ORIGINAL ARTICLE

Risk Factors and Maternal Complications of Placental Abruption in Third Trimester of Pregnancy

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ABSTRACT

Background: Placental abruption, defined as the separation of the placenta from the wall of the uterus prior to the fetal delivery, accounts for about 0.4-1% of the pregnancies. Women with diagnosis of a placental abruption and stillborn infant on admission are more likely to require massive transfusions and have complications, such as acute renal failure and disseminated intravascular coagulation (DIC), compared with women having a live fetus at presentation. These high-risk pregnancies can be managed vigilantly in the antenatal period to prevent fetal and maternal complications. The objective of this study was to determine the risk factors and maternal complications in females presenting with placental abruption during third trimester of pregnancy.

Patients and Methods: This cross-sectional study was conducted in the Department of Obstetrics & Gynecology, Sir Ganga Ram Hospital, Lahore from 21-7-2016 till 20-7-2017. A total of 400 females meeting the inclusion criteria were registered. Actual gestational age was calculated from 1st day of LMP. Appropriate investigations included imaging and laboratory tests. Complications were recorded. Patients were managed according to fetomaternal condition.

Results: In this study, prevalence of placental abruption was found to be 2.8%. Out of 400 patients, 45.75% (n=183) were between 18-30 years of age while 54.25% (n=217) were between 31-40 years of age (mean 30.74±4.77 years) with mean gestational age of 35.5±2.94 weeks. Frequency of maternal complications in females presenting with placental abruption during third trimester of pregnancy after 28 weeks of gestation was recorded. Hypovolemic shock was observed in 27% (n=108), while renal failure was recorded in 5.5% (n=22) patients. Hypertensive disorder followed by grand-multiparity, increased maternal age and trauma are found to the most common risk factors for placental abruption in the present study as 78.5% (n=314) of the patients had hypertensive disorder, 60% (n=242) patients were multigravida, 54.25% (n=217) patients were >30 years of age and 1.5% (n=6) patients presented after trauma. Frequency of fetal complications was calculated as, 57.25% (n=229) had preterm delivery, 46.75% (n=187) neonatal ICU admissions and 10.75% (n=43) intrauterine fetal demise were noted. Other maternal complications include disseminated intravascular coagulation in 4.5% (n=18) of the patients and 0.75% (n=3) maternal mortalities were noted.

Conclusion: Frequency of hypovolemic shock is significantly higher followed by renal failure in females presenting with placental abruption during third trimester of pregnancy after 28 weeks of gestation. However, every patient with placental abruption should be sorted out for the fetomaternal complications. Early diagnosis by identifications of the risk factors followed by the close follow up of the high risk patients, improvement in monitoring techniques and multidisciplinary team approach can lead to substantial improvement in fetomaternal outcome in patients with placental abruption.

Keywords: Abruptio placenta, maternal complications, hypovolemic shock, renal failure.

INTRODUCTION

Placental abruption is defined as a separation of normally situated placenta from wall of the uterus prior to fetal delivery. It is an important cause of vaginal bleeding in the third trimester of pregnancy. Placental abruption accounts for 1 in 80 deliveries and is an important cause of perinatal mortality and morbidity.[1-3] Placental abruption is a leading cause of maternal morbidity and mortality.[4] Incidence of placental abruption in Pakistan is reported to be 7% with an associated maternal mortality rate of 2.6%.[5] Approximately 0.4-1% of pregnancies are affected by placental abruption in

developed world, whereas studies from developing worlds quote figures of up to 4.5%.[1,6] Although several risk factors are known, the etiology is multifactorial.[1] Common causes include impaired placentation, hypertensive disorders of pregnancy, smoking, cocaine use, trauma, decompression of uterus, multiparity, advanced maternal age, nonvertex presentation.[6] Most cases of placental abruption cannot be predicted or prevented and the condition is an important risk factor for maternal and perinatal complications.[7,8] Resulting hemorrhagic shock can be potentially life threatening and therapeutic goal is to cease hemorrhage and to restore blood volume.[9]

Rationale of this study is to determine the risk factors and frequency of maternal complications in females with placental abruption during third trimester of pregnancy. Early identification of related complications and measures taken to decrease maternal morbidity and mortality are additionally addressed.

PATIENTS AND METHODS

The present cross-sectional study was conducted in the emergency department of Obstetrics and Gynaecology, Sir Ganga Ram Hospital, Lahore from 21-07-2016 to 20-07-2017. Sample size consisted of 400 patients, calculated with 95% confidence level, 2% margin of error and taking 4.35% expected percentage of renal failure in females presenting with placental abruption during third trimester of pregnancy (after 28 weeks of gestational age as per LMP). Sample technique was non probability consecutive sampling. Pregnant women between 18-40 years of study with parity <6 with singleton pregnancy having placental abruption (as per operational definition) that are sure of dates after 28 weeks calculated by LMP were included in the study. Females with other systemic problems and already existing renal disease (assessed on history and investigations) leading to deranged renal function tests (RFTs). Females with shock due to causes other than placental abruption (cardiogenic, septic and anaphylactic shock assessed on history and investigations). Females with history of vaginal bleeding due to other placental causes (such as placenta previa assessed on ultrasound) were also excluded. After informed consent, demographic profile (name, age, parity, gestational age and contact details) was noted. Actual gestational age was calculated from 1st day of LMP. Appropriate baseline investigations such as imaging and laboratory tests were done, which include blood group and cross match, complete blood count, blood urea, serum creatinine, serum electrolytes, liver function tests, urine analysis, prothrombin time, activated partial thromboplastin time, serum fibrinogen level and imaging tests such as obstetric and renal ultrasound scans were done. Fetus was monitored by cardiotocography, obstetric ultrasound and by performing biophysical profile according to the clinical condition. Hypovolemic shock was labeled if female underwent more than 30% blood loss (more than 1500 ml blood loss) with symptoms include tachycardia (more than 100 beats /min), tachypnoea (20-30 respiratory rate/min), decrease in pulse pressure (less than 25% of systolic BP), cold clammy skin, delayed capillary refill (more than 2 sec), and mild anxiety (restlessness and dizziness). Renal failure was labeled if serum creatinine increased 1.5-fold from baseline and urine output <0.5 ml/kg/hour for more than 6 hours from time of abruption (as per operational definition). Patients were managed according to the fetomaternal condition by standard management protocols. Management of patients with hypovolemic shock and renal failure was done by adopting multidisciplinary team approach, immediate resuscitation (by assessing and maintaining airway, breathing and circulation), full history, detailed examination, laboratory and imaging investigations, vitals, fluid and electrolyte balance monitoring, correction of hypovolemia by fluid replacement and administration of blood products and arrest of bleeding by arranging delivery of the fetus. All patients were treated in intensive care unit. Treatment was provided by multidisciplinary approach in collaboration with consultant obstetrician, anesthetist, nephrologist, hematologist, paediatrician, staff nurses, blood bank, theatre and laboratory staff. Bias in this study was controlled by large sample size and correct gestational age. The data was analyzed through SPSS version 20. Mean and standard deviation was calculated for the quantitative variables like age, and gestational age. Percentages and frequencies were calculated for the qualitative variables like maternal complications i.e. renal failure and hypovolemic shock. Frequency was calculated for parity and gestational age. Data was stratified for age (18-30, 31-40) and parity (nulliparous, 1-2, 3-5). Chi-square test was applied to compare the maternal outcome variables in stratified groups. A p-value of $\leq$0.05 was taken as significant.

RESULTS

A total of 400 cases meeting the inclusion criteria were included. Age distribution shows that 45.75 % (n=183) were between 18-30 years of age, while 54.25% (n=217) were between 31-40 years of age, with mean of 30.74±4.77 years. Two hundred and twenty-nine (57.25%) patients had gestational age of 29-36 weeks and 171 (42.75%) were between 37-42 weeks, mean gestational age being 35.5±2.9 weeks. Table 1 reflects the parity distribution among 400 patients; 12.25% being nulliparous, 27.25% 1-2 paras whereas 60.5% were 3-5 paras, mean parity being 2.75±1.5. Frequency of maternal complications in females presenting with placental abruption during third trimester of pregnancy after 28 weeks of gestation was observed. One hundred and eight patients (27%) presented with hypovolemic shock due to haemorrhage and 22 (5.5%) developed renal failure. The data was stratified for age (18-30, 31-40 years) (Table 2) showing association of maternal complication with maternal age, and it was observed that patients who were 31-40 years of age had more complications. The data was also stratified for parity (nulliparous, 1-2, and 3-5). (Table 3) showing p-value of 0.14 and 0.98 for renal failure and hypovolemic shock respectively. Although these results are not significant statistically as p-value<0.05 but clinically these complications seem to be associated with multiparity and increased maternal age.

Table 1: Parity distribution

Parity	No. of patients	%
Primigravida	49	12.25
Para 1-2	109	27.25
Para 3-5	242	60.5
Total	**400**	**100**

Women delivered vaginally were 261 (65.25%) whereas 139 (34.75%) underwent operative delivery. Hypertensive disorder followed by grand-multiparity, increased maternal age and trauma are the most common risk factors in the present study, as 78.5% (n=314) of the patients had hypertensive disorder, 60% (n=242) patients were multigravida, 54.25% (n=217) patients were >30 years of age and 1.5% (n=6) patients presented after trauma. Trauma causing placental abruption was blunt trauma, 5 patients presented after accident (out of which 2 patients had history of fall) and 1 had history of assault. Some patient had more than one risk factors. Frequency of fetal complications was calculated as, 57.25% (n=229) had preterm delivery, 46.75% (n=187) neonatal ICU admissions and 10.75% (n=43) intrauterine fetal demise were noted. Other maternal complications include disseminated intravascular coagulation in 4.5% (n=18) of the patients and 0.75% (n=3) maternal mortalities were noted.

Table 2: Stratification for age

Maternal complications		Age (years)		p-value
		18-30	31-40	
Renal failure	Yes	14	8	0.08
	No	169	209	
Hypovolemic shock	Yes	50	58	0.89
	No	133	159	

Table 3: Stratification for parity

Maternal Complications		Parity			p-value
		Nulliparous	1-2	3-5	
Renal failure	Yes	2	10	10	0.14
	No	47	99	232	
Hypovolemic shock	Yes	13	29	66	0.98
	No	36	80	176	

DISCUSSION

Placental abruption or abruptio placentae is a significant cause of maternal and fetal morbidity. The morbidity include maternal complications i.e. hemorrhagic shock resulting from excessive blood loss and result in intravascular compartment contraction, generalized coagulopathy, need for massive transfusions, acute renal failure and DIC. This study was planned with the view that placental abruption is associated with various fetomaternal complications while a lot of local studies are available related to frequency of maternal complications of placental abruption but still there is not much difference in percentages of these studies. Controversial results were noted in the frequency of maternal complication in different studies.[5-7] In a study conducted at Liaqat University Hospital Hyderabad in patients with placental abruption, in which frequency of renal failure is 4.35% and hypovolemic shock is 35.65% (n=115) in patients of placental abruption.[5] Another study conducted by Mukhergee S et al on maternal and fetal outcomes in patients of placental abruption showed that frequency of shock in these patients is 5.7% and renal failure is 7.5%.[6] These results show that there are still discrepancies in the results. The present study will help to sort out these discrepancies. The present study was conducted to know exactly the risk of complications related to placental abruption so that severity of condition can be addressed and measures can be taken out to decrease maternal morbidity and mortality related to these complications. In our study, about 14000 patient delivered during the study period and out of these 400 patients had placental abruption and prevalence of placental abruption was found to be 2.8% which is consistent with placental abruption prevalence in other studies.[5,6], but it is still high and alarming in comparison to the worldwide prevalence i.e. 0.4-1%.[1] Out of these 400 cases, 45.75% (n=183) were between 18-30 years of age while 54.25% (n=217) were between 31-40 years of age, mean$\pm$SD was calculated as 30.74$\pm$4.77 years, mean gestational age was calculated as 35.50$\pm$2.94 weeks. Frequency of maternal complications in females presenting with placental abruption was recorded as 27% (n=108) had hypovolemic shock and 5.5% (n=22) had renal failure. Most of the patients were unbooked cases.

Hypertensive disorder followed by grand multipara, increased maternal age and trauma are the most common risk factors in the present study as 78.5% (n=314) of the patients had hypertensive disorder, 60% (n=242) patients were multigravida, 54.25% (n=217) patients were >30 years of age and 1.5% (n=6) patients presented after trauma. We have found similar results in a study conducted at Liaqat University Hospital Hyderabad in patients with placental abruption, in which about 59.13% patients had hypertensive disorder, 53.19% of the patients were multigravida, 44.35% of the patients were >30 years of age and the frequency of renal failure is 4.35% and hypovolemic shock is 35.65% (n=115) in patients of placental abruption.[5] Another study carried out in Hyderabad in which frequency of renal failure is 6.25% and shock 19.4% (n=48) in abruptio placentae.[7] The findings of the above study is also in agreement with our findings.

An international study conducted by Chufamo N et al on Antepartum hemorrhage shows similar frequency of hypovolemic shock i.e. 24.6%.[10] A study conducted by Mukhergee S et al on maternal and fetal outcomes in patients of placental abruption showed that most of the cases of placental abruption were associated with different risk factors as 45% of patients were of increased maternal age >30 years, 25% had hypertension, 11% were grand multipara, and 10.4% had trauma respectively. Frequency of shock in these patients is 5.7% and renal failure is 7.5%.[6] These findings also support our results.

Coleman and friends presented baseline data regarding abruptio placentae in Korle-Bu Teaching Hospital (KBTH), Ghana, and mentioned the recommendations to reduce adverse outcomes and calculated that the perinatal and maternal mortality rates were 65% and 2% respectively.[11] Maternal shock and Intrauterine foetal death (IUFD) were significantly associated with coagulopathy (p=0.004 and 0.001 respectively). Early diagnoses of placental abruption may significantly reduce the fetomaternal complications with improved survival. The crucial risk factors identified in our study are grand multiparity, gestational hypertensive disorders, increased maternal age and trauma. In summary, we recorded exactly the risk of complications relating to placental abruption in our local population and severity of condition was addressed and measured which may be helpful to decrease maternal morbidity and mortality related to these complications. The findings in our study may be used as a guideline in our setup. Early diagnosis

followed by the close follow up of the high risk patients, improvement in monitoring techniques, multidisciplinary team involvement, appropriate counseling can lead to substantial improvement in fetomaternal outcome in patients with placental abruption.

CONCLUSION

Frequency of hypovolemic shock is significantly higher followed by renal failure in females presenting with placental abruption during third trimester of pregnancy after 28 weeks of gestation. However, every patient with placental abruption should be sorted out for the fetomaternal complications. It is recommended that early diagnosis that can be made by early identifications of the risk factors such as gestatonal hypertensive disorder, grandmultiparity, increased maternal age, multiple gestation and polyhydramnios followed by the close follow up of the high risk patients, improvement in monitoring techniques and multidisciplinary team involvement including consultant obstetrician, anesthetist, hematologist, paediatrician, staff nurses, blood bank, theatre, laboratory staff and portering staff can lead to substantial improvement in fetomaternal outcome in patients with placental abruption.

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