

Original Research Article

Fetoplacental Weight Ratio: Comparative Study in Term Normotensive and Hypertensive Pregnancies

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Abstract: Fetoplacental weight ratio is defined as fetal weight divided by placental weight. This ratio varies according to gestational age and depends on various disorders complicating pregnancy. This study was done in Government Maternity Hospital, Sultan bazaar, Hyderabad on 120 term patients between January 2016 to March 2016. After preliminary examination and investigations, patients were divided into 3 groups: normotensive (Group A), gestational hypertension (Group B), preeclampsia and eclampsia (Group C). Fetal weight and Placental weight was recorded on all these patients and Fetoplacental (F:P) ratio was calculated. This study aims to find out the change in F:P weight ratio in hypertensive disorders of pregnancies. This study concludes that mean weight of both fetus and placenta are both reduced and hence F:P ratio is constant even in hypertensive disorders.

Keywords: Fetal weight, placental weight, Gestational Hypertension, Preeclampsia, Fetoplacental weight ratio

INTRODUCTION

Placenta is a fetomaternal organ which is vital for maintaining pregnancy and promoting normal development of fetus [1, 2]. The fetus is dependent on the placenta for nutritional, respiratory and excretory functions [3]. Appropriate placental growth and development is essential for fetal growth and wellbeing [1]. In the first trimester, placental growth is more rapid than that of the fetus. But by approximately 17 postmenstrual weeks, placental and fetal weights are approximately equal [4]. By term, placental weight is approximately one sixth of fetal weight [4]. At term the placenta weighs 470 grams, is round to oval in shape with 22 cm diameter, and has a central thickness of 2.5 cm [4].

Fetal-placental (F:P) weight ratio is defined as fetal weight divided by placental weight. The ratio is approximately 5.6 ± 0.96 in a study by Lurie *et al* [5]. This ratio increases with gestational age. The growth and development of fetus in utero reflects a balance between fetus, placenta and mother [6]. F:P ratio is often used as an index of placental nutritional efficacy and is related to adverse perinatal outcomes [7]. Placental weight is an indicator of nutritional and environmental problems and is a predictor of birth weight. There is a significant relationship between

placental weight and birth weight, resulting in constant F:P ratio.

One of the hypotheses for preeclampsia is thought to be failure of cytotrophoblastic invasion of spiral arteries and is considered to be morphological basis for decreased placental perfusion [8]. These placental blood flow abnormalities give rise to interference with fetal oxygenation and growth, resulting in IUGR [8]. The magnitude of defect in trophoblastic invasion is thought to correlate with severity of the hypertensive disease [4]. Because of placental ischaemia, placental weight is decreased, depending on severity of hypertensive disorder [6, 7, 9].

MATERIALS AND METHODS

This study was done in Government Maternity Hospital, Sultanbazaar, Hyderabad between January 2016 to March 2016 on 120 patients between 37 -40 weeks delivered vaginally and also by Caesarean section. Gestational age was determined based on LMP, antenatal examination, early ultrasound. A thorough general examination, obstetric examination, routine investigations and ultrasound done. Selection criteria were as follows:

Inclusion criteria

1. Gestation age between 37-40 weeks

2. Singleton pregnancy
3. Rh positive
4. Live fetus

Exclusion criteria

1. Gestation age <37, >40 weeks
2. Multifetal pregnancy
3. Rh negative
4. Medical disorders like chronic hypertension , diabetes ,anaemia , renal disorders
5. Intra uterine fetal death

Patients were grouped according to blood pressure and albuminuria. Normotensive patients were included in Group A (60). Gestational hypertension patients (hypertension without albuminuria) were included in Group B (34). Preeclampsia patients (hypertension with albuminuria) and Eclampsia (associated convulsions) were included in Group C (26). Group B and C patients were evaluated with preeclampsia profile.

Birth weight recorded for all babies at delivery and noted. Placenta with membranes collected, examined and any abnormality was noted. Umbilical cord was cut at site of insertion for standardisation, to avoid errors in weight from different lengths of cord. Membranes were trimmed for standardisation. Placenta washed in running water as it is contaminated with blood and liquor to avoid errors with weight. Placenta is then dried with blotting paper to avoid errors in weight due to water retention. Placenta is then weighed and noted. Feto-placental weight ratio is then calculated.

RESULTS ANDDISCUSSION

Normal growth and survival of fetus depends on appropriate development and function of placenta. Pregnancy complicated by hypertension not only affects the maternal health, but also influences fetal outcome.

A total of 120 cases were studied, out of which 60 cases are normotensive (Group A), 34 cases are gestational hypertension (Group B), 26 cases are preeclampsia and eclampsia (Group C. In this study, among the normotensive cases, 40% are primigravidas, 60% are multiparas, whereas in the hypertensive group, 66.7% are primis, 33.35% are mults. In the present study the Caesarean section rate is 35% in normotensive group, 52.9% in gestational hypertension group, 76.9% in preeclampsia/eclampsia group.

In the present study, the mean fetal weight is 3.014 kg in normotensive group, 2.420 kg in gestational hypertension and 2.164 kg in preeclampsia/eclampsia group. The mean placental weight is 509.12 gm in normotensive, 416.60 in gestational hypertension, 377 gm in preeclampsia/eclampsia. The F:P ratio is 5.92 in normotensive, 5.80 in gestational hypertension, and 5.74 in preeclampsia/eclampsia. In a study by Lurie *et al* the F:P ratio is 5.6+/- 0.96 [5]. In a study by Gugapriya *et al* F:P ratio is 5.35 in normotensive and 6.03 in hypertensives [10]. In a study by Usha nag *et al*, the F:P ratio is 5.94 in normotensive and 6.02 in hypertensive group [11]. The F:P ratio in this study correlates with the F:P ratio in the above mentioned studies.

The mean weight of placenta in hypertensive cases was low as compared to normotensive cases in the present study. The mean birth weight was also low with increasing grades of hypertension compared to normotensive cases, so the F:P weight ratio is not significantly changed in both the groups. This correlates with a study by P Kaur *et al* [6], whereas F:P ratio is higher in hypertensive cases in a study by Raghavendra *et al* [1]. In a study by Bond *et al*, the F:P ratios, if more than 11, the perinatal problems are increased[12].

Table 1: Distribution of groups

	Group A (Normotensive)	Group B (Gestational hypertension)	Group C (Preeclampsia,eclampsia)
Number of patients	60	34	26
%age of patients	50%	28.3%	21.7%

Table 2: Parity

	Group A	Group B	Group C
Primigravida	24	22	18
Multigravida	36	12	8

Table 3: Route of delivery

	Group A	Group B	Group C
Vaginal delivery	33	12	5
Forceps/Ventouse	6	4	1
LSCS	21	18	20

Table 4: F:P weight ratio

	Group A	Group B	Group C
Number of cases	60	34	26
Mean Fetal weight (kg)	3.014	2.420	2.164
Mean Placental weight (gm)	509.12	416.60	377.00
F:P ratio	5.92	5.80	5.74

CONCLUSION

This study concluded that placental weight is an important predictor of birth weight. There is a significant relationship between placental weight and fetal weight, thus resulting in constant fetoplacental weight ratio in both normotensive and hypertensive patients. In hypertensive patients, decreased uteroplacental flow and placental villous lesions will hamper the growth of developing placenta and fetus and results in intrauterine growth retardation and intrauterine death.

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