Original Article

A Study to Evaluate the Effect of Antepartum Hemorrhage on Fetomaternal Outcomes in Major Degree Placenta Previa

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Abstract

Background: Placenta previa is a major cause of antepartum hemorrhage (APH), associated with adverse maternal and neonatal outcomes. This study aimed to assess maternal characteristics, complications, mode of delivery, and neonatal outcomes among women with placenta previa presenting with and without APH.

Objective: This study aims to evaluate the effect of antepartum hemorrhage (APH) on fetomaternal outcomes among women with a major degree of placenta previa.

Methods: This cross-sectional observational study was conducted on 121 women diagnosed with placenta previa at the time of delivery. Participants were classified into placenta previa with APH (n=50) and placenta previa without APH (n=71) groups. Maternal demographics, obstetric history, placenta previa type, maternal complications, delivery mode, and neonatal outcomes were recorded at delivery. Statistical significance was set at $p<0.05$.

Results: Maternal age, gravidity, parity, and previous cesarean sections did not differ significantly. The APH group had a higher mean number of previous abortions (1.56 ± 0.88 vs 1.41 ± 0.59, p=0.029). Type IV placenta previa was most common in both groups without significant difference. Anemia (54% vs 15.5%), PROM (8% vs 1.4%), and GDM (18% vs 14.1%) were higher in APH group (p=0.024). Emergency cesarean section was more frequent in APH group (56% vs 25.4%, p=0.001). Maternal outcomes including hysterectomy, transfusion, and ICU admission were similar, but hospital stay was longer (5.86 ± 2.40 vs 4.72 ± 1.70 days, p=0.003). Neonates in the APH group had lower gestational age (36.04 ± 1.41 vs 36.71 ± 1.49 weeks, p=0.014), higher prematurity (58% vs 28.4%, p<0.001), lower birth weight (2.46 ± 0.48 vs 2.76 ± 0.44 kg, p=0.001), and increased malpresentation (22% vs 4.2%, p=0.011); Apgar scores were comparable.

Conclusion: APH in placenta previa is associated with increased maternal complications, emergency cesarean delivery, prolonged hospitalization, and adverse neonatal outcomes including prematurity, low birth weight, and malpresentation. Previous abortion history may be an additional risk factor. Careful monitoring at delivery is essential to optimize maternal and neonatal outcomes.

Keywords: Placenta previa; Antepartum hemorrhage; Maternal outcomes; Neonatal outcomes; Cross-sectional study.

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Introduction

Placenta praevia (PP), in which the placenta implants at or near the internal cervical os, remains a high-risk obstetric complication with significant maternal and perinatal consequences.[1] According to the distance between the placental edge and the internal os, PP is often categorized as minor (placental edge within 2 cm of the os) or major (placental edge reaching or overlapping the os).[2]

Although relatively uncommon, the prevalence of PP is increasing. A recent meta-analysis from China estimated

the prevalence at 1.44% and noted an upward trend following shifts in fertility policies.[3] PP is a major cause of antepartum hemorrhage and remains a leading reason for maternal ICU admissions and "near-miss" cases worldwide.[4] Obstetric hemorrhage contributes as a direct cause of maternal mortality. Almost 30% maternal deaths in the Asian population are due to major obstetrical hemorrhage in placenta praevia, especially due to rise in the incidence of caesarean sections. Perinatal mortality in pregnancies complicated by placenta praevia is around 4-8 %.[5]

The etiology of PP is multifactorial, but disruption of the endometrium and uterine scarring are key factors. Recognized risk factors include advanced maternal age, multiparity, smoking, uterine curettage, prior PP, assisted reproductive technology, and, most notably, prior cesarean delivery.[6] Recent studies confirm that prior cesarean and advanced maternal age significantly increase the risk of PP and its severe forms.[7]

PP is associated with numerous maternal complications, including massive hemorrhage, postpartum hemorrhage, transfusion, hysterectomy, ICU admission, and prolonged hospitalization.[4] The risks are even greater when complicated by placenta accreta spectrum (PAS), with higher rates of blood loss, hysterectomy, and preterm delivery.[8]

Adverse fetal and neonatal outcomes are also common. Prematurity and intrauterine growth restriction (IUGR) contribute to low birth weight, lower Apgar scores, respiratory distress requiring NICU admission, malpresentation, and perinatal mortality.[6,9] A recent African cohort reported a preterm birth rate of 43%, a stillbirth rate of 3%, and low birth weight in nearly one-fifth of neonates born to mothers with PP and prior uterine scar.[10]

Given these risks, recent investigations have examined how antepartum hemorrhage and placental location/ type influence maternal and perinatal outcomes. A Turkish study in 2024 found that planned cesarean deliveries in PP, particularly when complicated by PAS, were associated with better maternal and surgical outcomes than emergency operations.[11]

In the present study, we aim to assess the effect of antepartum hemorrhage on short-term feto-maternal outcomes in major degree PP, and to evaluate whether placental type and location modify the risk of hemorrhage and complications.

Materials and Methods

Study Design & Period:

This is a cross sectional observational study carried out in the department of Obstetrics and Gynecology at Ad-din Women's Medical College Hospital, Moghbazar, Dhaka, from January 2023 to December 2023. Ethical clearance for the proposed study was obtained from Ad-din Medical College Institutional Review Board (IRB).

Study Population & Sampling Procedure:

A total 121 of singleton pregnant women complicated with major degree placenta praevia diagnosed by ultrasonography at the time of delivery were enrolled randomly for analysis.

Inclusion Criteria:

1. Age of the patient is between 20-40 years.
2. Gestational age between ≥ 28 - 40 weeks,
3. Pregnant women with major degree placenta praevia and placenta acreata spectrum disorders.

Exclusion Criteria:

1. Pregnant women diagnosed with antepartum hemorrhage due to abruption placenta.
2. Bleeding disorders like decreased platelet counts or altered coagulation profiles or HELLP syndrome.
3. Women with multiple gestation pregnancies were also excluded to avoid overrepresentation of studying high risk women.

Method of Data Collection:

Data will be collected in a predesigned data sheet from all those patients who fulfill the inclusion and exclusion criteria and are admitted to the patient department of Ad-din Women's Medical College Hospital, where pregnancies need to be terminated by C-section. Detailed history was taken, regarding maternal demographics, obstetric history (gravidity, parity, gestational age, previous cesarean sections, abortions, D&C), placenta previa type, and maternal complications were recorded at delivery. Delivery mode, maternal outcomes (e.g., hysterectomy, blood transfusion during cesarean section, hemoglobin level before and after operation, ICU admission, hospital stay), and neonatal outcomes (gestational age, birth weight, Apgar score, malpresentation) were collected.

Patients who had per vaginal bleeding during the pregnancy period will be assigned to the group, Placenta praevia with APH. Patients who didn't give a history of vaginal bleeding during pregnancy will be assigned to the group, placenta praevia without APH.

Operational Definitions:

APH (Antepartum Hemorrhage): Bleeding from or into the genital tract, occurring from 28 weeks of pregnancy and before the birth of the baby, according to WHO.

Moderate anemia: corresponds to a hemoglobin level of 7.0-9.9 g/dl.

Severe anemia: corresponds to a hemoglobin level of less than 7 g/dl.

Low birth weight (LBW): defined as a birth weight of less than 2500 g (up to and including 2499 g), as per the World Health Organization.

Data Collection Tools:

A checklist was designed to collect data about study participants' socio-demographic characteristics, obstetrics history, history of current pregnancy, mode of delivery, and maternal and neonatal outcomes.

Statistical Analysis:

Data will be analyzed by SPSS version 23.0 for statistical analysis. Continuous variables were summarized as mean ± standard deviation, and categorical variables as frequencies and percentages. Comparisons between APH and non-APH groups were made using independent t-tests for continuous variables and chi-square or Fisher's exact tests for categorical variables. Statistical significance was defined as $p<0.05$.

Results

Table 1: Maternal Demographic and Clinical Characteristics

Variable	APH (n=50)	No APH (n=71)	P-value
Maternal age, years, mean±SD [median, range]	28.46±4.482 [28,22]	29.01±4.234 [28,21]	0.880
Gravidity, mean ± SD [median, range]	3.88±1.796 [4,8]	3.90±1.475 [4,6]	0.324
Parity, mean ± SD [median, range]	2.42±1.052 [2,4]	2.56±1.038 [3,4]	0.783
Number of previous abortions, mean ± SD [median, range]	1.56±0.884 [1,2]	1.41±0.599 [1,4]	0.029
Number of previous D&C mean ± SD [median, range]	1.16±0.618 [1,4]	1.14±0.389 [1,2]	0.588
Number of previous CS mean ± SD	1.34±0.895	1.11±0.903	0.843
Placenta Previa type			
Type II Posterior	6 (12)	13 (18.3)	0.212
Type III	6 (12.0)	15 (21.1)	
Type IV	24 (48.0)	27 (38)	
Placenta Acreta	5 (10)	11 (15.5)	
Placenta Increta	8 (16)	5 (7.0)	
Placenta Percreta	1 (2)	0 (0)	
Placenta Localization			
Anterior	21 (42)	28 (39.4)	0.777
Posterior	29 (58)	43 (60.6)	
Gestational Complication			
None	12 (4.0)	35 (49.3)	0.024
Anemia	27 (54.0)	11 (15.5)	
PIH or PE	3 (6.0)	4 (5.6)	
GDM	9 (18.0)	10 (14.1)	
PROM	4 (8.0)	1 (1.4)	
Obesity	0 (0)	1 (1.4)	
IUGR	1 (2.0)	1 (1.4)	
Oligohydramnios	3 (6.0)	4 (5.6)	
Others	1 (2.0)	4 (5.6)	
LSCS			
Emergency	28 (56.0)	18 (25.4)	0.001
Emergency LSCS due to			
APH	22 (44)	12 (16.9)	0.007
PROM	3 (6)	1 (1.4)	
LP	1 (2)	1 (1.4)	
FD	2 (4)	4 (5.6)	

A total of 121 women with placenta previa were included, of whom 50 (41.3%) presented with antepartum hemorrhage (APH) and 71 (58.7%) did not. The mean maternal age was comparable between the APH group (28.46 ± 4.48 years) and the non-APH group (29.01 ± 4.23 years) (p=0.880). Similarly, gravidity (3.88 ± 1.80 vs 3.90 ± 1.47, p=0.324), parity (2.42 ± 1.05 vs 2.56 ± 1.03, p=0.783), and number of previous cesarean sections (1.34 ± 0.89 vs 1.11 ± 0.90, p=0.843) showed no significant differences.

However, the mean number of previous abortions was significantly higher among women with APH (1.56 ± 0.88) compared to those without APH (1.41 ± 0.59, p=0.029). The frequency of dilatation and curettage (D&C) procedures did not differ significantly between groups.

The distribution of placenta previa types was comparable between women with antepartum hemorrhage (APH) and those without APH, with no statistically significant difference observed (p = 0.212). Type IV placenta previa was the most frequent subtype in both groups, occurring in 24 (48.0%) of the APH group and 27 (38.0%) of the non-APH group. Type III placenta previa was the second most common presentation and was observed more frequently in the non-APH group 15 (21.1%) compared with the APH group 6 (12.0%). Type II posterior placenta previa accounted for 6 (12.0%) of cases in the APH group and 13 (18.3%) in the non-APH group.

Abnormally adherent placentation was identified in both groups. Placenta accreta was present in 5 (10.0%) of APH cases and 11 (15.5%) of non-APH cases, while placenta increta was more common in the APH group 8 (16.0%) vs. 5 (7.0%). Placenta percreta was rare, occurring in one case 1 (2.0%) in the APH group and in none of the non-APH cases.

Placental localization did not differ significantly between groups (p = 0.777). Posterior placental location predominated in both the APH group 29 (58.0%) and the non-APH group 43 (60.6%), while anterior placentation was observed in 21 (42.0%) and 28 (39.4%) of cases, respectively.

Maternal Complications

Gestational complications varied between the groups. Women with APH were more likely to develop anemia 27 (54%) vs 11 (15.5%), PROM 4 (8%) vs 1 (1.4%), and GDM 9 (18%) vs 10 (14.1%), whereas complications such as obesity, intrauterine growth restriction (IUGR), and oligohydramnios were infrequent across both groups. The overall difference in complication rates was statistically significant (p=0.024).

Mode of Delivery

The rate of emergency lower segment cesarean section (LSCS) was significantly higher among the APH group 28 (56%) vs 18 (25.4%), p=0.001. The primary indication for emergency LSCS was APH itself, accounting for 22 (44%) of cases, followed by PROM 3 (6%), labor pain 1 (2%), and fetal distress 2 (4%). In contrast, among the non-APH group, only 12 (16.9%) required emergency LSCS due to APH, and the remainder were for fetal distress 4 (5.6%), PROM 1 (1.4%), or labor pain 1 (1.4%) (p=0.007).

Table 2: Maternal Outcomes

Variables	APH (n=50)	No APH (n=71)	P-value
Preoperative hemoglobin, g/dL, mean ± SD [median, range]	10.83±0.779 [10.8,4.6]	10.82±1.19 [10.70,8.5]	0.162
Predischarge hemoglobin, g/dL, mean ± SD [median, range]	10.70±0.9731 [11,4.9]	11.05±1.165[11,7.2]	0.088
Hysterectomy Yes	13 (26)	18 (25.4)	0.936
No	37 (74)	53 (74.6)	
Uterine conservation, n (%)	0 (0)	0 (0)	
Bilateral uterine artery ligation	4 (8)	10 (14.1)	
Multiple hemostatic sutures			
Both	4 (8)	6 (8.5)	0.722
B-lyneh suture	1 (2)	0 (0)	
None	28 (56)	37 (52.1)	
Per Operative blood transfusion			
No blood transfusion	14 (28.0)	17 (23.9)	0.595
1-2 Unit	23 (46.0)	34 (47.8)	
3-4 Unit	3 (6.0)	9 (12.8)	
≥ 5 Unit	10 (20)	11 (15.5)	
Maternal Morbidity			
Bladder injury	2 (4.0)	5 (7.0)	0.742
PPH	2 (4)	3 (4.2)	
Hemorrhagic Shock	2 (2)	2 (2.8)	
DIC	0 (0)	0 (0)	
ICU admission	10 (20)	13 (18.3)	
Hospital length of stay, days, mean ± SD	5.86±2.408[5,10]	4.72±1.709[4,11]	0.003

Preoperative hemoglobin levels were similar in both groups (10.83 ± 0.78 vs 10.82 ± 1.19 g/dL, p=0.162). Pre-discharge hemoglobin also did not differ significantly (10.70 ± 0.97 vs 11.05 ± 1.16 g/dL, p=0.088). Hysterectomy was required in 13 (26%) of women with APH and 18 (25.4%) without APH (p=0.936), while uterine conservation procedures (bilateral uterine artery ligation, multiple hemostatic sutures, or B-Lynch sutures) were comparable between groups (p=0.722).

The need for preoperative blood transfusion was similar in both groups, with nearly half of women in each group requiring 1–2 units. Higher transfusion requirements (≥5 units) were slightly more frequent in the APH group 10 (20%) vs 11 (15.5%), but this was not statistically significant (p=0.595).

Maternal morbidity, including bladder injury, postpartum hemorrhage, hemorrhagic shock, and ICU admission, occurred in both groups without significant differences (p=0.742). Notably, ICU admissions were slightly higher in the APH group 10 (20%) vs 13 (18.3%). However, hospital stay was significantly prolonged in women with APH (5.86 ± 2.40 days vs 4.72 ± 1.70 days, p=0.003).

Table 3: Neonatal Outcomes

Variable	APH (n=50)	No APH (n=71)	P value
Gestational week at delivery, mean ± SD [median, range]	36.04±1.41 [36,7]	36.71±1.49 [37,10]	0.014
Prematurity	29 (58)	18 (28.4)	0.000
Birth weight, kg, mean ± SD [median, range]	2.46±0.478 [2.50,2.10]	2.76±0.445 [2.80,2.80]	0.001
Apgar score,≥7 in 5 min, mean ± SD [median, range]	1.92±0.274 [2.0,1]	1.96±0.203 [2.0,1]	0.385
Malpresentation, (n%)			
Breech	8 (16)	2 (2.8)	0.011
Transverse	3 (6)	1 (1.4)	

Gestational age at delivery was significantly lower in the APH group (36.04 ± 1.41 weeks) compared to the non-APH group (36.71 ± 1.49 weeks, p=0.014). Consequently, the incidence of prematurity was markedly higher in the APH group 29 (58%) vs 18 (28.4%), p<0.001. Mean neonatal birth weight was also significantly lower in the APH group (2.46 ± 0.48 kg vs 2.76 ± 0.44 kg, p=0.001). Apgar scores at 5 minutes were comparable across groups (p=0.385). Fetal malpresentation was significantly more frequent in the APH group 8 (16%) vs 2 (2.8%), p=0.011, with breech being the most common.

Discussion

This study compared maternal profiles, obstetric complications, delivery patterns, and short-term outcomes in women with placenta praevia who experienced antepartum hemorrhage (APH) versus those who did not. Out of 121 cases reviewed, about 41% presented with APH. While maternal age, parity, gravidity, and history of cesarean section were similar across both groups, women with APH had a greater number of prior abortions. This suggests that repeated uterine instrumentation or scarring from abortion procedures may increase vulnerability to abnormal placental implantation and hemorrhage. Similar findings were found in Bangladesh, whereas other studies emphasized different predictors, such as complete placenta praevia and reduced cervical length rather than abortion history.[12,13,14] These inconsistencies may reflect population-specific risk profiles and variations in clinical practice.

In our study, the type of placenta praevia was not significantly different between groups, although complete (type IV) praevia was most frequent overall. Previous research has consistently shown that complete placenta praevia carries the highest risk for bleeding, another studying confirming its association with earlier and heavier hemorrhage.[13,15] The lack of a significant relationship in our findings may stem from the sample size, referral patterns, or active management strategies at our center. Nonetheless, the predominance of type IV praevia underscores its clinical importance in risk stratification and patient counseling.

Maternal complications were considerably higher in women with APH, especially anemia, premature rupture of membranes (PROM), and gestational diabetes mellitus (GDM). The link between APH and anemia is well documented, with studies by Fan et al. and Wang et al. reporting increased transfusion requirements in women with placenta previa and bleeding.[12,15] PROM, though

less frequently described, may occur as a consequence of bleeding-induced cervical changes. Interestingly, our study noted a higher prevalence of GDM in the APH group. A study described GDM in women with placenta previa, its direct association with APH is less established.[16] Local maternal factors such as body mass index, nutrition, or diagnostic thresholds may have influenced this outcome in our population.

Antepartum hemorrhage strongly influenced the mode of delivery. Women with APH were substantially more likely to undergo emergency lower segment cesarean section (LSCS), with bleeding itself being the primary indication in nearly half of these cases. This observation is in line with a study, which reported a threefold higher risk of emergency cesarean delivery in APH cases.[17] Similarly, Another study emphasized APH as a key factor necessitating urgent surgical intervention.[12] These results reaffirm the importance of preparedness for rapid operative delivery in hospitals managing placenta previa cases.

Maternal morbidity outcomes were somewhat different from findings in larger international studies. Despite higher rates of anemia diagnoses, there was no significant difference in hemoglobin levels post-discharge, transfusion volumes, or major morbidities such as hysterectomy, bladder injury, or ICU admission between groups. In contrast, a research documented markedly higher hysterectomy rates in APH cases.[13] The lower severity observed in our study may reflect effective local surgical practices, including conservative methods like uterine artery ligation and hemostatic suturing. However, consistent with global evidence, APH was associated with prolonged hospital stays, reflecting the added healthcare burden.[15]

Neonatal outcomes were notably affected by APH. Deliveries occurred at earlier gestational ages, resulting in higher rates of prematurity and lower birth weights. These associations have been repeatedly confirmed in prior studies.[12,13,15] Additionally, we observed a greater frequency of malpresentations, especially breech, among neonates born to mothers with APH. This is consistent with a findings which described malpresentation as a frequent complication in bleeding previa.[18] Despite the adverse outcomes in gestation and birth weight, Apgar scores at five minutes did not differ significantly, suggesting that timely neonatal intervention and supportive care may reduce immediate postnatal risks.

Conclusion

This study demonstrates that antepartum hemorrhage in placenta praevia substantially worsens both maternal and neonatal outcomes. Women with APH had higher rates of anemia, PROM, emergency cesarean delivery, prematurity, low birth weight, and malpresentation, underscoring the need for close antenatal monitoring and proactive delivery planning. A possible link between previous abortions and APH was also observed, warranting further research into reproductive history as a predictor of hemorrhagic risk. The differences in maternal morbidity compared with international reports may reflect the effectiveness of conservative surgical and supportive measures in our setting. Future multicenter studies with larger sample sizes are recommended to validate these findings and provide clearer guidance for clinical management.

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