

# Risk factors predisposing to abruptio placentae

## *Maternal and fetal outcome*

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### ABSTRACT

**Objective:** Abruptio placentae is one of the leading causes of perinatal deaths. Abruptio placentae increase the neonatal morbidity and mortality. It is one of the recognized causes of low birth weight. The purpose of this study was to examine the risk factors for abruptio placentae together with the maternal and fetal outcome in a large population based data set.

**Methods:** All cases of abruptio placentae presented to the Department of Obstetrics, Wad Medani Teaching Hospital, Sudan during the period January 1997 through to December 2002 were collected. All infants born to those cases were also collected and analyzed as live birth or stillbirth. The live born infants were followed for one month to detect the neonatal deaths. The study also aimed to determine the predisposing factors for abruptio placentae. The study was designed as a case control study from live, singleton births and singleton fetal death.

**Results:** The total number of abruptio placentae collected during this period was 1028, while the total number of births during the same period was 15620

giving and incidence of 1028/15620 (6.5%) for abruptio placentae. The combined stillbirths and first month deaths were 20.2%. Abruptio placentae was associated with pre-eclampsia, diabetes, polyhydramnios and hypertension. Parity and maternal age were not associated with an increased incidence of abruptio placentae.

**Conclusion:** This study had the advantage of complete ascertainment of all reported cases of abruptio placentae during a period of 6-years. We found an increased risk for abruptio placentae associated with maternal diabetes, hypertension, pre-eclampsia and polyhydramnios. We found that infants born after abruptio placentae were small for gestational age and had lower Apgar scores than the control infants. The possibility of abruptio placentae should be considered by the clinician when managing pregnant women with any of those characteristics. Abruptio placentae should be managed in centers where there is advanced maternal and neonatal facilities.

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**I**t seems appropriate to consider abruptio placentae as occurring from the 20th week onwards while accepting that the management of an individual case will be influenced by the gestational age at presentation. Abruptio placentae is a premature separation of a normally situated placenta. Abruptio placentae is one of the causes of maternal morbidity and mortality. It is also associated with high perinatal and neonatal

morbidity and mortality. There are independent associations between abruptio placentae and severe fetal growth restriction. The main principles of management in the obvious case of abruptio placentae include early delivery, adequate blood transfusion, adequate analgesia, detailed monitoring of maternal condition and assessment of the fetal condition.

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**Methods.** The study was designed as a case control study from live singleton births and singleton fetal death in Wad Medani Teaching Hospital during the period January 1997 through to December 2002. Format for birth certificates and death certificates were designed to include the age of the mother, the gestational age, the parity of the mother, the birth weight, the Apgar score of all life birth and the presence of congenital malformation. The format also included any complication of pregnancy with special reference to abruptio placentae. The gestational age was estimated from the first day of the last normal menstrual cycle or calculated from an ultrasound performed early in the second trimester. Abruptio placentae in all cases were diagnosed clinically and confirmed by the ultrasound which ruled out placenta praevia. The ultrasound was also utilized to detect any apparent congenital malformation of fetuses and confirmed the diagnoses of polyhydramnios. Multiple births were eliminated in order to use statistical techniques that required independent observations. The controls were chosen using systemic random sampling from all singleton live births without abruptio placentae occurring in Wad Medani Teaching Hospital during the same period. The sampling was carried out to pick up the number record. The number was chosen so that the entire file was sampled yielded approximately the desired number of controls. Then the live born infants were cross matched with death certificates from 1st January 1997 through to 31st January 2003, which determined the number of infants who died within the first month following delivery.

**Results.** During the period January 1997 through to December 2002. The total number of deliveries was 15620, and the total number of abruptio placentae was 1028 showing an incidence of (6.5%) for abruptio placentae. The controls included 884 cases without abruptio placentae. **Table 1** showed the characteristics of infants born after abruptio placentae compared with the controls. In that table there were 131 still births 131/1028 (12.7%). The live birth were 897 infants. Those who died within the first 28 days were 77/897 (8.6%). Thus, the combined stillbirths and the first month deaths were 208/1082 (20.2%). **Table 1** also showed that the infants of high risk were those with low birth weight and with short gestational age. The lowest risk was associated with infants weighing 3500 gm or more 14/1028 (1.4%), while the highest risk was associated with infants weighing less than 1500 gm 77/1028 (7.5%). Hence, the risk is inversely proportional to the birth weight. It was clear that the infants of high risk were those delivered before the 28th week 77/1028 (7.5%), on the other hand, those delivered after 37 weeks

showed the least risk 40/1028 (3.8%). The Apgar score was assessed in the live born infants. The number of infants who died during the first month were born with low Apgar score. Significantly correlated with the Apgar score assessed at 5 minutes. Those with an Apgar score less than 3 were associated with high risk 33/820 (4.0%) while only 14/820 (1.7%) having an Apgar score of 8-10 died within the first month. Congenital malformation in all cases were 14/1028 (1.4%), out of those the combined still birth and death during the first month were only 4/1028 (0.4%). Concerning the controls there were no deaths within the first month. It was clear from the table that very few infants 59/884 (6.7%) were delivered before 36 week gestation, while 740/884 (83.7%) in the controls were delivered after 36 week gestation. In the study 290/1028 (28.2%) were delivered before 36 weeks gestations showing that abruptio placentae was associated with increased incidence of pre-term labor. In the controls 810/884 (91.6%) weighed more than 2500 gm at birth, those with an Apgar score of 8-10 were 796/884 (90%). The incidence of congenital malformation in the controls was 3/884 (0.3%), while it was 14/1028 (1.4%) in the study group. **Table 2** showed the maternal characteristics in pregnancies complicated with abruptio placentae. It was clear that the highest incidence of abruptio placentae in the study group was between 20-25 years of age 402/1028 (39.1%), the lowest incidence of abruptio placentae was after the age of 35, 60/1028 (5.8%). Nevertheless, the incidence of abruptio placentae is not significantly correlated with the age of 25-35. The highest incidence of abruptio placentae occurred with 1-2 parity 489/1028 (47.5%) while the lowest incidence was found with para 3 or more 128/1028 (12.5%) it was clear that there was no significant correlation. Pre-eclampsia was a predisposing factor for abruptio placentae accounting for 60/1028 (5.8%), hypertension accounted for (1.4%), diabetes accounted for 0.9% and polyhydramnios, accounted for 3.3%.

**Discussion.** The study focus on 2 kinds of variables: maternal predictive factors present before delivery and neonatal factors associated with abruptio placentae which might yield a clue to the diagnosis. The incidence of abruptio placentae in our study was 6.6%, this was similar to 6.5% reported by Mattar and Sibai.<sup>1</sup> Abruptio placentae was associated with 12.7% stillbirths which was equivalent to 12.2% found by Yamauchi et al.<sup>2</sup> In our study, the live born infants resulting from deliveries complicated by abruptio placentae accounted for 820/1028 (79.7%) out of those 77/820 (9.3%) died within the first month. Those results were comparable with 9.2 found by Hagan et al.<sup>3</sup>

**Table 1** - Characteristics of infants born after abruptio placentae compared with control.

Characteristics	Cases					Controls N=884 n (%)
	Live birth		Still birth N=131 n (%)	All cases		
	Lived after 28 weeks N=820 n (%)	Died before 28 weeks N=77 n (%)		N=1028 n (%)		
<b>Gestational age (weeks)</b>						
20-28	72 (8.8)	34 (44.2)	43 (32.8)	149 (14.5)	29 (3.3)	
29-32	96 (11.7)	1 (24.7)	26 (19.9)	141 (13.7)	30 (3.4)	
33-36	167 (20.4)	8 (10.4)	25 (19.1)	200 (19.4)	55 (9.6)	
37-40	302 (36.8)	11 (14.2)	29 (22.1)	342 (33.3)	465 (52.6)	
41+	183 (22.3)	5 (6.5)	8 (6.1)	196 (19.1)	275 (31.1)	
<b>Birth weight (gm)</b>						
<500		8 (10.4)	23 (17.5)	31 (3)	-	
500-1500	91 (11.1)	39 (50.6)	38 (29)	168 (16.3)	21 (2.4)	
1501-2500	178 (21.7)	15 (19.5)	28 (21.4)	24 (21.5)	35 (4)	
2501-3000	183 (22.3)	3 (3.8)	17 (13)	303 (19.7)	127 (14.3)	
3001-3500	199 (24.3)	5 (6.6)	18 (13.7)	222 (21.7)	303 (34.3)	
3500+	169 (20.6)	7 (9.1)	7 (5.4)	183 (17.8)	398 (45)	
<b>Apgar score at 5 minutes</b>						
<3	78 (9.5)	33 (42.9)	-	93 (9.4)	34 (3.8)	
4-7	185 (22.6)	30 (38.9)	-	198 (19.8)	541 (6.2)	
8-10	557 (67.9)	14 (18.2)	-	706 (70.8)	796 (90)	
Congenital malformation	10 (1.2)	2 (2.6)	2 (1.5)	14 (1.4)	3 (0.3)	

**Table 2** - Characteristics of infants born after abruptio placentae compared with control.

Characteristics	Cases					Controls N=884 n (%)
	Live birth		Still birth N=131 n (%)	All cases		
	Lived after 28 weeks N=820 n (%)	Died before 28 weeks N=77 n (%)		N=1028 n (%)		
<b>Maternal age (years)</b>						
<20	105 (12.8)	9 (11.7)	24 (18.3)	138 (13.4)	146 (16.5)	
20-25	323 (39.4)	28 (36.4)	51 (38.9)	402 (39.1)	295 (33.3)	
26-30	212 (25.8)	24 (31.2)	27 (20.7)	263 (25.6)	270 (30.5)	
31-35	133 (16.3)	10 (12.9)	22 (16.8)	165 (16.1)	133 (15.1)	
35+	47 (5.7)	6 (7.8)	7 (5.3)	60 (5.8)	40 (4.5)	
<b>Parity</b>						
0	327 (39.8)	31 (40.3)	53 (40.4)	411 (39.9)	345 (39)	
1-2	403 (49.2)	33 (42.8)	53 (40.4)	489 (47.6)	424 (48)	
3+	90 (11)	13 (16.9)	25 (19)	128 (12.5)	115 (13)	
Pre-eclampsia	43 (5.2)	1 (1.3)	16 (12.2)	60 (5.8)	-	
Polyhydramnios	12 (1.5)	3 (3.9)	19 (14.5)	34 (3.3)	5 (0.6)	
Hypertension	13 (1.6)	1 (1.3)	-	14 (1.4)	3 (0.3)	
Diabetes	8 (0.9)	-	2 (1.5)	10 (0.9)	-	

Infants with high risks were those born with weight less than 1500 gm (7.5%) while those weighing 3500 gm or more were with least risk (1.4%) that explained the fact that the infant risk was inversely proportional to the weight at birth. Those results were similar to 7.2%, 1.2% found in the study of Kramer et al.<sup>4</sup> Abruptio placentae was a common cause of pre-term labor. It was obvious from the study that infants delivered before the 28th week gestation were of high risk (7.5%), those delivered after 37th week carried the least risk (3.8%). Those results were comparable with 7.2%, 3.2% demonstrated by Rasmussen et al.<sup>5</sup> The Apgar score was assessed at 5 minutes in the live born infants,

the risk of the infant is inversely proportional to the Apgar score being 4% when the Apgar score was less than 3 and only 1.7% when the Apgar score was 8-10. Those results were similar to 3.9% and 1.4% appearing in the study of Tikkanen and Nuutila.<sup>6</sup> The incidence of congenital malformation in the study group was 1.4% of which one infant was stillbirth and the others died during the first month. On the other hand, the incidence of congenital malformation in the controls was 0.3% showing that congenital malformation predisposed to abruptio placentae. Our results were similar to 1.3% found by Hladky et al.<sup>7</sup> The highest incidence of abruptio placentae was between the maternal age of 20-28

years (39.1%) while the lowest incidence occurred before the age of 20-years (13.4%) and 5.8% after the age of 35-years. Those results were comparable with 38.5%, 12.9% and 5.4% in the same order found by Sheiner et al.<sup>8</sup> The relationship between the incidence of abruptio placentae and parity revealed that the incidence was very high in mothers who were para 0-2 (87.5%) while only 12.5% was found after para 3. The results were similar to 68.1% and 11.9% found in the study of Sheiner et al.<sup>9</sup> Pre-eclampsia accounted for 5.8% of cases with abruptio placentae that was similar to 5.5% in the study of Prochazka et al.<sup>10</sup> Other predisposing factors included hypertension, diabetes and polyhydramnios which in total accounted for 5.5% of cases with abruptio placentae. Those results were comparable with 5.2% found by Prochazka et al.<sup>10</sup>

The study highlighted the fact that abruptio placentae was related to some maternal factors such as pre-eclampsia, hypertension, diabetes and polyhydramnios. Abruptio placentae was a leading cause for pre-term labor. It was associated with high infant mortality and morbidity. Abruptio placentae was a serious obstetrical problem necessitating early diagnosis and proper care of the mother and the newborn.

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