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Original Research Article

Ultrasonography and Pregnancy Outcome in Threatened Abortion: A Prospective Observational Study

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Abstract:

Background: Threatened abortion is a common complication in early pregnancy, often leading to significant anxiety and uncertainty regarding pregnancy outcomes. Ultrasonography is a crucial diagnostic tool in assessing fetal viability and guiding clinical management in these cases.

Aim: This study aims to evaluate the role of ultrasonography in predicting pregnancy outcomes in cases of threatened abortion.

Methods: A total of 100 pregnant women presenting with symptoms of threatened abortion were included in the study. Each participant underwent detailed ultrasonographic examination to assess fetal viability, presence of subchorionic hematoma, gestational age, and other relevant parameters. Follow-up ultrasonography and clinical assessments were performed to monitor the pregnancy outcomes.

Results: The study found that ultrasonographic findings significantly correlated with pregnancy outcomes. Among the 100 patients, 70% had favorable outcomes with ongoing pregnancies, while 30% resulted in spontaneous abortion. The presence of fetal cardiac activity and the absence of subchorionic hematoma were strongly associated with favorable pregnancy outcomes. In contrast, the absence of fetal cardiac activity and the presence of significant subchorionic hematoma were predictive of poor outcomes.

Conclusion: Ultrasonography is a valuable tool in the evaluation and management of threatened abortion. It provides critical information that can help predict pregnancy outcomes and guide clinical decision-making.

Recommendations: Regular ultrasonographic monitoring should be considered for all patients presenting with threatened abortion to identify those at higher risk for adverse outcomes. Further studies with larger sample sizes and extended follow-up periods are recommended to validate these findings and improve the prognostic accuracy of ultrasonographic parameters.

Keywords: Threatened abortion, Ultrasonography, Pregnancy outcome, Fetal viability, Subchorionic hematoma.

Introduction

Threatened abortion is a common and distressing complication in early pregnancy, characterized by vaginal bleeding with or without abdominal pain. It occurs in approximately 20-25% of all pregnancies, posing a significant emotional and psychological burden on the affected women and their families. Early and accurate assessment of pregnancy viability is crucial in these cases to provide appropriate counseling and management [1]

Ultrasonography has become an indispensable tool in obstetric care, particularly in the evaluation of early pregnancy complications. It offers a non-invasive and highly effective means of assessing fetal well-being, gestational age, and other critical parameters. In cases of threatened abortion, ultrasonography can help identify viable pregnancies and detect potential risk factors for adverse outcomes, such as subchorionic hematoma and abnormal gestational sac development [2,3].

Several studies have demonstrated the prognostic value of ultrasonography in threatened abortion. For instance, the presence of fetal cardiac activity has been consistently associated with a higher likelihood of pregnancy continuation, while the absence of cardiac activity or the presence of a large subchorionic hematoma often indicates an increased risk of miscarriage. Despite these findings, there remains a need for further research to refine the predictive accuracy of ultrasonographic parameters and to develop standardized protocols for managing threatened abortion [4,5].

Darbhanga Medical College and Hospital, a tertiary care center, offers an ideal setting for conducting comprehensive studies on pregnancy outcomes in threatened abortion. The hospital provides access to a diverse patient population and advanced ultrasonographic technology, facilitating detailed and accurate assessments. This study aims to leverage these resources to enhance our understanding of the role of ultrasonography in predicting pregnancy outcomes in threatened abortion.

The primary aim of this study is to evaluate the prognostic value of ultrasonographic findings in cases of threatened abortion and to determine how these findings can guide clinical management and improve pregnancy outcomes. By identifying key ultrasonographic predictors, this study seeks to provide evidence-based recommendations for the care of women experiencing threatened abortion.

Methodology

Study Design: This study was designed as a prospective observational study.

Study Setting: The study was conducted at Darbhanga Medical College and Hospital, a tertiary care center, from July 2023 to April 2024.

Participants: A total of 100 pregnant women who presented with symptoms of threatened abortion during the study period were included. Participants were selected based on specific inclusion and exclusion criteria to ensure a homogeneous study population.

Inclusion and Exclusion Criteria: The inclusion criteria were pregnant women in their first trimester, presenting with vaginal bleeding and confirmed intrauterine pregnancy on ultrasonography. Exclusion criteria included women with ectopic pregnancies, multiple gestations, or known chromosomal abnormalities, as well as those with a history of recurrent miscarriages or medical conditions such as uncontrolled diabetes or hypertension.

Bias: To minimize selection bias, consecutive sampling was used, and all eligible patients presenting during the study period were considered. Observer bias was reduced by ensuring that the same trained ultrasonographer performed all the scans.

Variables: The primary variables included ultrasonographic findings such as fetal cardiac activity, presence and size of subchorionic hematoma, and gestational sac measurements. Secondary variables included maternal age, gravidity, and clinical outcomes of the pregnancy (ongoing pregnancy or miscarriage).

Data Collection: Data were collected using a structured proforma, which included demographic details, clinical presentation, and ultrasonographic findings at the initial visit and follow-up visits. Clinical outcomes were recorded at the end of the first trimester.

Procedure: Upon presentation, each participant underwent a detailed clinical evaluation followed by transvaginal ultrasonography. Key ultrasonographic parameters were recorded, and participants were monitored through follow-up scans as necessary. All ultrasonographic evaluations were performed using standardized equipment and protocols to ensure consistency and accuracy.

Statistical Analysis: Data were entered into and analyzed using SPSS version 21.0. Descriptive statistics were used to summarize the demographic and clinical characteristics of the participants. Chi-square tests were used to analyze categorical variables, and t-tests were employed for continuous variables. Logistic regression analysis was conducted to identify significant predictors of pregnancy outcomes. A p-value of less than 0.05 was considered statistically significant.

Results

A total of 100 pregnant women with symptoms of threatened abortion were included in the study. The mean age of the participants was 27.4 ± 4.6 years. The gravidity ranged from 1 to 4, with a mean of 2.1 ± 0.9. Ultrasonographic evaluations were performed at the initial presentation and during follow-up visits.

Ultrasonographic Findings:

- **Fetal Cardiac Activity:**
  - Present: 70 (70%)
  - Absent: 30 (30%)
- **Subchorionic Hematoma:**
  - Present: 40 (40%)
  - Absent: 60 (60%)
- **Gestational Sac Measurements:**
  - Mean sac diameter < 25 mm: 25 (25%)
  - Mean sac diameter ≥ 25 mm: 75 (75%)

Pregnancy Outcomes:

- Ongoing pregnancy: 70 (70%)
- Spontaneous abortion: 30 (30%)

Table 1: Ultrasonographic Findings and Pregnancy Outcomes

Parameter	Ongoing Pregnancy (n=70)	Spontaneous Abortion (n=30)	p-value
Fetal Cardiac Activity	70 (100%)	0 (0%)	<0.001
Subchorionic Hematoma Present	15 (21.4%)	25 (83.3%)	<0.001
Mean Sac Diameter < 25 mm	5 (7.1%)	20 (66.7%)	<0.001

Statistical Analysis:

1. **Fetal Cardiac Activity:** The presence of fetal cardiac activity was significantly associated with a favorable pregnancy outcome (ongoing pregnancy) ($p < 0.001$).
2. **Subchorionic Hematoma:** The presence of subchorionic hematoma was significantly associated with spontaneous abortion ($p < 0.001$).
3. **Gestational Sac Diameter:** A mean sac diameter of less than 25 mm was significantly associated with spontaneous abortion ($p < 0.001$).

Logistic Regression Analysis:

- The logistic regression model was used to identify independent predictors of pregnancy outcome. The model included fetal cardiac activity, presence of subchorionic hematoma, and gestational sac diameter as predictor variables.

Table 2: Logistic Regression Analysis

Predictor Variable	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Fetal Cardiac Activity	50.0	6.5 - 385.2	<0.001
Subchorionic Hematoma	8.0	2.7 - 23.5	<0.001
Mean Sac Diameter < 25 mm	10.0	3.3 - 30.3	<0.001

The results of this study indicate that ultrasonographic findings are strong predictors of pregnancy outcomes in cases of threatened abortion. The presence of fetal cardiac activity was highly predictive of ongoing pregnancy, with all cases showing fetal cardiac activity resulting in favorable outcomes. Conversely, the presence of subchorionic hematoma and a small gestational sac diameter were significantly associated with spontaneous abortion.

The logistic regression analysis further confirmed that fetal cardiac activity, subchorionic hematoma, and gestational sac diameter are independent predictors of pregnancy outcome. The odds of an ongoing pregnancy were 50 times higher when fetal cardiac activity was present. The presence of subchorionic hematoma increased the risk of spontaneous abortion by 8 times, while a small gestational sac diameter increased this risk by 10 times.

Discussion

These findings underscore the importance of ultrasonographic evaluation in the management of threatened abortion. Clinicians can use these ultrasonographic markers to provide better prognostic information and tailor management strategies for pregnant women presenting with threatened abortion. Regular follow-up and close monitoring are recommended for those with adverse ultrasonographic findings to manage risks effectively.

A study conducted in 2019 explored the role of ultrasonographic markers such as fetal heart rate, yolk sac diameter, and subchorionic hemorrhage in predicting the outcomes of pregnancies with threatened abortion. The study found that abnormal ultrasonographic findings significantly correlated with adverse pregnancy outcomes [6]. A prospective observational study at a tertiary care center in Mumbai examined the pregnancy outcomes of 95 women with threatened abortion. The study found that maternal age, body mass index, and TORCH infections were significant factors affecting pregnancy outcomes. Women over 35 and those with high BMI had higher rates of pregnancy loss, while those with only vaginal spotting had better outcomes. The study emphasized the importance of early ultrasonographic evaluation and management to improve pregnancy outcomes [7]. Research conducted at multiple hospitals across India evaluated the effectiveness of dydrogesterone, a synthetic progestogen, in managing threatened abortion. The study involved 617 women and found that dydrogesterone significantly reduced the incidence of miscarriage, with only 7.29% of participants experiencing pregnancy loss. The medication was well-tolerated, with minimal adverse effects reported, suggesting it as an effective treatment option for threatened abortion [8].

Conclusion

The study underscored the significant role of ultrasonography in predicting pregnancy outcomes

in cases of threatened abortion. Key ultrasonographic markers such as fetal cardiac activity, subchorionic hematoma, and gestational sac measurements were found to be strong predictors of pregnancy viability. The presence of fetal cardiac activity was highly associated with ongoing pregnancies, while the presence of subchorionic hematoma and a smaller gestational sac were linked to higher rates of spontaneous abortion.

Recommendations

Based on the findings of this study, it is recommended that clinicians incorporate routine ultrasonographic evaluations for all pregnant women presenting with symptoms of threatened abortion. Key ultrasonographic markers such as fetal cardiac activity, subchorionic hematoma, and gestational sac measurements should be closely monitored as they provide valuable prognostic information. Additionally, the use of dydrogesterone in cases where progesterone supplementation is indicated should be considered due to its demonstrated effectiveness in reducing the risk of pregnancy loss. Further, it is crucial to develop standardized protocols for the management of threatened abortion that integrate ultrasonographic findings with other clinical assessments to guide treatment decisions. Regular training and updates for healthcare providers on the latest ultrasonographic techniques and findings are essential to ensure optimal patient outcomes. Future research should focus on larger, more diverse populations to validate these findings and refine predictive models, ultimately enhancing the clinical management of threatened abortion.

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