ORIGINAL ARTICLE

Perinatal Outcome and Near-miss Morbidity Between Placenta Previa Versus Abruptio Placentae

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ABSTRACT

Objective: To compare perinatal outcome and near-miss morbidities between placenta previa versus abruptio placentae in patients of antepartum haemorrhage (APH).

Study Design: Cross-sectional, analytical study.

Place and Duration of Study: Gynaecology Unit II, Civil Hospital, Karachi, from August 2007 to July 2009.

Methodology: Patients with APH diagnosed as placenta previa and abruptio placentae who delivered after 24 weeks of pregnancy were selected from labour room. Outcome measures were birth weight, neonatal intensive care admission, stillbirth, perinatal mortality rates, near-miss, surgical intensive care admission, postpartum haemorrhage, hysterectomy, massive transfusion, renal failure, coagulopathy and maternal death. Stillbirth was defined as a fetus weighing ≥ 500 gm showing no sign of life after birth. Near-miss was defined as severe organ dysfunction which if not treated appropriately, could result in death. Descriptive statistics were calculated and chi-square was applied with significance level < 0.05.

Results: Stillbirths and perinatal mortality rates were significantly higher in abruptio placentae, 52.97% versus 18.18% and 534/1000 versus 230/1000 ($p < 0.01$). Near-miss cases were also significantly higher in abruptio placentae, 22.27% verus 11.18% ($p < 0.01$). Hypovolemic shock and coagulation failure were also significantly higher in abruptio placentae ($p < 0.05$).

Conclusion: Abruptio placentae carry significantly higher perinatal mortality and near-miss morbidity than placenta previa.

Key words: *Placenta previa. Abruptio placentae. Perinatal mortality. Stillbirth. Near-miss morbidity. Antepartum haemorrhage.*

INTRODUCTION

Worldwide maternal mortality ratio for the year 2005 was 402/100,000 livebirths and there were 535,900 maternal deaths.[1] Maternal mortality ratio (MMR) ranges from below 10/100000 in developed countries to above 2000/100000 in some developing countries.[1] Peripartum haemorrhage is the leading cause of direct maternal death worldwide accounting for 30% maternal deaths in Asia.[2] Major causes of peripartum haemorrhage are uterine atony, placenta previa (PP) and abruptio placentae (AP).[3]

In developed countries antepartum haemorrhage (APH) is not a major contributor to maternal mortality due to improved antenatal care, but continues to be responsible for maternal and perinatal morbidity. Incidence of APH in developed countries ranges from 2-5% of pregnancies.[4] In Pakistan there is lack of data for incidence of APH in pregnancies but studies have found it to be 6.7% of deliveries.[5] A recent local study reported APH as the commonest cause of stillbirths accounting for 33.5% of cases.[6] Important causes of APH include placenta previa and abruptio placentae with almost equal contribution. Abruptio placentae is premature separation of normally sited placenta before delivery while implantation of placenta partially or entirely in lower uterine segment is placenta previa.[4] Despite the decline in maternal mortality from APH in developed countries, four maternal deaths due to placental abruption were reported in confidential enquiries of maternal deaths in UK for the years 2000-2002.[7] Study from Indonesia reported 40% cases of near-miss or severe obstetric morbidity due to APH in public sector hospitals.[8]

Near-miss morbidity describes a patient with an acute organ system dysfunction, which if not treated appropriately, could result in death.[9] APH is also associated with maternal morbidity encompassing hypovolemic shock, coagulation failure, and acute renal failure. Incidence of AP in Western literature is quoted as 0.42%[10] to 1%.[11] AP is also a significant contributor to perinatal mortality and morbidity. Perinatal mortality rates (PNMR) of 9.2%[10] and 119/1000[11] with stillbirth rate of 83/1000[12] are quoted in Western studies. The various locally reported rates for APH with stillbirth are 4.4% with 58.5% from Abbottabad and[13] 1.8% -4.7% with 46.1-51% from Hyderabad.[5,14] Another study from Lahore reported foetal loss rate of 56.6%.[15]

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Incidence of PP quoted in Western studies is 0.4-0.8% of pregnancies with perinatal mortality rate (PNMR) of 42-81/1000 births.[4] PP is associated with postpartum haemorrhage, placenta accreta, preterm deliveries and fetal growth restriction.[4] In Pakistan only two hospital-based studies reported variable frequencies of PP as 0.7% and 3.5% of deliveries.[16,17] A study from Lahore reported PNMR associated with PP as 20%.[15] Available local studies have not mentioned well-defined near-miss morbidities, lack adequate data, and have individually examined either placenta previa or abruptio placentae.[5,13,16,17] Severe obstetric morbidity or near-miss are more sensitive measures of pregnancy outcome.[18]

The purpose of this study was to compare perinatal outcome and near-miss morbidities between placenta previa versus abruptio placentae in patients of antepartum haemorrhage (APH).

METHODOLOGY

This cross-sectional study was conducted from 1st August 2007 to 31st July 2009 at the Obstetrics and Gynaecology, Unit II of Civil Hospital, Karachi.

Patients selected through purposive sampling with singleton pregnancy, admitted on the unit's emergency days in labour room with APH and diagnosed as PP or AP who delivered beyond 24 weeks of pregnancy.

Patients on expectant management, local or undetermined cause of bleeding, and multiple pregnancy were excluded.

Diagnosis of PP was made by ultrasound or clinical presentation of painless bleeding in the presence of relaxed uterus and later confirmation of placental site. Diagnosis of AP was made by clinical parameters of bleeding associated with uterine contractions, tenderness and or ultrasound showing normal placental site. Later confirmation was done by attending obstetrician by the presence of retroplacental clots, or marks of Couvelaire uterus.

Severity of placental abruption was graded as I: slight bleeding, mild uterine tetany but no maternal shock. II: uterine tetany with tenderness, fetal distress but no maternal shock; and III: maternal shock, uterine tetany, tenderness, fetal distress, intrauterine fetal demise without (IIIA) or with coagulopathy (IIIB).

Perinatal outcome measures were birth weight, gestational age, stillbirth, neonatal intensive care admission (NICU), early neonatal death, and perinatal mortality rate (PNMR). Preterm birth was defined as birth after the age of viability and before 37 weeks.[19] Low birth weight (LBW) was defined as babies weighing 1.5 < 2.5 kg, very low birth weight (VLBW) 1-1.49 kg and extremely low birth weight (ELBW) as 0.5-0.99 kg.[19] Stillbirth was defined as birth of a fetus weighing ≥ 500 gm who does not show any sign of life.[20] Early neonatal death was defined as death within first 7 days of life. Perinatal mortality rate was defined as the number of stillbirths, and early neonatal deaths per thousand live and stillbirths.[21] Maternal outcome measures comprised of severe maternal morbidity (near-miss) i.e. hypovolumia, massive blood transfusions, intensive care (ICU) admission, coagulation failure, acute renal failure, emergency hysterectomy, postpartum haemorrhage (PPH) defined as blood loss ≥ 500 ml of blood after delivery, prolonged hospital stay ≥ 7 days, and maternal death. Near-miss resulting from haemorrhage was defined by organ dysfunction and management based criteria as expressed by Mantel *et al.*[9] Hypovolemic shock was defined as systolic blood pressure < 90 mmHg and infusion > 1 litre in 2 hours, acute transfusion of 2-3 units of blood; renal dysfunction was defined as oliguria < 30 ml/hour or < 400 ml/24 hours; coagulopathy was diagnosed by acute thrombocytopenia or prolonged prothrombin time (PT) or activated partial thromboplastin time (APTT). Massive blood transfusion was defined as transfusion of > 5 units of blood within 12-24 hours. Data of patient's age, parity, gestational age, type of PP, grade of AP, mode of delivery and fetal and maternal outcome was recorded on a semistructured proforma, entered in computer system and analyzed on SPSS version 17. Frequency and percentages were calculated for all variables, and fetomaternal outcome variables of PP and AP were then compared by chi-test on proportions; $p \leq 0.05$ was considered significant.

RESULTS

There were 5559 deliveries during the study period and 404 (7.26%) patients presented with antepartum haemorrhage. Out of those, 345 patients with APH comprising 143 with PP and 202 with AP, met inclusion criteria giving a frequency of 6.20% for delivered cases of APH, 2.57% for previa and 3.63% for AP. Eighty eight percent patients with PP and 94.55% with AP were unbooked and referred. In PP group, 37 (25.87%) patients had PP minor and 106 (74.12%) had PP major. AP was grade I, in 18.31% (n=37) patients, grade II, in 35.64% (n=72) and grade III, in 46.03% (n=93). The mean age in PP group was 28.6±5.56 (range 16-45) years and 27.81±5.29 (range18 to 42) years in the AP group. Mean parity was 3.13±2.59 in PP group and 3.33±2.77 in AP group. Mean gestational age was 34.24±3.36 weeks in PP group and 34.40±3.87 weeks in AP group. Gestational age in both groups is shown in Figure 1. Majority of women with AP delivered vaginally (67.32%, n=136), whereas mode of delivery was caesarian section (CS) in 89.51% (n=128) patients with previa as 74.12% had major PP. CS was done in 32.67% (n=66) patients with abruption. Overall CS rate was 56.23% (n=194).

Stillbirths were significantly higher in AP group ($p < 0.01$, Table I). Preterm births were not significantly different between the two groups, ($p > 0.05$). Neonatal weights ranged from 0.5 to 4.4 kg. Neonatal deaths were significantly higher in placenta previa. Lethal congenital anamoly rate in perinatal deaths was not significantly different, 1.37% (n=3) in AP versus 1.39% (n=2) in PP.

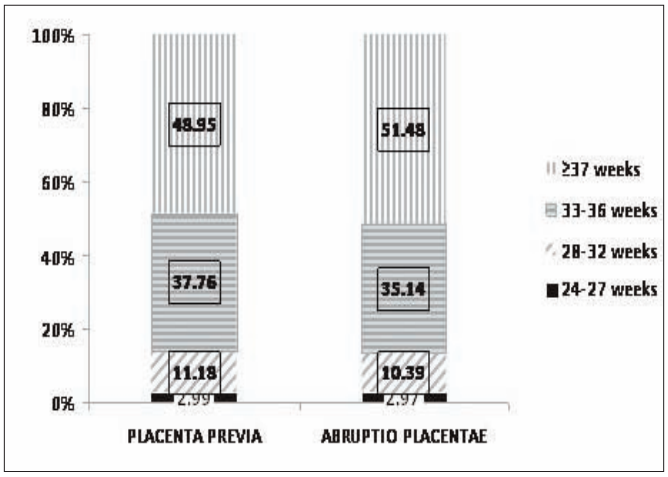

Figure 1: Gestational age distribution in placenta previa and abruptio placentae.

Table I: Perinatal outcome of PP and AP.

Perinatal outcome	Placenta previa n=143 (41.44%)	Abruptio placentae n=202 (58.55%)	p-value ◊
Preterm< 37 weeks	73 (51.04%)	98 (48.51%)	0.643
Preterm < 34 weeks	57 (39.86%)	63 (31.18%)	0.096
Birth weight < 2.5 kg	75 (52.44%)	103 (50.99%)	0.790
L.B.W1.5-2.49 kg	54 (37.76%)	76 (37.62%)	0.979
V.L.B.W1-1.49 kg	18 (12.58%)	22 (10.89%)	0.628
E.L.B.W0.5-0.99 kg	3 (2.99%)	5 (2.47%)	1.000 ◊◊
2.5-3.0 kg	54 (37.76%)	59 (27.72%)	0.095
> 3 kg	14 (9.79%)	40 (19.80%)	0.012
NICU	17 (15.59%)	18 (19.78%)	0.367
Still births	26* (18.18%)	107* (52.97%)	0.000
Neonatal deaths	9* (8.25%)	4 (4.39%)	0.038
Perinatal deaths*	33*	108*	0.000
P.N.M.R**	230.7/1000	534.6/1000	
Live births	108 (75.52%)	91 (45.04%)	0.000

*◊ P-value calculated by chi-square test; ◊◊ P-value calculated by Fisher's exact test; *Includes congenitally abnormal babies i.e 1still birth and 1 neonatal death in previa and 3 still births in abruptio; **Perinatal mortality rate after excluding congenital anamoly.*

Table II: Maternal outcome including near-miss morbidities and mortalities of PP and AP.

Maternal outcome	Placenta previa	Abruptio placentae	p-value◊
Near-miss cases*	16 (11.18%)	45 (22.27%)	0.008
Hypovolemic shock	10 (6.99%)	44 (21.78%)	0.000
Coagulopathy	2 (1.39%)	16 (7.92%)	0.007
Acute renal failure (ARF)	1 (0.69%)	6 (2.97%)	0.247◊◊
Emergency obstetrical Hysterectomy	6 (4.19%)	3 (1.48%)	0.141◊◊
Intensive care admission	11 (7.69%)	28 (13.86%)	0.075
Postpartum haemorrhage	10 (6.99%)	19 (9.40%)	0.426
Massive blood transfusions	10 (6.99%)	26 (12.87%)	0.079
Prolonged stay	8 (5.59%)	22 (10.89%)	0.085
Maternal deaths	1 (0.69%)	2 (0.99%)	1.000◊◊

*◊ P-value calculated by chi-square test; ◊◊ P-value calculated by Fisher's exact test; *Near-miss cases are less than total near-miss morbidities as > 1 morbidity was present in the same patient.*

Near-miss cases were higher in AP and morbidities of hypovolemic shock and coagulopathy were significantly high in them whereas other morbidities such as intensive care admission, ARF, PPH and prolonged stay were not statistically different (Table II). There were a total of 12 maternal deaths from all causes during the study period, thus PP contributed in 1 (8.33%) and AP in 2 (16.66%) maternal mortalities.

DISCUSSION

Majority of patients were in the age group 20-30 years in both PP and AP. This is in contrast to their traditional association with advanced maternal age.[10,11,22] The findings are consistent with Abbasi *et al.*[14] who found 20-29 years being the most frequent age group for abruption. This shows that APH is prevalent in younger obstetric population in contrast to advanced age, due to marriages at younger age in our set up with more than half of women getting married by the age of 20.[23] Majority of patients were multipara in both groups. Both groups had high rate of preterm delivery but there was no statistically significant difference. There was no significant difference in NICU admission but neonatal death rates were significantly higher in PP, whereas significantly higher stillbirth rates and PNMR was observed in AP group. These observations conform to higher chances of pre-delivery mortality in AP.[24] Stillbirth rate of 52.97% in AP group is consistent with observation in local studies.[5,13,15] Similarly significantly higher perinatal mortality in AP as compared to PP is consistent with result of a one year study from Lahore.[15] Neonatal mortality rate of 8.25% in PP is lower than the study from Peshawar who attributed 11% neonatal death rate to sub-optimal NICU facilities.[17]

Overall 33.45% cases of APH were near-miss (11.18% PP and 22.27% AP). Significantly higher near-miss events in AP can be explained by significantly higher rates of hypovolemic shock. A review on near-miss and` maternal deaths revealed haemorrhage to account for 29% cases of near-miss.[25] In this study one near-miss case had more than one near-miss event. Analysis of near-miss morbidity measures revealed AP group to have significantly higher rates of hypovolemic shock and coagulopathy due to higher abruption grades. These results are consistent with results found in another local study.[5] Emergency hysterectomy rates were not different in the two groups. PP showed a tendency towards emergency hysterectomy for PPH due to placental site bleeding, whereas in AP it was needed for uterine atony due to Couvelaire uterus. Hysterectomy rates of 4.19% in PP are close to hysterectomy rates of 5% described by Nasreen.[17] Similarly hysterectomy rates in AP correlate with 1.9% rates described in a study from Abbottabad.[13]

Other morbidity measures i.e. PPH, massive transfusions, ARF and ICU admission though higher in AP but failed to reach statistical significance. Local studies on AP and PP lack data on these morbidity outcomes simultaneously.[13,16,17] Only one current study on AP from Hyderabad described these outcomes but did not mention grading of AP.[5] As compared to this study, the patients with AP had high rates of PPH, ICU admission, and prolonged hospital stay. This can be explained by high percentage of grade III abruptio. Despite that, case fatality rate for AP in this study is much lower than 5% death rate in the aforementioned study. This relatively lower mortality can be attributed to prompt blood products replacement, timely ventilatory support and intensive care management.

A relatively lower CS rate (32.6%) in cases of AP in this study correlates with a rate of 30.2% by Sarwar *et al.*[13] and 27% by Bibi.[5] This is in significant contrast to CS rates of 91% by Tikanen *et al.*[10] High CS rate in PP are attributable to greater number of PP major. Maternal death rate was not significantly different but contribution of AP in overall maternal mortality (215.86/100000) was higher than for PP (16.66% versus 8.33%). Causes of maternal death in AP group were adult respiratory distress following massive transfusion of blood and severe coagulopathy leading to intractable haemorrhage. Maternal death in PP was due to haemorrhage in placenta percreta despite hysterectomy and internal iliac artery ligation.

To our knowledge this study has the largest sample size comprising 345 cases of APH, when compared to available local studies to date. Limitations of presented study are that being a tertiary hospital, patients received comprehensive obstetrical and intensive care facilities resulting in lower case fatality rate (0.86%) whereas majority of countrywide health care facilities lack these. Thus higher case fatalities can occur at those health care facilities.

Perinatal mortality and near-miss, being the most significant indicators of all parameters of fetomaternal outcome, have been found to be significantly higher in antepartum haemorrhage due to abruptio placentae.

CONCLUSION

APH resulted in high rate of near-miss morbidities and perinatal mortality. Abruptio placentae pose greater fetomaternal risk than placenta previa in this set up as shown by majority of AP grade III. Severe cases of AP are recognized with substantial delay which is most likely because of concealed haemorrhage. This leads to delay in referral and arrival at tertiary centre which results in enormously high perinatal mortality and near-miss.

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