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Incidence of Abruptio placentae in preeclampsia in a rural tertiary care hospital

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Abstract
Preeclampsia is a disorder specific to pregnancy. It is commonly defined as de novo hypertension and proteinuria after 20 weeks of gestational age. It occurs in 3-5% of pregnancies and is a major cause of both foetal and maternal morbidity and mortality worldwide. One of the most serious and terrifying complication of preeclampsia is abruptio placentae. Premature placental separation from its implantation site before delivery of the foetus has been called abruption placentae or accidental haemorrhage. Various studies have shown that there is 2-2.5 fold increase in incidence of abruption in hypertensive disorder of pregnancy.
The aim of the study is to study the incidence of abruptio placentae in women with preeclampsia.
Materials and Methods: 100 pregnant women with preeclampsia attending the antenatal OPD as well as admitted to the antenatal ward and labour room. Those women who fulfilled the inclusion criteria were enrolled in this study. The incidence of abruption placenta among these 100 women was studied.
Results: Among the 100 women with preeclampsia enrolled in the study, abruptio placentae was noted in 16 women (16%). Maternal complications were seen in the form of anaemia 11(78.57%), need for blood transfusion 8(57.14%), shock 4(28.57%), postpartum haemorrhage 2(14.28%) and puerperal sepsis 1(7.14%). Perinatal complications were seen in the form of low birth weight 8(57.14%), prematurity 5(35.71%), NICU admission 10(71.43%) and intrauterine death 4(28.57%).
Conclusion: Abruptio placentae affects approximately 1% of all deliveries. However, the incidence significantly increases in cases of preeclampsia and other hypertensive disorders of pregnancy. Association of abruptio placentae in cases of preeclampsia varies from 10-50%. In our study, incidence of abruption placenta in preeclampsia is 16%.

Keywords: Preeclampsia, abruption placenta, proteinuria, hypertension, haemorrhage

Introduction
Preeclampsia is defined as a multisystem disorder of unknown aetiology characterised by rise of blood pressure to the extent of 140/90 mm of Hg or more taken on at least 2 occasions 6 hours apart with proteinuria (>300 mg in 24 hours urine) in previously normotensive and non-proteinuric women after 20 weeks of gestation. It features abnormal vascular response to placentation associated with increased systemic vascular resistance, enhanced platelet aggregation, activation of coagulation system and endothelial dysfunction [1]. It is one of the major causes of maternal and foetal/neonatal morbidity and mortality. Every third case of obstetric morbidity and more than 50,000 maternal deaths per year worldwide are caused by pre-eclampsia. Abruptio placentae is one of the major complication of preeclampsia and it has serious implication on the health of both the mother and the foetus, which may result in maternal as well as perinatal mortality [2, 3].
Abruptio placentae is defined as premature separation of placenta from its implantation site before birth of the foetus. The initial event in abruptio placentae is bleeding into the decidua basalis. The haematoma which is formed separates placenta from maternal vascular system. This results in bleeding from or into the genital tract in the form of maternal blood and also causes impairment of foetal oxygenation and nutrition. Incidence of abruptio placentae varies from 0.5-1% of all births [4, 5]. Depending on the extent (partial or complete) and intensity of placental separation, it is a significant cause of perinatal mortality (15-20%) and maternal mortality (2-5%) [6, 7, 8]. It can occur at any period of gestation after 28 weeks of gestation. There are 3 varieties of abruption placentae revealed concealed and mixed. Abruption severe enough to cause foetal death occurs approximately in 1 in 100 deliveries [1, 3].
Preeclampsia, gestational hypertension, chronic hypertension all is associated with abruptio placentae. The association of preeclampsia in abruptio placentae varies from 10-50% [10, 11].

Risk of abruptio placentae is increased in women with chronic hypertension and preeclampsia increasing to a relative risk of 3.8 for preeclampsia and 2.8 for chronic hypertension with superimposed preeclampsia [3, 5, 8, 9]. The mechanism of placental separation in preeclampsia by spasm of the vessels in the uteroplacental bed (decidual spiral artery) causing anoxic endothelial damage, which in turn results in rupture of vessels or extravasation of blood in the decidua basalis (retroplacental haematoma) [2, 3, 6]. Prognosis depends on the degree of associated preeclampsia.

Aims and objectives

1. To study the incidence of abruptio placentae in pregnancies complicated with preeclampsia.
2. To note the severity of the abruptio, amount of blood loss, need for blood and components transfusion.
3. Effect of complications on maternal and foetal morbidity.

Materials and methods

The study was conducted in the Department of Obstetrics and Gynaecology in MVJ Medical College and Research Hospital, a rural tertiary care hospital, over a period of 2 years from July 2018 to September 2020. During this period, 100 antenatal women attending the outpatient department as well as admitted in the labour room and obstetric ward and fulfilling the inclusion and exclusion criteria were included in the study. After counselling, an informed written informed was obtained.

The diagnosis of preeclampsia was done according to NHBPEP working group on high blood pressure. The diagnosis of abruption placentae was made according to the signs and symptoms including vaginal bleeding, abdominal pain, back pain, tense and tender uterus, pallor, features of shock, foetal death and USG confirmation were feasible.

Inclusion Criteria

- Women with good dates.
- Singleton pregnancy.
- Patients booked in the first trimester with known first trimester BP record.
- Pregnant women between 20-42 weeks of gestation.
- BP>140/90 mm of Hg with proteinuria (>300 mg/dL).

Exclusion Criteria

- Gestational age <20 weeks or >42 weeks.
- Women who are neither sure of their dates nor having early USG.
- Obstetric complications like multiple gestation, polyhydramnios, premature rupture of membranes.
- Presence of gestational diabetes mellitus.
- Medical conditions like essential hypertension, renal disease, heart disease, diabetes mellitus and thrombophilia.
- History of trauma.
- Presence of short cord.
- History of prior abruption.
- Uterine anomalies.
- Placental anomalies.

All the women enrolled in the study were studied for demographic data such as age, gestational age, gravidity. The incidence of abruptio placentae in the 100 preeclamptic women was noted, severity of preeclampsia, severity of abruptio, amount of blood loss, need for blood and component transfusion, maternal and neonatal complications. The data were evaluated and statistically analysed using chi-square test and Student's t-test. P value <0.05 was considered statistically significant.

Results

Among the hundred preeclamptic women who were included in the study, fourteen women developed abruptio placentae. The incidence of abruptio placentae in preeclampsia was found to be 16%. 95% Confidence Interval was 0.0720-0.2080.

Table 1: Distribution of the Patients

Total Number of Preeclamptic Women (%)	Number of Women Developing Abruptio placentae (%)	Number of Women not Developing Abruptio placentae (%)	95% Confidence Interval
100 (100%)	16 (16%)	84 (84%)	0.0720-0.2080

No statistically significant relationship was found in respect of age, gestational age, gravidity between patients who developed abruptio placentae and those who did not develop abruptio placentae, while the association of severity of preeclampsia, mode of delivery and blood loss among patients with abruptio placentae and without abruptio placentae was statistically significant.

Table 2: Association of Subjects According to Age

Age	Women with Abruptio placentae	Women Without Abruptio placentae	Total Preeclamptic Women	p value
Mean ± SD	24.33 ± 4.5689	25.056 ± 4.5577	25.31 ± 4.5446	0.5607 Not Significant

Mean age of women who developed abruptio placentae was 24.33 ± 4.5689 while that of women who did not develop abruptio placentae was 25.056 ± 4.5577. This difference was statistically insignificant (p value 0.6109).

Table 3: Association of Subjects according to Gestational Age

Gestational Age	Women with Abruptio placentae	Women Without Abruptio placentae	Total Preeclamptic Women	p value
Mean ± SD	33.76 ± 6.16342	34.68 ± 6.685472	34.28 ± 6.28041	0.6109 Not Significant

Mean gestational age of women who developed abruptio placentae was 33.76 ± 6.16342 while that of women who did not develop abruptio placentae was 34.68 ± 6.685472. This difference was statistically insignificant (p value 0.6109).

Table 4: Association of Subjects according to Gravidity

Gravidity	No. of Women with Abruptio placentae (%)	No. of Women Without Abruptio placentae (%)	Total Number of Preeclamptic Women (%)	p value
Primigravidae	6 (12%)	44 (88%)	50 (50%)	1.1905 Not Significant
Multigravidae	10 (20%)	40 (80%)	50 (50%)	
Total	16 (16%)	84 (84%)	100 (100%)	

Out of fifty primigravidae, six women (12%) developed abruptio placentae while out of fifty multigravidae, ten women (20%) developed abruptio placentae. This difference was statistically insignificant (p value 1.1905).

Table 5: Association of Subjects with Severity of Preeclampsia

Severity of PE	No. of Women with Abruptio placentae (%)	No. of Women Without Abruptio placentae (%)	Total Number of Preeclamptic Women (%)	p value
Mild	4 (7.14%)	52 (92.86%)	56 (56%)	0.064 Significant
Severe	12 (27.27%)	32 (72.73%)	44 (44%)	
Total	16 (16%)	84 (84%)	100 (100%)	

Out of fifty-six women with mild preeclampsia, four women (7.14%) developed abruptio placentae while out of forty-four women with severe preeclampsia, twelve women (27.27%) developed abruptio placentae. This difference was statistically significant (p value 0.064).

Table 6: Association of Subjects with Mode of Delivery

Mode of Delivery	Number of Women with Abruptio placentae (%)	Number of Women Without Abruptio placentae (%)	Total Number of Preeclamptic Women (%)	p value
Vaginal	3 (5.26%)	54 (94.74%)	57 (57%)	0.000746 Significant
LSCS	13 (30.23%)	30 (69.77%)	43 (43%)	
Total	16(16%)	84 (84%)	100 (100%)	

Three women (5.26%) with abruptio placentae underwent vaginal delivery and thirteen women (30.23%) with abruptio placentae underwent LSCS whereas fifty-four women (94.74%) without abruptio placentae underwent vaginal delivery and thirty women (69.77%) without abruption placentae underwent LSCS. This difference was statistically significant (p value 0.000746).

Table 7: Association of Subjects According to Blood Loss

Blood Loss	Women with Abruptio placentae (%)	Women without Abruptio placentae (%)	Total Preeclamptic Women (%)	p value
Mean ± SD	1552.86±156.22	500.38±190.52	618.05±180.70	<0.0001 Highly Significant

Mean blood loss of women who developed abruptio placentae was 1552.86±156.22 mL, while that of women who did not develop was 500.38±190.52 mL. This difference was highly significant (p value<0.0001).

Table 8: Maternal Complications

Complications	No. of Women with Abruptio placentae (%)
Anaemia	11 (78.57%)
Need for Blood Transfusion	8 (57.14%)
Number of Units of Blood Transfused	
1	5
2	2
≥3	1
Shock	4 (28.57%)
Postpartum Haemorrhage	2 (14.28%)
Puerperal Sepsis	1 (7.14%)
Acute Renal Failure Coagulopathy (DIC) Need for FFP Transfusion Maternal Mortality	Nil

Among the women who had abruptio placentae, eleven (78.57%) developed anaemia, eight of them (57.14%) needed blood transfusion, four (28.57%) went into shock, two (14.28%) developed postpartum haemorrhage and one (7.14%) developed puerperal sepsis, whereas there was no incidence of acute renal failure, coagulopathy or maternal mortality.

Table 9: Perinatal Complications in Patients with Abruption

Complications	No. of Babies (%)
Low Birth Weight	8 (57.14%)
Prematurity	5 (35.71%)
NICU Admission	10 (71.43%)
Intrauterine Death (IUD)	4 (28.57%)

Perinatal complications in the form low birth weight was seen in eight cases (57.14%), prematurity in five cases (35.71%), ten babies (71.43%) needed NICU care while IUD was seen in four cases (28.57%).

Thus, among hundred preeclamptic women in the study, sixteen (16%) developed abruption placenta among whom the relation of age, gestational age and gravidity was not statistically significant, whereas the relation of severity of PE, mode of delivery and blood loss was statistically significant. Maternal complications were seen in the form of anaemia (78.57%), need for blood transfusion (57.14%), shock (28.57%), postpartum haemorrhage (14.28%) and puerperal sepsis (7.14%). Perinatal complications were seen in the form of low birth weight (57.14%), prematurity (35.71%), NICU admission (71.43%) and intrauterine death (28.57%).

Discussion

The cause of abruptio placentae is unknown, but a hypothesis suggests placental or vascular abnormalities due to failure of secondary invasion of trophoblastic villi. Abnormal placentation, vascular malformations and increased fragility of vessels predispose to haematoma formation resulting in abruption placenta [1, 2]. Abruption placenta occurs in 0.8-1.0% of all pregnancies [3, 6, 9] and 1.2% in twin pregnancies worldwide [7]. It is a major cause of third trimester haemorrhage and perinatal death. The high maternal morbidity and mortality is due to severe haemorrhage that follows this complication. The foetal morbidity and mortality is due to reduced placental surface area for oxygenation [4]. Maternal hypertension especially preeclampsia and eclampsia are major risk factors for abruption placenta [3, 5, 8, 10]. Patients with severe preeclampsia have been reported to have a relative risk of 3.8 and those with chronic hypertension with superimposed preeclampsia have a relative risk of 2.8 for placental abruption [5].

Table 10: Comparison of Incidence of Abruptio Placentae in various studies

Study	Incidence of abruptio placentae
Baha M Sibai *et al*.	5.6%
Mandana Saadat *et al*.	8.8%
Rathore R,Butt *et al*.	4%
Present Study	16%

In a study conducted by Baha M Sibai *et al*. [11] in 1984 on 303 preeclampsia women, abruptio placentae was noted in 5.6% women. In a study conducted by Mandana Saadat *et al*. [12] studied 125 women with PE and they were matched with the control group, i.e. 125 normotensive women. Abruptio placentae was noted in 8.8% in group 1 and 4% in group 2. In another study conducted by Rathore R, Butt *et al*. [13] at King Edward Medical University, Mayo Hospital, Lahore, in 2010 where 100 patients of PE were studied, they observed abruptio placentae in 4% cases. In the present study, incidence of abruptio placentae in preeclampsia was 16%.

Conclusion

Placental abruption was associated with increased odds of preeclampsia in a subsequent pregnancy. It is a medical and obstetric emergency. It is a serious and frequent complication of preeclampsia. Its incidence increases highly with the severity of preeclampsia. In addition to the gestational timing of abruption, the gestational timing of preeclampsia is also altered There is accumulating evidence that early-onset preeclampsia and late-onset preeclampsia represent distinct conditions, with early-onset being more severe and having a larger genetic component [14, 15]. No studies have explored the relationship between preterm abruption and preeclampsia with early delivery and recurrence of preeclampsia in subsequent pregnancies [16, 17]. Obstetrician must be cautious regarding abruptio placentae especially in cases of preeclampsia as close monitoring, early diagnosis and management can prevent serious maternal and perinatal hazards. The findings emphasise that better care could significantly improve maternal and perinatal prognosis.

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