

A STUDY OF MORPHOLOGY OF PLACENTA IN ECLAMPSIA OF PREGNANCY AND ITS EFFECT ON FETAL OUTCOME

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ABSTRACT

The placenta is the most important organ for maintaining healthy pregnancy. Eclampsia is one of the common disorders during pregnancy. The present study was carried out at Department of Anatomy Dr. S. N. Medical College, Jodhpur to find out the morphological changes in placentae of eclamptic group in comparison to those of control group. In the present study 100 placentae with normal pregnancy and 100 placentae with eclampsia of pregnancy were collected and the newborns were also evaluated for birth weight, type of birth and NICU admission. It was found that the eclamptic group had low placental weight, less maximum diameter, less thickness at center and less number of cotyledons ($p < 0.01$). Thus, eclampsia of pregnancy had adverse effect on placenta and in turn on the fetus as the mean birth weight of new born in eclamptic subjects was lower than normal subjects.

Keywords: Eclampsia, Placenta, Morphology, Fetus.

INTRODUCTION

Placenta is an important organ of prenatal life that can be examined easily without causing any harm to the baby or mother during the fetal life (1). Placenta can be used to accurately determine the conditions of infants during prenatal life. It also helps in identifying complications like eclampsia during pregnancy. Placenta, being the intermediate organ between mother and the foetus has most accurate record of the infant's prenatal experience. Complications encountered during pregnancy like eclampsia, gestational diabetes, hypothyroidism can be reflected on placenta. Eclampsia is a potentially fatal disorder of pregnancy with a significant maternal and fetal morbidity and mortality rate (2-3). In India, its incidence is reported to be 220/10,000 deliveries (4). Eclampsia can change the morphology and physiology of placenta and in turn can affect the

maternal and fetal health (5). The aim of present study was to see the spectrum of change in the morphology of eclamptic placenta and its effect on fetal outcome.

MATERIAL AND METHODS

It was a cross sectional study, carried out at Dr. S.N. Medical College Jodhpur in the Department of Anatomy. The placentae from 200 pregnant females were collected from Department of Obstetrics and Gynecology after taking informed consent. The placentae were fixed in formalin and studied. The subjects were divided into: –

Group-1: 100 placentae were collected from healthy controls (normotensive subjects). The average blood pressure of normal pregnant woman was 110-120 mm of Hg systolic and 70-80 mm of Hg diastolic.

Any increase over 130 mm of Hg systolic and 90 mm of Hg diastolic were excluded from control group.

Group-2: 100 placentae were collected from eclamptic subjects having diastolic blood pressure of at least 90 mm of Hg or a systolic pressure at least 140 mm of Hg. The blood pressures were recorded on at least two occasion 6 hours or more. Apart from blood pressure there must be at least one episode of convulsion.

The placenta was inspected for:

Shape: According to available literature the placentae have three shapes i.e. oval, circular or irregular (Figure-1A). After proper inspection the shape of the placenta was recorded.

Maximum diameter: The placentae were trimmed, dried with blotting paper and placed on a flat surface. Two maximum diameters were measured with a Vernier caliper which were at right angles to each other. Then average of these two diameters was calculated and taken as the diameter of placenta. (Figure-1B).

Thickness of the placenta: Thickness of the placenta was measured from the center. This was measured by piercing the knitting needle in the center of placenta and the embedded part of the needle was measured by the scale in centimeters (1).

Weight of placenta: The placenta was washed and clots were removed and placenta dried with filter paper. Umbilical cord was cut through the nearest point of placenta, and membranes were trimmed and the weight was measured in grams on the balance.

Number of Cotyledons: The placenta was placed with the maternal side facing upwards on a flat surface. Then counting was started from one end and ended at another end. The total number of cotyledons was recorded.

The newborn was inspected for:

Birth weight: The birth weight was recorded on balance machine in kilograms.

Type of Birth: Live birth or still birth was noted.

NICU admission: If done was noted.

Statistical significance of difference between two groups was calculated by using unpaired 't' test. A

difference between the two groups was considered to be significant when $p < 0.05$.

RESULTS

In the present study the shape of placenta was mostly circular (70%) in control group where as it was oval in (54%) of cases in eclamptic group (Table-1). The mean weight of placentae was less significantly in eclamptic group (312.88 gm) than in controls (492.90 gm) ($p < 0.01$). The mean diameter, mean thickness and mean number of cotyledons were also significantly less in eclamptic group than in control group ($p < 0.01$). The mean birth weight was 2.950 kg in control group and 1.945 kg in eclamptic group. The difference was statistically significant ($p < 0.01$). Still births were reported only in eclamptic group (27%) and admission in NICU was also needed more in (14%) cases in eclamptic group than in control group (4%) case (Figure 3 & 4). Thus, eclampsia of pregnancy causes significant changes in shape, diameter and thickness of placenta which in turn can affect fetal outcome.

Table-1: Distribution of shapes of placenta

Shape of Placenta	Eclamptic Group	Control Group
Oval	14	54
Circular	70	36
Irregular	16	10
Total	100	100

Table-2: Distribution of various parameters of placenta and newborn

Parameter	Eclamptic Group (Mean ± SD)	Control Group (Mean ± SD)	P-Value*
Weight	492.90 ± 74.75	312.88 ± 96.17	< 0.001
Diameter	18.360 ± 1.316	15.651 ± 2.03	< 0.001
Thickness	2.131 ± 0.46	1.666 ± 0.49	< 0.001
No. of cotyledons	17.73 ± 1.04	14.26 ± 1.98	< 0.001
Wight of newborn	2.950 ± 0.43	1.9450 ± 0.62	< 0.001

*Unpaired 't' test



Figure-1: Shapes of Placenta
(a-irregular, b-circular, c-oval)



Figure-2: Diameter of placenta

DISCUSSION:

In the present study the shape of placenta was mostly circular in control group (70%) where as it was oval in eclamptic group (54%). Similar results were observed by Sengupta where he found most of placentae were circular in control group (43.3%) and oval in preeclamptic group (40%) (6). Shah found no significant difference in oval or rounded shaped placenta (7). The mean weight of placentae decreases significantly in eclamptic group (312.88 gm) than in controls (492.90 gm) ($p < 0.01$). Sultan had also found lower placenta weight in eclamptic group compared control group (8). The mean diameter, thickness and number of cotyledons was significantly reduced in eclamptic group than in control group ($p < 0.01$). Similar results were found in earlier studies by Kajantie and Raghavendra and Sultans also revealed that there was trend of less placental diameter and number of cotyledons in eclamptic group compared to control group (9-11). The birth weight was (2.950 kg) in group-1 and (1.945 kg) in group-2. The difference was found to be statistically significant ($p < 0.01$). Stillbirth was

reported only in group-2 cases (27%) and admission in NICU was also needed more in (14%) cases in group-2 than in group-1 (4%) case. Martin and Long found that incidence of small for gestational age infants were found in mothers with severe pre-eclampsia ranged from 20% to 80% (12-13). Thus, eclampsia of pregnancy causes significant changes on morphology of placenta which in turn results in low birth weight, more still births and NICU admissions.

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