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Dr. Bharti Maheshwari
Professor & Head, Obstetrics & Gynaecology Department, Muzaffarnagar Medical College, Muzaffarnagar, Uttar Pradesh, India

Dr. Yashi Pandey
PG Resident, Obstetrics & Gynaecology Department, Muzaffarnagar Medical College, Muzaffarnagar, Uttar Pradesh, India

Dr. Sangeeta Singhal
Professor, Paediatrics Department, Muzaffarnagar Medical College, Muzaffarnagar, Uttar Pradesh, India

Corresponding Author:
Dr. Bharti Maheshwari
Professor & Head, Obstetrics & Gynaecology Department, Muzaffarnagar Medical College, Muzaffarnagar, Uttar Pradesh, India

To study the maternal and perinatal outcomes in patients suffering from placenta previa

Dr. Bharti Maheshwari, Dr. Yashi Pandey and Dr. Sangeeta Singhal

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Abstract
Background: Placenta previa is a disorder which occurs during pregnancy that is characterized by the presence of placental tissue close to or covering the cervix increasing the risk of antepartum, intrapartum and postpartum hemorrhage. Rapid significant loss of intravascular volume can lead to hemodynamic instability, decreased oxygen delivery, decreased tissue perfusion, cellular hypoxia, organ damage and death. Infants born to such patients are also at risk of premature deliveries and increased perinatal mortality.
Method: This prospective randomized clinical study was conducted in the Department of Obstetrics & Gynecology, Muzaffarnagar Medical College, Muzaffarnagar, Uttar Pradesh the period 2018-2020 after considering the inclusion and exclusion criterias.
Result: Primigravida were more affected than multigravia. Majority patients underwent Emergency LSCS than Elective one. PPH, Pre-operative and Post-operative anaemia and Adherent placenta was significantly more among Emergency LSCS. NICU admission was significantly more among Emergency LSCS.
Conclusion: The current study suggested that there is an association between advancing age, previous caesarean section and abortion as the risk factors for placenta previa. Placenta previa as noted from the study was seen to be associated with increased risk of maternal complications like PPH and neonatal complications including prematurity and low birth weight.

Keywords: Placenta previa, antepartum hemorrhage, postpartum hemorrhage, Prematurity, Intracranial hemorrhage, Respiratory distress syndrome

Introduction
Placenta previa is a disorder which occurs during pregnancy that is characterized by the presence of placental tissue close to or covering the cervix. The greatest risk associated with placenta previa is bleeding which often occurs as the lower part of the uterus begins stretching and lengthening takes place in the preparation for delivery [1].
For women who have not had a second trimester ultrasound, antepartum bleeding after 20 weeks of gestation mandates the sonographic determination of placental location before digital vaginal examination is performed as palpation of uterus can lead to the severe hemorrhage [2].
The reported incidence of placenta previa averages 0.3% or 1 case in 300 to 400 deliveries [3]. Multiparity, advanced maternal age, cigarette smoking, cocaine usage, multiple pregnancy, previous caesarean delivery, history of abortions or uterine surgical procedures are some of the risk factors contributing to the development of placenta previa [4-8].
Placenta previa is classified as “complete” when the placenta completely covers the internal cervical os, “partial” when the placenta partially covers the os, “marginal” when the lower edge of the placenta just reaches the os and “low-lying” when the placenta is in the lower segment but does not reach the internal os of the cervix [9].
Deficiency of the Decidua basalis at the endometrial scar is thought to be the cause of Placenta accreta. It is a form of morbidly adherent placenta with superficial uterine attachment. Placenta increta is characterized by placental penetration into the myometrium. Placenta percreta is the most severe form of morbidly adherent placenta in which the placenta penetrates through the uterine wall and other pelvic organs, most commonly the bladder. Morbidly adherent placenta is a serious complication of pregnancy and is associated with massive intrapartum hemorrhage and high maternal morbidity and mortality [10].
The diagnosis of placenta previa is based on identification of placental tissue covering the internal cervical os on an imaging study, typically ultrasound.

Transabdominal ultrasound should be performed first, if it shows placenta previa or the findings are uncertain, transvaginal sonography should be performed to better define placental position.

Placenta previa increases the risk of antepartum, intrapartun and postpartum hemorrhage. Rapid significant loss of intravascular volume can lead to hemodynamic instability, decreased oxygen delivery, decreased tissue perfusion, cellular hypoxia, organ damage and death.[11]Infants born to such patients are also at risk of premature deliveries and increased perinatal mortality.

PP is known to be associated with prematurity. However, there is debate about the effect of PP on fetal growth; some studies have suggested that pregnancies with PP are at risk of low birth weight and a low Apgar score [12].

This study was done for the assessment of the maternal and perinatal outcomes in patients suffering from placenta previa and the risk factors of placenta previa.

Materials and method

This prospective randomized clinical study was conducted after clearance from Board of Studies and Ethical committee in the Department of Obstetrics & Gynecology, Muzaffarnagar Medical College, Muzaffarnagar, Uttar Pradesh during the period 2018-2020.

The sample size was calculated by using the G-power software with 80% power and 5% significance level. The total sample size was determined to be 100. The study subjects were chosen as per the inclusion and exclusion criteria:

Inclusion criteria

- All cases of placenta previa diagnosed by clinical and ultrasonography admitted during the study period.
- Gestational age > 28 weeks.
- Age 20-35 years

Exclusion criteria

- Multiple pregnancies
- APH due to any other cause
- Gestational age <28 weeks
- Patients with orthopaedic /musculoskeletal pathology.

Study procedure

The Antenatal investigations done were complete hemogram, Blood grouping and Rh typing serology, blood sugar, Thyroid function test, urine routine examination and ultrasound. The Maternal outcome was assessed in the form of mode of delivery, any antenatal, intranatal and postnatal complications was noted. Neonatal outcome measured were gestational age, birth weight, APGAR score, Neonatal Intensive Care Unit (NICU) admission, perinatal morbidity and mortality was noted.

Statistical analysis

The data was entered into the Microsoft excel and the statistical analysis was performed by statistical software SPSS version 25.0. The Quantitative (Numerical variables) were present in the form of mean and SD and the Qualitative (Categorical variables) were present in the form of frequency and percentage.

The student t-test was used for comparing the mean values between the 2 groups whereas chi-square test was applied for comparing the frequency. The p-value was considered to be significant when less than 0.05.

Results

The mean age of the study population was 30.29±2.98 years (24-41) with 41.0% subjects 41.0% subjects in the age group of ≤ 30 years and 59.0% among > 30 years. Booked status was reported among 33.0%subjects. Primigravida was reported among 36.0%, Gravida 2/3 among 58.0% and Grand multipara among 6.0%. Majority of subjects underwent LSCS (72.0%) followed by Vaginal delivery (28.0%). Elective LSCS was done for 28 and Emergency LSCS for 44. Male baby was delivered among 57.0% and female among 43.0% women. Gestational age was < 34 among 51.0%, 34-37 among 10.0% and > 37among 39.0% women. There were 45.0% low birth weight (< 2500 gm) babies. (Table 1)

Table 1: Baseline characteristics of the study population

		Frequency	Percent
Age (in years)	≤ 30 years	41	41.0%
	> 30 years	59	59.0%
Booking status	Booked	33	33.0%
	Unbooked	67	67.0%
Parity	Primi gravida	36	36.0%
	Gravida 2/3	58	58.0%
	Grandmultipara	6	6.0%
Mode of Delivery	Vaginal	28	28.0%
	LSCS	72	72.0%
	Elective	28	38.9%
	Emergency	44	61.1%
Gender of baby	Male	57	57.0%
	Female	43	43.0%
Gestational age	< 34	71	71.0%
	34-37	10	10.0%
	> 37	19	19.0%
Baby weight	< 2500 gm	45	45.0%
	≥ 2500 gm	55	55.0%

Fetal movements were Abnormal among 13.0%. Prior episodes of bleeding were reported among 35.0% subjects. Previous history of LSCS was reported among 26.0% women. There was less association of placenta previa with previous history of abortion and LSCS. NICU admission was reported among 17.0% children with mostly babies were discharged within 10 days of delivery. Perinatal Mortality occurred in 7.0% children. (Table 2)

Table 2: Distribution of the perinatal characteristics among study population

		Frequency	Percent
Fetal movements	Abnormal	17	13.0%
	Normal	83	83.0%
Prior episodes of bleeding	No	65	65.0%
	Yes	35	35.0%
Previous history of LSCS	No	74	74.0%
	Yes	26	26.0%
Previous history of Abortion	No	89	89.0%
	Yes	11	11.0%
NICU admission	No	83	83.0%
	Yes	17	17.0%
Discharge of baby from NICU	<5	60	60.0%
	5 – 10	35	35.0%
	>10	5	5.0%
Perinatal Mortality	No	93	93.0%
	Yes	7	7.0%

PPH, Pre-operative and Post-operative anaemia and Adherent placenta was significantly more among Emergency LSCS. A higher percentage of complications were reported among Emergency LSCS. NICU admission was significantly more among Emergency LSCS (30.0%) compared to Elective LSCS

(15.6%). APGAR at 1 min ≥ 5 and APGAR at 5 min ≥ 7 was significantly more among Emergency LSCS.(Table 3)

Table 3: Distribution of maternal and fetal complications among subjects with elective and emergency LSCS

		Elective LSCS		Emergency LSCS		p-value
		Frequency	%	Frequency	%	
Complications	PPH	2	6.3%	9	22.5%	0.001*
	Shock	0	0.0%	1	2.5%	0.124
	Pre-operative anemia	20	62.5%	40	100.0%	0.001*
	Post-operative anemia	10	31.3%	38	95.0%	0.001*
	DIC	0	0.0%	0	0.0%	1.000
	Adherent placenta	0	0.0%	1	2.5%	0.124
APGAR score at 1 minute	< 5	1	1.0%	5	5.0%	0.047*
	≥ 5	99	99.0%	95	95.0%	
APGAR score at 5 minutes	< 5	1	1.0%	5	5.0%	0.047*
	≥ 5	99	99.0%	95	95.0%	
NICU admission		5	15.6%	12	30.0%	0.047*

Respiratory Distress Syndrome was reported among 5 (5%), Prematurity among 81 (81%), FGR among 20 (20%), Intracranial hemorrhage among 5 (5%), Intrauterine asphyxia among 25 (25%), Fetal abnormalities among 1 (1%) and Anaemia among 5(5%). (Table 4)

Table 4: Distribution of fetal complications

Complications of baby	Frequency	Percentage
Respiratory Distress Syndrome	5	5.0%
Prematurity	81	81.0%
FGR	20	20.0%
Intracranial hemorrhage	5	5.0%
Intrauterine asphyxia	25	25.0%
Fetal abnormalities	1	1.0%
Anaemia	5	5.0%

APGAR score, Mortality, NICU admission and discharge in 10 days was significantly more among subjects with gestational age < 34 weeks. There were more complications among women with pre-term babies. (Table 5)

Table 5: Comparison of outcome according to gestational age

	Gestational age			p-value
Outcomes	< 34 weeks	34-37 weeks	> 37 weeks	
APGAR score	4	0	1	0.045*
	5.6%	0.0%	5.3%	
Mortality	6	0	1	0.043*
	8.5%	0.0%	5.3%	
NICU admission	14	1	2	0.001*
	19.7%	10.0%	10.5%	
Discharge in 10 days	50	9	13	0.001*
	70.4%	90.0%	68.4%	

Mortality was significantly more among subjects with Emergency LSCS, APGAR score, NICU admission and duration of hospital stay > 10 days. There were more complications among women with pre-term babies. (Table 6)

Table 6: Comparison of perinatal outcome according to different maternal factors

Outcomes	Mortality	p-value
Emergency LSCS	5 (71.4%)	0.001*
Elective LSCS	0 (0.0%)	1.000
APGAR score	4 (57.1%)	0.005*
NICU admission	5 (71.4%)	0.001*
Duration of hospital stay > 10 days	4 (57.1%)	0.001*

Discussion

This study investigated the association between different risk factors and adverse maternal and neonatal outcomes with Placenta praevia.

Age

In current study, the mean age of the study population was 31.69±4.04 years (20-35) with 41.0% ≤ 30 years and 59.0% were more than 30 years. This finding was similar to *Adere et al.* [13] advanced maternal age ≥ 35 connoted 6-fold increase in risk of placenta previa, *Sorakayalapeta MR et al.*, [13] major number of cases fell into the age group 25-29years with mean age being 25.6 years

Prasanth et al. [14] found that the incidence of Placenta previa was highest in the age group of 20-29 years i.e., 72.9%, followed by 30-35 year age group, above 35 year age group and less than 19 year age group, i.e., 20.3%, 5.1%, 1.7% respectively. This is thought to be due to atherosclerotic changes in the uterus resulting in under perfusion and infraction of the placenta, thereby increasing the size of the placenta.

Parity

Prasanth et al. stated that the incidence of placenta previa was highest (73.55%) in multigravida (with two to three viable births). The incidence in Grandmultipara (>4 viable births) was 6.32% and in Primi, it was 26.43% [14].

The increased risk of placenta previa among multigravida women may be explained by degenerative change to the uterine vasculature leading to underperfusion of the placenta, compensatory enlargement and increased likelihood of implantation on the lower segment.

This may be due to endometrial scarring at the site of prior placental attachments resulting in lower placental implantation. Another possibility may be due to atherosclerotic changes of blood vessels which lead to decreased uteroplacental blood flow which in turn leads to large placenta encroaching on the internal cervical os with repeated pregnancies [14].

Mode of delivery

According to this study, patients who had previous delivery by caesarean section have about three times increased risk of placenta previa. Most studies have reported an association between previous caesarean section and placenta previa.

Women with placenta previa had 10-fold higher odds of Caesarean delivery. This can be explained by the fact that the placenta in the lower segment obstructs engagement of the head especially for major previa.

Gestational age

In current study, Gestational age was < 34 among 71.0%, 34-37 among 10.0% and > 37 among 19.0% women. *Kumari and Singh* reported that Prematurity has been observed in 68.57% (<37 weeks) of the newborn.

Past history

Past history of Caesarean section and history of uterine scar were found to be less associated with placenta previa. This may be explained by the fact that the placenta implants in a previous Caesarean section scar; it may be so deep as to prevent placental separation (Placenta accreta) or penetrate through the uterine wall into surrounding structures such as the bladder (placenta percreta) which may provoke massive hemorrhage at delivery.

PPH

Numerous studies conducted over the years showed a wide variation in the incidence of PPH among the pregnant women with placenta previa. In present study, PPH was seen in 10.7% of the cases.

The wide variation in the incidence could be due to the geographical differences, multiparity, prior caesarean section and other potential characteristics.

Blood transfusion and Anaemia

Prasanth et al. [14] found that 39.65% patients received blood transfusions and 3.7% of patients went in for hypotension and / or shock. No patients had febrile morbidity in the post-operative period. The incidence of PPH was 27.9%, hysterectomy was done in 4 cases (7.46%).

Our study found a significant association between placenta previa and risk of antepartum and postpartum hemorrhage: a nine times increased risk of the former and an eighteen times increased risk of the latter and anaemia. Women with placenta previa had also threefold higher odds of blood transfusion and fivefold odds of prolonged hospital stay. These findings are consistent with previous studies [15].

The increased risk of postpartum hemorrhage in women with placenta previa may be explained by the implantation of placenta in a previous scar which may go deep preventing placental separation. This may provoke severe hemorrhage during and after delivery because the lower segment does not constrict well the maternal blood supply. This necessitates blood transfusion. Therefore, it is important that blood transfusions and the obstetric emergency care be readily available at any facility treating women with placenta previa.

Fetal outcome

Wasim et al. [16] stated that fetal outcome was good in patients with MAP and placenta previa in our study with majority (73.2% vs 65.6%) delivering after 36 weeks with good APGAR and babies having birth weight ≥2.5kg and only three neonatal deaths due to prematurity.

NICU admission

In our study, NICU admission was reported among 17.0% children. This was in similarity to the study by *Sorakayalapeta MR et al*., [17] 25.2% NICU admissions were recorded. *Prasanth et al.* [14] found that perinatal morbidity in placenta previa yielded the following results. In the present study, 1.6%, 44.3% of babies received resuscitation and NICU admission. 39.34% of babies recovered.

The possible explanation for these could be that the bleeding associated with placenta previa may lead to hypoxia, intrauterine growth restriction and prematurity with underdeveloped organ systems.

Mortality

In current study, the Mortality was found to be 7.0%.

It was significantly more among subjects with Emergency LSCS, APGAR score, NICU admission and duration of hospital stay > 10 days. *Wasim et al.* [16] reported that low case fatality of 3% as only two patients died.

Complications

In our study, respiratory distress syndrome was reported among 5%, prematurity among 81%, FGR among 20%, intracranial hemorrhage among 5%, intrauterine asphyxia among 25%, fetal abnormalities among 1% and Anaemia among 5%.

The overall perinatal mortality rate ranged between 4-8%. The important causes are intrauterine asphyxia, prematurity, congenital malformations and associated placental abruption. The onset of bleeding before 20 weeks carries a poor fetal prognosis. Most of the neonatal mortality is attributed to prematurity [18] with its associated risk particularly respiratory distress syndrome and intracranial haemorrhage.

In our study, APGAR score at 1 min < 5 and APGAR at 5 min < 7 was significantly more among Emergency LSCS. APGAR score < 7, Mortality, NICU admission and discharge in 10 days was significantly more among subjects with gestational age < 34 weeks. *Kassem et al.* [19] found that morbidity was more marked before 34 weeks. There was a progressive decrease in neonatal morbidity in the form of improving APGAR score and fewer admissions to the neonatal intensive care unit as gestation advanced which was similar to our study.

Regarding the relationship between PP and fetal growth, there were two cases of fetal growth restriction. Fetal compromise in both cases could be explained by associated maternal medical disorders. Another four cases (3.3%) were diagnosed as small for gestational age. The reported rate of fetal growth restriction/small for gestational age in the literature ranges from 3% to 5% [20].

Conclusion

The present study suggested that placenta previa significantly contributes to maternal and perinatal morbidity and mortality. The current study suggested that there is an association between advancing age, previous caesarean section and abortion as the risk factors for placenta previa. Placenta previa as noted from the study was seen to be associated with increased risk of maternal complications like PPH and neonatal complications including prematurity and low birth weight. Hence, it is advisable to manage a case of placenta previa in a tertiary care center with a good neonatal support, round the clock operation theatre and blood bank facilities.

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