

Maternal Risk Factors and Perinatal Outcome in Women with Abruption Placenta

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Abstract

Background and objective: Abruption placenta is a significant cause of antepartum hemorrhage associated with fetal and maternal morbidity and mortality. Our objective was to determine the maternal risk factors and subsequent fetal and maternal outcomes in women with abruption placenta.

Methods: A cross-sectional study carried out at Maternity Teaching Hospital in Erbil city, Kurdistan Region, Iraq from 1st of August, 2020 until 1st of August, 2021. Sixty Women diagnosed with abruption placenta from 24 weeks of gestation and more were included. Maternal information was collected by a designed questionnaire to determine the risk factors associated with abruption placentae and the mode of delivery with fetal and maternal outcomes.

Results: Sixty pregnant women with abruption placentae were included in the study. The main risk factors for abruption placenta were previous cesarean section, gestational hypertension, preeclampsia and smoking. The rates of stillbirth and early neonatal death were 15% and 1.7% respectively. Newborns with low birth weight were 30%. Adverse maternal outcome for those delivered by emergency cesarean section was 22.7%, and (hysterectomy or other surgical procedures) was significantly high 22.7% among women aged ≥ 35 years. Perinatal mortality rate was significantly high when the delivery was with both emergency cs and vaginal delivery. The Fetal mortality was low 4.8% among neonates whose weight was 2.5 Kg and above, and it was high among neonates of less than 1 Kg 83.3%.

Conclusion: Abruption placenta associated with adverse fetal and maternal outcomes. Previous Caesarian section, gestational hypertension, and smoking are the main risk factors.

Key words: Abruption placenta; APGAR scores; Early neonatal death; Hysterectomy; Stillbirth.

Introduction

Abruption placenta (AP) is defined as complete separation of the placenta from the uterus before delivery. It occurs in around 1% of all pregnancies.¹ It can occur at any time after 20 weeks of pregnancy, but it's most common in the third trimester,^{1, 2} presented typically with vaginal bleeding (20%), abdominal pain, uterine tenderness and uterine contractions, and fetal distress.² Abruption

placenta is regarded as a significant cause of third-trimester bleeding associated with fetal and maternal morbidity and mortality.³ A study by E Sheiner *et al.*, displayed that preterm placental abruption is an unpredictable severe complication associated with significant perinatal morbidity and mortality.⁴ Factors found to be independently associated with placental abruption were grand multiparity, severe pregnancy-induced hypertension,

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malpresentation, history of second-trimester vaginal bleeding.⁵ Takai *et al.*, focused on the age parameter and the result showed that mothers with age over 40 years old are more prone to have severe hemorrhage.⁶ Smoking mainly maternal claimed as to have relation with Abruptio placenta AP and cocaine or other drug use.⁷ Whereas another study held in Women's Hospital and Clinic in Qatar focused on low socioeconomic like poor education and low income and the finding clearly states that Abruptio placenta appearance is less in women in better socioeconomic status.⁸ There are other risk factors that are considered in causing Abruptio placenta such as positive previous AP history in previous pregnancies, multiple pregnancy, blood disorders, abdominal trauma, and polyhydramnios. Abruptio placenta has been associated also with chorioamnionitis, in both term and preterm gestation.⁹ Abruptio placenta also found to

be associated with poor perinatal outcomes, including low birth weight, more incidence of prematurity, and still birth.¹⁰ In one large series of over 500 abruptions with live birth, 60.4% occurred at term, 25.3% occurred at 32 to 36 weeks, and 14.3% occurred before 32 weeks, however, gestational age-specific incidence rates vary considerably depending on the etiology.¹¹ Maternal risks and outcomes are depending on when the patient presents to the hospital. If the bleeding continues, both maternal and fetal lives are at stake. Partial placenta separation is associated with low mortality compared to full separation. However, in both cases, without early intervention, fetal death may occur. Recently calculated that Abruptio placenta accounts for 5-8% of maternal deaths.^{12, 13} This study aimed to carefully evaluate maternal risk factors for the abruptio placenta and subsequent fetal and maternal outcomes to seek for improve surveillance and better outcome

Material and methods

A descriptive cross-sectional study was carried out in Maternity Teaching Hospital in Erbil city, Kurdistan Region, Iraq from 1st of August, 2020 until the 1st of August, 2021. Inclusion criteria: were pregnant women with vaginal bleeding diagnosed with placental abruption, Gestational age (≥ 24 weeks), and agreed to participate in the study. Exclusion criteria were Gestational age (< 24 weeks). Other underlying causes of vaginal bleeding like placenta previa, vasa Previa, bleeding due to local cervical lesions, and those hemodynamically unstable. The population study were pregnant women with vaginal bleeding and diagnosed as abruptio placentae who presented to the labor room, high-risk ward and emergency unit, and operation theater of Maternity Teaching Hospital. Approval was taken from the research protocol scientific committee of Kurdistan Higher Council of Medical Specialties on (official order 830) on the 2nd of November 2020. A written

informed consent was taken in the first interview from each pregnant woman who agreed to participate in the study. Maternal information was collected by a designed questionnaire which include data on: maternal age, height, and weight at the time of presentation, parity, gestational age at presentation, pregnancy complications (pregnancy-induced hypertension, preeclampsia, preterm premature rupture of membranes, multiple gestations, polyhydramnios, trauma), previous abruptio placentae and smoking. During delivery, data about gestational age and mode of delivery (vaginal, elective cesarean, or emergency cesarean) were collected. After delivery, the fetal outcome such as fresh stillbirth, macerated stillbirth, alive, birth weight, Apgar score, admission to the neonatal intensive care unit, and survival in the first week of life was recorded. Maternal complications in the postpartum period were also recorded including intrauterine balloon, B-lynch,

hysterectomy, and maternal mortality. Gestational age calculated by first-trimester Ultrasound scan. The data was recorded on a specially designed questionnaire, then analyzed using Statistical Package for Social Sciences (SPSS) version 23 and the results

Results

Sixty pregnant women with abruption placentae were included in the study. Their mean age (\pm SD) was 32.0 ± 6.0 years, and the age range was 18 to 44 years. The median was 32.5 years. It is evident in Table 1 that more than half 53.3% of the women were aged 25-34 years, and 60% of them were obese (of different degrees).

Table (1): The Risk Factors for Abruption Placentae in the study group.

	No.	(%) n = 60
Age of mother (years)		
< 25	6	(10.0)
25-34	32	(53.3)
\geq 35	22	(36.7)
Mean (\pm SD)	32.0 \pm 6.0	(\pm 6.0)
Body Mass Index, BMI (Kg/m ²)		
18.5-24.9	9	(15.0)
25-29	15	(25.0)
30-34	24	(40.0)
35-39	10	(16.7)
\geq 40	2	(3.3)
Parity		
Primi-gravida	10	(16.7)
Multi-para	35	(58.3)
Grand multi-para	15	(25.0)
Gestational hypertension	23	(38.3)
Preeclampsia	15	(25.0)
Multiple gestation	3	(5.0)
Polyhydramnios	11	(18.3)
Trauma	6	(10.0)
Smoking	17	(28.3)
Previous Cesarean section	30	(50.0)
Previous abruption placentae	7	(11.7)
Premature rupture of membrane (PROM)	8	(13.3)

Table 2 shows that more than half 56.7% of the fetuses were delivered alive with a normal APGAR score, 26.7% had low APGAR scores and had been admitted to the Neonatal Intensive Care Unit NICU. The rates of fresh stillbirth and early

compared between patients with different variables, with a statistical significance level of ≤ 0.05 . the results presented as rates, ratios, frequencies, percentages in tables and figures and analyzed using t-test and chi-square tests.

The table shows that 16.7% were primigravida, 58.3% were multi-parous women, and 25.0% were grand multi-parous women. The main risk factors were: previous Cesarean section 50.0%, gestational hypertension 38.3%, smoking 38.0%, and preeclampsia 25%. The other factors are presented in Table (1).

neonatal death were 15.0% and 1.7% respectively. The APGAR score in the first minute was relatively poor, as half of the neonates had either moderately depressed score 23.3% or severely depressed score 26.7%. The five minutes APGAR score was better, where it is evident that 73.3%

had an excellent score. Regarding the neonatal birth weight, the table shows that 30% of the neonates had a low birth weight of less than 2.5 Kg (but of different

degrees). The table shows also that only 13.3% of the newborns were delivered as full term, while the rest were delivered as pre-term Table (2).

Table (2): Fetal Outcomes of the Study Sample.

	No.	(%)
Fetal outcome		
Fresh stillbirth	9	(15.0)
Alive with normal APGAR score	34	(56.7)
Low APGAR + admission to NICU	16	(26.7)
Early neonatal death	1	(1.7)
APGAR first minute		
Excellent 7-10	30	(50.0)
Moderately depressed 4-6	14	(23.3)
Severely depressed 0-3	16	(26.7)
APGAR fifth minutes		
Excellent 7-10	44	(73.3)
Moderately depressed 4-6	6	(10.0)
Severely depressed 0-3	10	(16.7)
Newborn weight (Kg)		
< 1	6	(10.0)
1-1.49	1	(1.7)
1.5-2.49	11	(18.3)
≥ 2.5	42	(70.0)
Gestational age (weeks)		
< 28	11	(18.3)
28-31	15	(25.0)
32-36	26	(43.3)
≥ 37	8	(13.3)
Total	60	(100.0)

It is evident in Table 3, which the majority of the women were delivered by Cesarean section, either elective 30.0% or emergency 36.7%. The outcome was good

in the majority of the cases 91.7% and only one woman 1.7% needed a hysterectomy, and four women 6.7% needed other surgical interventions.

Table (3): Maternal Outcomes of the Study Sample.

	No.	(%)
Mode of delivery		
Spontaneous vaginal delivery	20	(33.3)
Elective Cesarean section	18	(30.0)
Emergency Cesarean section	22	(36.7)
Maternal outcomes		
Good	55	(91.7)
Hysterectomy	1	(1.7)
Other surgical managements	4	(6.7)
Total	60	(100.0)

No significant associations were detected between the fetal outcomes and the following variables of Table 4, age ($P = 0.089$), BMI ($P = 0.105$), gestational

hypertension ($P = 0.225$), preeclampsia ($P = 0.649$), multiple gestation ($P = 0.738$), polyhydramnios ($P = 0.728$), trauma ($P = 0.508$), smoking ($p = 0.305$), previous

Cesarean section ($P = 0.053$), previous abruptio placentae ($P = 0.397$), and premature rupture of membrane 'PROM' ($P = 0.282$). A significant association was detected between parity and outcome where it is clear that the more the parity, the more the rate of death ($P = 0.004$). The rate of death was significantly high 27.3% when the delivery was by emergency Cesarean section, and it was 20.0% when the neonate delivered vaginally, while

none of those who delivered by elective Cesarean section died ($P < 0.001$). The death rate was low 4.8% among neonates whose weight was 2.5 Kg and above, and it was high among neonates of less than 1 Kg 83.3%, and among neonates of 1.5-2.49 Kg 27.3%, while none of the neonates of the bodyweight 1.1-1.49 Kg died, knowing that there was only one neonate in this weight category ($P < 0.001$).

Table (4): Fetal Outcomes by the Risk Factors.

	N	Alive with normal APGAR score No. (%)	Low APGAR with admission to NICU No. (%)	FSB or early neonatal death No. (%)	
Age (years)					
< 25	6	2 (33.3)	2 (33.3)	2 (33.3)	
25-34	32	23 (71.9)	6 (18.8)	3 (9.4)	
≥ 35	22	9 (40.9)	8 (36.4)	5 (22.7)	0.089*
Body Mass Index, BMI (Kg/m ²)					
18.5-24.9	9	3 (33.3)	5 (55.6)	1 (11.1)	
25-29	15	12 (80.0)	2 (13.2)	1 (6.7)	
30-34	24	15 (62.5)	5 (20.8)	4 (16.7)	
35-39	10	4 (40.0)	3 (30.0)	3 (30.0)	
≥ 40	2	0 (0.0)	1 (50.0)	1 (50.0)	0.105*
Parity					
Primi-gravida	10	3 (30.0)	6 (60.0)	1 (10.0)	
Multi-para	35	26 (74.3)	4 (11.4)	5 (14.3)	
Grand multi-para	15	5 (33.3)	6 (40.0)	4 (26.7)	0.004*
Gestational hypertension					
Yes	23	11 (47.8)	9 (39.1)	3 (13.0)	
No	37	23 (62.2)	7 (18.9)	7 (18.9)	0.225†
Preeclampsia					
Yes	15	7 (46.7)	5 (33.3)	3 (20.0)	
No	45	27 (60.0)	11 (24.4)	7 (15.6)	0.649*
Multiple gestation					
Yes	3	3 (100.0)	0 (0.0)	0 (0.0)	
No	57	31 (54.4)	16 (28.1)	10 (17.5)	0.738*
Polyhydramnios					
Yes	11	6 (54.5)	4 (36.4)	1 (9.1)	
No	49	28 (57.1)	12 (24.5)	9 (18.4)	0.728*
Trauma					
Yes	6	3 (50.0)	1 (16.7)	2 (33.3)	
No	54	31 (57.4)	15 (27.8)	8 (14.8)	0.508*
Smoking					
Yes	17	7 (41.2)	6 (35.3)	4 (23.5)	
No	43	27 (62.8)	10 (23.3)	6 (14.0)	0.305*
Previous Cesarean section					
Yes	30	21 (70.0)	4 (13.3)	5 (16.7)	
No	30	13 (43.3)	12 (40.0)	5 (16.7)	0.053†
Previous abruptio placentae					

Yes	7	4 (57.1)	3 (42.9)	0 (0.0)	
No	53	30 (56.6)	13 (24.5)	10 (18.9)	0.397*
Premature rupture of membrane (PROM)					
Yes	8	4 (50.0)	1 (12.5)	3 (37.5)	
No	52	30 (57.7)	15 (28.8)	7 (13.5)	0.282*
Mode of delivery					
Spontaneous vaginal delivery	20	13 (65.0)	3 (15.0)	4 (20.0)	
Elective CS**	18	17 (94.4)	1 (5.6)	0 (0.0)	
Emergency CS**	22	4 (18.2)	12 (54.5)	6 (27.3)	<0.001*
Newborn weight					
< 1 Kg	6	0 (0.0)	1 (16.7)	5 (83.3)	
1-1.49 Kg	1	0 (0.0)	1 (100.0)	0 (0.0)	
1.5-2.49	11	1 (9.1)	7 (63.6)	3 (27.3)	
≥ 2.5	42	33 (78.6)	7 (16.7)	2 (4.8)	< 0.001*
Total	60	34 (56.7)	16 (26.7)	10 (16.7)	

*By Fisher’s exact test. †By Chi-square test. **CS: Cesarean section.

FBS: Fresh stillbirth. NICU: Neonatal intensive care unit.

It is evident in Table 5 that maternal morbidity outcome (that needed hysterectomy or other surgical procedures) was significantly high 22.7% among women aged ≥ 35 years, while none of the women of the other age groups had bad outcome ($P = 0.014$). The rate of bad outcome was significantly high 22.7% among women delivered by emergency Cesarean section, while none of the women delivered by the other means died

($P = 0.009$). No significant association was detected between the maternal outcomes with the following variables: BMI ($P = 0.118$), parity ($P = 0.153$), gestational hypertension ($P = 0.066$), preeclampsia ($P = 0.591$), multiple gestation ($P > 0.999$), polyhydramnios ($P = 0.573$), trauma ($P > 0.999$), smoking ($P = 0.132$), previous Cesarean section ($P > 0.999$), previous abruptio placentae ($P = 0.475$), and PROM ($P = 0.524$).

Table (5): The Association of Maternal outcomes and the Risk Factors.

	N	Maternal outcome		P value
		Good No. (%)	Bad No. (%)	
Age				
< 25	6	6 (100.0)	0 (0.0)	
25-34	32	32 (100.0)	0 (0.0)	
≥ 35	22	17 (77.3)	5 (22.7)	0.014*
Body Mass Index, BMI (Kg/m ²)				
18.5-24.9	9	9 (100.0)	0 (0.0)	
25-29	15	15 (100.0)	0 (0.0)	
30-34	24	22 (91.7)	2 (8.3)	
35-39	10	7 (70.0)	3 (30.0)	
≥ 40	2	2 (100.0)	0 (0.0)	0.118*
Parity				
Primi-gravida	10	10 (100.0)	0 (0.0)	
Multi-para	35	33 (94.3)	2 (5.7)	
Grand multi-para	15	12 (80.0)	3 (20.0)	0.153*
Gestational hypertension				
Yes	23	19 (82.6)	4 (17.4)	

No	37	36 (97.3)	1 (2.7)	0.066*
Preeclampsia				
Yes	15	13 (86.7)	2 (13.3)	
No	45	42 (93.3)	3 (6.7)	0.591*
Multiple gestation				
Yes	3	3 (100.0)	0 (0.0)	
No	57	52 (91.2)	5 (8.8)	>0.999*
Polyhydramnios				
Yes	11	11 (100.0)	0 (0.0)	
No	49	44 (89.8)	5 (10.2)	0.573*
Trauma				
Yes	6	6 (100.0)	0 (0.0)	
No	54	49 (90.7)	5 (9.3)	> 0.999*
Smoking				
Yes	17	14 (82.4)	3 (17.6)	
No	43	41 (95.3)	2 (4.7)	0.132*
Previous CS†				
Yes	30	28 (93.3)	2 (6.7)	
No	30	27 (90.0)	3 (10.0)	> 0.999*
Previous abruptio placentae				
Yes	7	6 (85.7)	1 (14.3)	
No	53	49 (92.5)	4 (7.5)	0.475*
Premature rupture of membrane (PROM)				
Yes	8	7 (87.5)	1 (12.5)	
No	52	48 (92.3)	4 (7.7)	0.524*
Mode of delivery				
Spontaneous vaginal delivery	20	20 (100.0)	0 (0.0)	
Elective CS†	18	18 (100.0)	0 (0.0)	
Emergency CS†	22	17 (77.3)	5 (22.7)	0.009*
Total	60	55 (91.7)	5 (8.3)	

*By Fisher's exact test. †CS: Cesarean section.

Discussion

Although several risk factors are known, the etiopathogenesis of placental abruption is multifactorial and not well understood¹⁴. Multiple risk factors were known to be associated with a rising risk of placental abruption such as previous Cesarean section (CS), gestational hypertension, smoking, and preeclampsia. Chronic hypertension complicates 0.3–0.8% of pregnancies, and increasing maternal age, parity and smoking increase the risk. In some, but not all studies, chronic hypertension has been a risk factor for placental abruption¹⁵. However, the current study confirmed that the frequency of previous cesarean sections was significantly higher in the placental

abruption group, which corresponded to a 1.5-fold higher risk for placental abruption development, which is estimated to be 50% of the cases. Patients diagnosed with gestational hypertension account for more than 38% of the cases with abruptio placenta. It is evident smoking is one of the risk factors that is predicted to cause placenta abruption, in this study the percentage of smoker patients diagnosed with abruption of the placenta was 28.3% of cases, Whereas preeclampsia was assessed to be 25% of the cases with abruption placenta. This finding corresponds to the study conducted by Ghaheh *et al* (2013)¹⁵. Several studies conducted around the world confirmed a

two-five-fold increased risk for placental abruption development in women with a history of previous cesarean sections^{2-3, 9}. Regarding fetal outcome, a significant association was detected between parity and outcome where it is clear that the more the parity, the more the rate of fetal death. The rate of death was significantly high 27.3% when the delivery was by emergency Cesarean section, and it was 20.0% when the neonate delivered vaginally, while none of those who delivered by elective Cesarean section

Conclusion

The current study confirmed that the frequency of previous cesarean sections and smoking was significantly higher in the placental abruption group. Regarding

Conflicts of interest

The author reports no conflicts of interest.

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died. The death rate was low 4.8% among neonates whose weight was 2.5 Kg and above, and it was high among neonates of less than 1 Kg 83.3%, and among neonates of 1.5-2.49 Kg 27.3%, while none of the neonates of the bodyweight 1.1-1.49 Kg died, knowing that there was only one neonate in this weight category. Garces *et al* (2020) concluded that nulliparity independently associated with both lower body weight and weight for gestational age z-scores as well as higher neonatal mortality compared to multiparity¹⁶.

fetal outcomes, a significant association was detected between parity and fetal outcome, where it is clear that the more the parity the more the rate of fetal death.

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