Original Article

Short Cervix A Predictor of Massive Haemorhage in Patient with Placenta Previa

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ABSTRACT

Objective: The aim of this study was to investigate the relationship between cervical length and risk for massive hemorrhage in placenta previa and determine whether a short cervix can be used as a predictor.

Study Design: A prospective cohort study.

Place and Duration of Study: This study was conducted at the Obstet & Gynae Department, Saidu Group of Teaching Hospital, Swat from 15th, January 2020 to 14th December 2023.

Methods: A total of 200 pregnant women in their third trimester diagnosed by Radiologist as placenta previa from the ages between20 and 36 weeks. Using trans-vaginal ultrasound of the cervix, cervical length was assessed, and patients were categorized as having a short cervix (Cervical Length ≤25 mm) or those with normal cervical length (> 25mm). The primary endpoint was the occurrence of massive bleeding (over 1000 mL blood loss and which need blood transfusion during caserean section). Secondary outcomes were maternal and neonatal morbidity.

Results: The study included 200 pregnant women diagnosed with placenta previa, divided into two groups according to cervical length; short cervix (≤ 25 mm) in group I; 80 women and 120 with a normal cervix (> 25 mm). Nevertheless, the group of short cervix versus that with normal one was delivered at a significantly earlier gestational age (35.9 ± 1.6 weeks vs. 36.5± 1.3 weeks; p = 0.04). a short cervix remained an independent predictor of massive hemorrhage (AOR 2.3; 95% CI: 1.4 - 3.8, p=0.01). Additional significant predictors were prior cesarean delivery (AOR 1.8; 95% CI: 1.1 - 3·0, p = 0.04) and complete previa (AOR.9; 95% CI 1.2 - 3.1, p = 0.03).

Conclusion: The significance of our study is in providing an understanding on the association between cervical length and hemorrhagic risk in placenta previa.

Key Words: Placenta Previa, Short Cervix, Massive Hemorrhage, Predictive Factors.

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INTRODUCTION

Placenta previa is defined as a placental implantation that partially or totally covers the internal cervical os, and it is considered to be one of the most important high-risk obstetric complications [1]. One of the most serious risks in patients with placenta previa is massive hemorrhage, that may result intrapartum maternal morbidity and mortality associated with it, and adverse neonatal outcomes [2, 3]. In order to optimize clinical management and outcomes, women at high risk of massive hemorrhage need to be identified early [4].

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Traditionally, the degree of placental coverage, maternal age and parity and history of cesarean deliveries have been used to stratify risk for hemorrhage in cases with a diagnosis of PP [5, 6]. Nonetheless, a new line of evidence has indicated that cervical length measured by transvaginal ultrasound may provide supplementary and even more specific information about the risk for hemorrhage [7]. Although short cervix is a well-known risk factor for preterm birth and other obstetric complications in general [8]. It remains largely uninvestigated with regard to Placenta previa.Therefore, it is very important to master whether cervical length can predict just before cascade usage for patients with placenta previa [9]. Precisely characterizing risk would allow providers to optimize monitoring and expectant management strategies, like timing of delivery or preparation for potential blood transfusions [10, 11].

The purpose of this study was to evaluate the association between placenta previa patients' cervical length and their likelihood of experiencing catastrophic hemorrhage. From an existing cohort of pregnant women with this condition, they tried to uncover if a finding of a short cervix was predictive for massive hemorrhage and hence whether clinical practice requirements need adjusting. The findings of this study

could facilitate the design of more accurate risk prediction models, and in turn support clinical decisions for maternal and neonatal outcomes among patients with placenta previa.

METHODS

A total of 200 pregnant women diagnosed with placenta previa which were defined at week 20–36 weeks. The study included patients who had ultrasound findings showing complete placenta previa before 28 weeks of gestation, singleton pregnancy and the ability to measurement cervical length through trans-vaginal ultra-sonography. Exclusion criteria were multi-fetal pregnancies, secondary obstetric complications (e.g. placental abruption or accreta), and incomplete medical records. The primary endpoint was massive hemorrhage, which is over 1000 mL blood loss at caserean section and need blood transfusion. Secondary outcomes included maternal morbidity (need for hysterectomy, ICU admission) and neonatal outcome measures (Apgar scores, NICU admission).

Data Collection: The following information was gathered from the patients' medical records; Maternal demographic data (age, parity [previous deliveries of ≥22 weeks gestation], prior cesarean section, obstetric history and details related to the current pregnancy. The principle predictor was cervical length, assessed by trans-vaginal ultrasound at standard antenatal visits. Patients; Patients were split into two groups based on the measurement of their cervical length (short cervix ≤ 25 mm and normal > 25 mm).

Statistical Analysis: Version 25.0 of SPSS software was utilized to conduct the statistical analysis on these data. Comparisons of massive hemorrhage between the short cervix group and normal cervical length group were performed using chi-square test. We then conducted a multivariable logistic regression to control for potential confounding, such as maternal, parity, history of cesarean delivery. The findings were presented as odds ratios (ORs) with 95% confidence intervals (CIs), and statistical significance was defined as a p-value of less than 0.05.

Ethical Considerations: This work was approved by the Saidu group of teaching hospital review board (IRB), and all data pertaining to patient information were de-identified. The study was performed according to the Declaration of Helsinki (guidelines). Informed consent was obtained.

RESULTS

The study included 200 pregnant women diagnosed with placenta previa, divided into two groups according to cervical length; short cervix (≤ 25 mm) in group oneI; 80 women and 120 with a normal cervix (> 25 mm). Clinical and demographic traits maternal age, parity, prior cesarean birth, and gestational age at diagnosis did not significantly differ between the two groups. Nevertheless, the group of short cervix versus that with normal one was delivered at a significantly earlier gestational age (35.9 ± 1.6 weeks vs. 36.5± 1.3 weeks; p = 0.04).

In terms of the incidence of massive hemorrhage, it was significantly higher in short cervix 35.0% compared to normal cervix (19.2% p = 0.01). Also, women with a short cervix were more likely to receive blood transfusion (32.5 vs. 17.5%, p =0.02). There was a trend towards higher rate of hysterectomy in the short cervix group; however, this difference was not statistically significant (8.8% vs. 4.2%, p = 0.19).

Maternal morbidity was also increased in women with a short cervix, including higher rates of ICU admission (17.5% vs. 7.5%, p=0.03) and longer hospital stay duration [4.8 ±2.1 days vs. 3.8±1.4 days p=0.04]. The short cervix group had higher rates of postpartum hemorrhage (27.5% vs. 14.2%, p = 0.09) but the difference in percentages between groups was similar.

Neonatal outcomes were a 5 min Apgar <7 which was higher among women with short cervix (21.3% vs. 9.2%, p=0.02) and NICU admission that occurred more frequently in the same group of patients than control (22.5% vs. 11.7%, p=0.01). Average birth weight (2780 ± 545 grams vs. 2955 ± 489 grams, p =0.07) and the rate of parity showed no statistical difference.

Table No. 1: Study population's demographic and clinical characteristics

Characteristic	Total (N = 200)	Short Cervix (≤ 25 mm) (N = 80)	Normal Cervix (> 25 mm) (N = 120)	p-value
Maternal Age (years), mean ± SD	30.2 ± 4.5	30.5 ± 4.3	29.9 ± 4.7	0.47
Parity, n (%)				
Nulliparous	81 (40.5%)	34 (42.5%)	47 (39.2%)	1.00
Multiparous	119 (59.5%)	46 (57.5%)	73 (60.8%)	1.00
Previous Cesarean Delivery, n (%)	50 (25.0%)	22 (27.5%)	28 (23.3%)	0.52
Gestational Age at Diagnosis (weeks), mean ± SD	24.6 ± 2.8	24.4 ± 2.9	24.7 ± 2.7	0.63
Gestational Age at Delivery (weeks), mean ± SD	36.2 ± 1.4	35.9 ± 1.6	36.5 ± 1.3	0.04*
Placenta Previa Type, n (%)				
Complete	113 (56.5%)	54 (67.5%)	59(49.2%)	0.24
Partial	87 (43.5%)	26 (32.5%)	61 (50.8%)	0.24

Significant p-value < 0.05

Table No. 2: Incidence of Massive Hemorrhage

Outcome	Total (N = 200)	Short Cervix (≤ 25 mm) (N = 80)	Normal Cervix (> 25 mm) (N = 120)	p-value
Massive Hemorrhage, n (%)	51 (25.5%)	28 (35.0%)	23 (19.2%)	0.01*
Blood Transfusion Required, n (%)	47 (23.5%)	26 (32.5%)	21 (17.5%)	0.02*
Hysterectomy, n (%)	12 (6.0%)	7 (8.8%)	5 (4.2%)	0.19

Table No. 3: Maternal Morbidity in Patients with Placenta Previa

Morbidity	Total (N = 200)	Short Cervix (≤ 25 mm) (N = 80)	Normal Cervix (> 25 mm) (N = 120)	p-value
ICU Admission, n (%)	23 (11.5%)	14 (17.5%)	9 (7.5%)	0.03*
Postpartum Hemorrhage, n (%)	39 (19.5%)	22 (27.5%)	17 (14.2%)	0.09
Hospital Stay (days), mean ± SD	4.2 ± 1.8%	4.8 ± 2.1%	3.8 ± 1.4%	0.04*

Table No. 4: Results for Newborns

Neonatal Outcome	Total (N = 200)	Short Cervix (≤ 25 mm) (N = 80)	Normal Cervix (> 25 mm) (N = 120)	p-value
Apgar Score < 7 at 5 minutes, n (%)	29 (14.5%)	17 (21.3%)	12 (9.2%)	0.02*
NICU Admission, n (%)	32 (15.9%)	18 (22.5%)	14 (11.7%)	0.01*
Birth Weight (grams), mean ± SD	2875 ± 512	2780 ± 545	2955 ± 489	0.07

Table No. 5: Multivariate Logistic Regression Examination of Massive Hemorrhage Predictors

Variable	Adjusted Odds Ratio (AOR)	95% Confidence Interval (CI)	p-value
Short Cervix (≤ 25 mm)	2.3	1.4 - 3.8	0.01*
Maternal Age (> 35 years)	1.5	0.9 - 2.5	0.12
Previous Cesarean Delivery	1.8	1.1 - 3.0	0.04*
Gestational Age at Delivery	0.8	0.7 - 1.1	0.26
Complete Placenta Previa	1.9	1.2 - 3.1	0.03*

Based on multivariate logistic regression analysis, a short cervix remained an independent predictor of massive hemorrhage (AOR 2.3; 95% CI: 1.4 - 3.8, p=0.01). Additional significant predictors were prior cesarean delivery (AOR 1.8; 95% CI: 1.1 - 3·0, p = 0.04) and complete previa (AOR.9; 95% CI 1.2 - 3.1, p = 0.03). Massive hemorrhage was not significantly associated with maternal age or gestational age at delivery.

DISCUSSION

The results of this study indicate that short cervix (≤ 25 mm) is strongly associated with critical massive hemorrhage in patients with placenta previa. It is in keeping with a mounting body of evidence that cervical length may indeed have an important role to play in the prediction of poor maternal outcomes for placental conditions.

Among the short cervix group, there were 35.0% with caused massive hemorrhage; this percentage is significantly higher than that in normal cervix group (19.2%). This is similar to the work from a researcher who evaluated the incidence of hemorrhage based on cervical length in women at term without a history of spontaneous PTB for which they reported that approximately 30% (similar to our findings) who had a CL < 25 mm delivered following an episode of antepartum hemorrhage[12]. Nevertheless, normal cervix group rate of hemorrhage in our study was slightly greater to 15% reported another researcher and it might be explained on the differences regarding populations studied and clinical management or even definition for major hemorrhage responder were different [13].

Blood transfusion was indicated statistically significantly more often in women with a short cervix group than the normal cervix, 32.5% vs. 17.5%; p =0.02. This result is consistent with the results of a research. Similar to previous reports of increased transfusion rates amongst women with a short cervix [14]. Their study reported rates of transfusion at 35% in the short cervix group, , closely matching the 32.5% observed in our cohort. The consistency of this finding strengthens the ability to predict risk for hemorrhage with cervical length [15].

More mothers experienced morbidity in the short-cervix group compared with controls (ICU admission and longer hospital stay). In our study the ICU admission rate of 17.5% is higher than the 10% reported by another researcher in a comparable cohort, suggesting that our study population may have had more severe cases of placenta previa or that there may have been differences in the thresholds for ICU admission [16]. The longer hospital stay in those with a short cervix is similar to the same findings in a research who, using data of their own cohort for patients with short cervix, reported a hospital stay in average lasting 5 days, just above the value observed in our study: 4.8.

The short cervix group had significantly worse neonatal outcomes, including low Apgar scores and NICU admissions. In our study the rate of low 5-minute Apgar (<7) was found to be 21.3% which is higher than the 15% reported by Silver et al., (2018) in their analysis of neonatal outcomes in placenta previa cases with a short cervix [16]. As a proportion, 22.5% of our NICU admissions is higher than other studies like the Tsai et al., (2011) which may be due to variance in either personnel or patients among institutions [17].

According to multivariate logistic regression analysis, the probability of massive hemorrhage being increased by AOR of2.3 times. [18-20] This is of the same order as 2.5 for AOR in Rouse et al (2020), adding support to cervical length being one of the most important criteria for hemorrhage risk stratification [14]. Previous cesarean delivery and complete placenta previa have also been shown by our study to be significant predictors, as illustrated recently in the meta-analyses conducted by Rosenberg et al., (2020) [5] who stressed that these features are not independent risks presented together.

CONCLUSION

The significance of our study is in providing an understanding on the association between cervical length and hemorrhagic risk in placenta previa. Cervical length measurement is an essential part of the antenatal care management in cases of placenta previa and provides a useful tool for predicting risk assessment to prevent massive hemorrhage thus improved overall clinical outcomes.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Neelum Zahir, Sadaf Ali
Drafting or Revising Critically:	Sadaf Ali, Maryam Afridi
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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