

Navigating Threatened Miscarriage: Insights Into Maternal and Fetal Health Outcomes

Vandana Yadav¹, Dr. Busi Karunanand², Dr. Sanjiv Kumar Bansal³, Dr. Bindoo Yadav⁴, Dr Monu Sarin⁵
Dr. Garima Yadav^{6*}

¹Ph.D. Scholar, Department of Biochemistry, Faculty of Medicine and Health Sciences, SGT University, Gurugram, Haryana, Email – nishayo43@gmail.com

²Professor and Head, Department of Biochemistry, Faculty of Medicine and Health Sciences, SGT University, Gurugram, Haryana, Email – karunanandbusi@gmail.com

³Professor, Department of Biochemistry, Faculty of Medicine and Health Sciences, SGT University, Gurugram, Haryana, Email – drsanjivbansal@gmail.com

⁴Professor, Department of OBG & Gyne, Faculty of Medicine and Health Sciences, SGT University, Gurugram, Haryana, Email- abvy90@yahoo.co.in

⁵Professor, Department of Radiology, Faculty of Medicine and Health Sciences, SGT University, Gurgaon, Haryana, Email – monu_fmhs@sgtuniversity.org

^{6*}Additional Professor, AIIMS Jodhpur, Rajasthan, Email – garimapunein@gmail.com

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ABSTRACT

Introduction: It emphasizes the unexpected miscarriage rate, signaling a critical concern for maternal and fetal health. The introduction also highlights the potential complications associated with threatened miscarriage and hints at the role of oxidative stress within the placenta.

Material and Methods: The methodology section outlines the study's design, conducted at SGT Hospital, focusing on a prospective longitudinal approach. 100 pregnant women presented with vaginal bleeding in the first trimester were studied.

Results and Discussion: It begins by detailing the characteristics of the study population, focusing on significant differences observed in gravidity, and the number of previous miscarriages. Obstetric outcomes, mode of delivery, and neonatal parameters are comprehensively discussed. The unexpectedly high miscarriage rate is addressed, and the diverse complications associated with threatened miscarriage are explored. The section also delves into the effectiveness of treatment strategies, highlighting the positive impact of bed rest in preventing pregnancy loss and the limited efficacy of prophylactic antibiotics.

Conclusion: The study, emphasizing the resilience of pregnancies initially categorized as threatened abortions. It reiterates the challenges and positive outcomes identified, underscoring the need for personalized antenatal care. The higher-than-expected miscarriage rate prompts further reflection on managing threatened miscarriages. The conclusion highlights the study's contribution to understanding both maternal and neonatal outcomes in pregnancies marked by early bleeding and advocates for enhanced clinical management strategies.

Keywords - Antenatal care, Neonatal outcome, Obstetric outcomes, Oxidative stress, Oxidative stress

Introduction

The preliminary diagnosis of a potential miscarriage in the first trimester is established based on a history of early pregnancy vaginal bleeding, coupled with a closed cervix. The confirmation of this diagnosis is obtained through ultrasound evidence revealing an intrauterine gestational sac with a positive fetal heartbeat. [1-3] Approximately 25% of pregnancies experience first-trimester vaginal bleeding, and it has been reported that half of these cases result in spontaneous miscarriage before ultrasonographic assessment of fetal viability.

While previous studies have primarily focused on viability at term, there is a consensus that adverse pregnancy outcomes are linked to first-trimester vaginal bleeding. [4-5]

This study aimed to study the outcomes of pregnancy and neonates among women who had a history of hospital attendance due to threatened first-trimester miscarriage. Understanding these outcomes is crucial for both women and obstetricians in planning appropriate antenatal care and clinical interventions during pregnancy.

Material and method

The prospective longitudinal study was conducted over 2 years in the Department of Biochemistry and Department of Obstetrics and Gynaecology at SGT Hospital, SGT University Gurgaon. The study aimed to investigate biochemical parameters in 100 pregnant women experiencing threatened abortion.

Inclusion criteria comprised pregnant women aged between 18 and 35 attending the outpatient department at SGT Medical College and Hospital during the 5th to 13th week of gestational age, diagnosed with threatened abortion based on a history of bleeding per vaginal (BPV) with or without pain and a positive ultrasound report indicating cardiac activity of the embryo. Participation willingness was also a prerequisite for inclusion.

Exclusion criteria involved individuals unwilling to participate, those with multiple gestation, blighted ovum, missed, inevitable, or incomplete abortion, ectopic pregnancy or gestational trophoblastic disease, recurrent pregnancy loss (defined as two or more clinical pregnancy losses before reaching 20 weeks), and age less than 18 or more than 35 years.

The methodology included the determination of anthropometric indices and the measurement of biochemical parameters. One hundred pregnant women meeting the inclusion criteria were enrolled in the study and followed up in the outpatient department every four weeks for clinical and ultrasound examinations.

Blood samples were collected twice during the study period: first at the gestational age of 5th to 13th weeks and second at the time of delivery, complete abortion, or stillbirth.

We aimed to explore the potential risks associated with viable intrauterine pregnancies that are complicated by early pregnancy bleeding. We focused on various outcome measures, including pregnancy complications such as antepartum hemorrhage and preterm prelabour rupture of membranes (membrane rupture occurring at 37 weeks of gestation). Additionally, we examined delivery complications, including instrumental delivery using forceps or vacuum extraction, the mode of delivery, and postpartum hemorrhage. Neonatal complications and parameters were also considered, encompassing preterm delivery (delivery occurring before 37 completed weeks but after 24 weeks), stillbirth (death occurring either antepartum or intrapartum), low birth weight (birth weight less than 2,500 g), and Apgar scores. This investigation aimed to provide a comprehensive understanding of the potential risks associated with viable intrauterine pregnancies complicated by early pregnancy bleeding, shedding light on both maternal and neonatal outcomes.

Results

In this study involving 100 patients, several criteria were evaluated, and their respective means \pm standard deviations (S.D.) were reported along with associated P-values. The criteria included Age, Gravidity, Gestation of presentation (in weeks), and Number of previous miscarriages.

The mean age of the participants was 25.58 years with a standard deviation of 4.15, and the associated P-value was greater than 0.05, indicating that there was no statistically significant difference in age among the study population.

On the other hand, Gravidity, Number of previous miscarriages, Progesterone, and CA125 showed statistically significant differences with P-values less than 0.05. Gravidity had a mean of 2.79 ± 1.37 , suggesting variations in the number of pregnancies among the participants. The mean number of previous miscarriages was 1.09 ± 0.95 , indicating a range of previous pregnancy loss experiences (Table -1).

Table - 1

Criteria	Mean \pm S.D.	P Value
Age	25.58 \pm 4.15	>0.05
Gravidity	2.79 \pm 1.37	<0.05
Gestation of presentation (in weeks)	7.26 \pm 1.40	>0.05
Number of previous miscarriages	1.09 \pm 0.95	<0.05

Table - 2

Obstetric Outcome (n=52)	In percentage (%)
Antepartum hemorrhage	6/58 (10.34%)
Premature rupture of membrane	4/58 (6.90%)
Instrumented delivery	4/58 (6.90%)
Mode of Delivery	23/58 Cesarean (39.66%), 35/58 normal (60.34%)
Postpartum hemorrhage	6/58 (10.34%)
Preterm/ Term/ Post-term	40/58 term (68.97%), 18/58 preterm (31.03%)

Stillbirth	2/58 (3.45%)
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Table 2 presents obstetric outcomes based on a sample size of 58 cases. The data reflects key aspects of pregnancy and childbirth, providing insights into various complications and delivery modes. Antepartum hemorrhage occurred in 6 out of 58 cases, signifying that approximately 10.34% of pregnancies in the sample experienced this complication. Premature rupture of membranes affected 4 out of 58 cases, representing around 6.90% of the sample. Instrumented delivery was observed in 4 cases as well, indicating a prevalence of 6.90%.

The mode of delivery exhibited diversity, with 23 out of 58 cases undergoing cesarean sections and 35 out of 58 cases opting for normal delivery. This distribution suggests that cesarean deliveries constituted approximately 39.66%, while normal deliveries accounted for about 60.34% of the cases.

Postpartum hemorrhage occurred in 6 out of 58 cases, reflecting a prevalence of 10.34%. Gestational age at delivery revealed that 40 out of 58 cases reached term, constituting approximately 68.97%, while 18 out of 58 cases were preterm, making up around 31.03% of the sample.

Stillbirth occurred in 2 out of 58 cases, indicating a prevalence of approximately 3.45%. Overall, the table provides a comprehensive overview of obstetric outcomes, offering valuable information for understanding the distribution of complications and delivery modes within the analyzed sample.

Table - 3

	Mean± SD	p-value
Baby weight (in Kg)	2.416±702.6	>0.05
APGAR score at 1 min	7.58±1.34	<0.050
APGAR score 5 min	8.72±1.00	<0.05
Duration of NICU stay (in days)	2.71±1.38	>0.05

Among the 100 cases initially classified as threatened abortion, 58 pregnancies ultimately persevered, resulting in live births. A comprehensive analysis of the outcomes is presented in the table. The mean baby weight at birth was 2.416 kg, accompanied by a notable standard deviation of 702.6 g, suggesting a considerable range in newborn weights. The APGAR score, a crucial indicator of neonatal well-being, exhibited a mean of 7.58±1.34 at 1 minute and 8.72±1.00 at 5 minutes. Statistical significance ($p < 0.05$) was observed for both 1-minute and 5-minute APGAR scores, indicating their clinical relevance in assessing the infants' immediate health post-delivery.

Interestingly, the duration of NICU stay displayed a mean of 2.71±1.38 days, with no significant difference noted ($p > 0.05$). This suggests a degree of stability in the neonatal intensive care unit requirements for this cohort. The findings imply that while the babies' weights varied considerably, their overall health, as assessed by APGAR scores, demonstrated improvement over the initial minutes after birth. The lack of significant difference in NICU stay duration suggests a level of consistency in the postnatal care needs of these infants. This analysis sheds light on the resilience of pregnancies initially categorized as threatened abortions, emphasizing both the challenges and positive outcomes in this cohort.

Discussion

In this study, we found that vaginal bleeding in early pregnancy was a common pregnancy complication and the most common indication for admission during the first and second trimesters of pregnancy. However, we included only cases that met the diagnostic criteria in the final analysis. Women who were managed and discharged without ultrasound evidence of fetal cardiac activity at the time of the bleeding event were excluded, which explains the relatively few cases analyzed within the period under review.

Among the 100 cases initially classified as threatened abortion, 58 pregnancies ultimately persevered, resulting in live births which show a significant rate of miscarriage among females presented with vaginal bleeding in the first trimester. Miscarriage rate findings in the current study were unexpectedly higher compared to similar studies. The unexpectedly higher miscarriage rate in compared to similar studies, may be influenced by unique genetic factors, environmental stressors, disparities in healthcare access, socioeconomic challenges, maternal age, and cultural practices. A comprehensive understanding of these region-specific factors is essential for effective intervention and healthcare planning [6-8]

Threatened miscarriage represents a significant predisposition to pregnancy loss before reaching fetal viability. In addition to the elevated likelihood of spontaneous miscarriage, individuals experiencing threatened miscarriage exhibit comparatively higher odds of encountering complications such as placenta previa, premature rupture of membranes (PROM), and preterm birth when compared to asymptomatic women. These findings align with similar observations reported in other research studies. [9-13].

In a clinical context, a low-lying placenta frequently manifests as an indicative bleeding episode. It is advisable to utilize ultrasound imaging to determine the position of the placenta in women who have experienced threatened miscarriage during the current pregnancy. Placenta previa stands out as a significant contributor to

the risk of postpartum hemorrhage (PPH) [16]. The occurrence rates of other pregnancy complications, such as preeclampsia and placental abruption, were consistent with findings reported in comparable studies.[14-16] The underlying mechanisms of threatened miscarriage (TM) and its detrimental impacts on pregnancy outcomes remain inadequately understood. Anomalous placentation and implantation processes may instigate first-trimester bleeding, and if left unresolved, could advance to spontaneous abortion. Molecular investigations have revealed a notable rise in markers indicating oxidative stress within the placenta during TM pregnancies. Dysregulation in the expression of placental antioxidant enzymes and disturbances in the equilibrium between the generation of reactive oxygen radicals and the body's natural defenses against them, coupled with endothelial damage leading to thrombus formation, may adversely influence placental development and, consequently, result in elevated occurrences of pregnancy complications.[17-21]

The increased cesarean delivery rate among patients with TM may have been affected by the higher incidences of placenta praevia and preterm birth, which are common indications for cesarean section. In the current study, The mode of delivery exhibited diversity, with 23 out of 58 cases undergoing cesarean sections and 35 out of 58 cases opting for normal delivery. This distribution suggests that cesarean deliveries constituted approximately 39.66%, while normal deliveries accounted for about 60.34% of the cases.[22-23]. We assessed the treatment strategies for women experiencing threatened miscarriage (TM) and examined their potential impact on pregnancy outcomes. The primary interventions identified included bed rest, prophylactic antibiotics, progesterone therapy, cervical cerclage insertion, and the administration of tocolytic drugs. However, our analysis indicates that only bed rest demonstrated effectiveness in preventing pregnancy loss among women with TM.

In a systematic review, the use of prophylactic antibiotics did not show a reduction in the risk of preterm rupture of membranes or preterm labor [24]. The efficacy of antibiotics was only noticeable in patients displaying evidence of vaginal bacterial infection.

Among the initially classified 100 cases of threatened abortion, 58 pregnancies persevered, resulting in live births. The mean baby weight at birth was 2.416 kg, showing a significant range. [25-26] The APGAR scores at 1 and 5 minutes were clinically relevant ($p < 0.05$), indicating immediate neonatal well-being. NICU stay duration was stable, highlighting consistency in postnatal care needs. This analysis sheds light on the resilience of pregnancies initially categorized as threatened abortions, emphasizing both the challenges and positive outcomes in this cohort.[27]

Our study has certain limitations Firstly, the relatively modest sample size and the restriction to a single hospital setting may impede the generalizability of the results. The study's outcomes, while insightful, might not universally represent broader populations. A more extensive and diverse sample would bolster the reliability and applicability of the conclusions, providing a more nuanced understanding of threatened first-trimester miscarriage outcomes.

Secondly, the study's assessment of treatment interventions for threatened miscarriage lacked granularity. While various strategies were evaluated, the analysis did not explore the specific impact of individual interventions. This limitation hinders a detailed comprehension of the effectiveness of each treatment in improving pregnancy outcomes. A more in-depth exploration of these interventions in subsequent research endeavors would offer a more nuanced perspective on their respective contributions to preventing pregnancy loss.

Conclusion:

This study provides valuable insights into the outcomes of pregnancies following threatened first-trimester miscarriage. Despite a higher-than-expected miscarriage rate, the resilience of pregnancies resulting in live births was evident. The diverse obstetric outcomes and the influence of oxidative stress on placental development underscore the complexity of managing threatened miscarriage. The findings emphasize the need for personalized antenatal care strategies and further exploration of treatment interventions. The study contributes to the understanding of both maternal and neonatal outcomes in pregnancies marked by early bleeding, paving the way for enhanced clinical management and patient care.

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