

Determination of Pregnancy Outcome in High-Risk Cases of Placenta Previa in Tertiary Care Center

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Abstract

Background: Placenta previa is the life-threatening complication which endangers both maternal and fetal life; it is one of the obstetric complications which alter the health indicators of any institution. With the increase in cesarean rate, there is an increase in the incidence of placenta previa and the obstetric complications there on. Furthermore, in rural districts, where there is increased incidence of infection resulting in pelvic inflammatory disease and increased abortions result in increased incidence of placenta previa. Placenta previa is complete or partial depending on its relation to the internal os of the cervix with the placenta. It is a major risk factor for antepartum and postpartum hemorrhage. It can lead to renal failure, DIC, and MODS when associated with other complications or when diagnosed or managed late. In the past decade, it has contributed to major risk for hemorrhagic cause of maternal death. The presence of placenta previa would increase a woman's risk for placenta accreta spectrum (PAS). Uncontrolled postpartum hemorrhage from placenta previa or PAS may need multiple blood transfusion, *in situ* hysterectomy, admission to the intensive care unit, or even mortality, thereby ending the reproductive career. The incidence of placenta previa is 3–5/1000 pregnancies worldwide. Assisted reproductive technology and maternal smoking or tobacco consumption increases the risk of placenta previa. It highlights the role of an interprofessional team in managing patients with this condition to improve outcomes for mother and neonate.

Aims: This prospective study was conducted in the CEMONC center of Government Sivagangai Medical College, tertiary care center catering to three districts: (1) To analyze the common risk factors of placenta previa in rural set up, (2) role of serial monitoring, early admission and intervention in modifying maternal and fetal outcome, and (3) effectiveness of the intervention in reducing maternal and fetal mortality.

Materials and Methods: This prospective study was conducted in the Department of Obstetrics and Gynecology, Government Sivagangai Medical College from October 2021 to October 2022. Targeted populations for this study were all women diagnosed with placenta previa transabdominally either during the second and third trimesters of pregnancy or intraoperatively. Data were carefully extracted from medical records, reviewed, and analyzed. Inclusion criteria was placenta previa diagnosed preoperatively or intraoperatively. Exclusion criteria were patients with placenta located in upper segment, cases of bleeding per vaginam with abruptio placenta, bleeding per vagina due to local causes, and vesicular mole.

Statistical Analysis: Statistical analysis was done with SPSS, version 25.0. Categorical variables were expressed as number of cases and percentages (%).

Results: Pregnancies complicated by placenta previa were 41. Total delivery in that period was 5267. The magnitude of placenta previa was 0.78%. About 41.46% women were above 28 years of age and 70% were multigravidas. About 39.01% had major degree placenta previa, 51.2% had prior cesarean deliveries, 4.88% had prior abortion, and 56.09% preterm deliveries. About 100% cases delivered by cesarean delivery, 68.3% cases had postpartum hemorrhage and 9.76% had adherent placenta.

Conclusion: This study showed that the magnitude of placenta previa was 7 in 1000 pregnancies. Advanced maternal age, multiparity, and previous cesarean section were significantly associated risk factors of placenta previa. Adverse maternal outcomes due to placenta previa were postpartum hemorrhage, anemia, and also the need for blood transfusion due to significant amount of blood loss due to the disease condition and its complications. Neonates born to women with placenta previa were also at

risk of being born preterm, intrauterine growth restriction, and respiratory distress syndrome. Hence, the detection of placenta previa should be encouraged and careful evaluation with timely delivery to reduce the associated maternal and perinatal complications is recommended.

Key words: Adherent placenta, Maternal morbidity, Placenta previa, Postpartum hemorrhage, Prior cesarean delivery

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INTRODUCTION

Placenta previa is the life-threatening complication which endangers both maternal and fetal life; it is one of the obstetric complications which alter the health indicators of any institution. With the increase in cesarean rate, there is an increase in the incidence of placenta previa and the obstetric complications there on. Furthermore, in rural districts, where there is increased incidence of infection resulting in pelvic inflammatory disease and increased abortions result in increased incidence of placenta previa. Placenta previa is complete or partial depending on its relation to the internal os of the cervix with the placenta.^[1-3] Its a major risk factor for antepartum and postpartum hemorrhage. It can lead to renal failure, DIC, and MODS when associated with other complications or when diagnosed or managed late. In the past decade, it has contributed to major risk for hemorrhagic cause of maternal death.^[4] The presence of placenta previa would increase a woman's risk for placenta accreta spectrum (PAS).^[5] Uncontrolled postpartum hemorrhage from placenta previa or PAS may need multiple blood transfusion, *in situ* hysterectomy, admission to the intensive care unit, or even mortality, thereby ending the reproductive career. The incidence of placenta previa is 3–5/1000 pregnancies worldwide. Assisted reproductive technology and maternal smoking or tobacco consumption increase the risk of placenta previa.^[7]

The mid pregnancy routine fetal anomaly scan should include placental localization, thereby identifying women at risk of persisting placenta previa or a low-lying placenta.

For pregnancies at more than 16 weeks of gestation, the term low-lying placenta should be used when the placental edge is <20 mm from the internal os on transabdominal or transvaginal scanning (TVS).

If the placenta is thought to be low lying (<20 mm from the internal os) or previa (covering the os) at the routine fetal anomaly scan, a follow-up ultrasound examination including a TVS is recommended at 32 weeks of gestation to diagnose persistent low-lying placenta and/or placenta previa.

In women with a persistent low-lying placenta or placenta previa at 32 weeks of gestation who remain asymptomatic, an additional TVS is recommended at around 36 weeks of gestation to inform discussion about mode of delivery. Cervical length measurement may help facilitate management decisions in asymptomatic women with placenta previa. A short cervical length on TVS before 34 weeks of gestation increases the risk of preterm emergency delivery and massive hemorrhage at cesarean section. Plan antenatal care, including hospitalization,

to individual woman's needs and social circumstances, for example, distance between home and hospital and availability of transportation, previous bleeding episodes, hematology laboratory results, and acceptance of receiving donor blood or blood products. A single course of antenatal corticosteroid therapy is recommended between 34 + 0 and 35 + 6 weeks of gestation for pregnant women with a low-lying placenta or placenta previa and is appropriate before 34 + 0 weeks of gestation in women at higher risk of preterm birth. Neonates born to mothers with placenta previa more likely suffer from preterm birth, perinatal death, congenital malformations, and Apgar scores at 1 min and 5 min lower than 7.^[5-11] Perinatal morbidity is also studied that majority of babies require resuscitation and neonatal intensive care unit (NICU) admission.^[8] Moreover, the most substantial outcome of this disorder is small for gestational age and low birth weight.^[9,10] The complication of placenta previa is limited not only to the antepartum period but also to the intrapartum and postpartum courses which were complicated with a high rate of cesarean delivery, peripartum cesarean hysterectomy, morbid adherent of placenta, and postpartum hemorrhage.^[6] Pregnancies complicated with placenta previa also have a significantly higher rate of postpartum anemia and delayed discharge from the hospital.

Aim of the Study

This prospective study was conducted in the CEMONC center of Government Sivagangai Medical College, tertiary care center catering to three districts.

1. To analyze the common risk factors of placenta previa in rural set up
2. Role of serial monitoring, early admission, and intervention in modifying maternal and fetal outcome
3. Effectiveness of the intervention in reducing maternal and fetal mortality.

MATERIALS AND METHODS

The study was conducted in Government Sivagangai Medical College and Hospital. The data were collected from October 2021 to October 2022.

Sample Size

All pregnant women with placenta previa diagnosed sonologically or presented with bleeding per vaginum due to placenta previa was considered for this study. First, all cases were identified from health management information system, and their medical registration number was used to access patient's information. Complete birth registry records were taken for analysis. From 5267 deliveries, 41 cases of placenta previa were identified.

Inclusion and Exclusion Criteria

Inclusion criteria

All singleton pregnancies diagnosed with placenta previa transvaginally or transabdominally either during the second and third trimesters of pregnancy or intraoperatively were include in the study.

Exclusion criteria

The following criteria were excluded from the study:

1. Cases of bleeding per vaginum with abruptio placenta
2. Bleeding per vagina due to local causes, vesicular mole
3. All singleton pregnancies without placenta previa.

Study Variables

Independent variables

- i. Sociodemographic factors
- ii. Obstetric factors
- iii. Neonatal and maternal complications.

Dependent variables

- i. Placenta previa

Data collection tools, a checklist, were designed to collect data about patients sociodemographic characteristics, obstetric and gynecological history, mode of delivery, and maternal and neonatal outcome and complications data quality management. Data were checked for completeness and consistency before data entry by the principal investigator; the completed questionnaire was coded. For data cleaning, the coded data were entered into EPI Info version 3.5.

Data Analysis and Processing

Data were entered into EPI Info version 3.5.1 for data exploration and cleaning. The cleaned data were exported to SPSS version 25 for statistical analysis that descriptive statistics was used to summarize categorical variables. $P < 0.05$ was considered statistically significant.

RESULTS

The following data were obtained from the present study. The total number of deliveries occurred from October 2021 to October 2022 was 5267. Out of that, 41 cases were placenta previa; hence, magnitude of placenta previa was 0.78%.

Based on Table 1, where sociodemographic factors were analyzed, it is noted that incidence of placenta previa is more in <30 years, about 75.6%.

The mean age was 28 years. Almost 97.56% patients had antenatal check-up, only one patient was unbooked.

Based on this study [Table 2], it is noted that about 70% patients were multiparous, which signifies that previous disruption of endometrial and myometrial tissues contribute to higher incidence.^[11] In this series, as multiparous constitutes as majority, 51.22% had previous history of cesarean, 4.88% patients had history of abortions. About half of the cases tend to deliver preterm, 46.34% of cases were <36 weeks, 34.14% cases were late preterm, and only 19.51% constitutes term delivery. Almost all cases were delivered by cesarean. About 73.17% of cases were done as emergency procedure, where the patient has come with either bleeding or in labor which necessitates immediate intervention.

Type of placenta previa depends on the location that was noted either by ultrasound diagnosis of previa or noted during cesarean delivery for some other indication and where ultrasound examination had failed to notice placenta previa which is shown in Table 3. There were 16 (39.01%) cases of major degree placenta previa in the present series.

Table 1: Sociodemographic characteristics

Sociodemographic parameters	Total	Percentage
Age		
<25 years	14	34.14
25–30 years	17	41.46
31–35 years	9	21.95
36–40 years	1	2.43
Antenatal follow up		
Yes	40	97.56
No	1	2.44

Table 2: Obstetric characteristics

Obstetric parameters	Total	Percentage
Obstetric code		
PRIMI	12	29.26
Multi	29	70.74
Gestational age		
<36 weeks	19	46.34
36–36 weeks 6 days	14	34.14
>37 weeks	8	19.51
Mode of delivery		
LSCS	41	100
Vaginal delivery	0	0
Procedure		
Elective cesarean	11	26.83
Emergency cesarean	30	73.17
Type of anesthesia		
Spinal anesthesia	36	87.80
General anesthesia	5	12.20
Previous obstetric history		
Previous LSCS	21	51.22
Hysterectomy	1	2.44
Abortion	2	4.88

Table 4 depicts maternal complications associated with placenta previa. In this series, 68.23% of patients had postpartum hemorrhage which is one of the dreaded complication in obstetrics as it results in maternal morbidity and mortality. About 85.37% of patient required blood transfusion during delivery in view of placenta previa. Majority of the patient had postpartum anemia in spite of blood transfusion which required further correction during postnatal period which constituted about 75.61%. One of the recent innovations was SR cannula usage whose mechanism of action is decreasing blood loss by creating negative pressure inside the uterine cavity, thus assisting constriction of spiral arterioles by normal physiological myometrial contraction and thus preventing hysterectomy. In this

series, we used SR cannula in about 51.21% patients along with bilateral uterine artery ligation. Thus, hysterectomy was on; y 14.63% in our institution and also prevented maternal mortality. About 14.63% patient underwent hysterectomy in view of placenta accreta syndrome. Due to complications, duration of hospital was slightly increased when compared with other conditions which constitute about 46.34%. Adjacent visceral injury that is bladder injury was about 4.87% which was associated with the previous history of cesarean. In this series, as shown in Table 5.

In this series, as preterm delivery was more in placenta previa, NICU admission contributed to 56.09%. Among total NICU admission, 39.02% required preterm care, 17.07% babies had respiratory distress syndrome, and 2.44% were intrauterine death due to placenta previa bleeding. About 51.22% constitutes low birth weight due to prematurity and IUGR. In this series, 65.85% babies had Apgar score above 6 at birth. Neonatal death occurred due to prematurity which constitutes about 9.76%.

Table 3: Location of placenta

Location of placenta	Total	Percentage
Type I	5	12.20
Type IIA	12	29.27
Type IIB	9	21.95
Type III	8	19.51
Type IV	8	19.5

Table 4: Maternal complications

Parameters	Total	Percentage
PPH	28	68.23
Adherent placenta	4	9.76
Blood transfusion	35	85.37
Hysterectomy	6	14.63
Post-partum ANEMIA	31	75.61
SR cannula usage	21	51.21
Surgical site infection	5	12.20
Bladder injury	2	4.87
Duration of hospital stay		
10 days	22	53.66
>10 days	19	46.34

Table 5: Neonatal outcome

Neonatal parameters	Total	Percentage
Birth weight		
<1.5 kg	4	9.76
1.6–2 kg	4	9.76
2–2.5 kg	21	51.22
>2.5 kg	12	29.27
IUD	1	2.44
APGAR at birth		
<6	14	34.14
>6	27	65.85
PRE term	19	46.34
Late PRE term	14	34.14
Term	8	19.51
NICU admission	23	56.09
Preterm care	16	39.02
RDS	7	17.07
Neonatal death	4	9.76

DISCUSSION

Placenta previa is one of the dreaded complication in obstetrics as it leads to maternal and neonatal morbidity and mortality. Placenta previa affects 0.3–2% of pregnancies in the third trimester and has become more evident secondary to the increasing trends of cesarean sections.^[11] In this study, magnitude of placenta previa was 0.78%. The risk factors correlating with placenta previa are advanced maternal age, multiparity, tobacco use, prior suction, and curettage, assisted reproductive technology, history of cesarean section(s), and prior placenta previa.^[3] Similarly, in this study, the previous cesarean contributed to about 51.22% and multiparity constituted about 70.74%. These results are comparable with the study done by Ojha *et al.*, Wu *et al.*^[16,17] The relationship between advanced maternal age and placenta previa may be confounded by higher parity and a higher probability of previous uterine procedures or fertility treatment. However, it may also represent an altered hormonal or implantation environment.^[12] Painless vaginal bleeding during the second or third trimester of pregnancy is the usual presentation. The bleeding may be provoked from intercourse, vaginal examinations, labor, and at times, there may be no identifiable cause.^[13] On speculum examination, there may be minimal bleeding to active bleeding. With the diagnosis of placenta previa, the patient is scheduled for elective delivery at 36–37 weeks through cesarean section.^[14,15] However, some patients with placenta previa present with complications and require urgent cesarean sections at an earlier gestational

age. Patients with excessive or continuous vaginal bleeding should be delivered through cesarean section regardless of gestational age. If bleeding subsides, then expectant management is permissible if the gestational age is <36 weeks. If at or >36 weeks of gestation, then cesarean delivery is recommended.^[15] The patient should be admitted and, if qualified, receive magnesium sulfate for fetal neuroprotection and steroids for fetal lung maturity. Inpatient versus outpatient management depends on the stability of the patient, the number of episodes of bleeding, proximity to the hospital, as well as compliance. A vertical skin incision is the recommended incision for optimal exposure. A high vertical uterine incision may be required if the placenta is covering the lower uterine segment, or if the lower uterine segment is underdeveloped. After delivery of the fetus, the placenta spontaneously detaches, and the uterine incision can be closed. There may be hemorrhage after detachment of the placenta secondary to the decreased contractibility of the lower uterine segment, which can be managed with bimanual uterine massage, uterotonics, B-Lynch sutures, Cho sutures, uterine artery, or internal iliac artery ligation.^[4,19] As NHM Tamil Nadu recommends SR Cannula, a recent innovation to control postpartum hemorrhage, in this study, it was used in about 51.4% of cases along with uterine artery ligation. At times, the massive hemorrhage may not be controlled with conservative measures, and a hysterectomy is necessary.^[4] If the placenta does not detach or partially detaches then the patient has PAS, and the placenta should remain *in situ*, the uterine incision closed, and a cesarean hysterectomy should follow.^[7,10] In this study, PAS constituted about 9.76%, hence proceeded to placenta *in situ* hysterectomy. If there is high suspicion for PAS, then a cesarean section should be performed without manipulation of the placenta. There is a three-fold to four-fold increased neonatal mortality and morbidity rate with placenta previa primarily from preterm delivery. The neonate is at increased risk of preterm birth, lower birth weight, lower APGAR scores, and increased risk for respiratory distress syndrome. In this study, preterm delivery constituted 80.49%. This is also supported by the studies done by Rosenberg *et al.* and Faiz *et al.*^[17-19]

CONCLUSION AND RECOMMENDATION

This study showed that the magnitude of placenta previa was 7 in 1000 pregnancies. Advanced maternal age, multiparity, and previous cesarean section were significantly associated risk factors of placenta previa. Adverse maternal outcomes due to placenta previa were postpartum hemorrhage, anemia, and also the need for blood transfusion due to significant amount of blood

loss due to the disease condition and its complications. Neonates born to women with placenta previa were also at risk of being born preterm, intrauterine growth restriction, and respiratory distress syndrome. Hence, the detection of placenta previa should be encouraged and careful evaluation with timely delivery to reduce the associated maternal and perinatal complications is recommended. Patients with placenta previa should be considered as high-risk antenatal mother and compatible blood should always be available for such cases before considering surgical mode of delivery that is cesarean. Family welfare services should also be insisted as a strategy toward in reduction of parity, cesarean section rate, and thereby the incidence of placenta previa. Strategies and protocols should be emphasized to reduce the rate of cesarean section, senior doctors and interdisciplinary team have to be involved in the management of all cases of placenta previa.

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