

MORPHOLOGICAL STUDY OF PLACENTA IN PREGNANCY INDUCED HYPERTENSION WITH ITS CLINICAL RELEVANCE IN SIR T. HOSPITAL BHAVNAGAR

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ABSTRACT

Background: The intrauterine existence of foetus is dependent on one vital organ –“The Placenta”. Which is essential for maintaining pregnancy and promoting normal foetal development. Information on placental size, shape, consistency, completeness of the placenta, presence of accessory lobes, placental infarcts, haemorrhage and tumors may be important to the care of both mother and infant. Hypertensive disorders complicating pregnancy are common and form one of the deadly triad along with haemorrhage and infection, that results in large number of maternal deaths and there off foetal deaths. So, the present study was undertaken to analyze the clinical correlation between the weight of placenta and weight of new born baby in pregnancy induced hypertension (cases) & normal pregnancy (control) group.

Methods: present study was conducted on 100 full forms freshly delivered placenta was taken from Sir T. Hospital Bhavnagar. Out of them 50 were PIH and 50 were normal pregnancy.

Results: In this study, weight of placenta in control group ranges between 501-550 gms and in PIH 201-250 gms. The mean weight of placenta is 483.2 gms in control group and 410.8 gms in PIH. Weight of new born baby in control group ranges between 2501-3000 gms and in PIH 1001-1500 gms. The mean weight of new born baby is 2828.4 gms in control group and 2323 gms in PIH.

Conclusion: This study will help to correlate the effect of severity of PIH on mean weight of placenta and mean weight of new born baby.

KEY WORDS: Pregnancy Induced Hypertension, Weight Of Placenta, Weight Of New Born Baby.

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INTRODUCTION

The intrauterine existence of foetus is dependent on one vital organ –“The Placenta”. Which is essential for maintaining pregnancy and promoting normal foetal development [1]. The placenta is an organ of transport and endocrine function. Information on placental size, shape, consistency, completeness of the

placenta, presence of accessory lobes, placental infarcts, haemorrhage and tumors may be important to the care of both mother and infant. The placental efficiency refers to the ability of the placenta to extract and transfer nutrients and oxygen from the mother to foetus [2]. The placenta at term is a circular disc with a diameter of 185 mm And thickness of about

2.5 cm at its center, it feels spongy and weight about 500 gms, the proportion of the weight of baby roughly 1:6 at term and occupies about 30 % of uterine wall [3].

The placenta develops from sperm and egg cells that form foetus, and functions as a foetomaternal organ with two components, the foetal part (Chorion frondosum) ,and the maternal part (Decidua basalis) [4]. Placenta are examined macroscopically and microscopically for a variety of reasons diagnostic, either for the mother or for the neonate, prognostic prediction of future pregnancies, investigative and for Legal purpose [5]. Toxaemia of pregnancy is the leading cause of maternal mortality and is an important factor in foetal wastage. The incidence is high in backward countries with malnutrition, hypoproteinaemia & poor obstetric facilities [6,7].

Hypertensive disorders complicating pregnancy are common and form one of the deadly triad along with haemorrhage and infection, that results in large number of maternal deaths and there off foetal deaths. Morphologically placenta of hypertensive disorders of pregnancy are lighter in weight, lesser in diameter and thickness, with high incidence of abnormal shape & cord insertion and the foetoplacental ratio is diminished. Infarction retroplacental haemorrhage, subchorionic fibrin is also higher in incidence in hypertensive placenta.

MATERIALS AND METHODS

Present study of placental morphology in pregnancy induced hypertension was done in the Department of Obstetrics & Gynecology, Sir T Hospital and in Department of Anatomy, Govt. Medical College, and Bhavnagar between years of July 2012-July 2013.

100 full terms freshly delivered placenta were collected, both normal and caesarean section, out of them 50 were pregnancy induced hypertension & 50 were normal pregnancy. In pregnancy induced hypertension, only those cases having blood pressure ranging 140/90mm of Hg and above, with or without oedema, and/ or proteinuria were included. None of these cases had hypertension prior to pregnancy. In normal pregnancy group, only those cases with normal blood pressure without oedema or

proteinuria were included.

Placenta with cord and membranes were collected immediately after delivery. Any abnormality of cord and membranes was noted. The weight of new born baby and weight of placenta are measured in grams by weighing machine.

RESULTS

The observations were analyzed for the clinical correlation between the Weight of placenta & Weight of New Born Baby in PIH (Cases) and Normal Pregnancy (Control) group all 100 Pregnant Woman. The statistical data which were extracted from the calculation and analysis were tabulated in Table1 (a), (b) and Table2 (a), (b) to show different parameters at a glance.

Fig. 1: Baby Weight Machine.



Fig. 2: Baby Weight Machine with Measuring weight of Baby.



Table 1(a): Values of Recorded observations of placental weight in control group

Group no.	Weight (gms)	Control	
		No. of case	Percentage (%)
1	150-200	—	—
2	201-250	1	2
3	251-300	2	4
4	301-350	3	6
5	351-400	7	14
6	401-450	6	12
7	451-500	10	20
8	501-550	11	22
9	551-600	7	14
10	601-650	3	6

Table 1 (b): Values of Recorded observations of placental weight in PIH Cases.

Group no.	Weight (gms)	Control	
		No. of case	Percentage (%)
1	150-200	1	2
2	201-250	8	16
3	251-300	5	10
4	301-350	6	12
5	351-400	5	10
6	401-450	8	16
7	451-500	8	16
8	501-550	7	14
9	551-600	3	6
10	601-650	—	—

Table 2 (a): Values of Recorded observations of weight of New Born Baby in Control Group.

Group no.	Weight (gms)	Control	
		No. of case	Percentage (%)
1	1001-1500	1	2
2	1501-2000	4	8
3	2001-2500	9	18
4	2501-3000	17	34
5	3001-3500	17	34
6	3501-4000	2	4

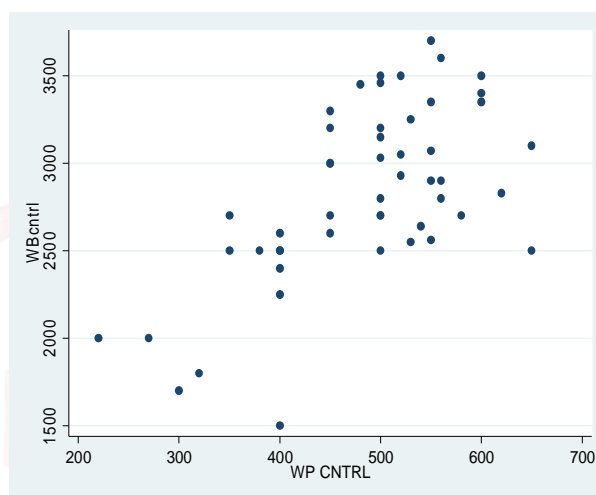
Table 2 (b): Values of Recorded observations of weight of New Born Baby in PIH Cases.

Group no.	Weight (gms)	PIH	
		No. of case	Percentage (%)
1	1001-1500	12	24
2	1501-2000	7	14
3	2001-2500	11	22
4	2501-3000	9	18
5	3001-3500	8	16
6	3501-4000	3	6

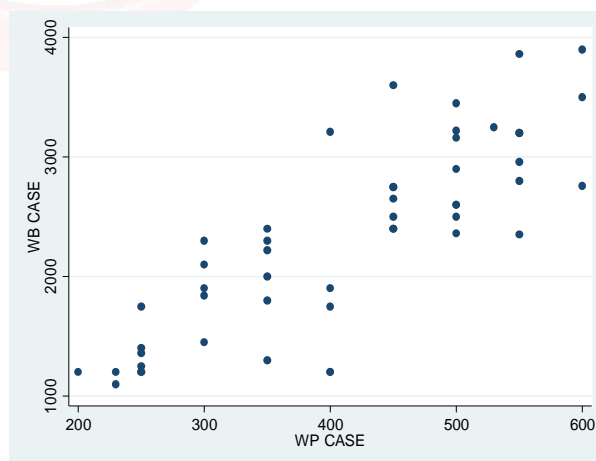
Table 3: Comparison with similar previous study with Present study.

Workers	Mean weight of placenta ± SD		Mean Weight of Baby ± SD	
	Control	PIH	Control	PIH
Udania, A. & Jain, M.L. [1]	495.67 ± 114.11	405.67 ± 101.64	2640 ± 503.45	2280 ± 626.32
G.Priya, K.Bhavina and S.Sundarapandian [10]	451.25 ± 48.64	283.13 ± 42.80	3033 ± 236.05	1986 ± 271.32
Rath G, Garg K, and Sood M. [11]	382.148±52.321	351.308±64.047	2718.29±532.57	2404.03±360.31
Present Study	483 ± 95.62	410 ± 116.17	2828.4 ± 504.10	2323 ± 797.68

Graph 1: Comparison of Baby Weight and Placental Weight from the Regression Equation in Control group (In present study).



Graph 2: Comparison of Baby Weight and Placental Weight from the Regression Equation in Cases (In present study).



According to table 1(a) & table 1(b)

	Control	PIH
Mean Weight of Placenta	483.2	410.8
Maximum Weight of Placenta	650	600
Minimum Weight of Placenta	220	200
Standard Deviation	95.62	116.17

Table 1 (a) & Table 1(b) shows Placental weight is found in ranges between 220-650 gms in

control group, & 200-600 gms in PIH.

In control group more number of cases of Placental weight ranges between 501-550 gms, & in PIH more number of cases found in ranges between 201-250 gms. Therefore, in the present study, the placental weights are lower in PIH cases than control group.

The mean Placental weight is 483.2 gms in control group, 410.8 gms in PIH. Here is a significant lowering of Placental weight in PIH. Difference between mean weight of Placenta in control & cases is 72.4 gms. Placental weight less than 220 gms are found only in PIH. combined mean of all 100 cases are 447 gms.

The maximum weight of Placenta is 650 gms in control group, 600 gms in PIH. Minimum weight of Placenta is 220 gms in control group, 200 gms in PIH. Standard Deviation (SD) 95.62 in control, 116.17 in PIH combined SD of all 100 cases 111.93. with 95% conf. Interval of all 100 cases is between 424.78 - 469.21.

According to table2 (a) & table2 (b)

	Control	PIH
Mean Weight of New Born Baby	2828.4	2323
Maximum Weight of New Born Baby	3700	3900
Minimum Weight of New Born Baby	1500	1100
Standard Deviation	504.10	797.68

Table2(a) & Table 2(b) shows weight New born baby of is found in ranges between 1500-3700 gms in control group, & 1100-3900 gms in PIH.

In control group more number of cases of Baby weight ranges between 2501-3000 gms & in PIH more number of cases found in ranges between 1001-1500 gms. Therefore, in the present study, the Baby weights are lower in PIH cases than control group.

The mean Baby weight is 2828.4 gms in control group, 2323 gms in PIH. There is a significant lowering of Baby weight in PIH. Difference between mean weight of Baby in control & cases is 505.4 gms. Baby weight less than 1500 gms are found only in PIH combined mean of all 100 cases are 2575.7 gms.

The maximum weight of Baby is 3700 gms in control group, 3900 gms in PIH. Minimum weight of Baby is 1500 gms in control group, 1100 gms

in PIH. Standard Deviation (SD) 504.10 in control, 797.68 in PIH. Combined SD of all 100 cases 710.78 with 95% conf. Interval of all 100 cases is between 2434.66-2716.73.

T test (two samples) for correlation has been used to find the significance of degree of correlation. Regression analysis has been carried out to find the exact relationship between Placental weight and weight of new born Baby.

DISCUSSION

Hypertensive disorder of pregnancy is one of the leading causes of maternal morbidity and mortality and perinatal morbidity and mortality. Fetal growth depends in part of Placental growth. Placenta being a foetal organ shares the same stress & strain, to which the foetus is exposed. Thus any disease process affecting the mother & foetus also has great impact on Placenta. Normally placental morphology varies considerably during its short life span.

Hosemann H.(1946) [8] in his study of normal term pregnancy found the Placental weight of 400-1000 grams Where as Wiggleworth J.S. (1962) [9] Found Placental weight to be 360-570 grams. In the present study, the placental weight is found to range between 220-650 grams in control group & 200-600 grams in cases. Therefore, in the present study, the placental weights are lower than the findings of above authors.

The mean Placental weights as seen in the present study is 483 grams in control group, 410 grams in cases and mean weight of new born baby is 2828 grams in control group & 2323 grams in cases as compared with previous studies which are Udanja, A. & Jain, M.L [1] in which the mean placental weight of control & cases are 495,405 and mean weight of baby control & cases are 2640,2280 grams respectively, G.Priya, K.Bhavina and S.Sundara-pandian [10], in which the mean placental weight of control & cases are 451,283 and mean weight of baby control & cases are 3033,1986 grams respectively and Rath G, Garg K, & Sood M. [11] in which the mean placental weight of control & cases are 382,351 and mean weight of baby control & cases are 2718, 2404grams

espectively. Therefore, in the present study, the mean placental weights & mean weight of baby are nearer the findings of above authors.

Chakravorty (1967) [12] in his study of PIH found the mean placental weight of 410 grams in mild hypertension and 350 grams in severe hypertension. Mean placental weight in PIH as seen in present study is 410 grams. Therefore, in the present study, the placental weights is similar the finding of above auther. Chakravorty found mean foetal birth weight 2805 grams in the normal term pregnancy, 2724 grams in mild hypertension and 1759 in severe hypertension. In the present study, mean foetal birth weight 2828 grams in the normal term pregnancy, 2323 grams in hypertension. Therefore, in the present study, the mean foetal birth weight is higher than the finding of above author.

The reduction in Placental and foetal weight in PIH as shown by Armitage¹³, Boyd¹⁴, Hamilton and Rowe (1969) [15], chakravorty (1967) [12], Thomson [16] are also confirmed by present study. Sinclair (1948)[17,18], Thomson et al.(1969) [16], Hamilton and Rowe (1969) [15], mukerjee and lal(1983) [19], Vasudeva [20] have shown that there is linear correlation between placental weight and foetal weight.

The Mean, Maximum weight, Minimum weight, Standard Deviation, Regression coefficient were calculated and discussed. T test (two samples) for correlation has been used to find the significance of degree of correlation. Regression analysis has been carried out to find the exact relationship between Placental weight and weight of new born Baby. The linear correlation exists between weight of New born baby and the weight of placenta in Control group & PIH.

Two separate formulae were derived for calculation in control & cases as under:

$$Y = 1205.84 + 3.337948 (X)$$

$$Y = 5.703451 (X) - 19.97768$$

Where X is the weight of Placenta in gms
Y is the weight of New born baby in gms

The result shows that there is Positive Correlation between weight of Placenta and weight of new born baby in control & PIH. Simple linear regression equation so far derived can be

used for estimation of weight. If either of the measurement (Placental weight or Baby weight) is known, the other can be calculated.

ABBREVIATIONS

PIH - Pregnancy induced hypertension

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Conflicts of Interests: None

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