Original Research Article

Effect of Pregnancy Induced hypertension on morphology of placenta and birth weight of newborn

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Abstract

Background: Hypertensive pregnancy may be responsible for vascular damage, enhanced systemic inflammation and insulin resistance in the placenta as oxygen and nutrient transfer is impaired and oxidative stress is generated affecting the placental growth and development. Placental growth pattern in hypertensive pregnancies shows a variable pattern owing to placental insufficiency. Present study was done to investigate the morphological changes in placenta in hypertensive pregnancy. And its effect on birth weight of newborn.**Material Method:** The study was carried out on 80 placentae, mothers and their babies. The placentae was collected from Obstetrics and Gynaecology, Department of NSCB Medical College, Jabalpur. Out of 80 placentae 40 from Pregnancy induced hypertensive and 40 normotensive mothers. As soon as the placenta was delivered, the umblical cord was cut it was put into formal saline. It was kept in a tray, to the membranes were trimmed ofl, cord was cut about 10 cm from the insertion. The blood clots adherent to maternal surface were picked up. The placenta was then washed in plain tap water naked Eye examination was done and following variables studied.**Result:** A Macroscopic study of the placenta revealed placental weight, placental volume, diameter, placental thickness and number of cotyledons were less in study group. Mean placental weight in study group was 336gm and in control group was 425 ($p<0.05$). Mean placental volume in study group & control group were 236and352 ml respectively ($p<0.05$). Mean number of cotyledons were 14.7and 16 in study & control group respectively but not significant and mean diameter15.6 cms and17.05cms in study and control group. But in the present study placental thickness was not significant ($p<0.539$). There was a single umbilical artery present in one patient in PIH group .. There was a tendency of lowering the weight of neonate 2.1kg in study group and 2.7kg in control group ($p<0.05$).**Conclusion:** In PIH group placental changes were related with fetal outcome. Common placental changes were significant in this study.

Keywords: hypertension, morphology, weight & newborn

Introduction

Pregancy-induced hypertension (PIH) is the leading cause of maternal mortality and is an important factor in fetal wastage[1]. Pregnancy complications like hypertension are reflected in placenta in a significant way both macroscopically and microscopically. Several studies have shown that utero-placental blood flow is decreased in PIH due to maternal vasospasm. This leads to constriction of fetal stem arteries and has been associated with the changes seen in the placenta of preeclamptic women. Maternal vasospasm leads to fetal hypoxia and reduced fetal birth weight[2&3].

Material & Method

The study was carried out on 80 placentae, mothers and their babies. The placentae was collected from Obstetrics and Gynaecology, Department of NSCB Medical College, Jabalpur from September 2009 -September 2011. Out of 80 placentae 40 from pregnancy induced hypertensive and 40 from normotensive mothers.

Material

1. 80 placentae taken for the study, will be collected soon after delivery along with umblical cord. .
2. Weighing machine.
3. Inch tap.
4. Magnifying glass.
5. Dissection instruments.

As soon as the placenta was delivered, the umblical cord was cut it was put into formal saline. It was kept in a tray, to the membranes were trimmed, cord was cut about 10 cm from the insertion. The blood clots adherent to maternal surface were picked up. The placenta was then washed in plain tap water naked Eye examination was done and following variables studied.

Weight of placenta - Accurate weight of the placenta was recorded by weighing machine.

Volume of placenta the volume of the placenta was measured by water displacement method. The placenta was immersed in water filled container. The volume of water poured out of the correction was measure is a graduated cylinder marked in millimeters (ml).

Shape of placenta - The shape of the placenta and presence of accessory lobe were recorded after proper inspection. Each placentae was categorized as oval, circular or irregular in shape.

Diameter:- The placenta was placed in a flat tray. At first the maximum diameter was measured with a metallic scale graduated in centimeter (cm). Then a second maximum diameter was taken at night angles to the first me. The mean of two measurements was considered as the diameter of the placentae expressed in centimeters.

Thickness of Placenta:

With a long needle placental thickness was measured at 4 points of each placenta. The mean of the 4 points measurements was calculated and considered as thickness of the placenta.

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Number of Cotyledons: Any abnormality :- presence of calcification, infarction etc were noted.

Results

Table 1: Morphometry of Placenta and Birth Weight

Group		Placental weight(gms)	Placental volume[ml]	Mean diameter	Thicknesss	No of cotyledons	Birth weight New born[kg]
Normal	Mean	425.00	352.5	17.05	2.16	16	2.7
	Std Deviation	69.92	58.88	1.81	0.29	2.3	0.29
PIH	Mean	336.00	236.50	15.610	1.900	14.70	2.180
	Std Deviation	47.889	71.959	1.5092	0.2821	3.368	0.4940
Significance	t-A/C	5.12 p<0.05	6.67 p<0.05	3.08 p<0.05	2.71 p<0.05	1.74 p>0.05	3.96 p<0.05

Table 2: Birth Weight

Group	Mean	Std Deviation	No.
Normal	2.727	0.294	40
PIH	2.180	0.494	40

Birth weight of baby ranging from in group A 2.5 to 3.1 kg, in group B 15 to 4.25 kg and group C 1.7 to 2.3. The mean Birth weight was 2.638 (±0.3312). 1476 (±0.455) and 2.08 (±0.2919) in groups were noted.

Fig 1: Fetal surface showing calcification & Maternal showing infraction.

Fig 2: Maternal surface showing calcification & Placenta showing sub chorionic haematoma

Discussion

Present study reveals the weight, volume, diameter, thickness and no. of cotyledons of placenta of pregnancy induced hypertensive mother having lower values is comparison to normotensive mothers. These findings are similar with the other workers Fox (1994)[4].

It has been reported that the maternal utero-placental blood flow is decreased in pre-eclampsia Browne and Veall (1953)[5]; Bewly et al (1991)[6] because there is maternal, vasospasm. Reduced maternal uteroplacental blood flow leading indirectly to constriction of foetal stem arteries, Stock et al (1980)[7] has been associated with the changes in the placenta of pre-eclamptic mothers.

Naeye and Friedman(1979)[8] calculated that 70% of the excess foetal deaths in women with hypertension are due to large placental infarcts, markedly small placental size.A study of normal term pregnancy found the placental weight of 400-1000 grams where as found placental weight to be 360-570 grams. Udainia et al (2004)[9] in his study found the placental weight ranging between 250-700 gm. In the present study the placental weight is found to range between 260-430 gms in PIH cases and 300-850 in normal pregnancy.A study of pregnancy induced hypertension found the means placental weight to be 410 gms. Mean placental weight in pregnancy induced hypertension as seen in present study is 318.50(±43.53) grams and is in conformity with the findings of above author.

The mean volume of placenta is found to be 236.50 ml (±71.95) patients, which is significantly lower in comparison to normal placentae. In cases of severe preeclampsia or long standing cases of pregnancy aggravated hypertension placentae were grossly small in volume, irregular in shape.

In the present study the mean placental diameter of PIH mothers is found to be 15.61(±1.50) which is significantly lower than the normotensive mothers. ($p<0.05$).

Ashfaq, Janjua, Channa[1] found the mean placental diameter 14.32(±00.32) cm but did not found significant difference in placental diameter of normal and hypertensive mothers.

The mean of thickness of placenta in PIH group is 1.900(±0.2821) which is similar significantly lower than ($p<0.05$) with normal study gro sent study the mean no. of cotyledons found is 14.70(±3.36) which is lower than with the control group but not significant. These findings are similar with the study of Kishwara Ara[2] who found significantly less no. of cotyledons in PIH group (10.0) than control group (11.0).

In the present study marginal insertion of umblical cord was found to be 30% cases in PIH, which is comparable with findings of the other two study groups. Fox (1967), and Udainia et al (2004)[9] had observed increase in the marginal attachment of umblical cord in PIH cases.

Also, Pretorius (1996) reported cases of marginal insertion of placenta in about 42% cases of pregnancy induced hypertension. Role of marginal insertion of umblical cord in the placenta has also been implicated in the induction of hypertension. In the present study, irregular shaped placenta found more in PIH mother i.e. 8% than normal study group ie. 1%.

Majumdar et al (2005)[10] found that mothers with pregnancy induced hypertension had smaller irregular placenta with marginal insertion of umblical cord. Kishwara, Ara (2005-2006)[2] found irregular placenta more in PIH group 8% as compared to normal study groups.Rath in (1994)[11] stated that in hypertension arrangement of the intracotyledonous, vasculature is altered; resulting in low birth weight of the babies, and altered placental morphology.In present study 80 placenta were selected for morphological. This study is carried out in 40 placentae of PIH mothers and 40 of normal mothers,Criteria for labelling the mother mother with B.P.>140/100 were included in PIH group and normal group as uncomplicated pregnancy.Placenta were examined in regard to weight, volume, shape, diameter, thickness, membranes, attachment of umbilical cord infarction, calcification in number of blood vessels in umblical cord in morphological study .The mean weight of placenta is found to be 425.00 gm with S.D. of 69.921 in normal placentae. In PIH cases it is found to be 336.00 gm with S.D. of 47.88.The mean volume of placenta is found to be 352.50 ml. with S.D. of 58.88 in normal placentae. In PIH cases it is 236.50 ml with S.D. of 71.959.The mean diameter of placenta in normal subjects is found to be 17.050 cm S.D. of 1.8174 cm whereas in cases of PIH mothers it is found to be 15.61 with S.D. of 1.50.The mean thickness of placenta in normal subjects is found to be 2.16 with of.29 cm whereas in anaemic mothers its found to be 2.411 with S.D. of.57. PIH cases it is found to be 109 cm with S.D. of 28. with S.D. of 2.35. Mean number of cotyledons in normal subjects are found to be 16.0 of 2.35. The mean number of cotyledons in PIH cases are 14.70 with standard devitation of 3.36.The attachment of umbilical cord is found to be central in 15% of normal subjects, 2.5% of PIH cases, where are eccentric attachment is found to be 50% in normal, and 67,5% in PIH subjects. Marginal attachment is found to be 35.0% in normal and 30.05% in PIH subjects[12] .The mean birth weight of baby is found to be 2.638 kg with S.D. of S.D. 3312 is normal cases, and 2.084 with S.D. of 29 in PIH mothers.The term baby is found to be 95% in normal and 85.0% in PIH cases,where as preterm baby is found to be 15% in PIH cases. In our study sub chorionic haematoma is found to be present in anaemiccases[13]. Calcification of placenta is found to be more in PIH The mean weight of placenta is significantly lower in PIH subjects as compared to normal group ($p<.05$).

Conflict of Interest: Nil Source of support:Nil

Blood vessels of umbilical cord in all the placenta showed presence of throe blood vessels i.e.2 arteries and I vein except 1 placenta of study group which had I artery and I vein in the umbilicalcord.

It is also concluded from the study that the mean birth weight of baby is significant in PIH group as compared with normal subjects.

Conclusion

That it is concluded that the pregnancy induced hypertension adversely affects both foetal and placental outcome. If these diseases are diagnosed at an early stage by frequent monitoring of blood pressure, added precaution can be instituted during antenatal period and labour to reduce the further risk to mother and foetus.**:** PIH significantly affects the placenta by reducing its weight and dimensions. These changes may cause placental insufficiency as a result of compromised utero-placental blood flow. Therefore has an adverse affect on the neonatal birth weight. PIH has definite influence on morphology, histology of placenta, and thus affects the growth of the fetus.

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