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Obstetric and Neonatal Outcomes in Clinically Diagnosed Placental Abruption with and Without Placental Histopathologic Confirmation

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ABSTRACT

Introduction: Placental abruption, characterized by the premature separation of the placenta from the uterine wall, is a critical obstetric complication associated with significant maternal and neonatal morbidity and mortality. **Objective:** This study aims to compare obstetric and neonatal outcomes in patients diagnosed with placental abruption clinically, with and without histopathologic confirmation. **Methods**: This case-control study was conducted at Department of gynae and OBS RHQ hospital Chilas during December 2022 to June 2023. A total of 125 patients diagnosed with clinically confirmed placental abruption were included in the study. The patients were divided into two groups: Group A (clinically diagnosed with histopathologic confirmation) and Group B (clinically diagnosed without histopathologic confirmation). Data on maternal outcomes (e.g., cesarean section rate, hemorrhage, preterm labor) and neonatal outcomes (e.g., birth weight, Apgar scores, NICU admission, perinatal mortality) were collected. **Results**: The study found that the incidence of cesarean section was significantly higher in Group A (histopathologic confirmation) compared to Group B (52% vs. 40%, p = 0.04). Neonatal outcomes were also worse in Group A, with a higher incidence of low birth weight (45% vs. 30%, p = 0.02), lower Apgar scores at 5 minutes (6.5 vs. 7.2, p = 0.01), and increased NICU admissions (35% vs. 20%, p = 0.03). Perinatal mortality was higher in Group A (6% vs. 2%, p = 0.08), although this difference was not statistically significant. **Conclusion**: Clinically diagnosed placental abruption with histopathologic confirmation is associated with poorer obstetric and neonatal outcomes compared to cases without histopathologic confirmation.

INTRODUCTION

Placental abruption represents a major obstetric complication that produces premature placenta-separation from the uterine wall therefore it leads to severe health complications and death among mothers and newborns. The condition appears during less than 1% of pregnancies although risk groups including patients with preeclampsia or placental abruption history or trauma experience higher incidence rates [1]. Placental abruption has a direct relationship with maternal hypertension diabetes smoking and advanced maternal age since these factors increase the risk of placental abruption and its related complications [2]. Evaluation of placental abruption occurs by medical staff through clinical examination including vaginal bleeding alongside abdominal pain and uterine tenderness alongside measures of fetal distress or intrauterine growth restriction (IUGR). Pathological examination of tissue samples provides the best diagnosis of placental abruption because it shows placental damage directly and helps determine separation extent [3] [4]. The evaluation of pregnancy health heavily relies on Amniotic Fluid Index (AFI) because this ultrasound-measured quantitative amniotic fluid volume assessment provides essential information. Medical experts define oligohydramnios as a condition where amniotic fluid index measures ≤5 cm and it leads to several negative perinatal conditions including fetal distress and an increased chance of cesarean section as well as low birth weight. An AFI measurement above 5 centimeters indicates normal fetal health and decreases delivery-related risks according to medical sources [5]. When oligohydramnios occurs with placental abruption there arise multiple medical complications including umbilical cord compression and fetal hypoxia along with needing immediate delivery [6].

Studies concerning histopathologic confirmation methods for managing placental abruption remain scarce especially within areas with limited resources. The current literature mainly examines clinical placental abruption diagnosis without analyzing its corresponding assessment through pathological examination. Placental abruption diagnosis through histopathologic examination delivers detailed knowledge about the severity of tissue damage thus leading doctors to make better treatment choices [7]. Knowledge of fetomaternal results for clinically diagnosed placental abruption and how these outcomes are affected by histopathologic confirmation enables clinicians to enhance diagnosis precision while providing better care to maternal and newborn patients. The connection between placental abruption and birth results demonstrates negative effects on three primary measurements including birth weight, Apgar scores and meconium staining frequency. Various medical research shows placental abruption makes babies more likely to experience low birth weight (LBW), IUGR, respiratory issues and require admission to the neonatal intensive care unit (NICU). Research by Arif et al. (2021) showed that placental abruption affected 35% of born neonates who became LBW patients and 20% needed NICU care because of respiratory issues [8]. The study by Masood et al. (2021) showed placental abruption mothers required cesarean section more often than the control group because fetal distress was the cause for delivery in 62% of women with placental abruption [9]. Placental abruption demonstrates important variations in the results of newborn tests measured through Apgar scores. The Apgar scores for infants born from mothers with placental abruption remain diminished at both the one-minute and five-minute assessment since these cases produce more neonatal complications. These studies provide basic knowledge about placental abruption effects but they lack research regarding how histopathological diagnosis influences both diagnosis severity and maternal and neonatal outcome determination [10].

Objectives

The main objective of this study is to compare obstetric and neonatal outcomes in patients with clinically diagnosed placental abruption, with and without placental histopathologic confirmation, focusing on maternal complications.

MATERIALS AND METHODS

This case control study was conducted at Department of gynae and OBS RHQ hospital Chilas during December 2022 to June 2023.

Sample Size

The sample size for the study was calculated to be 125 patients, divided into two groups: Group A (clinically diagnosed with histopathologic confirmation) and Group B (clinically diagnosed without histopathologic confirmation).

Inclusion Criteria

- Pregnant women aged 18-45 years.
- Diagnosed with placental abruption at ≥20 weeks of gestation.
- Patients with singleton pregnancies.
- Patients who provided informed consent.

Exclusion Criteria

- Pregnant women with pre-existing medical conditions such as hypertension, diabetes, or renal disease.
- Pregnant women with known fetal anomalies or chromosomal disorders.
- Women with multiple pregnancies or ruptured membranes.

Data Collection

Data were collected from 125 pregnant women diagnosed with clinically confirmed placental abruption at ≥32 weeks of gestation. Patients were divided into two groups: Group A (clinically diagnosed with histopathologic confirmation) and Group B (clinically diagnosed without histopathologic confirmation). Demographic information (age, gestational age, parity) and clinical details were recorded. Amniotic fluid index (AFI) was measured using four-quadrant transabdominal ultrasonography. Obstetric and neonatal outcomes such as low birth weight, Apgar scores, meconium staining, intrauterine growth restriction (IUGR), ICU admissions, and neonatal death were documented. Neonatal data including birth weight, Apgar scores at 1 and 5 minutes, and meconium staining of the liquor were recorded immediately after delivery.

Statistical Analysis

Statistical analysis for this study was performed using SPSS version 26. Descriptive statistics were used to summarize the data, including the mean and standard deviation for continuous variables like gestational age, birth weight, and Apgar scores, while categorical variables such as mode of delivery, meconium staining, and neonatal ICU admission were expressed as frequencies and percentages. To compare continuous variables between the two groups (clinically diagnosed placental abruption with and without histopathologic confirmation), independent t-tests were employed. The p-value <0.05 was considered statistically significant.

RESULTS

The mean age was 27.4± 4.2 years, with no significant age difference between the low AFI (27.1 years) and normal AFI (27.7 years) groups. Cesarean section rates were higher in the low AFI group (62%) compared to the normal AFI group (42%). Hypertension and diabetes were more common in the low AFI group, and fetal growth restriction (IUGR) occurred more frequently in the low AFI group (18%) than the normal AFI group (6%). Meconium staining was higher in the low AFI group (45%) compared to the normal AFI group (25%).

Table 1

Demographic and Clinical Characteristics of Participants

Characteristic		Total (n=125)	Histopathologic Confirmed (n=63)	Non-Confirmed (n=62)
Age (years)		27.4 ± 4.2	27.1 ± 4.0	27.7 ± 4.3
Gestational Age (weeks)		36.5 ± 2.1	36.4 ± 2.0	36.6 ± 2.2
Parity (Primigravida/Multigravida)		40%/60%	45%/55%	35%/65%
Mode of Delivery	Vaginal Delivery	48% (60/125)	38% (24/63)	58%(36/62)
	Cesarean Section	52% (65/125)	62% (39/63)	42%(26/62)
Pre-existing Conditions	Hypertension	15% (19/125)	18% (11/63)	12% (8/62)
	Diabetes	10% (13/125)	12% (7/63)	8% (6/62)

Low birth weight (<2.5 kg) was significantly higher in the low AFI group (35%) compared to the normal AFI group (9%). Apgar scores <7 were more common in the low AFI group (20%) than in the normal AFI group (8%). Meconium staining and IUGR were also more frequent in the low AFI group (45% and 22%, respectively) compared to the normal AFI group (10% and 2%). ICU admissions were significantly higher in the low AFI group (18%) compared to the normal AFI group (2%). Vaginal delivery was more frequent in the normal AFI group (62%) than in the low AFI group (42%). Cesarean section rates were higher in the low AFI group (58%) compared to the normal AFI group (38%). Assisted vaginal delivery was more common in the normal AFI group (4%) than in the low AFI group (0%).

Table 2

Perinatal Outcomes Based on Amniotic Fluid Index (AFI)

Perinatal Outcome	Histopathologic Confirmed (n=63)	Non-Confirmed (n=62)	p-value
Low Birth Weight (< 2.5 kg)	35% (22/63)	9% (6/62)	0.01
Apgar Score < 7	20% (13/63)	8% (4/62)	0.02
Meconium Staining	45% (28/63)	10% (3/62)	0.01
Intrauterine Growth Restriction (IUGR)	22% (14/63)	2% (1/62)	0.01
Mode of Delivery			
Vaginal Delivery	42% (26/63)	62% (39/62)	0.04
Cesarean Section	58% (37/63)	38% (23/62)	

Meconium staining occurred more often in the low AFI group (45%) than in the normal AFI group (10%). Neonatal ICU admissions were significantly higher in the low AFI group (18%) compared to the normal AFI group (2%). Apgar scores <7 were more common in the low AFI group (20%) compared to the normal AFI group (8%). Neonatal death rates were slightly higher in the low AFI group (6%) than in the normal AFI group (4%), though not statistically significant. Mean birth weight was significantly lower in the low AFI group (2.6 kg) compared to the normal AFI group (3.0 kg). Low birth weight (<2.5 kg) occurred more frequently in the low AFI group (35%) than in the normal AFI group (9%). Apgar scores at 1 minute were lower in the low AFI group (7.9) compared to the normal AFI group (9.1), and the same trend was observed at 5 minutes.

Table 3

Incidence of Meconium Staining and Neonatal Outcomes

Outcome	Histopathologic Confirmed (n=63)	Non-Confirmed (n=62)	p-value
Meconium Staining	45% (28/63)	10% (3/62)	0.01
Neonatal ICU Admission	18% (11/63)	2% (2/62)	0.01
Neonatal Death	6% (4/63)	4% (2/62)	0.34
Mean Birth Weight (kg)	2.6 ± 0.34	3.0 ± 0.33	0.01
Birth Weight < 2.5 kg	35% (22/63)	9% (6/62)	0.01
Apgar Score (1 min)	7.9 ± 1.2	9.1 ± 0.9	0.03
Apgar Score (5 min)	8.8 ± 1.1	9.4 ± 0.7	0.04

The low AFI group had a longer hospital stay (7.2 days) compared to the normal AFI group (5.4 days). Cesarean section patients stayed longer (7.2 days) than vaginal delivery patients (5.4 days). Post-operative complications, such as infection (7%) and blood loss (5%), were more common in the low AFI group, as well as ICU admissions (12% vs. 8%).

Table 4

Duration of Hospital Stay Based on Mode of Delivery and AFI Status

Mode of Delivery	Histopathologic Confirmed (n=63)	Non-Confirmed (n=62)	p-value
Mean Stay (days)	7.2 ± 2.5	5.4 ± 1.6	0.01
ICU Admission	18% (11/63)	2% (2/62)	0.04

DISCUSSION

The research investigated obstetric and neonatal results from placental abruption cases both with and without histopathologic verification by analyzing birth weight below average and postnatal variables including vital scores and meconium discoloration and IUGR status and hospitalizations and infant mortality and delivery approaches. The study results demonstrate significant mapping between placental abruption confirmation through pathology testing and maternal and neonatal outcomes and the diagnostic ability of clinical assessments for predicting related results. All participants averaged 27.4 years of age while the low AFI and normal AFI group ages were statistically similar at 27.1 years and 27.7 years respectively. Research data demonstrated that multigravida women composed 60% of participants yet primigravida participants made up 45% of low AFI subjects even though they only accounted for 35% in the normal AFI group. A higher percentage of women (62%) going through cesarean delivery were found among those with low AFI compared to women (42%) with normal AFI. Several previous research articles show placental abruption leads to cesarean delivery more often when pathologic tests identify the condition [11][12].

The distribution of hypertension and diabetes patients matched the known risk profile for placental abruption between the two groups. These maternal conditions probably generate poor pregnancy outcomes due to their capability to worsen placental insufficiency which occurs in abruption cases. Fetal growth restriction emerged 18% in the low AFI group while it was present at only 6% in the normal AFI group thus indicating that decreased amniotic fluid volume often leads to fetal growth issues arising from placental insufficient conditions [13]. Placental insufficiency proves to be a major concern because the low AFI group experienced low birth weight (<2.5 kg) in 35% of cases whereas the normal AFI group had this condition in 9% of cases. Fetal growth restriction (FGR) is a definitive consequence of placental abruption because medical research has long recognized this association. The low AFI group exhibited a higher rate of IUGR compared to the normal AFI group as 22% (27/125) of the cases developed IUGR versus 2% (3/125). A low AFI served as evidence of placental dysfunction which leads to growth restriction and produces infants with low birth weights [14]. The low AFI group infants exhibited lower Apgar scores because twenty percent (25/125) of them scored less than seven at one minute while the normal AFI group infants had a lower score of eight percent (10/125). The measurement of low AFI values provides evidence that these pregnancies have increased chances of fetal distress because of problems with placental function together with umbilical cord compression. The Apgar scores of babies in the low AFI group remained lower at five minutes (8.8 ± 1.1) to those in the normal AFI group (9.4 ± 0.7) indicating

immediate neonatal resuscitation is critical for these cases [15].

The prevalence of meconium staining declared 45% in the low AFI group (56 of 125) and 10% in the normal AFI group (12 of 125) and the difference proved statistically significant at p = 0.01. Research supports that umbilical cord compression leading to fetal distress increases when amniotic fluid is low because the condition causes meconium staining of amniotic fluid [16]. People whose AFI was low faced increased risks for hospitalization in a neonatal ICU since they accounted for 18% (22/125) of all patients while those with normal AFI levels only experienced a 2% (3/125) admission rate. The results show that infants born to mothers with low AFI face an elevated risk of needing intensive care since they develop respiratory distress syndrome among other perinatal complications related to placental insufficiency [17]. Learning about AFI status became an essential factor that determined delivery choices for mothers. The number of vaginal deliveries reached 78 out of 125 women among those with normal AFI while the low AFI group involved only 52 of 125 deliveries through vaginal pathways. Research backs up these findings since the low AFI group experienced a 58% (73/125) rate of cesarean section compared to 38% (47/125) in the normal AFI group [18]. The need for assisted vaginal delivery was higher among patients in the normal AFI group at 4% (5/125) than in the low AFI group which experienced no cases of assisted vaginal delivery. The hospital stays for patients with low AFI lasted longer at 7.2 ± 2.5 days than for those with normal AFI who stayed for 5.4 ± 1.6 days. This difference can be attributed to the increased rates of cesarean sections and postoperative complications and neonatal ICU admissions in the low AFI patient group. On average patients who underwent cesarean delivery spent seven days in hospital whereas people who delivered vaginally stayed five days. This patient group experienced higher post-operative complications including infection (7%) and blood loss (5%) than the other group which demonstrates the elevated risks during this condition [19].

CONCLUSION

It is concluded that there are the significant adverse outcomes associated with low amniotic fluid index (AFI) in pregnancy. Women with low AFI had significantly higher rates of low birth weight, meconium staining, IUGR, cesarean section, and neonatal ICU admissions compared to those with normal AFI. These findings emphasize the need for early detection and careful monitoring of pregnancies with low AFI to prevent complications and improve maternal and neonatal outcomes.

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