

IMPACT OF ABRUPTIO PLACENTA AMONGST THE CHILDBIRTH CASES CONDUCTED AT A TERTIARY CARE HOSPITAL OF KARACHI

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ABSTRACT

Objective: Placental abruption (PA) is a significant obstetric complication that increases the risk of morbidity and mortality for both mother and fetus across the world. Therefore, the aim of this study was to determine the frequency, risk factors and Impact of abruptio placenta among the childbirth cases conducted at a tertiary care hospital in Karachi.

Methodology: This was a hospital based cross sectional study that was conducted at the tertiary care hospital, Jinnah Postgraduate Medical Centre, Karachi, over a 2 years period; from January 1st, 2019 to December 31st, 2020. The maternal demographic data; age, medical history (gravidity, parity, gestational week, comorbidities, trauma, multiple pregnancies), pregnancy outcomes such as mode of delivery, and maternal morbidity (acute kidney injury, postpartum hemorrhage, anemia, DIC, ICU for ventilator support, obstetric hysterectomy), maternal mortality, and fetal outcomes were documented. The mean and standard deviation was calculated for continuous variables whereas frequencies and percentages were documented for categorical variables.

Results: A total of 178 pregnant women with PA were included in the study; their mean age was 31.19 ± 4.85 years, and their mean gravidity was 4.089 ± 2.65 . Parity showed that most of the patients 107(60.11%) had parity 2-4. The mean gestational age was 32.87 ± 3.46 weeks. Comorbidities revealed that 132(74.2%) patients were anemic followed by 110(61.8%) cases were hypertensive. 141(79.2%) patients spontaneously delivered vaginally, while 35(19.6%) underwent assisted vaginal delivery. There were 3(1.7%) maternal deaths observed. The Fetal outcome revealed that Only 53(29.85) fetuses were alive while 125(70.2%) were dead. Eighty eight neonates were fresh stillbirth and 37(20.8%) were macerated stillbirth.

Conclusion: This study concluded that Placental abruption was associated with high incidence of maternal and fetal morbidity and mortality. Anemia was the most prevalent maternal risk factor, followed by hypertension. Additionally, pregnant women with placental abruption frequently had abdominal pain and vaginal bleeding. In addition, the majority of the fetuses were stillbirth.

Keywords: Placental abruption, low birth weight, postpartum hemorrhage, Cesarean-section

INTRODUCTION

Placental abruption (PA) is the early detachment of the placenta from the uterine lining before the second stage of labor is fully completed. It is one of the reasons of bleeding in women at the end of second trimester of their pregnancies. A critical but comparatively uncommon pregnancy condition called placental abruption puts the health of both mother and fetus at jeopardy. Abruptio placentae is also termed as placental abruption [1,2]. The incidence is predicted to be between 0.6% and 1% in the United States [3], but between 0.4% and 0.5% in Nordic countries [3] and between 3.5% and 3.8% in several south Asian nations [4,5]. It often manifests as an unusual maternal hemodynamic instability, abdominal pain, and uterine contractions, and abnormal fetal heart rate tracings[6–8]. Chronic placental malfunction and detachment from the uterine wall are further features of this disorder, which as it progresses may result in a reduction in the placental surface area accessible for exchange of oxygen and nutrition supply for the fetus[9]. A high possibility of low birth weight, premature birth, and perinatal death may result from this process[3]. Severe cases of abruption can quickly lead to high levels of maternal blood loss, fetal hypoxia, and fetal mortality, necessitating an urgent caesarean birth [3].

Although the cause of PA is not completely understood, the condition is typically multifactorial and includes factors such as multiple pregnancies, diminished placentation, placental insufficiency, hypoxic condition in uterus, uteroplacental under perfusion, hypertension before and during pregnancy, intrauterine growth restriction, advanced maternal age, maternal trauma, smoking, alcohol and cocaine use, small umbilical cord, abrupt decompression of the uterus, (polyhydromnios)[10-12]. Depending on the level of bleeding and placental separation, several clinical manifestation of PA may be present [10-12]. Lastly, placental abruption may arise from

trauma to the abdomen, for instance a car accident, a fall, or violence that causes a blow to the belly [13].

When the vascular structures nourishing the placenta are compromised, placental abruption results. In other words, the vascular networks that connect the placenta's maternal side to the uterine lining are severed. The fetus receives oxygen and nutrients from these vascular systems. When the vascular structures are damaged due to hypertension, substance abuse, or disorders that cause the uterus to stretch, the vascular network may become disrupted. The placenta is less elastic than the uterus despite being a muscle like the uterus. Therefore, the placenta remains stable as the uterine tissue rapidly extends, but the vascular system that connects the uterine wall to the placenta tears away [14,15].

PA frequently begins suddenly, intensely, and un-expecting; it has to be treated immediately. Advanced life support and transportation to a hospital with a full-facility obstetrical unit and a neonatal intensive care unit are required for pre-hospital treatment for the patient with a suspected PA. Most women will get intravenous (IV) fluids, extra oxygen, and continuous maternal and fetal monitoring after arriving at the hospital, following completing the history and physical examination. The course of treatment will depend on the information gathered during the evaluation, the gestation of the pregnancy, and the level of distress the pregnant woman and/or fetus are suffering [16,17].

PA is a life threatening condition that puts the mother and fetus lives at danger. The mother's and fetus' lives are at danger if the bleeding is uncontrolled. Unless a caesarean section is done rapidly, death is imminent if the placenta is completely or nearly completely separated. There have been reports of fetal death rates between 1-40%, however this also relies on the fetus's age and the degree of separation. About 1 to 5% of maternal fatalities in the US each year are attributed to placental abruption. The second morbidity, in addition to the bleeding, is connected to blood transfusions, the fetus' preterm, hysterectomy, and C-Section. In some researches, rates of recurrence 3-10% are documented [2][18].

There is a lack of data available in Pakistan regarding risk factors, etiology, pregnancy outcomes and prompt management of pregnant women with PA. Therefore, this retrospective study was

conducted at a tertiary care hospital in Karachi to understand the frequency of PA in our study population, its consequence on fetal and maternal outcome and to identify the associated risk factors in order to prevent maternal and fetal mortality.

METHODOLOGY

This was a hospital based cross sectional study that was conducted at the tertiary care hospital, Jinnah Postgraduate Medical Centre, Karachi, over a 2 years period; from January 1st, 2019 to December 31st, 2020 by using a non-probability convenient sampling technique. The ethical approval was obtained from the Ethical Review Committee of concerned hospital. A total of 178 pregnant women with PA who presented to obstetric emergency department of JPMC were included in the study, whereas pregnant women with placenta previa were excluded from the study.

All cases of PA were recognized through medical records. Admission files were used to record the patient's demographic data, past and current medical history, clinical features, and pregnancy outcomes among the women who presented with PA. The leading subjects included the following items: maternal demographic data (age, residence: urban/rural) medical history (gravidity, parity, gestational age, previous mode of delivery, booking status, history of anemia, hypertension, trauma, multiple pregnancies), clinical features, laboratory investigations (hemoglobin levels, platelet count, total leukocyte count, coagulation parameters, serum urea, serum creatinine, liver enzymes, coagulation profile), pregnancy outcomes such as mode of delivery, estimated blood loss, and maternal morbidity (acute kidney injury, postpartum hemorrhage, anemia, DIC, prolong hospitalization, ICU for ventilator support, obstetric hysterectomy), maternal mortality, and fetal outcomes (alive, FSB, MSB).

The data was coded, entered and analyzed using SPSS version 20.0. The result was presented in tables of frequencies and percentage. The mean and standard deviation was calculated for continuous variables whereas frequencies and percentages were documented for categorical variables.

RESULTS

A total of 178 pregnant women with PA were included in the study; their mean age was 31.19 ± 4.85 years, and their mean gravidity was 4.089 ± 2.65 . Parity showed that most of the patients 107(60.11%) had parity 2-4. The mean gestational age was 32.87 ± 3.46 weeks. The mean systolic blood pressure, diastolic blood pressure, temperature, heart rate and respiratory rate was 120.6 ± 24.6 mm Hg, 79.7 ± 18.3 mm Hg, 89.1 ± 29.06 °F, 100.12 ± 8.9 /min and 19.67 ± 6.56 /rate, respectively. The majority of the patients 154(86.5%) were un-booked. Comorbidities revealed that 132(74.2%) patients were anemic followed by 110(61.8%) cases were hypertensive. Only 31(17.4%) patients had a history of trauma. As far as previous mode of delivery is concerned, 143(80.33%) cases had spontaneous delivered vaginally, whereas 32(17.9%) had history of cesarean section, as shown in Table I.

In terms of laboratory findings, the majority of cases were anemic, with the mean Hb level being 8.85 ± 7.44 g/dl, the mean platelet count being $163.79 \pm 65.90 \times 10^9/L$, the mean total leukocyte count being $14.36 \pm 4.61 \times 10^9/L$, the mean total bilirubin being 0.73 ± 0.35 mg/dL, the mean serum urea being 29.7 ± 21.7 mg/dl, the mean serum creatinine being 1.02 ± 1.003 mg/d, as shown in Table II. Abdominal pain in 177(99.4%) cases was the most common symptom observed followed by vaginal bleeding in 176(98.8%) cases whereas 158(88.8%) patients were anemic. Almost all patients had uterine tenderness 177(54.71%), and majority of the patients 171(96.1%) had woody consistency of uterus; while uterine contractions were exhibited in 128(71.9%) cases. Fetal heart sounds were positive only in 60(33.7%) cases. Approximately 1-4 cm cervix opening was observed in more than half of the patients 99(55.6%). Cervix was soft central and membranes were intact in 149(83.7%) and 151(84.4%) patients, respectively. About 122(68.5%) cases exhibited an artificial rupture of membrane. Additionally, blood stained liquor was observed in most of the patients 148(83.1%), as shown in table III.

The maternal outcome of patients with PA revealed that 141(79.2%) patients spontaneously delivered vaginally, while 35 (19.6%) underwent assisted vaginal delivery. Around 500-1000 ml estimated blood loss was reported in 125(70.2%) patients. Maternal complications after delivery showed, anemia was found in 146 (82.0%) of the patients, and acute kidney injury was found in 29 (16.3%) patients. Kidneys were severely affected in 16(9.0%), followed by liver in 11(6.2%) patients. Only four patients (2.2% of the total) had DIC, while 54 (30.3%) had PPH. The

duration of hospitalization stay was prolonged in 136 (76.4%) patients, showing that PA is associated with a prolonged hospital stay. Obstetric hysterectomy was required in two patients for control of postpartum hemorrhage (PPH). About 73(41.0%) cases need admission to the ICU. There were 3(1.7%) maternal deaths observed, as shown in Table IV.

The Fetal outcome after delivery of patients with placenta abruption revealed a 0 Apgar score in 126 (70.8%) cases. Only 53(29.85) fetuses were alive while 125(70.2%) were dead. Eighty eight neonates were fresh stillbirth and 37(20.8%) were macerated stillbirth. The majority of the newborns were male 94(52.8%) and 84(47.2%) were female. Infants born to women with PA had increased risk of low birth weight 2.13 ± 1.14 kg, as shown in Table V.

Table I: Maternal demographics of patients with placental abruption. (n=178).

Demographic details (n=178)		Mean±SD n(%)
Age (years)		31.19±4.85
Gravidity		4.08±2.65
Parity	Nulliparous	1(0.56%)
	Para 1	28(15.7%)
	Para 2-4	107(60.11%)
	Multipara> 4	42(23.6%)
Gestational age (weeks)		32.87±3.46
Systolic Blood Pressure (mm Hg)		120.6±24.6
Diastolic Blood Pressure (mm Hg)		79.7±18.3
Temperature (°F)		89.1±29.06
Heart Rate (b/min)		100.12±8.9
Respiratory Rate (Cycles/min)		19.67±6.56
Booking Status of pregnant women	Booked	24(13.5%)
	Un booked	154(86.5%)
Co-morbidities	Hypertensive	110(61.8%)
	Anemic	132(74.2%)
	Diabetic	3(1.7%)
	Hepatitis	6(3.4%)
Trauma history		31(17.4%)
Multiple gestation		4(2.2%)
Previous mode of delivery	Spontaneous Vaginal Delivery(SVD)	143(80.33%)
	Cesarean section	32(17.9%)
	Dilation and evacuation (D&E)	1(0.6%)
	Lower segment Cesarean section (LSCS)	2(1.1%)

Tab II: Mean of Maternal laboratory investigations.

Laboratory investigations	Mean±SD
Hb (gm/dl)	8.85±7.44
Platelet count (10⁹/L)	163.79±65.90
Total leukocyte count(10⁹/L)	14.36±4.61
Total_bilirubin (mg/dL)	0.73±0.35
Serum Urea (mg/dl)	29.7±21.7
Serum Creatinine (mg/dl)	1.02±1.003
INR	1.03±0.27

Table III: Prevalence of maternal clinical features.

Maternal outcomes			n	%
Symptoms and signs	Abdominal pain		177	99.4
	Anemic		158	88.8
	PV bleeding		176	98.8
Findings of uterus	Uterine tenderness		177	99.4
	Woody consistency of uterus		171	96.1
	Fetal heart sounds (FHS)	Positive	60	33.7
		Negative	118	66.3
	Uterine contractions	Positive	128	71.9
		Negative	50	28.1
	Os_cm	Closed	27	15.1
		Fully dilated	7	3.9
		1-4	99	55.6
		5-9	45	25.3
Clinical findings of Cervix	Cervix	Soft central	149	83.7
	Cervix membrane	Thick posterior	29	16.3
		Intact	151	84.8
		Ruptured	27	15.2
	Artificial rupture of membrane (ARM)		122	68.5
	Blood_Stained_Liquor		148	83.1

Table IV: Prevalence of maternal outcomes.

Maternal outcomes			n	%
Mode of delivery	Spontaneous_Vaginal delivery		141	79.2
	Ceserean_Section		9	5.05
	Assisted_Vaginal delivery		35	19.6
Estimated Blood loss (EBL)	< 500 ml		36	20.2
	500-1000 ml		125	70.2
	>1000 ml		17	9.5
Maternal Complications	Acute kidney injury		29	16.3
	Anemia		146	82.0
	Organ dysfunction	Liver	11	6.2
		Kidney	16	9.0
		Brain	2	1.i
		Nil	149	83.7
	Disseminated intravascular coagulation (DIC)		4	2.2
	Prolong hospital stay		136	76.4
	Postpartum hemorrhage (PPH)		54	30.3
	ICU_for_Ventilatory_Support		73	41.0
	Obs_Hysterectomy		2	1.1
Maternal mortality	Death		3	1.7
	Alive		175	98.3

Table V: Prevalence of fetal outcomes.

Fetal outcomes		Mean±SD n (%)	
APGAR	0	126	70.8
	1-4	19	10.6
	5-8	33	18.5
Alive	Yes	53	29.8
	No	125	70.2
fresh stillbirths (FSB)	Yes	88	49.4
	No	90	50.6
Macerated stillbirth(MSB)	Yes	37	20.8
	No	141	79.2
Gender of baby	Male	94	52.8
	Female	84	47.2
Weight of baby (kg)	2.13± 1.14		

DISCUSSION

In obstetrics and gynecology, PA is a frequent but deadly complication that is a primary cause of postpartum hemorrhage. If it goes unnoticed or untreated, both the mother and the child are at risk. According to reports, PA occurs 1%, globally. However, several investigations in recent years have indicated a decline in incidence; [19]therefore, the present study demonstrated the evaluation of risk factors that causes maternal and fetal mortality associated with PA.

Pregnant women with vaginal bleeding, abdominal pain, and a history of trauma, as well as those who deliver prematurely without apparent cause, may have PA. According to one study, 35% of abruption cases present with occult bleeding and 68% with occult abdominal pain. Fetal death can occasionally be the presenting symptom. In their study, 3(4.8%) of the cases were stillbirths, and 28(45%) of the cases indicated fetal distress. 45(73%) PA patients underwent emergency caesarean sections, whereas 17 (27%) gave birth spontaneous vaginally [19]. These incidence of PA was not consistent with previous research by Tikkanen et al. [20], wherein only severe cases

were documented. Some individuals with modest presentations may have given birth vaginally since the diagnosis can only be made through a caesarean surgery. Vaginal birth is an option for treating mild PA, however caesarean sections are typically required for treating significant PA. The present study was inconsistent with the above mentioned research and revealed that almost all the pregnant women with PA presented with abdominal pain 177(99.4%) and PV bleeding 176(98.8%). In terms of fetal mortality, 125(70.2%) were dead and 88(49.4%) were fresh stillbirths with low birth weight 2.13 ± 1.14 kg. For the maternal survival, about 9(5.05%) cases underwent for C-section, and 141(79.2%) cases had spontaneous vaginal delivery. About 73(41.0%) cases were admitted to the ICU for maternal survival.

Another observational prospective study conducted in Pakistan, determined the incidence, and the maternal and fetal outcomes of PA. PA was observed in 84(3.9%) patients. The majority of women, 43 (51.1%), were in the 25–30 age range. The incidence was 73 (86.1%) higher in multiparous women. Overall, 59(70.0%) women had anemia. Six (7.0%) patient had pregnancy-induced hypertension, 5(6%) had diabetes, and 4(5%) cases had multiple gestations. 10 (12%) of the women had no risk factors. In terms of delivery method, 62 (74%) of the women spontaneously gave birth vaginally, whereas 21 (25%) required caesarean sections. One patient passed away before delivery as a result of severe anemia, shock, and disseminated intravascular coagulation (DIC). Hypovolumic shock was the most common maternal complication observed in 21 (25%) patients, followed by postpartum hemorrhage in 11 (13%) cases, an altered coagulation profile in 6 (7%), and renal failure in 2 (2.3%) individuals. 32 (38%) of the infants delivered by 52 (62%) of the mothers were stillborn. Two preterm babies who were born out of 52 live ones passed away within the first week of life. Perinatal mortality overall was 40.4% [21]. The present study was not endorsed by the above reported research in terms of frequencies. However, consistent in terms of clinical symptoms, maternal and fetal outcomes, revealing that pregnant women with PA were aged between 27-34 (mean 31.19 ± 4.85) years, the incidence of PA was highly prevalent 107(60.11%) in para 2-4. About 132(74.2%) were anemic, 110(61.8%) had hypertension and 3(1.7%) were diabetic. As far as mode of delivery is concerned, 141(79.2%) women delivered spontaneous vaginally and 9(5.05%) underwent caesarean section for maternal and fetal survival. According to maternal outcomes, PPH was reported in 54 (30.3%) patients and causes anaemia in 146 (82.0%) patients. Maternal death occurred in 3(1.7%) cases. Fetal death occurred in 125(70.2%) cases.

Another Retrospective study based on risk factors and maternal and fetal outcome revealed that most of cases were un-booked, with an average age of 34.5 years (range, 18-44) and almost two-third of the patients belonged to poor socioeconomic status. 96% of patients had anemia ($Hb < 10 \text{ g\%}$), with rates of maternal and fetal death of 3.5% and 68%, respectively. Due to reduced blood pressure in patients with PA caused by vaginal bleeding, the 25% incidence of hypertensive condition found in our study may have been underestimated [22]. Patients with gestational hypertension disorders are nonetheless more likely to acquire AP [23]. These results, which indicated that the majority of PA patients were un-booked with an average age of 31.19 ± 4.85 years, were somewhat comparable to those of the current study. Anemia was found in 132 (74.2%) patients, followed by hypertension in 110 (61.8%), with maternal and fetal death rates of 3(1.7%) and 125 (70.2%), respectively.

Similarly, another study conducted in Dubai, examined patients admitted with suspected PA at gestational age of 28 weeks and above. There were 15,079 births overall throughout their research period, and diabetes (26%), chronic hypertension (2.2%), pre-eclampsia (19.5%), prior caesarean section (26%), and multiple pregnancies (9.8%) were the prenatal risk factors linked with abruption. In 78% of cases of abruption, the delivery method was a caesarean section. 20% had received blood transfusion, and 33% experienced PPH. The following harmful fetal outcomes occurred: Preterm birth occurred in 51% of the cases, 47% of the newborns weighed $< 2.5 \text{ kg}$, 8 cases of intrauterine fetal death occurred, and 1 neonatal death occurred [24]. The present study was inconsistent with the above research, showing that most common antenatal risk factors associated with abruption were anemia 132(74.2%) and hypertension 110(61.8%). Previous C-sections were performed in 32 (17.9%) of the cases, and 4 (2.2%) of the cases had multiple gestations. Maternal outcomes revealed that 30.3% had postpartum hemorrhage causing severe anemia. Fetal outcome revealed 53(29.8%) were alive, and all the dead and alive babies had birth weight of $< 2.5 \text{ kg}$ (mean 2.13 ± 1.14).

The strength of this study is that the utilization of maternally linked data, which includes thorough information on the demographics of the mothers, as well as information about the mothers before and during pregnancy, labor and delivery, and newborn status. This study has some limitations. Since this was a hospital-based trial, there is a chance of selection bias. Women with challenging pregnancies are more likely to be referred for delivery in the study setting. This

might result in an overestimation of the stated risk and consequences for the mother and fetus. Despite these drawbacks, placental abruption is unquestionably linked to high rates of maternal morbidity as well as neonatal morbidity and death. Future research should go into further detail on the abruption's location, degree of detachment, and, its timing and severity.

CONCLUSION

This study concluded that Placental abruption was associated with high incidence of maternal and fetal morbidity and mortality. Anemia was the most prevalent maternal risk factor, followed by hypertension. Additionally, pregnant women with placental abruption frequently had abdominal pain and vaginal bleeding. In addition, the majority of the fetuses were dead. The risk of placenta abruption and related feto-maternal outcome may be decreased by receiving good prenatal care, improving maternal nutrition, early detection, thorough monitoring, and quick management.

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