Study of effect of eclampsia and chronic hypertension on gross morphology of placenta

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ABSTRACT
The placenta is the most important organ for maintaining healthy pregnancy. Eclampsia and chronic hypertension during pregnancy is one of the common disorder. Aim To analyze the morphology of placenta in disorders of hypertension during pregnancy. Methods The present study was done on 75 placentae in department of anatomy Dr. S. N. medical college Jodhpur to find out the morphological changes in placentae of edamptic and chronic hypertensive groups in comparison to those of normal control group. The morphology of placenta including shape, number of cotyledons, weight, diameter, thickness and insertion of cord was assessed. Results It was found that the eclamptic group had low placental weight, less maximum diameter, less thickness at centre and less no. of cotyledons while chronic hypertensive subjects had almost similar diameter, thickness and no. of cotyledons than controls. Conclusion The eclampsia of pregnancy have more adverse effect on morphology placenta than chronic hypertension.

1. Introduction
Placental efficiency refers to the ability of the placenta to extract and transfer nutrients and oxygen from the mother to the fetus. It is commonly defined as the grams of fetus that can be supported by each gram of placenta [1]. The complications of hypertensive disorders in pregnancy have been attributed to abnormalities in the placenta[2,3]. Eclampsia which is a rare but more severe form of PIH is defined as seizures in a pregnant woman with preeclampsia in the absence of known or subsequently diagnosed convulsive disorder [4]. Even though most women with chronic hypertension have uncomplicated pregnancies, chronic hypertension, affects 0-5% of pregnant women, depending on which population that is studied and which criteria that are used [5]. Studies have shown that chronic hypertension responsible for only 30% of hypertensive disorders during pregnancy and about 70% of cases were diagnosed as gestational hypertension and/or preeclampsia [6]. Eclampsia includes seizures and coma that happen during pregnancy but are not due to preexisting or organic brain disorders[7]. In UK, the incidence of eclampsia is 4.9/10,000 and in USA it is 4.3/10,000 deliveries[8]. In India, its incidence is reported to be 220/10,000 deliveries [9]. The aim of present study was to observe the change in the morphology of eclamptic and chronic hypertensive placenta.

2. Material and Method
The placentae from 75 pregnant females were collected from Gynecology & Obstetrics department and studied in Department of Anatomy Dr. S.N. Medical College Jodhpur. The subjects were divided into:

Group 1: included healthy control normotensive subjects and their number was 25.

The average blood pressure of normal pregnant woman is 110-120 mm of Hg. systolic & 70-80 mm of Hg. diastolic. Any increase over 130 mm of Hg. systolic & 90 mm of Hg. diastolic must be viewed with suspicion and systolic pressure of 140 mm of Hg and over and diastolic of 90 mm of Hg and above must be considered as high and as indicative of toxemia.

Group2: Eclamptic subjects having diastolic blood pressure of at least 90 mm of Hg or a systolic pressure at least 140 mm of Hg. These blood pressures must be recorded on at least two occasion 6 hr or more apart blood pressure with convulsions and there number was 25.
Group3: Chronic hypertensive (CHT) group including 25 subjects on the basis of diastolic blood pressure. The subjects with the presence of persistent hypertension of whatever cause, before the 20th week of gestation or persisting hypertension beyond 6 weeks postpartum.

The placenta was examined for:

Shape: The shape of the placenta was recorded after proper inspection. Each placenta was categorized as oval, circular or irregular in shape (Figure 1).

Figure 1

(a–irregular, b–discoid, c–oval)

Maximum diameter: The placenta was trimmed and placed in a flat tray after mopping. At first, the maximum diameter was measured with a vernier calliper. Then a second maximum diameter was taken at right angles to the first one. The mean of two measurements was considered as the diameter of placenta and expressed in centimeter. (Figure 2).

Figure 2

Thicknness of the placenta: Thickness of the placenta was measured from the center. This was measured by piercing the knitting needle in the placenta and the embedded part of the needle was measured by the scale. Thickness of placenta at center was measured in centimeters [10].

Weight of placenta: The placenta was washed properly by tap water and clots were removed from the maternal surface and gently pressed dried with filter paper. Umbilical cord was cut through the nearest point of placenta as much as possible, and membranes were trimmed. Then the placenta was weight on the balance. The weight of placenta was measured in grams [10] (Figure 3).

Number of Cotyledons: Each formalin-fixed placenta was taken on both hands. Then gentle pressure was applied on the central part of the fetal surface with thumbs of both hands while holding the periphery of the placenta with the other fingers. As a result, the cotyledons on the maternal aspect becomes prominent after separation between them. Then the placenta was put on a flat tray with maternal side facing upward by placing a block of paraffin on the fetal side. Then counting was started from the left side of the one end of the placenta going rightward and again turning back to the left in a manner of loop. This counting procedure was repeated until the other end of the placenta was reached. The total number of cotyledons was recorded [11] (Figure 4).

Insersion of umbilical cord : Shortest distance from cords insertion to placental margin was measured for assessing the placement of umbilical cord on the surface of placenta to determine the insertion of umbilical cord.

Statistical significance of difference between the groups was calculated by using Students “t” test. A difference between the two groups was considered to be significant when p<0.005.
3. Result and Discussion:

In the present study the shape of placenta was discoid in 56% in control group, 24% in eclampsia group and 40% in CHT group whereas it was oval in 24% cases of controls 64% cases of eclampsia and 36% cases of CHT. Irregular placenta was observed in 20% cases of controls, 12% cases of eclampsia and 24% cases of CHT (Table 1). Thus most of placenta were discoid in controls and CHT group. Ashfaq M. found that most of placenta was discoid in control and CHT group [12] whereas Shah et. al observed no significant significance in oval or rounded shaped placenta [13]. Most of the placenta had eccentric insertion in all the three groups (Table 3). The mean weight of placentae decreases extremely significant in eclamptic group (326.20 gm) than in controls (491.44 gm) (p<0.0001) while the mean weight was 419.72 gm in CHT group this difference was also statistically significant (p<0.05) in present findings. Ashfaq M. reported the mean placental weight to be 532 gm and thickness at centre of placenta and diameter at centre of placenta was decreased whereas the chronic hypertension affect only the placental weight significantly but not the diameter, thickness and number of cotyledons. Thus, eclampsia has more severe effect on morphology of placenta than chronic hypertension. The insertion of umbilical cord is not affected by the severity of hypertension during pregnancy.

Table 3. Showing insertion of Placenta

<table>
<thead>
<tr>
<th>Groups</th>
<th>Central n(%)</th>
<th>Eccentric n(%)</th>
<th>Marginal n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>6(24)</td>
<td>17(68)</td>
<td>2(8)</td>
</tr>
<tr>
<td>Eclampsia</td>
<td>4(16)</td>
<td>16(64)</td>
<td>2(8)</td>
</tr>
<tr>
<td>CHT</td>
<td>8(32)</td>
<td>15(60)</td>
<td>2(8)</td>
</tr>
</tbody>
</table>

4. Conclusion

Eclampsia and chronic hypertension are the hypertensive conditions of pregnancy. Both of these disorders affect the maternal health and as placenta is derived from both maternal and fetal components so any disorder in mother should affect the placenta. Eclampsia severely affects the weight, diameter, thickness and number of cotyledons whereas the chronic hypertension affect only the placental weight significantly but not the diameter, thickness and number of cotyledons. Thus, eclampsia has more severe effect on morphology of placenta than chronic hypertension. The insertion of umbilical cord is not affected by the severity of hypertension during pregnancy.

5. References