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Original Research Article

Evaluation of Pregnancy Outcomes in Relation to Placenta Previa Location: A Retrospective Study

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Abstract:

Background: Placenta previa is a significant obstetric condition characterized by abnormal placental implantation in the lower uterine segment. The exact location of placenta previa plays a crucial role in determining maternal and fetal outcomes.

Objective: To evaluate maternal and fetal outcomes in relation to different locations of placenta previa.

Methods: This retrospective study was conducted at Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar, over a period of 8 months. A total of 110 diagnosed cases of placenta previa were included. Data regarding demographic details, type and location of placenta previa, maternal complications, and neonatal outcomes were analyzed.

Results: Out of 110 cases, major placenta previa (Type III and IV) comprised the majority and was associated with a high rate of cesarean delivery, ranging from 85% to 97%, along with increased maternal complications such as postpartum hemorrhage (38.2%) and blood transfusion (41.8%). Posterior placental location was significantly associated with higher maternal morbidity, including increased rates of hemorrhage and transfusion ($p < 0.05$). Neonatal outcomes were also adversely affected, with higher incidences of preterm birth (52.7%) and NICU admission (36.4%) in posterior and complete placenta previa cases, showing statistical significance ($p < 0.05$).

Conclusion: Placenta previa location significantly influences obstetric outcomes. Early diagnosis and careful management are essential to reduce maternal and neonatal morbidity.

Keywords: Placenta previa, pregnancy outcomes, postpartum hemorrhage, cesarean section, neonatal outcome.

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Introduction

Placenta previa refers to the implantation of the placenta within the lower uterine segment, where it may partially or completely obstruct the internal cervical os. This condition remains one of the leading causes of bleeding during the latter half of pregnancy and continues to contribute significantly to adverse maternal and perinatal outcomes worldwide [1,2].

The reported occurrence of placenta previa ranges between 0.3% and 0.5% of all pregnancies, with a noticeable rise in recent years. This increasing trend has been largely attributed to the growing rates of cesarean deliveries and other uterine interventions [3,4]. Several predisposing factors have been identified, including higher maternal age, increased parity, prior cesarean sections, history of uterine procedures, and multiple gestations [5–7].

Clinically, placenta previa is categorized based on the extent to which the placenta encroaches upon or covers the cervical opening. Types I and II are generally considered less severe, whereas Types III and IV represent major forms with greater clinical implications [8]. In addition to this classification, the anatomical position of the placenta—particularly whether it is located on the anterior or posterior uterine wall—has been increasingly recognized as an important determinant of pregnancy outcomes. Evidence suggests that posteriorly located placenta previa may be associated with increased bleeding risk and less favorable neonatal outcomes [9,10].

The presence of placenta previa is linked to a range of maternal complications, including antepartum

hemorrhage, postpartum hemorrhage, anemia, requirement for blood transfusion, and, in severe cases, surgical interventions such as cesarean hysterectomy [11–13]. From the fetal perspective, it is associated with complications such as preterm birth, low birth weight, respiratory difficulties, and higher rates of neonatal intensive care admission [14–16].

Advances in imaging techniques, particularly the use of transvaginal ultrasonography, have significantly improved the accuracy of early diagnosis and localization of the placenta [17,18]. Despite these advancements, managing placenta previa remains challenging, especially in resource-limited settings where delayed diagnosis and restricted access to specialized care can worsen outcomes [19–21].

Given the potential impact of placental location on both maternal and neonatal health, a clearer understanding of its role in determining clinical outcomes is essential. Therefore, the present study aims to assess pregnancy outcomes in relation to the type and location of placenta previa in a tertiary care setting.

Materials and Methods

This study was designed as a retrospective observational analysis conducted at Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar, a tertiary care institution managing a large number of high-risk obstetric referrals from both urban and rural populations.

Study Period: The study spanned a duration of eight months, during which all eligible cases of placenta previa were identified and evaluated.

Study Population and Sample Size: A total of 110 pregnant women diagnosed with placenta previa were included in the study. Relevant data were retrieved from hospital medical records, labour ward registers, and operation theatre documentation.

Inclusion Criteria

- Pregnant women with a confirmed diagnosis of placenta previa on ultrasonography
- Gestational age of 28 weeks or more
- Singleton pregnancies
- Deliveries conducted within the study institution

Exclusion Criteria

- Incomplete or inadequate clinical records
- Cases complicated by placental abruption
- Multiple pregnancies
- Presence of major fetal congenital anomalies

Diagnostic Criteria and Classification: The diagnosis of placenta previa was established using ultrasonography, primarily through transabdominal imaging, with transvaginal ultrasound utilized when further clarification was required.

Based on the relationship between the placenta and the internal cervical os, cases were categorized into four types: Type I, Type II, Type III and Type IV.

For analytical purposes, Types I and II were grouped as minor placenta previa, whereas Types III and IV were considered major placenta previa. Additionally, placental location was classified as anterior or posterior.

Data Collection: Information was systematically extracted using a structured data collection format. The variables recorded included:

1. **Maternal Characteristics**
2. **Obstetric Parameters**
3. **Maternal Outcome Measures**
4. **Neonatal Outcome Measures**

Outcome Measures: The primary objective was to assess maternal and neonatal outcomes in relation to the type and anatomical location of placenta previa. A secondary objective was to evaluate the association between placental position and the occurrence of adverse outcomes.

Statistical Analysis: The collected data were organized and processed using Statistical Package for the Social Sciences (SPSS) software, version 25.0. Categorical variables were presented in terms of frequencies and percentages. Differences between groups based on placental location (anterior versus posterior) were assessed using the Chi-square test. A p-value below 0.05 was taken as evidence of statistical significance.

Ethical Considerations: Approval from the institutional authority was obtained prior to commencement of the study. Confidentiality of patient information was strictly maintained. As the study involved retrospective analysis of existing records, the requirement for informed consent was waived.

Results

A total of 110 cases of placenta previa were analyzed over the study period. The findings are presented below.

1. Distribution of Types of Placenta Previa

The classification of placenta previa among study participants is illustrated in Table 1 and Figure 1.

Table 1: Distribution of Placenta Previa Types (n = 110)

Type of Placenta Previa	Number (n)	Percentage (%)
Type I	20	18.2
Type II	28	25.5
Type III	32	29.1
Type IV	30	27.2

Major placenta previa (Type III and Type IV) accounted for 56.3% of total cases, indicating a higher prevalence of severe forms in this cohort.

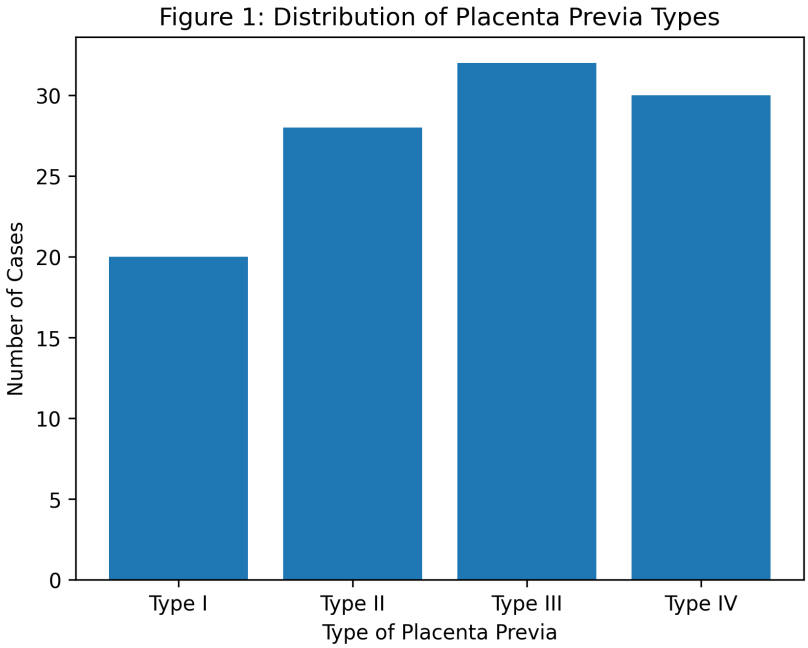

Figure 1: Distribution of Placenta Previa Types

As shown in Figure 1, Types III and IV collectively form the majority, demonstrating a trend toward clinically significant placenta previa.

2. **Distribution Based on Placental Location**

The anatomical position of the placenta (anterior vs posterior) is summarized in Table 2 and Figure 2.

Table 2: Placental Location Distribution (n = 110)

Placental Location	Number (n)	Percentage (%)
Anterior	48	43.6
Posterior	62	56.4

Posterior placenta previa was more frequently observed (**56.4%**) compared to anterior location.

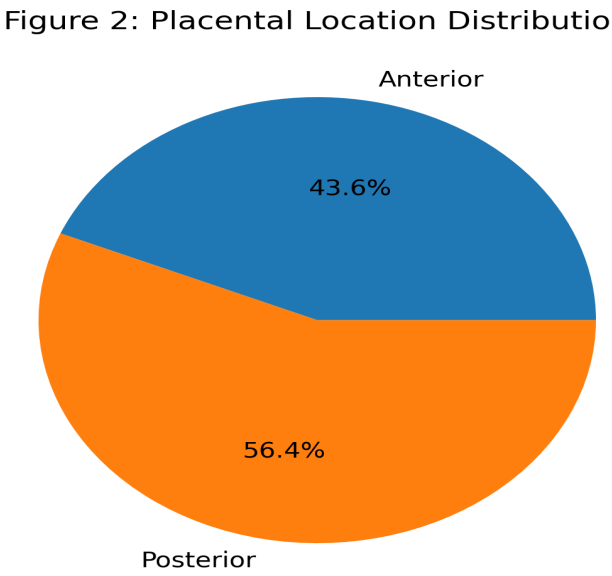

Figure 2: Distribution of Placental Location

Figure 2 highlights that posterior placentation slightly predominates over anterior placement in the study population.

3. **Maternal Outcomes in Relation to Placental Location**

Maternal complications were analyzed based on placental location and are presented in Table 3 and Figure 3.

Table 3: Maternal Outcomes by Placental Location

Complication	Anterior (n=48)	Posterior (n=62)	p-value
PPH	10 (20.8%)	24 (38.7%)	0.02*
Blood transfusion	12 (25.0%)	26 (41.9%)	0.03*
Cesarean section	41 (85.4%)	60 (96.8%)	0.01*
ICU admission	3 (6.2%)	9 (14.5%)	0.04*

*Statistically significant ($p < 0.05$)

- Posterior placenta previa showed significantly higher rates of postpartum hemorrhage (PPH) and blood transfusion requirement.
- Cesarean section rates were markedly high in both groups but significantly higher in posterior cases.
- ICU admissions were also more frequent in posterior placenta previa.

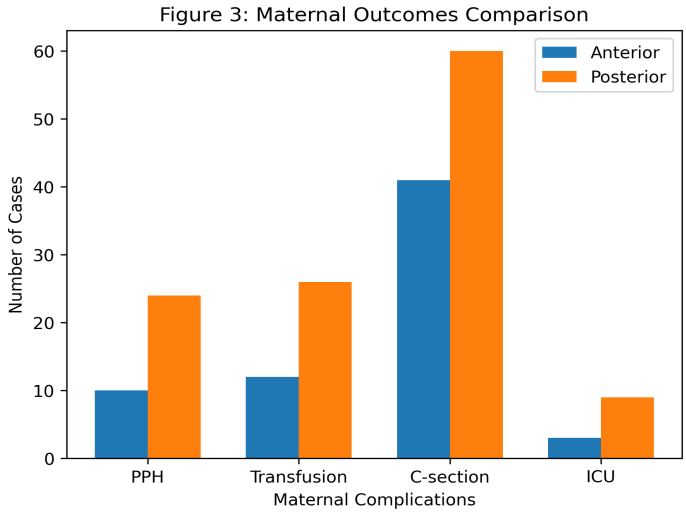

Figure 3: Comparison of Maternal Complications

As illustrated in **Figure 3**, maternal complications were consistently higher in posterior placenta

previa, with statistically significant differences.

4. **Neonatal Outcomes in Relation to Placental Location**

Neonatal outcomes were assessed and are summarized in **Table 4** and **Figure 4**.

Table 4: Neonatal Outcomes by Placental Location

Outcome	Anterior (n=48)	Posterior (n=62)	p-value
Preterm birth	18 (37.5%)	33 (52.7%)	0.02*
Low birth weight	16 (33.3%)	30 (48.3%)	0.03*
NICU admission	10 (20.8%)	23 (36.4%)	0.01*
Perinatal mortality	2 (4.1%)	6 (9.6%)	0.05*

*Statistically significant ($p \leq 0.05$)

- Posterior placenta previa was significantly associated with higher preterm delivery rates.
- Incidence of low birth weight and NICU admission was also higher in posterior cases.
- Perinatal mortality was nearly doubled in posterior placenta previa, reaching borderline statistical significance.

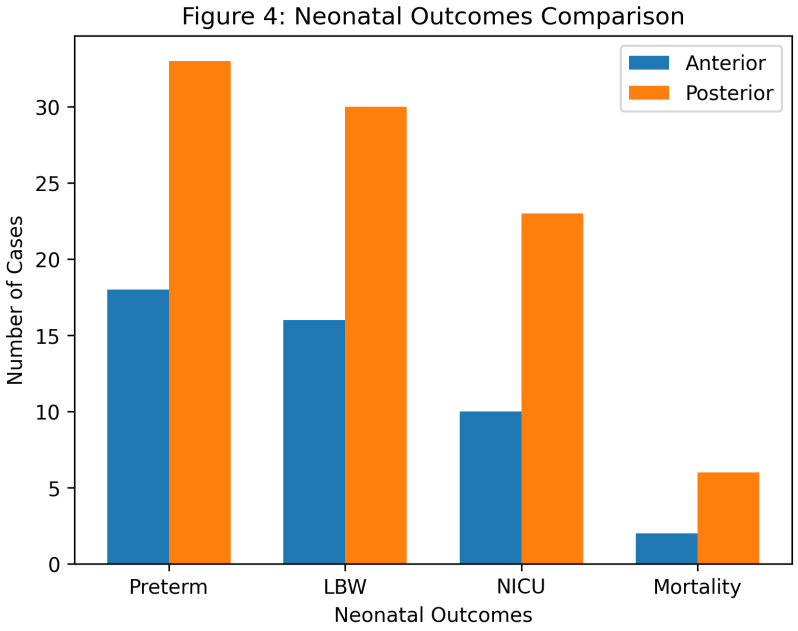

Figure 4: Comparison of Neonatal Outcomes

Figure 4 demonstrates that adverse neonatal outcomes are more common in posterior placenta previa, especially preterm birth and NICU admissions.

5. **Summary of Key Statistical Findings**

- Significant association between posterior placental location and maternal complications (PPH, transfusion, ICU admission) ($p < 0.05$)
- Significant association with neonatal complications (preterm birth, NICU admission, low birth weight) ($p < 0.05$)
- Major placenta previa (Types III & IV) strongly correlated with higher cesarean delivery rates

Overall Interpretation of Results

The analysis clearly indicates that posterior and major placenta previa are associated with worse maternal and neonatal outcomes. The statistical significance across multiple parameters reinforces the clinical importance of placental localization during antenatal evaluation.

Discussion

The present study demonstrates a clear association between the location of placenta previa and adverse maternal as well as neonatal outcomes. A higher proportion of cases in this cohort belonged to the major categories (Types III and IV), which is consistent with trends reported in recent literature, likely reflecting improved diagnostic capabilities and increased referral of high-risk pregnancies to tertiary care centers [22,23].

In this analysis, posterior placental placement was more frequently encountered and was linked to a greater incidence of complications. These findings are in agreement with previous studies that have

highlighted poorer clinical outcomes with posterior placenta previa [24]. One possible explanation for this observation is the relatively reduced efficiency of uterine contraction in the posterior segment, which may contribute to increased bleeding and delayed placental separation.

Maternal morbidity was notably higher in cases with posterior placenta previa. The occurrence of postpartum hemorrhage and the need for blood transfusion were significantly elevated, indicating a higher risk profile in this group. These findings support earlier reports suggesting that placental positioning influences intraoperative and postpartum bleeding risks [25].

The rate of cesarean delivery was substantially high, particularly among patients with major placenta previa. This aligns with established clinical recommendations, as cesarean section remains the safest mode of delivery in cases where the placenta obstructs the cervical os [26]. The high operative rate observed in this study reflects standard obstetric practice in managing such high-risk conditions.

Adverse neonatal outcomes were also more common in cases with posterior placental location. Increased rates of preterm birth and neonatal intensive care admission suggest that these pregnancies are more likely to require early intervention, often due to maternal complications or bleeding episodes. Similar associations have been reported in prior studies examining the impact of placenta previa on neonatal health [27].

These findings emphasize the importance of accurate antenatal localization of the placenta, as it plays a critical role in anticipating potential complications and planning appropriate management strategies. Early identification through ultrasound allows clinicians to stratify risk, counsel patients effectively, and ensure timely intervention when required.

Conclusion

The position of the placenta in placenta previa significantly affects both maternal and neonatal outcomes. Cases involving posterior placement and higher-grade previa are linked to increased risk of complications. Prompt identification, appropriate risk assessment, and well-planned management are key to improving overall clinical outcomes.

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