

PLACENTAL MORPHOLOGY IN HYPERTENSIVE PREGNANCY

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SUMMARY

The mean birth weight in 231 normal pregnancies at term was 2840 gm and that in 158 hypertensive pregnancy was 2660 gm. the difference being 160 gm. The corresponding placental weight was 368 gm. and 359 gm., the F/P ratio being 7.72 and 7.41 respectively. There were 92 (23.27%) small for date babies, of which 45 (27.11%) were in the hypertensive group. The F/P ratio varied from 6.62 to 9.8. Placental co-efficient in the weight group of 3100 to 4000 gm. was 0.11 in normal cases and 0.12 in hypertensive cases while in the weight group upto 2000 gm. these were 0.15 and 0.18 respectively.

There were 54 (13.8%) placentae with abnormal shape and placenta reniformis was seen in 19 cases. Of the abnormal shape 29 (53.7%) were with hypertension. There were two circumvelet placentae.

Calcification was found in 140 cases of which 87 were hypertensive. Red infarct was more common in hypertensive group (62%) than in normal cases (27%).

Type of insertion of the umbilical cord had no relation with birth weight or hypertension. In 3 cases single umbilical artery was noted.

Introduction

Placenta is directly related to the growth and development of the foetus in utero. Being an organ of vital importance for continuation of pregnancy and foetal nutrition it has evoked great interest among the physiologists and the obstetricians as well and much work has been done to understand the 'unique biological status' (Ounstead, 1971) of this complex organ. Morphologically the placenta shows some interesting

variations. But it is not yet known whether the placenta plays any role in the causation of preclampsia or not.

This is a study of the placenta in normal and hypertensive pregnancies in relation to its weight and other morphological variations.

Materials and Methods

In this study placenta of 389 cases of term pregnancy were studied morphologically. There were seven sets of twins. Cases were studied at random.

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Accepted for Publication on 31/10/90.

Preparation of the placenta

After expulsion the placenta was taken in a clean tray. Membranes were trimmed off from the margin of the placenta. The umbilical cord was cut near to the placenta. Then the placenta was washed and blood and blood clots were removed. The placenta was then weighed after mopping with dry cotton pad. Next the placenta was examined for shape, dimension, number of cotyledons, calcification, infarct and retroplacental clot. Umbilical cord was examined for length, mode of insertion, number of vessels and knots.

Total number of cases studied were 389 including seven sets of twin, number of hypertensive cases were 158. The total number of babies was 396 and babies from hypertensive mother were 166.

Results and Observations**Placental weight, area and placental co-efficient**

The average placental weight varied from 280 gms to 415 gms in normotensive patients whereas in hypertensive group it varied from 279 to 407 gms. (Table I). The heaviest placenta

TABLE I

Birth weight (gms)	No. of cases		Placental wt.		F/P ratio		Placental area		Placental Co-efficient	
	Normal	Hypertensive	Normal	Hypertensive	Normal	Hypertensive	Normal	Hypertensive	Normal	Hypertensive
Upto 2000	25	19	280	282	7.14	7	224 cm	190 cm	0.15	0.18
2100-2400	22	26	363	279	6.62	8.60	221 cm	234 cm	0.16	0.12
2500-3000	130	78	366	356	8.21	8.42	244 cm	254 cm	0.13	0.14
3100-4000	48	43	415	407	9.63	9.83	276 cm	317 cm	0.11	0.12

Table I showing placental weight, F/P ratio, placental area and placental co-efficient.

Examination of the baby - Babies were examined for weight, sex, height and any congenital abnormality.

Feto-placental weight ratio and placental co-efficient were calculated.

weighed 800 gms. in which the birth weight of the baby was 4000 gms. The F/P ratio in normal patients varied between 6.6 to 9.6 and in hypertensive group it was 7 to 9.8. The placental area increases with increase in weight. It was ob-

TABLE II

Age group (yrs)	No. of cases		Mean birth wt. (gms)		Mean placental Wt. (gms)		F/P ratio	
	Normal	Hypertensive	Normal	Hypertensive	Normal	Hypertensive	Normal	Hypertensive
Upto 20	71	53	1760	2460	362	358	7.6	6.8
21-30	152	94	2880	2820	371	360	7.7	7.8
31 & above	8	11	2830	2200	375	363	7.5	6

Table II showing birth weight, placental weight and F/P ratio in relation to age of the patient.

served that no definite variation of placental weight and F/P ratio in the two groups was found.

Placental co-efficient in the weight group of 3100 to 4000 gms. was 0.11 in the normal patients and 0.12 in hypertensive patients, while in the weight group upto 2000 gms. these were 0.15 and 0.18 respectively. Placental co-efficient decreased as the birth weight and placental weight increased.

Birth weight, placental weight, and F/P ratio in relation to the age of the patient

Table II shows that mean birth weight was maximum in the age group of 21-30 years and the F/P ratio were 7.8 and 7.7 in normal and hypertensive groups respectively. Lighter babies were in the hypertensive group in upto 20 years group and in 31 years or above group of patient. In both group F/P ratio are 6.8 and 6 respectively.

Birth weight, placental weight and F/P ratio in relation to parity

It can be seen from Table III that in the normotensive group except in primigravida cases birth weight gradually increased with increasing parity, but such a relation was not maintained by the weight of the placenta. In the hypertensive group, of course, both birth weight and placental weight did not show any definite relationship.

Taking all the cases together the mean birth weight in normal group was 2840 gms. and 2660 gms. in hypertensive group with a mean dif-

ference of 180 gms. The corresponding mean placental weight was 368 gms. and 359 gms. the F/P ratio being 7.72 and 7.41 respectively. The difference of the placental weight in the two groups was negligible. This might be due to hypertrophy of the placental mass in response to chronic hypoxia in hypertensive patients (Fox, 1964).

There were 92 (23.23%) low birth weight babies, out of these 47 (20.43%) were among the normotensive and 45 (27.11%) were among the hypertensive patients.

Shape of the placenta

Abnormal shape of the placenta was found in 54 cases (13.8%). Out of which placenta reinfornis was in 19 cases, circumvalet placenta in 3 cases, bilobed in 5, elliptical shape in 17 cases and triangular placenta in 10 cases. Of these 54 cases, 29 (53.7%) had hypertension. There were two cases in this group with circumvalent placenta.

Multiple chorionic cyst was found in 2 cases only and 9 placentae were with retroplacental clot and all of these patients were hypertensive.

Calcification of varied degree was found in 100 placentae (36%) of which 87 (62.14%) were with hypertension. Red infarct was common in hypertensive group in 62 per cent of cases against 27 per cent in normal cases.

TABLE III

Parity	No. of cases		Mean birth wt. (gms)		Mean placental wt. (gms)		F/P ratio	
	Normal	Hypertensive	Normal	Hypertensive	Normal	Hypertensive	Normal	Hypertensive
P0	43	35	2860	2720	376	362	7.6	7.5
P1	75	58	2610	2440	372	358	7	6.8
P2	82	49	2750	2890	366	385	7.5	7.8
P3 & above	31	16	2870	2250	377	375	7.6	6

Table III showing birth weight, placental weight and F/P ratio in relation to parity.

Umbilical Cord

Length of the umbilical cord varied from 19 cm. to 77 cm. In maximum number of cases length varied between 43 cm. to 52 cm. average length being 44.8 cm.

Insertion of the cord in the placenta was central in 175 cases (44.19%) eccentric in 167 (42.17%), marginal in 39 (9.84%), vellamantous in 3 and there were 5 cases with battledore insertion (1.26%). Insertion of the cord had no effect on birth weight or in the incidence of hypertension. Only in one case there was stricture at the insertion of the cord and the fetus was still born.

In 3 cases single umbilical artery was noted, one had severe hypertension and intrauterine death, the other two cases had normal babies of average birth weight.

False knot was present in 46 cases (12%), Varices were noted in 150 cases (39%) without any relation to maternal hypertension.

Discussion

Hypertensive diseases in pregnancy are known to cause small for date baby. There is general agreement that large babies tend to have large placentas and small babies tend to have small placentas, though this relationship is not always constant (Morrison, 1963). In hypertensive patients, in this study, birth weight of babies and placental weight were less than in normal patients in each category of birth weight. Area of the placenta in hypertensive group was more when compared to normotensive patients except in very low birth weight group where area was much smaller. This might be due to failure of compensatory mechanism as a result of prolonged hypoxia in some patients. Chakraborty (1968) and Shah et al (1985) also reported smaller placentae with small babies in toxemia patient. At term the placental foetal ratio lies between 1:6 and 1:8 (Morrison, 1963). In 53.8 percent of cases Shah et al (1985) found the ratio to be 1:5 the range being 1:4 to 1:6 while Bhargava et al (1983) found 6 and 6.66. In the present study the range of F/P ratio varied from 6.62 to

9.8. From the birth weight of 2100 gm. onwards F/P ratio was found to be more in hypertensive group than in normal patients.

Little (1960) described evolution and significance of red infarcts. Section et al (1950) also described various degenerative vascular lesions of placenta in pre-eclampsia, which may lead to intervillous vascular disturbances. Little (1960) found red infarct in 30.5 per cent of cases. Dutta and Dutta (1989) observed 80 to 85.71 per cent placentae with red infarct in pre-eclampsia and in 43.15 per cent in normal pregnancy. In the present study red infarct was found in 62 per cent of cases with hypertension. In a morphometric study of placenta in normal pregnancy, pre-eclampsia and I.U.G.R. Boyd and Scott (1985) showed that placentas of pre-eclampsia and I.U.G.R. were of lower volume with increased area of infarction.

Acknowledgement

Authors are grateful to Dr. R.K. Das, Professor and Head of the Department of Obstetrics and Gynaecology, Gauhati Medical College, for kindly permitting us to publish the hospital data.

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