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Original Research

To determine the prevalence of antepartum hemorrhage (APH) and assess its impact on maternal and perinatal outcomes

[1]Shama Batra, [2]Vishal Gupta

[1]Professor, Department of Obs & Gynae, Venkateshwara Institute of Medical Sciences, Gajraula, Uttar Pradesh, India;
[2]Assistant Professor, Department of Anaesthesia, Shakshi Medical College & Research Centre, Guna, Madhya Pradesh, India

ABSTRACT:
Aim: This study aims to determine the prevalence of antepartum hemorrhage (APH) and assess its impact on maternal and perinatal outcomes in a tertiary care hospital. **Materials and Methods:** This prospective cohort study was conducted over 12 months, enrolling 100 pregnant women diagnosed with APH after 20 weeks of gestation. Women with coagulopathies, multiple pregnancies, or fetal anomalies were excluded. Participants were divided into two subgroups: placenta previa and placental abruption. Maternal data were collected at diagnosis and follow-up, including mode of delivery, postpartum hemorrhage, blood transfusions, and surgical interventions. Neonatal outcomes, such as birth weight, Apgar scores, and NICU admissions, were recorded. Statistical analysis using chi-square tests, t-tests, and multivariate logistic regression was performed to assess the impact of APH on outcomes, with significance set at $p < 0.05$. **Results:** Placenta previa accounted for 60.00% of the APH cases, while placental abruption represented 40.00%. Maternal outcomes indicated a significantly higher cesarean section rate in placenta previa (83.33% vs. 62.50%, $p = 0.020$) and more frequent postpartum hemorrhage in placental abruption (50.00% vs. 25.00%, $p = 0.007$). Neonatal outcomes showed lower birth weights and earlier delivery in the placental abruption group ($p = 0.031$ and $p = 0.010$, respectively). NICU admissions were higher in placental abruption (30.00% vs. 16.67%), although not statistically significant ($p = 0.088$). Multivariate regression identified gestational age at diagnosis as a significant predictor of adverse outcomes (OR = 0.89, $p = 0.018$). **Conclusion:** The study demonstrates that antepartum hemorrhage, particularly placental abruption, is associated with increased maternal and neonatal complications. Early diagnosis and multidisciplinary management are critical for improving outcomes. These findings underscore the importance of targeted interventions in high-risk pregnancies to mitigate the impact of APH on maternal and perinatal health.

Key Words: Antepartum hemorrhage, placenta previa, placental abruption, maternal outcomes, perinatal outcomes.

Corresponding author: Vishal Gupta, Assistant Professor, Department of Anaesthesia, Shakshi Medical College & Research Centre, Guna, Madhya Pradesh, India

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INTRODUCTION

Antepartum hemorrhage (APH) is a critical obstetric condition defined as vaginal bleeding from the genital tract that occurs after 20 weeks of gestation but before the onset of labor. It is a leading cause of maternal morbidity and mortality worldwide, particularly in low- and middle-income countries. APH can have significant implications for both the mother and the fetus, leading to complications such as maternal hemorrhage, preterm birth, intrauterine growth restriction (IUGR), and even fetal or neonatal death. Given the high risks associated with APH, early identification and appropriate management are essential to improve maternal and perinatal outcomes.[1-3]The two primary causes of antepartum hemorrhage are placenta previa and placental abruption. Placenta previa occurs when the placenta implants abnormally low in the uterus, either partially or completely covering the cervix. This can lead to significant bleeding as the lower uterine segment thins in preparation for labor, or when uterine contractions displace the placenta. Placenta previa is associated with various maternal risk factors, including advanced maternal age, multiple gestations, smoking, and a history of cesarean delivery or uterine surgery. Its prevalence has increased in recent years, largely due to the rise in cesarean deliveries.Placental abruption, on the other hand, refers to the premature separation

of the placenta from the uterine wall. It typically presents with painful vaginal bleeding, uterine tenderness, and fetal distress. Placental abruption is considered a medical emergency due to the potential for severe maternal and fetal complications. Risk factors for placental abruption include hypertensive disorders of pregnancy, trauma, smoking, cocaine use, and a history of previous abruption. The abrupt separation of the placenta reduces oxygen and nutrient delivery to the fetus, increasing the risk of adverse perinatal outcomes such as preterm birth, low birth weight, and stillbirth.[4-8]The impact of antepartum hemorrhage on maternal health can be profound. In cases of severe hemorrhage, mothers may experience hypovolemic shock, disseminated intravascular coagulation (DIC), or require emergency interventions such as blood transfusions or surgical procedures, including cesarean sections and, in extreme cases, hysterectomy. Additionally, women with APH are at greater risk of postpartum hemorrhage, which can further complicate recovery and contribute to long-term morbidity.[9-11]

For the fetus, the consequences of APH can be equally severe. Depending on the severity of the hemorrhage and the underlying cause, fetuses may experience compromised blood flow and oxygenation, which can result in IUGR, preterm delivery, or perinatal death. Neonates born to mothers with APH are often delivered preterm, which is associated with an increased risk of neonatal morbidity, including respiratory distress syndrome, neonatal jaundice, hypoglycemia, and admission to the neonatal intensive care unit (NICU). The timing and management of delivery are critical to optimizing outcomes for both the mother and the fetus in cases of APH.[12,13]The management of antepartum hemorrhage requires a multidisciplinary approach, often involving obstetricians, maternal-fetal medicine specialists, anesthesiologists, and neonatologists. Initial management focuses on stabilizing the mother, controlling hemorrhage, and assessing fetal well-being. In cases of placenta previa, elective cesarean delivery is often recommended before labor to prevent catastrophic bleeding. For placental abruption, the management depends on the severity of the abruption and gestational age; prompt delivery may be necessary in cases of severe abruption, especially if there is evidence of fetal compromise.[13]Understanding the prevalence of APH and its associated risk factors is crucial in improving maternal and neonatal outcomes. The prevalence of APH can vary widely depending on geographic location, healthcare access, and population demographics. In tertiary care hospitals, where high-risk pregnancies are often referred, the prevalence of APH may be higher than in the general population. Additionally, the type of APH (placenta previa vs. placental abruption) and its severity can influence maternal and perinatal outcomes. Identifying trends in the prevalence of APH and the outcomes associated with it can help guide clinical practice, improve resource allocation, and inform public health strategies aimed at reducing maternal and neonatal morbidity and mortality.[14]The purpose of this study is to determine the prevalence of antepartum hemorrhage in a tertiary hospital and to assess its impact on maternal and perinatal outcomes. By analyzing data from a cohort of women with APH, this study aims to provide insight into the risk factors, clinical management, and outcomes associated with APH in a high-risk obstetric population. The findings of this study could help inform clinical guidelines and improve the management of APH, ultimately contributing to better health outcomes for both mothers and their newborns.

MATERIALS AND METHODS

This prospective cohort study was conducted to determine the prevalence of antepartum hemorrhage (APH) and its impact on maternal and perinatal outcomes in a tertiary care hospital. Ethical approval for the study was obtained from the hospital's Institutional Review Board, and informed consent was obtained from all participants before enrollment.The study was conducted in the Obstetrics and Gynecology Department of a tertiary hospital. A total of 100 pregnant women diagnosed with antepartum hemorrhage during their pregnancy were recruited from the antenatal inpatient and outpatient departments over a period of 12 months. Antepartum hemorrhage was defined as any vaginal bleeding from the 20th week of gestation until the delivery of the baby. Women with pre-existing conditions such as coagulopathies, multiple pregnancies, or those with known fetal anomalies were excluded from the study.The study population included women aged 18-45 years who were at various gestational ages, presenting with clinical symptoms of antepartum hemorrhage. The participants were divided into subgroups based on the type of APH, namely placenta previa and placental abruption.The study followed a prospective observational cohort design. Women who met the inclusion criteria were followed from the time of diagnosis of antepartum hemorrhage until delivery. Data on maternal and neonatal outcomes were collected at delivery and during the immediate postpartum period.

Methodology

Data were collected through structured interviews, clinical examinations, and medical record reviews. The following information was collected:

1. **Maternal Characteristics**: Age, gravidity, parity, gestational age at diagnosis of APH, and obstetric history, including any previous history of APH or cesarean section.
2. **Maternal Outcomes**: Mode of delivery (vaginal or cesarean), need for blood transfusion, occurrence of postpartum hemorrhage (PPH), maternal ICU admission, and any surgical

interventions required for hemorrhage control, such as uterine artery ligation or hysterectomy.

3. **Fetal Outcomes**: Gestational age at delivery, birth weight, Apgar scores at 1 and 5 minutes, need for neonatal intensive care unit (NICU) admission, neonatal morbidity, and neonatal mortality.

Diagnostic Criteria for Antepartum Hemorrhage

- **Placenta Previa**: Diagnosed via transabdominal or transvaginal ultrasound, characterized by the abnormal implantation of the placenta in the lower uterine segment, either partially or completely covering the internal cervical os.
- **Placental Abruption**: Clinically diagnosed based on the presence of vaginal bleeding associated with uterine tenderness, abdominal pain, and fetal distress or death.

Follow-Up and Assessment

Each participant was followed up from the time of diagnosis of APH until delivery. Weekly follow-ups were conducted to monitor maternal and fetal well-being, including blood pressure monitoring, fetal heart rate monitoring, and ultrasound assessments when clinically indicated. The participants' management included hospital admission, bed rest, and steroid administration for fetal lung maturity if preterm delivery was imminent.The primary outcome measures included the prevalence of APH, mode of delivery, maternal morbidity (blood transfusion, PPH, surgical intervention), and neonatal outcomes (birth weight, NICU admission, Apgar score, and neonatal mortality). The secondary outcomes included the type of APH (placenta previa or placental abruption) and the associated maternal and fetal complications.

Data Analysis

Data were analyzed using SPSS version 25.0. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarize maternal, fetal, and neonatal characteristics. The chi-square test was used to assess the association between APH and adverse maternal and perinatal outcomes. Independent t-tests were performed to compare continuous variables such as maternal age, gestational age, and birth weight between groups. Multivariate logistic regression analysis was performed to determine the predictors of adverse outcomes while controlling for potential confounders such as maternal age, parity, and gestational age at the onset of APH. A p-value of <0.05 was considered statistically significant.

RESULTS

Table 1: Baseline Maternal Characteristics

The baseline maternal characteristics for the study population are summarized in Table 1. The mean maternal age for women with placenta previa was 32.50 years (SD = 5.20), while those with placental abruption had a slightly lower mean age of 30.80 years (SD = 4.90), with the difference being statistically significant ($p = 0.045$). Gravidity was similar between the two groups, with a mean of 3.00 (SD = 1.20) for placenta previa and 2.80 (SD = 1.10) for placental abruption, and this difference was not significant ($p = 0.250$). Parity was also equivalent across both groups, with 75.00% of women in each group being multiparous ($p = 0.984$).

A notable difference was observed in the percentage of women with a previous cesarean section: 63.33% of those with placenta previa had a history of cesarean delivery compared to 37.50% of those with placental abruption, which was statistically significant ($p = 0.008$). Additionally, the gestational age at diagnosis was significantly later in the placenta previa group (30.50 weeks, SD = 3.00) compared to the placental abruption group (28.40 weeks, SD = 2.70) ($p = 0.012$).

Table 2: Maternal Outcomes

The maternal outcomes are outlined in Table 2. The mode of delivery differed significantly between the two groups, with 83.33% of women with placenta previa undergoing a cesareansection compared to 62.50% in the placental abruption group ($p = 0.020$). Postpartum hemorrhage (PPH) occurred more frequently in the placental abruption group (50.00%) compared to the placenta previa group (25.00%), and this difference was statistically significant ($p = 0.007$). Blood transfusions were required in 55.00% of women with placental abruption, which was significantly higher than the 30.00% of women with placenta previa who required a transfusion ($p = 0.012$). ICU admissions were more common in the placental abruption group (22.50%) compared to the placenta previa group (10.00%), although this difference did not reach statistical significance ($p = 0.068$). Surgical interventions, such as hysterectomy, were rare in both groups, with 3.33% of placenta previa cases and 7.50% of placental abruption cases requiring this intervention ($p = 0.348$).

Table 3: Neonatal Outcomes

Neonatal outcomes are presented in Table 3. The mean birth weight was significantly lower in the placental abruption group (2.50 kg, SD = 0.60) compared to the placenta previa group (2.80 kg, SD = 0.50) ($p = 0.031$). The gestational age at delivery also differed significantly, with neonates in the placental abruption group being delivered at a mean gestational age of 35.50 weeks (SD = 2.60) compared to 37.00 weeks (SD = 2.10) in the placenta previa group ($p = 0.010$).

The Apgar scores at 1 minute were lower in the placental abruption group (6.90, SD = 1.50) compared to the placenta previa group (7.50, SD = 1.20), with a statistically significant difference ($p = 0.045$). A similar trend was observed for the 5-minute Apgar scores, with mean values of 7.80 (SD = 1.30) in the placental abruption group and 8.50 (SD = 1.00) in the placenta previa group ($p = 0.021$). NICU admissions

were more frequent in the placental abruption group (30.00%) compared to the placenta previa group (16.67%), although this difference did not reach statistical significance (p = 0.088).

Table 4: Prevalence and Type of Antepartum Hemorrhage

Table 4 shows the prevalence of the two types of antepartum hemorrhage (APH) included in the study. Out of the 100 women diagnosed with APH, 60.00% were diagnosed with placenta previa, while 40.00% were diagnosed with placental abruption. The total sample size of APH cases was 100, representing 100.00% of the study population.

Table 5: Neonatal Morbidity and Mortality

Neonatal morbidity and mortality are summarized in Table 5. Respiratory distress syndrome (RDS) was observed in 37.50% of neonates born to mothers with placental abruption, compared to 20.00% of neonates born to mothers with placenta previa (p = 0.055), indicating a trend toward increased RDS in the abruption group, although the difference did not reach statistical significance. Hypoglycemia was more frequent in the placental abruption group (17.50%) compared to the placenta previa group (8.33%), but this difference was not statistically significant (p = 0.193).

Neonatal jaundice occurred at similar rates between the two groups, with 23.33% in the placenta previa group and 22.50% in the placental abruption group (p = 0.933). Neonatal mortality, although higher in the placental abruption group (10.00%) compared to the placenta previa group (3.33%), did not reach statistical significance (p = 0.178).

Table 6: Multivariate Logistic Regression Analysis

The multivariate logistic regression analysis (Table 6) examined predictors of adverse maternal and neonatal outcomes. Maternal age did not show a significant association with adverse outcomes, with an odds ratio of 1.05 (95% CI: 0.95-1.17) and a p-value of 0.299. Gestational age at diagnosis of APH was significantly associated with adverse outcomes, with an odds ratio of 0.89 (95% CI: 0.80-0.98) (p = 0.018), indicating that earlier diagnosis of APH was associated with a higher likelihood of adverse outcomes.

Comparing the two types of APH, placenta previa versus placental abruption, the odds ratio for adverse outcomes was 1.75 (95% CI: 1.10-2.86), with a statistically significant p-value of 0.024, indicating that placental abruption was associated with a greater likelihood of adverse outcomes. Mode of delivery (cesarean versus vaginal delivery) was not significantly associated with adverse outcomes, with an odds ratio of 1.42 (95% CI: 0.82-2.48) and a p-value of 0.208.

Table 1: Baseline Maternal Characteristics (N=100)

Variable	Placenta Previa (n=60)	Placental Abruption (n=40)	p-value
Maternal Age (years)	32.50 (5.20)	30.80 (4.90)	0.045
Gravidity (mean, SD)	3.00 (1.20)	2.80 (1.10)	0.250
Parity (n, %)	45 (75.00%)	30 (75.00%)	0.984
Previous Cesarean Section (n, %)	38 (63.33%)	15 (37.50%)	0.008
Gestational Age at Diagnosis (weeks)	30.50 (3.00)	28.40 (2.70)	0.012

Table 2: Maternal Outcomes

Outcome	Placenta Previa (n=60)	Placental Abruption (n=40)	p-value
Mode of Delivery (Cesarean)	50 (83.33%)	25 (62.50%)	0.020
Postpartum Hemorrhage (PPH)	15 (25.00%)	20 (50.00%)	0.007
Blood Transfusion Required (n, %)	18 (30.00%)	22 (55.00%)	0.012
ICU Admission	6 (10.00%)	9 (22.50%)	0.068
Surgical Intervention (e.g., Hysterectomy)	2 (3.33%)	3 (7.50%)	0.348

Table 3: Neonatal Outcomes

Neonatal Outcome	Placenta Previa (n=60)	Placental Abruption (n=40)	p-value
Birth Weight (kg, Mean, SD)	2.80 (0.50)	2.50 (0.60)	0.031
Gestational Age at Delivery (weeks)	37.00 (2.10)	35.50 (2.60)	0.010
Apgar Score (1 min, Mean, SD)	7.50 (1.20)	6.90 (1.50)	0.045
Apgar Score (5 min, Mean, SD)	8.50 (1.00)	7.80 (1.30)	0.021
NICU Admission (n, %)	10 (16.67%)	12 (30.00%)	0.088

Table 4: Prevalence and Type of Antepartum Hemorrhage

APH Type	Number of Cases (n)	Percentage (%)
Placenta Previa	60	60.00%
Placental Abruption	40	40.00%
Total APH Cases	100	100.00%

Table 5: Neonatal Morbidity and Mortality

Neonatal Complication	Placenta Previa (n=60)	Placental Abruption (n=40)	p-value
Respiratory Distress Syndrome (RDS)	12 (20.00%)	15 (37.50%)	0.055
Hypoglycemia	5 (8.33%)	7 (17.50%)	0.193
Neonatal Jaundice	14 (23.33%)	9 (22.50%)	0.933
Neonatal Mortality	2 (3.33%)	4 (10.00%)	0.178

Table 6: Multivariate Logistic Regression Analysis for Predictors of Adverse Maternal and Neonatal Outcomes

Variable	Odds Ratio (95% CI)	p-value
Maternal Age	1.05 (0.95-1.17)	0.299
Gestational Age at Diagnosis	0.89 (0.80-0.98)	0.018
Placenta Previa vs Placental Abruption	1.75 (1.10-2.86)	0.024
Mode of Delivery (Cesarean)	1.42 (0.82-2.48)	0.208

DISCUSSION

The baseline characteristics in this study reveal significant differences between women with placenta previa and placental abruption. The mean maternal age was higher for women with placenta previa compared to those with placental abruption (32.50 vs. 30.80 years, p = 0.045), which aligns with findings in previous studies where advanced maternal age has been identified as a risk factor for placenta previa. The lack of a significant difference in gravidity and parity between the two groups is consistent with research by Faiz and Ananth (2003), who noted that parity may not strongly differentiate the risk between the two types of hemorrhage.[8] However, the higher incidence of previous cesarean sections in the placenta previa group (63.33%) compared to the placental abruption group (37.50%, p = 0.008) echoes the findings by Silver et al. (2006), which linked cesarean delivery as a significant risk factor for placenta previa due to uterine scarring.[9]

The gestational age at diagnosis of APH was significantly earlier in the placental abruption group (28.40 weeks) compared to the placenta previa group (30.50 weeks, p = 0.012). This finding corresponds with studies that suggest placental abruption tends to occur earlier in pregnancy, especially in cases associated with hypertensive disorders.

In terms of maternal outcomes, our study found a significantly higher rate of cesarean delivery in women with placenta previa (83.33%) compared to those with placental abruption (62.50%, p = 0.020). This is in line with evidence from Oyelese et al. (2006), who reported that cesarean delivery is the preferred mode of delivery in placenta previa cases due to the risks of massive hemorrhage during vaginal birth.[10] The higher incidence of postpartum hemorrhage (PPH) in the placental abruption group (50.00%) compared to the placenta previa group (25.00%, p = 0.007) can be attributed to the more acute and severe nature of placental abruption, which often leads to rapid blood loss, a finding that parallels studies by Ananth et al. (2001).[12]

The need for blood transfusion was also significantly higher in the placental abruption group (55.00%) than in the placenta previa group (30.00%, p = 0.012). This supports findings from previous research showing that placental abruption is associated with more frequent and severe maternal hemorrhage, leading to higher rates of transfusion. Although ICU admissions were more common in the placental abruption group (22.50%) than in the placenta previa group (10.00%), this difference did not reach statistical significance (p = 0.068), which is in line with studies that note placental abruption often requires more intensive management but may not always escalate to ICU care.

The neonatal outcomes demonstrated significant differences between the two groups. Neonates born to mothers with placental abruption had lower birth weights (2.50 kg vs. 2.80 kg, p = 0.031) and were delivered at an earlier gestational age (35.50 weeks vs. 37.00 weeks, p = 0.010). These findings reflect previous studies, such as those by Tikkanen et al. (2006), which highlighted that placental abruption frequently leads to preterm birth and intrauterine growth restriction (IUGR). Lower Apgar scores at 1 minute (6.90 vs. 7.50, p = 0.045) and 5 minutes (7.80 vs. 8.50, p = 0.021) in the placental abruption group further underscore the more severe neonatal compromise associated with abruption.[11]

NICU admissions were more frequent in the placental abruption group (30.00%) compared to the placenta previa group (16.67%), though this did not reach statistical significance (p = 0.088). This finding aligns with the work of Sheiner et al. (2005), who reported that placental abruption is more commonly associated with severe neonatal outcomes requiring NICU care.[14]

In this study, 60.00% of the cases of APH were due to placenta previa, while 40.00% were due to placental abruption. These proportions are consistent with historical data on the prevalence of APH, which generally reports placenta previa as the more common cause of APH, occurring in approximately 70% of cases. However, the slightly higher prevalence of placental abruption (40%) in our study could be related to the inclusion of high-risk pregnancies, such as those with hypertensive disorders.

The incidence of respiratory distress syndrome (RDS) was higher in the placental abruption group (37.50%) compared to the placenta previa group (20.00%, p = 0.055). Although the difference did not reach

statistical significance, this trend is consistent with findings from a study by Hibbard et al. (1993), which indicated that placental abruption is often associated with greater neonatal respiratory complications due to preterm birth. Hypoglycemia was more frequent in the placental abruption group (17.50%) compared to the placenta previa group (8.33%, p = 0.193), which parallels studies showing that stress-related factors in abruption can affect neonatal glucose regulation.[13]

Neonatal mortality was higher in the placental abruption group (10.00%) compared to the placenta previa group (3.33%), although this did not reach statistical significance (p = 0.178). This finding is consistent with the literature, which generally reports higher neonatal mortality rates in cases of placental abruption, particularly in cases of severe placental separation.

The multivariate logistic regression analysis demonstrated that earlier gestational age at diagnosis was significantly associated with adverse outcomes (OR = 0.89, 95% CI: 0.80-0.98, p = 0.018), which is consistent with previous studies indicating that early onset of APH is associated with more severe complications for both the mother and neonate. The odds ratio for adverse outcomes in placental abruption compared to placenta previa was 1.75 (95% CI: 1.10-2.86, p = 0.024), supporting the widely accepted understanding that placental abruption tends to have more serious consequences than placenta previa.

Mode of delivery (cesarean versus vaginal) did not show a significant association with adverse outcomes (OR = 1.42, 95% CI: 0.82-2.48, p = 0.208), which aligns with research suggesting that cesarean delivery is often chosen to manage maternal and fetal complications, but the outcomes are influenced more by the severity of the underlying condition rather than the mode of delivery itself.

CONCLUSION

In conclusion, this study highlights the significant prevalence of antepartum hemorrhage (APH) in a tertiary care hospital and its substantial impact on maternal and perinatal outcomes. Placenta previa and placental abruption, the leading causes of APH, were associated with increased maternal complications such as postpartum hemorrhage and the need for blood transfusion, as well as adverse neonatal outcomes, including preterm birth and NICU admissions. Early identification and appropriate management of APH are crucial in mitigating these risks. The findings underscore the importance of a multidisciplinary approach to care, tailored to optimize both maternal and fetal health outcomes.

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