ORIGINAL ARTICLE

Morphological Study and Demographic Survey of Abruptio Placenta Patients in Term Delivery. A Case Control Study

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ABSTRACT

Objective: This study was conducted to assess the gross morphological changes in abruptio placenta and its demographic prevalence in our set up.

Study Design: A case control study.

Place and Duration of Study: The study was conducted in Anatomy Department of Federal Medical and Dental College and data was collected from Gynaecology and Obstetrics department of Pakistan Institute of Medical Sciences, affiliated with Shaheed Zulfiqar Ali Bhutto Medical University (SZABMU) Islamabad in a duration of eight months from 13th July 2015 to 20th February 2016.

Materials and Methods: Eighty pregnant women presented in the term pregnancy, forty having abruptio placenta, and forty with normal placenta already diagnosed by ultrasounds. Non-purposive sampling technique was done for the comparison between two groups. An organized data collection check list was used for the collection of data. The data was statistically analyzed using SPSS version 20 and MS Excel. The Chi-Square test and Student T test were applied, with *p* value ≤0.05.

Results: During the study period, eighty pregnant women with forty abruption placenta cases were included. Among these most frequent age was 26 to 30 years (50%) with mean± SD age of 28.1± 4.9. Majority, 70% were of low socioeconomic status and mode of delivery was C-Section (87.5%) in abruptio placenta group. The mean weight (grams) of abruptio placentae was found to be 396.4 ±49.9 as compared to 523.3 grams ± 38.8 in normal placentae. The diameter (cm) of abruptio placentae was 13.0±2.9 as compared to normal placentae16.4 ± 3.8. The number of cotyledons were reduced to 11.5±6.1 in abruptio placentae as compared to control 16.5 ± 6.8.

Conclusion: It is concluded that gross morphological changes in abruptio placenta include reduction in its weight, dimensions and number of cotyledon. Moreover, the demographics show that it is more prevalent in low socioeconomic women leading to high rate of Cesarean Section.

Key Words: *Abruptio Placenta, APH (Antepartum Hemorrhage), Socio-Economic Status.*

Introduction

Abruptio placenta is the early detachment of normally located placenta from its uterine wall.[1,2] It was first defined by Edward, an English physician in 1776, as "accidental hemorrhage in placenta".[3] While in 1819, Baudelocque used the term "concealed accidental hemorrhage".[3] In 1901, Holmes studied 199 new cases and introduced the term "Ablatio placentae", which was later modified into abruptio placentae by Delee.[4] In 40% of cases, there is no etiology but in 60% of cases, it is associated with chronic and pregnancy induced hypertension(PIH),[5,6] maternal vascular disease, smoking, drug ingestion, nutritional deficiency, uterine anomalies, trauma, tumors, antiphospholipid antibody syndrome, hyperhomocystinemia, twin pregnancy etc.[7,8]

It is most common in 2nd and 3rd trimester with the incidence of 1% of all pregnancies. Its perinatal mortality rate is 119/1000 births.[3,7,8] Recurrence risk of abruptio placentae is 4-12% but increases to 25% in two consecutive pregnancies with fetal demise upto 7%. It can be sorted into grade I (mild) which is 40%, grade II (moderate)that is 45% and grade III (severe)which is 15%.[9] In grade I, there is slight vaginal bleeding and uterine irritability, while in grade II there is uterine hypertonicity with mild to moderate vaginal bleeding, hypofibrinogenemia, and fetal distress.[10] But in grade III, fetal death and heavy vaginal bleeding with maternal hypotension, hypofibrinogenemia and thrombocytopenia.[10] These cases are diagnosed by taking history and on clinical ground as tender uterus with increased resting tone and hypertonic or hyperactive uterine contractions

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and on delivery passage of clots with hematoma or hemorrhage of placenta.[11]

On gross examination, discontinuity in placental tissue from maternal site is of diagnostic value. In 80% of patients external bleeding is present, but in 20% it is concealed and diagnosis is mostly delayed.[12] Important clinical parameters in assessment of severity are maternal hemodynamic status, coagulation profile, complete blood picture and fetal condition. Abruptio placenta may be due to hemorrhage into the decidua basalis of the placenta, leading to hematoma formation and increase in hydrostatic pressure resulting in separation of the adjacent placenta.[3,13] In severe detachment of placenta, blood accumulates in uterine muscularis and perimetrium layer, and even sometime blood enter into the broad ligament and under the peritoneum of pelvis with classical picture of uteroplacental apoplexy. This term first explained by Couvelaire.[14] Gross examination, revealed fissures on the perimetrial surface of the uterus and evidence of active bleeding and hemoperitoneum.[15,16] As a result of exposed hematoma, disruption and separation of the basal plate from the decidua increases until complete placental detachment occurs.[17] On naked examination, the weight of placenta may be normal but in most cases it is less than average range of 475-650gms.[18] Calcification and vascular dilation or congestion may be visible.[19,20] In 60% of cases, uteroplacental arterial insufficiency leads to ischemia and rupture of involved vessels can be evident, thus causing abruptio placenta.

It is important to identify morphological examination of births (placenta) occurring in public sector hospital in Pakistan because of its high recurrence rate and associated maternal and fetal mortalities. This study was conducted to assess the gross morphology of abruptio placenta and its demographic prevalence in our set up.

Materials and Methods

A case control study, based on non-purposive sampling technique was carried out in anatomy department of Federal Medical and Dental College in collaboration with Gynecology and Obstetrics department of PIMS / Shaheed Zulfiqar Ali Bhutto Medical University Islamabad over a period of eight months (13th July 2015 with approval of ethical committee up to 20th February 2016). Sample size was calculated according to the WHO formula (prevalence ratio).[21] Eighty placentae were collected from labor room and Gynecology department of PIMS hospital, who delivered either vaginally or by caesarian section with the permission of ethical committee of SZAB Medical University Islamabad. Forty placentae from confirmed cases of abruptio placentae (case group) with complete medical and obstetric history were collected and recorded to identify the confounders (hypertension, smoking, twin pregnancy). Forty control groups were taken from normal and uncomplicated pregnancies. Mothers with the age of 15-40 years were included in the study. Pregnant women with other placental abnormalities (like placenta Previa, placenta accrete, and percreta) in the term pregnancy, twin pregnancy and age above 40 years were excluded. After delivery, the specimen were washed with tap water, labeled with numbers and preserved in 10 % formalin solution for 48 hours.[1]

A structured data collection check list was used to collect the required data. Chi-Square tests were applied for simple descriptive statistics (frequencies, percentages) and computed for each categorical variable such as age, socioeconomic status and mode of delivery. Whereas mean and standard deviation was calculated for numerical (continuous) variables which included placental weight, diameter, and number of cotyledons and were analyzed by Student T test. The data was statistically analyzed using SPSS version 20 and MS Excel. *P* value <0.05 was considered statistically significant.

Results

Demographic Data:

Table I: Age of Patients in the two Study Groups (n= 80)

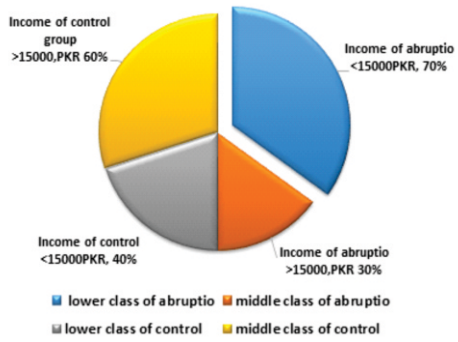
Age in years	Abruptio (n=40)	Control (n=40)	*p*-value
15- 20	3 (7.5%)	2 (5.0%)	1.0
21 to 25	8 (20.0%)	11 (27.5%)	0.62
26 to 30	20 (50.0%)	18 (45.0%)	0.20
31 to 40	9 (22.5%)	9 (22.5%)	1.0
Mean $\pm$ SD	28.1 $\pm$ 4.9	27.6 $\pm$ 4.8	0.08

Age was equal in both patients and control groups in the study. In the patients (abruption placenta) group the mean age was 28.1 $\pm$ 4.9, whereas in the controls it was 27.6 $\pm$ 4.8 years. This difference in mean age was not statistically significant (*p*-value = 0.08). Age stratification also showed no major variation in

patient's age in both groups. (Table I).

The above Pie Chart illustrates that 60% of control

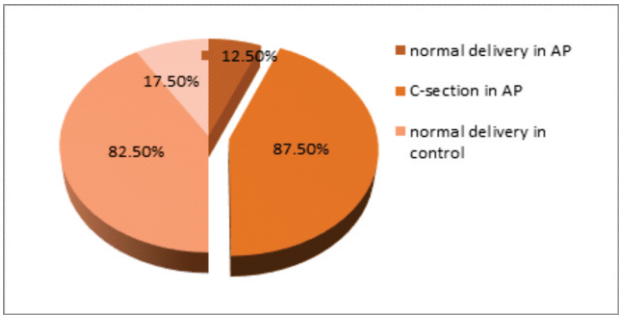
Chart 1: Comparision of Socioeconomic Status in Abruption Versus Control Group



group belonged to middle socioeconomic class while in case group 30% belong to middle class. Similarly it is revealed that lower socioeconomic class in control groups was 40% and in abruptio it was 70%.

This pie chart illustrates that C-section rate was high

Chart 2: Comparison between the Mode of Delivery in Control Versus Patient Group



among abruptio patient as compared to control group. But *p*-value=0.187 was not found statistically significant.

The placental weight and diameter were compared

Table II: Placental Weight in Grams and Diameter in Centimeters of Patients in the Two Study Groups

Placental weight (gms)	Abruptio (n=40)	Control (n=40)	*p*-value
Mean ± SD	396.4 ± 49.9	523.3 ± 38.8	<0.001
Placental diameter (cm)	–	–	–
Mean ± SD	13.0 ± 2.9	16.4 ± 3.8	<0.001
Numbers of cotyledon in placenta	–	–	–
Mean ± SD	11.5 ± 6.1	16.5 ± 6.8	<0.001

among the abruptio placenta patients and normal controls. The mean placental weight was 396.4 ± 49.9 grams in patients and 523.3 ± 38.8 grams in the controls and this difference in the means was statistically found highly significant (p-value = <0.001). Similarly the mean placental diameter was 13.0 ± 2.9 cm in patients and 16.4 ± 3.8 cm in the control and this difference was also highly significant (p-value = <0.001). The mean numbers of cotyledon in placenta were 11.5 ± 6.1 in patients and 16.5 ± 6.8 in the controls and this difference was also significant (*p*-value = <0.001). (Table II).

Discussion

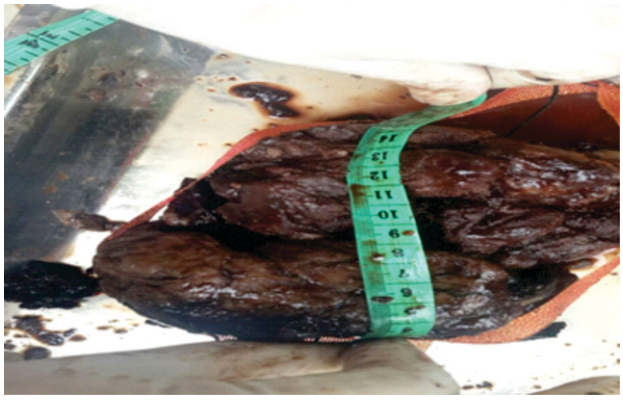


Fig 1: Showing Measurement of Diameter of Abruptio Placenta

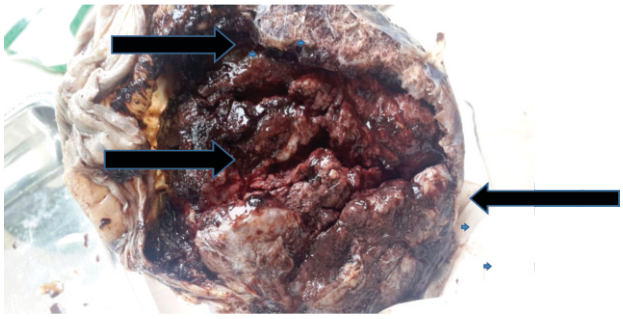


Fig 2: Showing Multiples Abruption in Placenta

Fig 3: Showing Single, Huge Abruptio with Large Hematoma Formation in Placenta

Abruptio placenta is referred to as detachment of normally placed placenta before time. Its incidence range is 0.3% to 2.2% in the developed world, whereas in Pakistan its incidence is quite high reaching up to 7%.

In this study the mean age of patients was 28.0 years and a significant number (70.0%) of them was between 21 to 30 years. Abbasi RM et al in his work on fetomaternal outcome among cases of abruptio placenta asserted that a majority (60.0%) of their subjects were between 21 to 30 years of age. [22,23]

Similar work conducted by Shukur-ud-din S and colleagues witnessed an average age of 30.0 years in their cases of placental abruption.[24]A study conducted in India on morphological forms of placenta in normal and hypertensive cases reports mean age of 26.5 years.[25] Naseer-ud-din.A. In year 2010 shows a mean age between 20-30years in the study of placental abruption.[3]

The detailed categorization of socioeconomic status of abruptio patients indicate that most were from low socioeconomic class with income <15000 PKR, uneducated, and non-booked. Most of them presented to emergency and had no record of antenatal checkup as compared to control group. Moreover, the recent research proves that perinatal prognosis could be improved by regular antenatal visits, as the abruptio placenta is an acute clinical presentation of a chronic disease process.[3,14,17,26] Moreover the proportion of caesarean sections in abruptio placenta was higher than the control group. This also shows that delay in diagnosis and treatment by primary health care centers resulted in increased C-section ratio at tertiary.[22,27]

The weight of placenta is an important and functionally significant parameter as it is related to villous area and fetal metabolism. Low weight of placenta is good indicator of fetal hypoxia at term pregnancy. In the current study, placental weight and diameter was found significantly different among abruptio patients and control group.[1,22,28] The mean placental weight was significantly less in abruption group depicting loss of it during pregnancy or before delivery. Previous studies by Narasimha JV and Chandini et al found similar findings of decreased weight of placenta in patients compared to control group.[29,30] A local study from Bahawalpur also witnessed a similar trend of decreased weight of placenta in patient group when compared with the control group.[31] In abruptio placenta there is a breach in the tissue of placenta. Similarly, in this study the placental diameter were also found decreased in the abruptio patients compared to healthy controls. Similar results were found in previous studies by Zia-ur-Rehman et al. and Goswami P et al[1,28,31]

In the current study the number of cotyledon in the placenta was also found decreased in the abruptio patients. Agarwal GC et al also noted that mean number of cotyledons were less in patients than controls. Many other investigators also reported that mean number of cotyledons were less in women with pregnancy induced hypertension as compared to control group. [32]

Conclusion

It is concluded that gross morphological changes in abruptio placenta include reduction in its weight, dimensions and number of cotyledon. Moreover, the demographics show that it is more prevalent in low socioeconomic women leading to high rate of Cesarean Section.

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