

Ultrasound Evaluation of Vaginal Bleeding in the First Trimester of Pregnancy: A Prospective Observational Study

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Abstract: This prospective observational study conducted at the MNR Medical College aimed to evaluate the effectiveness of ultrasonography in diagnosing the causes of first trimester vaginal bleeding and predicting pregnancy outcomes. The study included 100 antenatal women with first trimester bleeding, using both transabdominal and transvaginal ultrasound to assess the location and viability of pregnancies. Results indicated a high prevalence of nonviable pregnancies, with 58% showing irregular gestational sacs and only 11% having detectable fetal heart activity. Ultrasound proved highly sensitive and specific in diagnosing conditions like ectopic pregnancy and incomplete abortion. The findings underscore the critical role of ultrasonography in managing early pregnancy bleeding, highlighting its importance in guiding clinical decisions and improving patient outcomes.

Keywords: first trimester bleeding, ultrasonography, pregnancy outcomes, nonviable pregnancy, ectopic pregnancy

1. Introduction

Vaginal bleeding during the first trimester of pregnancy is a common and often alarming symptom that affects 16-25% of pregnancies. This bleeding can be indicative of a variety of conditions, ranging from benign implantation bleeding to serious complications like miscarriage, ectopic pregnancy, or gestational trophoblastic disease. Accurate and timely diagnosis is critical for effective management and to improve pregnancy outcomes.

Ultrasonography has become an indispensable tool in the evaluation of first-trimester bleeding, allowing for the accurate diagnosis of the pregnancy's location and viability. This study aimed to assess the effectiveness of ultrasonography in diagnosing the causes of first-trimester vaginal bleeding and its role in predicting pregnancy outcomes.

2. Materials and Methods

This prospective observational study was conducted at the Department of Obstetrics & Gynecology, MNR Medical College, from December 2019 to November 2021. A total of 100 antenatal women presenting with first-trimester vaginal bleeding were included in the study.

Inclusion Criteria:

- Women with vaginal bleeding in the first trimester.
- Patients who provided informed consent.

Exclusion Criteria:

- Non-obstetric causes of vaginal bleeding.

Clinical history, physical examination, and ultrasonography (both transabdominal and transvaginal) were performed. The findings from the ultrasound were correlated with the clinical diagnosis and outcomes were evaluated.

3. Results

Demographics:

- The majority of the patients were between 21-25 years old (43%).
- 68% of the women were multigravida, indicating a higher prevalence of complications in those with previous pregnancies.

Ultrasound Findings:

- Gestational Sac: 58% of the cases showed an irregular gestational sac.
- Fetal Heart Activity: Present in only 11% of the pregnancies, indicating a high rate of non-viable pregnancies.
- Diagnosis by Ultrasound: The most common diagnosis was incomplete abortion (28%), followed by missed abortion (18%), and ectopic pregnancy (13%).

Table 1: Distribution of Patients Based on Age Group

Age Group (years)	Frequency	Percentage (%)
18- 20	34	34.0
21- 25	43	43.0
26- 30	16	16.0
>31	7	7.0
Total	100	100

Table 2: Distribution of Patients Based on Parity

Parity	Frequency	Percentage (%)
Primigravida	32	32.0
Multigravida	68	68.0
Total	100	100

Table 3: Distribution of Patients Based on Ultrasound Diagnosis

Ultrasound Diagnosis	Frequency	Percentage (%)
Incomplete abortion	28	28.0
Missed abortion	18	18.0
Threatened abortion	12	12.0
Ectopic pregnancy (right)	11	11.0
Complete abortion	10	10.0

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Molar pregnancy	9	9.0
Inevitable abortion	5	5.0
Anembryonic gestation	5	5.0
Ectopic pregnancy (left)	2	2.0
Total	100	100

Correlation with Clinical Diagnosis:

- Ultrasound showed high sensitivity and specificity in diagnosing non-viable pregnancies (sensitivity 98%, specificity 100%) and ectopic pregnancies (sensitivity 100%, specificity 99%).
- Clinical diagnosis alone showed significant limitations, particularly in identifying non-viable pregnancies, where the specificity was only 52%.

Table 4: Correlation of Ultrasound Diagnosis with Final Diagnosis

Parameters	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Viable Pregnancy	100	100	100	100
Ectopic Pregnancy	100	99	95	100
Non-viable Pregnancy	98	100	100	98

4. Discussion

The study underscores the critical role of ultrasonography in managing first-trimester bleeding. The high accuracy of ultrasound in diagnosing non-viable pregnancies and ectopic pregnancies allows for timely and appropriate management^{1,2}, reducing the need for invasive procedures and improving patient outcomes.

For instance, the ability to accurately diagnose an ectopic pregnancy is vital, as prompt surgical intervention is often required to prevent life-threatening complications. Similarly, early identification of non-viable pregnancies allows for necessary interventions, such as medical management or surgical evacuation, reducing the risk of prolonged complications^{3,4}.

The findings suggest that incorporating routine ultrasound into the standard care protocol for women presenting with first-trimester bleeding can significantly improve pregnancy outcomes, particularly in resource-limited settings⁵.

5. Conclusion

Ultrasonography is an essential diagnostic tool for evaluating first-trimester vaginal bleeding, offering precise identification of pregnancy viability and guiding clinical decisions. Its high sensitivity and specificity in diagnosing ectopic pregnancies and non-viable intrauterine pregnancies highlight its importance in obstetric care, helping to reduce the incidence of preventable complications and improving overall pregnancy outcomes. Further research is recommended to explore the long-term outcomes of pregnancies diagnosed with ultrasound, particularly concerning preterm delivery and other complications associated with first-trimester bleeding.

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