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Predictors of Antepartum Hemorrhage in Patients with Placenta Previa

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ABSTRACT

Antepartum Hemorrhage (APH) is a significant complication in pregnancy that poses serious risks to both maternal and fetal health. **Objective:** To find the predictors of antepartum hemorrhage in patients with placenta previa among the local population of Pakistan. **Methods:** This cross-sectional study was conducted at PAF Hospital Mianwali from November 2023 to April 2024. A total of 208 patients were included in the analysis. Patients diagnosed with placenta previa confirmed through ultrasound examination were included in the study. **Results:** The mean age of the patients was 32.83 ± 4.56 years. Out of 208, there were 60 (28.8%) and nulliparous, 148 (71.2%) were multiparous. 85 (40.9%) had previous C-section and 30 (14.4%) were suffered from hypertension. 15 (7.2%) were diabetic and 180 (86.5%) were non-smokers. APH increased by 15% (Adjusted OR: 1.15, 95% CI: 1.05-1.26, p = 0.005). Furthermore, patients with a history of previous cesarean sections had over twice the odds of developing APH compared to those without this history (Adjusted OR: 2.12, 95% CI: 1.23-3.66, p = 0.007). **Conclusions:** This study concluded that advanced maternal age and a history of previous cesarean sections are significant predictors of antepartum hemorrhage in patients with placenta previa.

INTRODUCTION

Antepartum Hemorrhage (APH) is a major cause of maternal and fetal compromise in pregnancy whose major risks would include the following. Whereas placenta previa is a severe cause of APH that results from implantation of the placenta over or near the cervical. It goes with bleeding that can endanger the pregnancy and may potentially result in early delivery [1]. The prevalence has however been increasing mainly due to increased rates of cesarean section deliveries and advanced maternal age. Consequently, healthcare providers must be very careful and closely observe the patients with this disease [2]. The rates of occurrence of the placenta previa also vary, it is staked at 0,5-2% of all pregnancies and differences depending on geographical and demographic indicators [3]. There are four types of placenta previa, and management and prognosis vary depending on which of the four: total, partial, marginal, and low-lying placenta previa [4]. The situation in which the placenta occupies the area of the cervix is referred to as full placenta previa which poses the highest risk of bleeding and complications during labor. On the other hand, low-lying placenta previa may get better as the pregnancy progresses [5]. Frequent risk factors related to antepartum hemorrhage in placenta previa patients should be known to enhance the quality of maternal-fetal results. Some examples of risk factors include previous cesarean sections, multiparity, maternal age, and some diseases that will help in the early evaluation and treatment of such patients [6]. Meta-analyses of prior investigations have highlighted that the rate of placenta previa is higher in women who have had a previous C-

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section, possibly because of scarring of the uterine wall and hence placental attachment [7]. Furthermore, pregnant women in the advanced maternal age group are at higher risk for placenta previa and its consequential hemorrhage. Number of gestations is another important predictor that should be considered. There is increased placenta previa risk in multiparous than in nulliparous women mainly because of such changes in the structural makeup of the uterus following previous pregnancies [5]. Other factors, which include, multiple gestation and maternal medical complications like hypertension and diabetes also play a part in the development of placenta previa and consequently APH. It is of great clinical importance to identify these predictors because of the specificity of their manifestation [8]. Accurate early identification enables better assessment of the maternal condition and fetal well-being, as well as strategies regarding possible delivery. For example, women classified as high-risk deserve scheduled cesarean sections before the onset of labor, which can be useful in the prevention of severe hemorrhage and general enhancement of both maternal and neonatal health outcomes [9]. Besides clinical features, patient characteristics and the external environment, including cigarette smoking and uterine pathology, could further boost the likelihood of placenta previa and related APH [10]. Smoking is also reported to be with low birth weight preterm and even abnormal implantation of placenta during pregnancy. Any abnormality in the shape or size of the uterus whether congenital or as a result of other factors can cause developmental abnormalities in the placental locale increasing the prevalence of previa. Nonetheless, given such risk factors and predictors, more elaborate research efforts that discuss the relationships between such variables in different populations are still lacking [11-13].

The aim of this study was to find the predictors of antepartum hemorrhage in patients with placenta previa among the local population of Pakistan.

METHODS

This cross-sectional study was conducted at PAF Hospital Mianwali from November 2023 to April 2024. Approval from the hospital's ethical committee was obtained and informed consent was taken before collecting the data. Ethical approval was taken from ethical review committee Ref No. 005G Estb/EC/01/2023. A total of 208 patients were included in the analysis. Sample size was calculated using open Epi calculator. Assuming a prevalence of placenta previa, a 95% confidence interval, and a 5% margin of error, the required sample size was determined to include 208 participants, ensuring adequate power for statistical analysis. Adjustments were made for potential exclusions and dropouts. Patients diagnosed with placenta previa confirmed through ultrasound examination were included in the study. Pregnant women of all ages presented with symptoms of antepartum hemorrhage. Patients with multiple gestations, those with other complicating factors, such as placenta accreta, and who underwent elective cesarean delivery for reasons unrelated to previa were excluded. Data were collected from the patient's medical records, ensuring confidentiality and compliance with ethical guidelines. Data consists of demographic factors including; age, parity, prior pregnancies, and Socioeconomic status. Previous history of surgery, including the prior history of cesarean section; history of prior miscarriages; and history of prior placenta previa was taken. Some clinical predictors examined included a history of hypertension, diabetes, smoking status, and any observed uterine abnormalities in past pregnancies. Both maternal and neonatal details were documented concerning antepartum hemorrhage rates, number of cases requiring blood transfusions, gestational age at birth, type of delivery; vaginal or cesarean section, birth weight of the baby, and Apgar score. Data were analyzed using the software SPSS version 26.0. Descriptive statistics were calculated for all variables, including means, medians, and standard deviations for continuous variables, and frequencies and percentages for categorical variables. Univariate analysis was conducted to describe the distribution of individual variables within the study population. Continuous variables such as age, gestational age, and birth weight were summarized using means, medians, and standard deviations, while categorical variables like parity, socioeconomic status, type of delivery, and history of cesarean section were reported as frequencies and percentages.

RESULTS

Data were collected from 208 patients according to inclusion criteria of the study. The mean age of the patients was 32.83 ± 4.56 years. Out of 208, there were 60 (28.8%) and nulliparous, 148 (71.2%) were multiparous. 85 (40.9%) had previous C-section and 30 (14.4%) were suffered from hypertension. 15 (7.2%) were diabetic and 180 (86.5%) were non-smokers (Table 1).

Table 1: Demographic and Clinical Characteristics of Patients (n = 208)

Variables	Mean ± SD / Frequency (%)
Mean Age (Years)	32.83 ± 4.56
Parity	
Nulliparous	60 (28.8%)
Multiparous	148 (71.2%)
Previous Cesarean Sections	85 (40.9%)
Comorbid Conditions	
Hypertension	30 (14.4%)

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Diabetes	15 (7.2%)
Smoking Status	
Non-Smokers	180 (86.5%)
Smokers	28 (13.5%)

120 patients with Antepartum Hemorrhage (APH), a significant proportion (50%) had a history of previous cesarean sections, compared to only 28.4% of the 88 patients without APH (p = 0.005). Although the proportions of nulliparous and multiparous women were similar between the two groups, the study did not find significant differences for other predictors, including hypertension, diabetes, and smoking, with p-values of 0.350, 0.480, and 0.450, respectively (Table 2).

Table 2: Univariate Analysis of Predictors of Antepartum Hemorrhage (n = 208)

Predictors	APH (+) Frequency (%)	APH (-) Frequency (%)	p-Value
Nulliparous	30 (25%)	30 (34.1%)	0.150
Multiparous	90 (75%)	58 (65.9%)	0.150
Previous Cesarean Sections	60 (50%)	25 (28.4%)	0.005
Hypertension	20 (16.7%)	10 (11.4%)	0.350
Diabetes	10 (8.3%)	5 (5.7%)	0.480
Smoking	18 (15%)	10 (11.4%)	0.450

In figure 1 the results of the univariate analysis conducted to identify significant predictors of antepartum hemorrhage. Predictors that were evaluated included maternal age, parity, previous cesarean section, multiple pregnancies, placental abnormalities (e.g., placenta previa, placental abruption), smoking, hypertension, and gestational diabetes. Each variable was analyzed individually to assess its association with the incidence of antepartum hemorrhage. Statistical measures, such as Odds Ratios (ORs) with corresponding 95% Confidence Intervals (CIs), were presented. Variables with statistically significant associations ($p < 0.05$) were highlighted. The graphical representation included either a forest plot or bar chart to facilitate interpretation of the results.

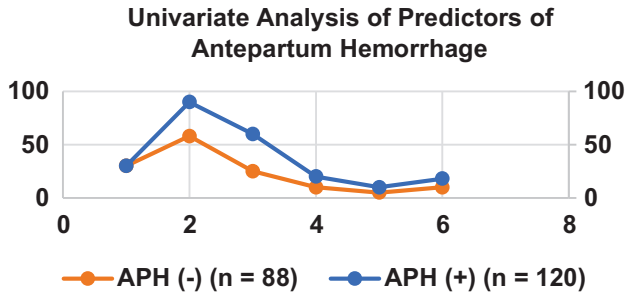

Figure 1: Univariate Analysis of Predictors of Antepartum Heomorrhage

APH increased by 15% (Adjusted OR: 1.15, 95% CI: 1.05-1.26, p = 0.005). Furthermore, patients with a history of previous cesarean sections had over twice the odds of developing APH compared to those without this history (Adjusted OR: 2.12, 95% CI: 1.23-3.66, p = 0.007). Other factors such as nulliparity, hypertension, diabetes, and smoking did not show significant associations with APH, indicating that age and prior cesarean deliveries are critical risk factors for this complication (Table 3).

Table 3: Multivariate Logistic Regression Analysis

Predictors	Adjusted OR (95% CI)	p-Value
Mean Age (Years)	1.15 (1.05-1.26)	0.005
Previous Cesarean Sections	2.12 (1.23-3.66)	0.007
Nulliparous	1.40 (0.82-2.39)	0.200
Hypertension	1.75 (0.83-3.70)	0.140
Diabetes	1.60 (0.65-3.94)	0.300
Smoking	1.25 (0.63-2.47)	0.520

This figure presented the results of the multivariate logistic regression analysis that was conducted to determine independent predictors of the outcome variable. Variables included in the model were those that had shown significance in the univariate analysis or were clinically relevant. Adjusted Odds Ratios (AORs) with corresponding 95% Confidence Intervals (CIs) were displayed to quantify the strength of association for each predictor. Variables with statistically significant associations ($p < 0.05$) were highlighted. The results were visualized using a forest plot to provide a clear comparison of the adjusted effects of each predictor (Figure 2).

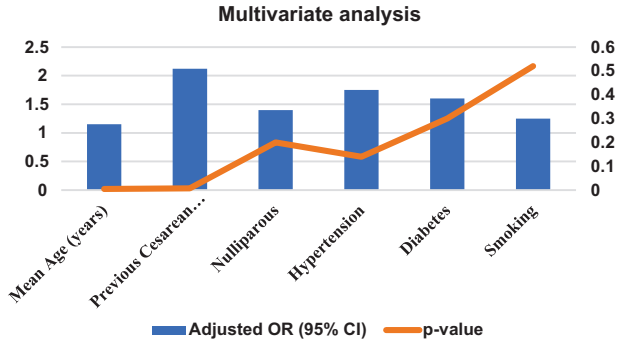

Figure 2: Multvariate Analysis of Logistic Regression Analysis

Infants in the APH group had a mean birth weight of 2,800 grams (range: 1,500-3,600), notably lower than the 3,200 grams (range: 2,500-4,000) observed in the non-APH group ($p < 0.001$). Additionally, the Apgar score at 1 minute was significantly lower in the APH group, with a median score of 7 (range: 3-9) compared to 8 (range: 6-9) in the non-APH group ($p < 0.001$). Furthermore, 33.3% of infants in the APH group were admitted to the NICU, compared to only 11.4% in the non-APH group ($p < 0.001$). The rate of preterm births was also significantly higher in the APH group, with 50% of infants born before 37 weeks gestation, compared to 22.7% in the non-APH group ($p < 0.001$) (Table 4).

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Table 4: Neonatal Outcomes Based on Antepartum Hemorrhage Status (n = 208)

Neonatal Outcomes	APH (+) Frequency (%)	APH (-) Frequency (%)	p-Value
Birth Weight (g)	2,800 (1,500-3,600)	3,200 (2,500-4,000)	<0.001
Apgar Score at 1 Minute	7 (3-9)	8 (6-9)	<0.001
NICU Admission	40 (33.3%)	10 (11.4%)	<0.001
Preterm Birth (<37 Weeks)	60 (50%)	20 (22.7%)	<0.001

In the APH group, 25% required blood transfusions, compared to only 5.7% in the non-APH group ($p < 0.001$). Additionally, a substantial majority of patients with APH (75%) underwent scheduled cesarean deliveries, while only 28.4% of those without APH had this procedure ($p < 0.001$). Conversely, vaginal delivery was much more common in the non-APH group, with 68.2% delivering vaginally compared to just 16.7% in the APH group ($p < 0.001$) (Table 5).

Table 5: Management Interventions for Antepartum Hemorrhage (n = 208)

Interventions	APH (+) Frequency (%)	APH (-) Frequency (%)	p-Value
Blood Transfusion	30 (25.0%)	5 (5.7%)	<0.001
Scheduled Cesarean Delivery	90 (75.0%)	25 (28.4%)	<0.001
Vaginal Delivery	20 (16.7%)	60 (68.2%)	<0.001
Hospital Stay > 3 Days	50 (41.7%)	10 (11.4%)	<0.001

DISCUSSION

The findings suggested that measures of gestational age and prior surgical deliveries are key contributors to APH. Also, knowledge has been gained on the effect of APH on neonatal mortality and the approaches used in the management of affected patients [14]. A variety of age-related physiological alterations may change the structure of the uterus and the mode of placental attachment, putting older women more at risk of such diseases [15]. Further, the alteration of preoperative findings toward a significantly increased risk of APH reported on patients who had a prior cesarean section was also supported by other previous studies [16]. Previous surgeries such as cesarean sections may cause scarring and changes in the endometrium, which may lead to poor placentation, causing bleeding. This underscores the need for comprehensive obstetrics history and assessment during prenatal and antenatal visits, especially for those with previous C-sections [17]. The conclusions drawn about the neonatal outcomes are indeed alarming and they establish the dangers inherent in APH. It was also established that infants born to mothers who experienced APH had low birth weights, reduced Apgar scores, and were more admitted to the NICU than the ones who did not experience APH. These outcomes can be attributed to the fact that maternal blood loss has adverse effects on placental blood flow and oxygen delivery to the fetus which in turn presents adverse effects to fetal growth and development [18]. Moreover, the APH group had more preterm births than controls, and this affirms the need for improved control of pregnancies with placenta previa complications. The disposition of antepartum hemorrhage in patients who have placenta previa continues to be one of the difficult areas of obstetrics. Consequently, this study shows that a considerable number of patients with APH needed blood transfusion and elective LSCS therefore calling for early management to prevent such complications [19, 20]. While this study provided valuable insights, it is essential to acknowledge its limitations. The retrospective design may introduce biases related to data accuracy and completeness. Additionally, the single-center nature of the study may limit the generalizability of the findings.

CONCLUSIONS

This study concluded that advanced maternal age and a history of previous cesarean sections are significant predictors of antepartum hemorrhage in patients with placenta previa. The study highlighted the critical need for careful monitoring and proactive management in at-risk populations to improve maternal and neonatal outcomes.

Authors Contribution

Conceptualization: SB, HA
Methodology: UI
Formal analysis: UI, ST
Writing, review and editing: SB, HA, SA, NK, ST

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

The authors declare no conflict of interest.

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REFERENCES

[1] King LJ, Mackeen AD, Nordberg C, Paglia MJ. Maternal risk factors associated with persistent placenta previa. Placenta. 2020 Sep; 99: 189-92. doi: 10.1016/j.placenta.2020.08.004.

[2] Oğlak SC, Tunç Ş, Obut M, Şeker E, Behram M, Tahaoğlu AE. Maternal near-miss patients and maternal mortality cases in a Turkish tertiary referral hospital. Ginekologia Polska. 2021 Mar; 92(4): 300-5. doi: 10.5603/GP.a2020.0187.

[3] Obut M and Oğlak SC. Retrospective evaluation of placenta previa cases: A secondary-center experince. Namık Kemal Tıp Dergisi. 2020 Aug; 8(2): 197-203. doi: 10.37696/nkmj.653185.

[4] Feng Y, Li XY, Xiao J, Li W, Liu J, Zeng X et al. Risk factors and pregnancy outcomes: complete versus

DOI: https://doi.org/10.54393/pjhs.v6i1.2338

incomplete placenta previa in mid-pregnancy. Current medical science. 2018 Aug; 38: 597-601. doi: 10.1007/s11596-018-1919-9.

[5] Gibbins KJ, Einerson BD, Varner MW, Silver RM. Placenta previa and maternal hemorrhagic morbidity. The Journal of Maternal-fetal & Neonatal Medicine. 2018 Feb; 31(4): 494-9. doi: 10.1080/14767058.2017.1289163.

[6] Dorkham MC, Epee-Bekima MJ, Sylvester HC, White SW. Experience of Bakri balloon tamponade at a single tertiary centre: a retrospective case series. Journal of Obstetrics and Gynaecology. 2021 Aug; 41(6): 854-9. doi: 10.1080/01443615.2020.1799341.

[7] Bahar A, Abusham A, Eskandar M, Sobande A, Alsunaidi M. Risk factors and pregnancy outcome in different types of placenta previa. Journal of Obstetrics and Gynaecology Canada. 2009 Feb; 31(2): 126-31. doi: 10.1016/S1701-2163(16)34096-8.

[8] Jain V, Bos H, Bujold E. Guideline No. 402: diagnosis and management of placenta previa. Journal of Obstetrics and Gynaecology Canada. 2020 Jul; 42(7): 906-17. doi: 10.1016/j.jogc.2019.07.019.

[9] Jauniaux ER, Alfirevic Z, Bhide AG, Belfort MA, Burton GJ, Collins SL *et al.* Placenta praevia and placenta accreta: diagnosis and management: green-top guideline no. 27a. Bjog. 2018 Dec; 126(1): e1-48. doi: 10.1111/1471-0528.15306.

[10] Grönvall M, Stefanovic V, Paavonen J, Loukovaara M, Tikkanen M. Major or minor placenta previa: Does it make a difference?. Placenta. 2019 Sep; 85: 9-14. doi: 10.1016/j.placenta.2019.08.080.

[11] Fadl SA, Linnau KF, Dighe MK. Placental abruption and hemorrhage-review of imaging appearance. Emergency Radiology. 2019 Feb; 26: 87-97. doi: 10.1007/s10140-018-1638-3.

[12] Facchinetti F, Venturini P, Verocchi G, Volpe A. Comparison of two preparations of dinoprostone for pre-induction of labour in nulliparous women with very unfavourable cervical condition: a randomised clinical trial. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2005 Apr; 119(2): 189-93. doi: 10.1016/j.ejogrb.2004.06.039.

[13] Madden N and Kominiarek MA. Nigel Madden, MD. OBG Management.;35:7.

[14] Durukan H, Durukan ÖB, Yazıcı FG. Planned versus urgent deliveries in placenta previa: maternal, surgical and neonatal results. Archives of Gynecology and Obstetrics. 2019 Dec; 300: 1541-9. doi: 10.1007/s00404-019-05349-9.

[15] Long SY, Yang Q, Chi R, Luo L, Xiong X, Chen ZQ. Maternal and neonatal outcomes resulting from antepartum hemorrhage in women with placenta previa and its associated risk factors: A single-center retrospective study. Therapeutics and Clinical Risk Management. 2021 Jan: 31-8. doi: 10.2147/TCRM.S288461.

[16] Fan D, Wu S, Liu L, Xia Q, Wang W, Guo X *et al.* Prevalence of antepartum hemorrhage in women with placenta previa: a systematic review and meta-analysis. Scientific Reports. 2017 Jan; 7(1): 40320. doi: 10.1038/srep40320.

[17] Kuribayashi M, Tsuda H, Ito Y, Tezuka A, Ando T, Tamakoshi K *et al.* Evaluation of the risk factors for antepartum hemorrhage in cases of placenta previa: a retrospective cohort study. Journal of International Medical Research. 2021 Nov; 49(11): 03000605211054706. doi: 10.1177/03000605211054706.

[18] Cao P, Ji L, Qiao C. Nomogram based on clinical characteristics and ultrasound indicators for predicting severe postpartum hemorrhage in patients with anterior placenta previa combined with previous cesarean section: a retrospective case-control study. BioMed Central Pregnancy and Childbirth. 2024 Aug; 24(1): 572. doi: 10.1186/s12884-024-06706-6.

[19] Zhou Y, Song Z, Wang X, Zhang M, Chen X, Zhang D. Ultrasound-based nomogram for postpartum hemorrhage prediction in pernicious placenta previa. Frontiers in Physiology. 2022 Aug; 13: 982080. doi: 10.3389/fphys.2022.982080.

[20] Mitsuzuka K, Togo A, Nakajima R, Kanno Y, Sato K, Ishimoto H. Is cervical length a useful predictor of antepartum hemorrhage in patients with placenta previa?. Tokai Journal of Experimental and Clinical Medicine. 2022 Dec; 47(4): 204-8.