study population encompassed sixty-two female patients referred from the Department of Obstetrics and Gynecology at Rohilkhand Medical College who experienced vaginal bleeding during the first trimester of pregnancy (less than fourteen completed week of gestation) and provided informed consent for undergoing detailed ultrasound examinations. Patients with vaginal bleeding attributed to non-obstetric causes during pregnancy were excluded from the study, thereby maintaining the homogeneity and clinical relevance of the research sample.

Results: In this study, the data show that threatened abortion was the most common diagnosis, accounting for 69.3% of clinical diagnoses and 66.1% of USG diagnoses, with a minor discrepancy of 4.8% between the two methods. Incomplete abortion also featured prominently, with clinical diagnoses at 25.8% and USG diagnoses at 24.2%, showing a slight difference of 6.66%. Missed abortion increased from 1.6% in clinical diagnoses to 4.8% in USG diagnoses, highlighting the significant role of USG in refining clinical impressions, with a large discrepancy of 66.6%. Complete abortion showed similar percentages for both clinical and USG diagnoses, each at 1.6%. Ectopic gestation remained consistent across both diagnostic methods at 1.6%. Notably, anembryonic gestation was not identified clinically but was detected on USG, resulting in a 100% discrepancy between the two methods.

Conclusion: This study underscores the critical role of ultrasonography as a diagnostic tool in managing first-trimester vaginal bleeding. By providing detailed and accurate insights into the underlying causes, ultrasonography significantly enhances diagnostic accuracy compared to clinical evaluation alone. Conditions such as threatened abortion, incomplete abortion, and anembryonic gestation were more precisely identified through ultrasound, facilitating timely and appropriate management.

Keywords: Vaginal bleeding; Clinical diagnosis; Ultrasound diagnosis; First trimester; Abortion

INTRODUCTION

Vaginal bleeding is a common issue encountered in emergency departments during the first trimester of pregnancy. This early stage is a sensitive period with a higher likelihood of pregnancy loss. Studies indicate that roughly half of those who seek emergency care for first-trimester bleeding

experience a spontaneous abortion, also known as miscarriage.[1] Vaginal bleeding in the first trimester of pregnancy is a notable concern for patients and healthcare providers, with its prevalence estimated to be between 7% and 24%.[2] This notable prevalence underscores how common this concern is among pregnant individuals. Understanding the pregnancy outcome following first-trimester vaginal bleeding is essential for both the patient and the healthcare provider, as it helps guide appropriate prenatal care and early interventions aimed at reducing maternal and postnatal complications.[2,3,4]

Among all clinically recognized pregnancies, an estimated 10% to 20% result in early pregnancy loss. However, the actual rate of spontaneous loss is likely higher, as many miscarriages go unnoticed and are misinterpreted as late or heavy menstrual bleeding.[5] Furthermore, 12% to 57% of pregnancies complicated by first-trimester bleeding ultimately result in miscarriage.[6]

While the term "spontaneous abortion" was traditionally used to refer to a natural miscarriage occurring before 20 weeks of gestation, recent trends in medical literature favor the term "miscarriage."[7] The American College of Obstetricians and Gynecologists (ACOG) has updated its reVITALize gynecology definitions to recommend using the terms “miscarriage” or “intrauterine pregnancy loss.” This change has been supported by several professional organizations in the United States, including the American Academy of Nurse-Midwifes and the American Academy of Family Physicians. Both terms refer to the same event: the termination of an intrauterine pregnancy determined to be nonviable.[8]

The symptoms of a miscarriage can vary depending on its type or stage. In cases of asymptomatic miscarriage, the first noticeable sign may be the sudden disappearance of typical pregnancy symptoms, such as nausea or fatigue.[9] In cases of threatened, incomplete, or complete pregnancy loss, patients may experience symptoms like vaginal bleeding and pelvic cramps. In cases of septic miscarriage, additional symptoms may include uterine pain, purulent vaginal or cervical discharge, and, in severe cases, systemic symptoms such as fever, hypotension, and tachycardia.[10]

Differentiating between viable and nonviable pregnancies, as well as ruling out other conditions like pregnancy complications or pelvic infections, typically begins with comprehensive clinical history and examination, including abdominal and pelvic assessment, pelvic ultrasound & quantitative serum β-hCG levels.[11]

The differential diagnosis of vaginal bleeding in the first trimester includes several potential causes like ectopic pregnancy, subchorionic hematoma, gestational trophoblastic disease, Implantation or idiopathic bleeding, missed abortion, threatened abortion, Complete abortion, Incomplete abortion, Blighted ovum, Arteriovenous malformation each requiring careful consideration.

The use of ultrasonography has greatly enhanced the ability to diagnose these conditions, particularly during the first 14 weeks after conception. A first-trimester ultrasound, often performed by a healthcare professional or obstetrician as part of routine prenatal care, can help identify the underlying cause of abnormalities such as vaginal bleeding or the possible passage of foetal remains.[12]

In daily obstetric practice bleeding in early pregnancy is a common event that frequently heralds an abnormality interrupting the normal development of early gestation and a limited amount of studies have been done on this topic in this demographic region.

This study was aimed to find these various abnormalities leading to first-trimester vaginal bleeding in this demographic region. The study also aimed to compare the finding of clinical and pelvic examinations with that of ultrasonography.

MATERIALS AND METHODS

This study was a cross-sectional design conducted in the Department of Radiodiagnosis at Rohilkhand Medical College & Hospital, Bareilly. The study lasted for one year, starting from the time of approval by the Research and Ethics Committee. The study population encompassed female patients referred from the Department of Obstetrics and Gynecology at Rohilkhand Medical College, specifically those who exhibited vaginal bleeding in the early stages of pregnancy. The sample size for the study was calculated to consist of 62 patients. Simple random sampling was used to select participants, ensuring an unbiased sample. Data collection was done using a study proforma, which was used to document relevant information from the participants.

Inclusion Criteria

The study enrolled female patients who experienced vaginal bleeding during the first trimester of pregnancy (less than fourteen completed week of gestation) and provided informed consent for undergoing detailed ultrasound examinations.

Exclusion Criteria

Patients with vaginal bleeding attributed to non-obstetric causes during pregnancy were excluded from the study, thereby maintaining the homogeneity and clinical relevance of the research sample.

Equipment Utilization

Samsung V7, Samsung HS 70, and Samsung HS 40 ultrasound models, equipped with 3-5MHz curvilinear probes, were utilized for conducting ultrasound scans. Transvaginal ultrasonography, employing 7.5-12 MHz transvaginal probes, was employed selectively when trans-abdominal ultrasound findings necessitated further clarity or confirmation.

Ultrasonography Protocol

Each participant in the study underwent a structured ultrasonographic examination protocol, beginning with obtaining comprehensive informed consent. The initial assessment included trans-abdominal ultrasonography using a curvilinear array transducer. If the initial scan results were unclear or inconclusive, transvaginal ultrasonography was then performed. The examination documented critical parameters such as the location and presence of the gestational sac, foetal development milestones (including visualization of the foetal pole and measurement of crown-rump length), foetal cardiac activity, foetal movements, and any peritoneal fluid.

Data collection followed a consecutive, exhaustive non-probabilistic sampling method, drawing from the radiologist's reports and patient request forms. The variables studied included age, socioeconomic status (assessed using the modified Kuppuswamy scale), bleeding intensity, ultrasound findings, and the concordance rate between clinical and ultrasound diagnoses.

During the ultrasound, the following parameters were recorded: uterine size, gestational sac location and size, crown-rump length (CRL), cardiac activity, foetal movements, foetal pole presence, adnexal assessment, and the presence of free fluid in the cul-de-sac.

Ultrasonographic Parameters Assessed:

- Gestational Sac: Location, size, and viability.
- Fatal Pole: Presence or absence.
- Cardiac Activity: Detected using Doppler in viable pregnancies.
- Adnexa: Any evidence of ectopic pregnancy or adnexal masses.
- Subchorionic Hematoma: Size and extent.
- Fluid in the Pouch of Douglas: Presence or absence.

Statistical Analysis

All collected data were meticulously entered into SPSS (Statistical Package for Social Sciences) Version 23.0 for comprehensive statistical analysis. Descriptive statistical measures such as proportions, means, and standard deviations were calculated to provide a detailed overview of the study cohort. Furthermore, appropriate statistical tests were applied to discern significant correlations and associations, with a predefined significance level set at $p < 0.05$ to guide the interpretation of findings and ensure statistical rigor in drawing conclusions.

RESULTS

Age Group Distribution

The breakdown of patients by age group was as follows: 7 patients (11.3%) in the 18-20 age range, 25 patients (40.3%) in the 20-25 range, 20 patients (32.3%) in the 25-30 range, and 10 patients (16.1%) in the 30-35 range, with a total of 62 patients. This suggests that age may play a role in the likelihood of first trimester vaginal bleeding, with the 20-25 age group having the highest frequency.

Socioeconomic Status

The data reveals that the majority of patients, 51 patients (82.2%), belonged to a low socioeconomic status, while 7 patients (11.2%) were from an intermediate socioeconomic status, and only 4 patients (6.6%) came from a high socioeconomic status, out of a total of 62 participants. This indicates that most of the patients in the study came from low socioeconomic backgrounds, which may suggest a higher vulnerability to complications due to potential poverty and lack of resources.

Clinical Features

The majority of patients (71.0%) experienced bleeding for 4-6 days, with an average duration of 4.45 days and a standard deviation of 1.55. Abdominal pain was reported by 67.7% of the patients. In terms of amenorrhea, the most common duration was 4-6 weeks, reported by 43.5% of participants, with a mean duration of 6.56 weeks and a standard deviation of 2.12. These results highlight a typical pattern of early pregnancy complications, characterized by bleeding lasting a few days, often accompanied by abdominal pain, and typically occurring within the first 6-8 weeks of pregnancy.

Clinical Examination

Uterine sizes were categorized at 6, 8, 10, and 12 centimetres, with the most common size being 10 cm, observed in 32.3% of the cases, and an overall mean size of 9.29 cm with a standard deviation of 2.05. Regarding cervical status, 79.0% of patients had a closed cervix, which is significant as it may indicate an ongoing pregnancy or a delayed miscarriage. Concerning the fornices, 85.5% were free, suggesting a lower likelihood of infection or extensive pathology, while 14.5% were tender, possibly indicating inflammation or ectopic pregnancy. These findings provide valuable insights into the assessment of first trimester vaginal bleeding and help guide clinical management through ultrasonographic evaluations.

Ultrasound findings

The presence of a gestational sac was the most common finding, observed in 56.45% of the cases. Fetal node and fetal cardiac activity were seen in 38.7% and 30.6% of the cases, respectively, indicating varying stages of embryonic development. The yolk sac and Subchorionic bleed were identified in 21.6% and 9.7% of the cases, respectively, which may offer insights into early pregnancy status and potential complications. In terms of amniotic fluid, 'Normal' was most frequently reported at 53.2%, while 'Absent' was significant in 41.9%, suggesting critical conditions affecting pregnancy viability. Concerning the placenta, the majority (88.7%) showed no visible placenta at the time of the scan, with a small percentage indicating the location of the placenta (fundal, anterior, or posterior), which are essential

factors for monitoring the pregnancy's health and outcomes.

Clinical Diagnosis vs Ultrasound Diagnosis

The data show that threatened abortion was the most common diagnosis, accounting for 69.3% of clinical diagnoses and 66.1% of USG diagnoses, with a minor discrepancy of 4.8%. Incomplete abortion also featured prominently, with clinical diagnoses at 25.8% and USG diagnoses at 24.2%, showing a slight difference of 6.66%. Missed abortion increased from 1.6% in clinical diagnoses to 4.8% in USG diagnoses, highlighting the significant role of USG in refining clinical impressions, with a large discrepancy of 66.6%. Complete abortion showed similar percentages for both clinical and USG diagnoses, each at 1.6%. Ectopic gestation remained consistent across both diagnostic methods at 1.6%. Notably, anembryonic gestation was not identified clinically but was detected on USG, resulting in a 100% discrepancy between the two methods. These findings emphasize the crucial role of ultrasonography in refining clinical assessments and improving diagnostic accuracy in managing first trimester vaginal bleeding.

Table 1: Age Group

Age group	Frequency	% of Total
18-20	7	11.3 %
20-25	25	40.3 %
25-30	20	32.3 %
30-35	10	16.1 %
Total	62	100.0%

Table 2: Distribution of subjects according to socioeconomic status

Socioeconomic status	No. of cases	Percentage
Low	51	82.2%
Intermediate	7	11.2%
High	4	6.6%

Table 3: Distribution of subjects according to presenting complaints

Duration of bleeding (days)	Frequency	% of Total
1-3	14	22.6 %
4-6	44	71.0 %
7-9	4	6.5 %
Mean ± SD	4.45 ± 1.55	
Duration of amenorrhea (weeks)		
4-6	27	43.5 %
6-8	18	29.0 %
8-10	12	19.4 %
10-12	5	8.1 %
Mean ± SD	6.56 ± 2.12	
Pain in abdomen	42	67.7 %

Table 4: Distribution of subjects according to clinical examination (N=62)

Uterine size	Frequency	% of Total
6	10	16.1 %
8	17	27.4 %
10	20	32.3 %
12	15	24.2 %
Mean ± SD	9.29 ± 2.05	
Status of cervix		
Open	13	21.0 %
Closed	49	79.0 %
Fornices		
Free	53	85.5 %
Tender	9	14.5 %

Table 5: Distribution of subjects according to ultrasonographic findings (N=62)

Ultrasonographic findings	Frequency	% of Total
Gestation sac	35	56.45 %
Fetal node	24	38.7 %
Fetal cardiac activity	19	30.6 %
Yolk sac	13	21.6 %
Subchorionic bleed	6	9.7 %
Liquor		
Normal	33	53.2 %
Less	3	4.8 %
Absent	26	41.9 %
Placenta		
Absent	55	88.7 %

Fundal	4	6.5 %
Anterior	1	1.6 %
Posterior	2	3.2 %

Table 6: Disparity between Clinical diagnosis, USG diagnosis ad final diagnosis (N=62)

Cases	Clinical Diagnosis		USG Diagnosis		Disparity	
	Frequency	% of Total	Frequency	% of Total	Frequency	% of Total
Incomplete Abortion	15	24.1 %	14	22.5 %	1	6.66 %
Missed Abortion	1	1.6 %	3	4.8 %	2	66.6 %
Threatened Abortion	42	67.7 %	40	64.5 %	2	4.8 %
Complete Abortion	1	1.6 %	1	1.6 %	0	0.00%
Ectopic Gestation	2	3.2 %	2	3.2 %	0	0.00 %
Hydatidiform Mole	1	1.6%	1	1.6%	0	0.00%
Anembryonic gestation	0	0.00%	1	1.6 %	1	100%

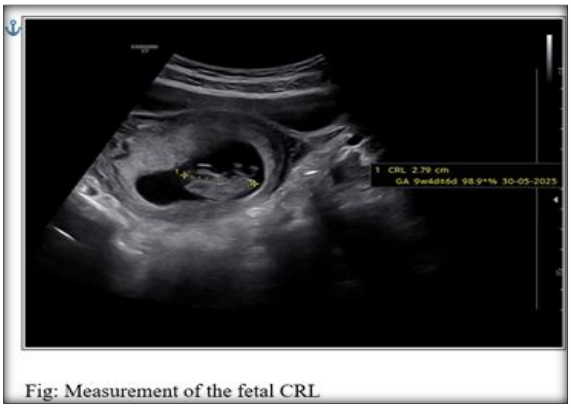

Fig: Measurement of the fetal CRL

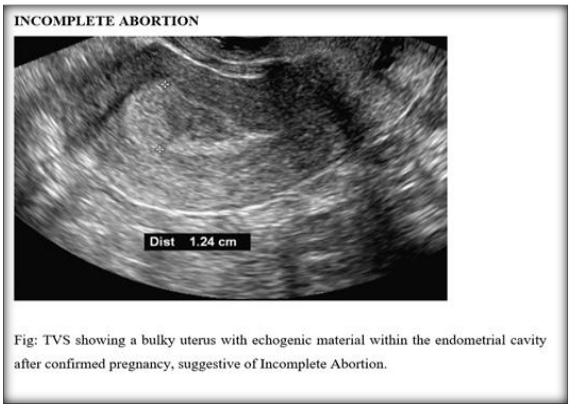

Fig: TVS showing a bulky uterus with echogenic material within the endometrial cavity after confirmed pregnancy, suggestive of Incomplete Abortion.

Fig: Subchorionic hemorrhage

Fig: TVS showing Bulky post-abortal uterus with no products of conception within

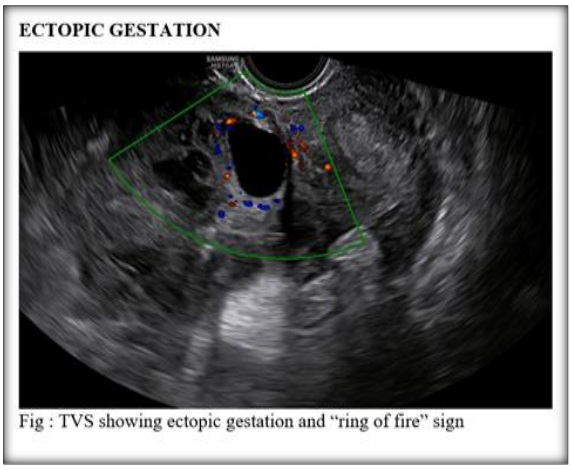

Fig : TVS showing ectopic gestation and "ring of fire" sign

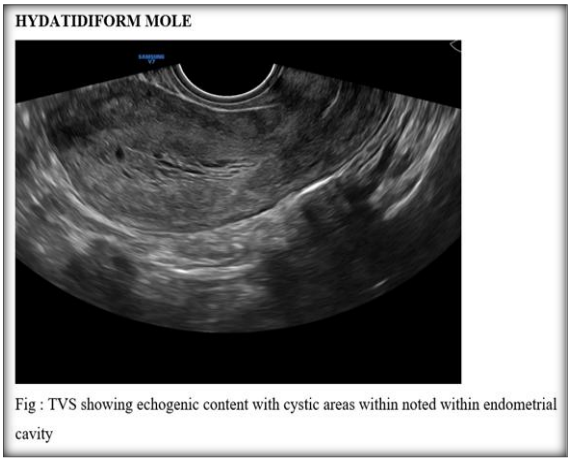

Fig : TVS showing echogenic content with cystic areas within noted within endometrial cavity

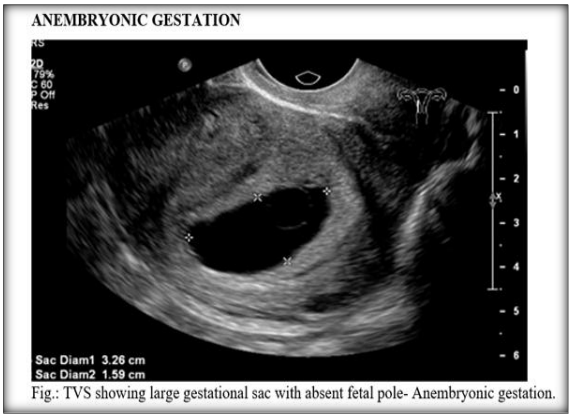

Fig.: TVS showing large gestational sac with absent fetal pole- Anembryonic gestation.

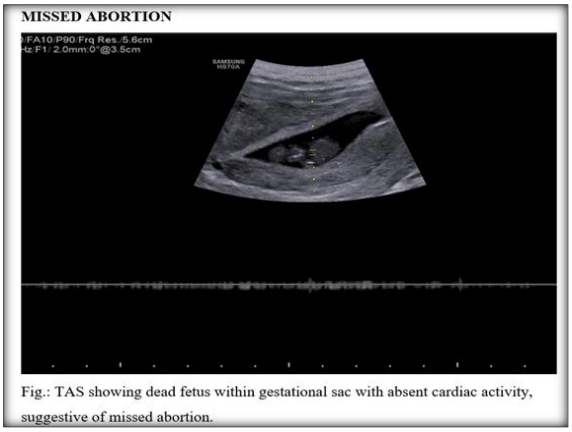

Fig.: TAS showing dead fetus within gestational sac with absent cardiac activity, suggestive of missed abortion.

DISCUSSION

This cross-sectional study, conducted at Rohilkhand Medical College and Hospital, analysed 62 patients presenting with first-trimester vaginal bleeding. Employing both trans-abdominal and transvaginal ultrasonography, the study assessed its diagnostic efficacy in comparison to clinical evaluations. The findings underscore the indispensable role of ultrasonography in diagnosing and managing complications of early pregnancy.

Age of the patients

In our study, the majority of participants (40.3%) were in the 20-25 years age group, followed by 32.3% in the 25-30 years group. The youngest participants, aged 18-20 years, constituted 11.3%, while the oldest group, aged 30-35 years, accounted for 16.1%.

Yadav et al.[13] reported that 48.4% of cases were in the 21-25 years age group, closely aligning with our finding of 40.3% in the 20-25 years group. They also observed 30% of cases in the 18-20 years group, higher than our finding of 11.3%, while 13.3% of their cases were in the 26-30 years group, lower than our 32.3%. Their mean age of 23.5 ± 3.74 years corresponds to the younger demographic observed in our study.

Socioeconomic status of patients.

The socioeconomic distribution in this study reveals that 82.2% of cases belonged to the low socioeconomic status (SES) group, while intermediate and high SES groups accounted for 11.2% and 6.6% of cases, respectively. This pattern highlights the influence of socioeconomic factors on healthcare access and the timely diagnosis of first-trimester vaginal bleeding.

Similar trends were observed by Borah et al.[14], who reported underutilization of ultrasonography among low SES populations due to financial and accessibility barriers.

Addressing these disparities is vital to improving healthcare outcomes for underserved populations.

Presenting Complaints

In our study, 71% of participants experienced bleeding for 4-6 days, followed by 22.6% with 1-3 days and 6.5% with 7-9 days. The mean bleeding duration was 4.45 ± 1.55 days. Amenorrhea most commonly lasted 4-6 weeks (43.5%), followed by 6-8 weeks (29%), 8-10 weeks (19.4%), and 10-12 weeks (8.1%), with a mean duration of 6.56 ± 2.12 weeks. Abdominal pain was reported by 67.7% of participants, making it a prominent symptom.

Borah et al.[14] reported a higher proportion of patients with amenorrhea of 8-12 weeks (83%), slightly later than our finding, where most patients had amenorrhea of 4-6 weeks. However, both studies identified pain as a common symptom, with Borah et al.[14] noting it in 58% of cases, aligning with our 67.7%.

These findings collectively highlight that first-trimester bleeding often occurs early in pregnancy, frequently accompanied by abdominal pain, with variations in bleeding duration and severity influenced by demographic or healthcare access differences. Such insights are crucial for clinicians in diagnosing and managing early pregnancy complications.

Clinical Examination

In our study, the most common uterine size among participants was 10 weeks (32.3%), followed by 8 weeks (27.4%), 12 weeks (24.2%), and 6 weeks (16.1%), with a mean size of 9.29 ± 2.05 weeks. The cervix was closed in 79% of cases and open in 21%, while the fornices were free in 85.5% of participants and tender in 14.5%. These findings highlight the importance of physical examination in assessing first-trimester vaginal bleeding.

Yadav et al.[13] reported similar results, with 68.3% of patients having a closed cervix and 31.7% an open cervix, comparable to our findings of 79% and 21%, respectively. Additionally, their study observed free fornices in 90% and tenderness in 10% of cases, aligning with our rates of 85.5% and 14.5%.

Ultrasonographic Findings

In our study, ultrasonography revealed a gestational sac in 56.45% of cases, fetal node in 38.7%, and fetal cardiac activity in 30.6%. The yolk sac was observed in 21.6%, while Subchorionic bleed was noted in 9.7%. Amniotic fluid assessment showed normal levels in 53.2% of cases, absent in 41.9%, and reduced in 4.8%. Placenta was absent in 88.7%, with the remainder located fundally (6.5%), posteriorly (3.2%), or anteriorly (1.6%).

Jagdeshwari,[15] reported Subchorionic hemorrhage in cases of threatened abortion, aligning with our 9.7% incidence. Their emphasis on fetal cardiac activity as a viability marker corresponds with our finding of 30.6%. Similarly, the presence of gestational sacs in 56.45% of our cases matches their findings. Our study confirms the reliability of ultrasonographic markers in diagnosing first-trimester complications, such as gestational sac presence, fetal cardiac activity, and Subchorionic hemorrhage, underscoring its importance in early pregnancy evaluation.

Disparity Between Clinical Diagnosis and USG Diagnosis

Diagnoses of conditions such as complete abortion, ectopic pregnancy, and hydatidiform mole demonstrate high agreement between clinical and USG evaluations. Cases like missed abortion and anembryonic gestation show significant differences, highlighting the importance of USG in detecting conditions that might be clinically overlooked. The findings emphasize the importance of integrating USG into diagnostic protocols to improve accuracy, especially for conditions with subtle or ambiguous clinical presentations. Yadav et al.[13] reported a notable difference between clinical and ultrasonographic (USG) diagnoses. For example, threatened abortion was clinically suspected in 48.3% of cases but confirmed by USG in only 29 cases (48.3%). Similarly, incomplete abortion was clinically diagnosed in 26.7% of cases, while USG confirmed only 17 cases (28.3%). These findings are consistent with our study, where incomplete abortion was diagnosed clinically in 25.8% of cases and confirmed by USG in 24.2%. The agreement between clinical and final diagnoses in our study was stronger for threatened abortion, with a similar 66.1% confirmed across both modalities, highlighting USG's reliability in confirming diagnoses.

CONCLUSION

This study highlights the vital role of ultrasonography in diagnosing and managing first-trimester vaginal bleeding, offering greater accuracy than clinical evaluation alone. Ultrasound enabled clearer identification of conditions like threatened abortion, incomplete abortion, and anembryonic gestation, with the greatest diagnostic discrepancies seen in incomplete abortion and anembryonic gestation. The study also revealed significant correlations between first-trimester bleeding and factors such as age and socioeconomic status, underlining the importance of focused care for at-risk populations. These findings support the routine use of ultrasound in early pregnancy assessment and call for larger, multicenter studies to further validate and expand upon these results.

REFERENCES

1. Dighe M, Cuevas C, Moshiri M, Dubinsky T, Dogra VS. Sonography in first trimester bleeding. J Clin Ultrasound. 2008;36(6):352-66.
2. Gupta N, Samariya M, Choudhary D, Yadav K, Kannoujiya P. Ultrasonographic evaluation of first trimester bleeding per vaginum. Int J Reprod Contracept Obstet Gynecol. 2016;5(9):3085-7.
3. Naskar A, Chowdhury R, Saha PK, Das RK. Evaluation of pregnancy outcome in women with first trimester vaginal bleeding: A longitudinal study at a tertiary care hospital, Kolkata, India. J Clin Diagn Res. 2022;16(9).
4. Benson LS, Holt SK, Gore JL, Callegari LS, Chipman AK, Kessler L, Dalton VK. Early pregnancy loss management in the emergency department vs outpatient setting. JAMA Netw Open. 2023;6(3): e232639.
5. Jackson T, Watkins E. Early pregnancy loss. JAAPA. 2021;34(3):22-7.
6. Prine LW, MacNaughton H. Office management of early pregnancy loss. Am Fam Physician. 2011;84(1):75-82.
7. Clement EG, Horvath S, McAllister A, Koelper NC, Sammel MD, Schreiber CA. The language of first-trimester nonviable pregnancy: Patient-reported preferences and clarity. Obstet Gynecol. 2019;133(1):149-54.
8. Sharp HT, Johnson JV, Lemieux LA, Currigan SM. Executive summary of the reVITALize initiative: Standardizing gynecologic data definitions. Obstet Gynecol. 2017;129(4):603-7.
9. Sapra KJ, Joseph KS, Galea S, Bates LM, Louis GM, Ananth CV. Signs and symptoms of early pregnancy loss. Reprod Sci. 2017;24(4):502-13.
10. Udoh A, Effa EE, Oduwole O, Okusanya BO, Okafo O. Antibiotics for treating septic abortion. Cochrane Database Syst Rev. 2016;7(7):CD011528.
11. Hendriks E, MacNaughton H, MacKenzie MC. First trimester bleeding: Evaluation and management. Am Fam Physician. 2019;99(3):166-74.
12. Lee WA, Nelson G, Grogan SP. Sonography 1st trimester assessment, protocols, and interpretation. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan.
13. Yadav V, Nagar A, Singh S, Lakhkar Guru B. Role of ultrasound in first trimester vaginal bleeding. Int J Med Pub Health. 2024;14(4):477-482.
14. Borah KK, Phukan P, Choudhary C. Bleeding per vaginum in first trimester of pregnancy-role of USG and its correlation with clinical assessment. J Med Sci Clin Res. 2016;4(2):9573-81.
15. Jagadeswari, Role of Ultrasound in Evaluation of Vaginal Bleeding in First Trimester of Pregnancy, J Res Med Dent Sci, 2021, 9(10): 274-276.