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A correlate between placental and fetal weight at term in North Coastal Andhra Pradesh.

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***Abstract**: The placenta is one organ which forms before the fetus and is the fore runner of the fetal growth from implantation till parturition[1]. It persists throughout gestation and leaves the uterus only after the delivery of the fetus. Both the placenta and the fetus are associated with one another from formation of the zygote to the birth of the fetus. Hence both are together known as the feto placental unit. They grow together and also both work in tandem under the influence of many extrinsic and intrinsic factors. There definitely should be a correlation between both and could help measuring the growth of one based on the other.*
Different ethnicities and different populations[2] can present with different proportion of weights and this is an attempt to measure the same in the population of South India. The present study was conducted at the Rajiv Gandhi Institute of Medical Sciences, Srikakulam, one of the medical institutes present in the rural areas of North costal Andhra Pradesh, South India.
The data was compiled from 100 placentas collected from the department of Gynecologyfrom July 2017 to April 2018 along with the correlated fetal weight from singleton new born, using standard procedures. The weight of the placenta was averaging around 443gms and fetal weights averaging around 2796gms with the feto placental ratios around 6.21.
BACKGROUND
The correlation between the weight of the placenta at birth[3,4,5] and the weight of the neonate at to gestational age has been studied at the Rajiv Gandhi Institute of Medical Sciences, Srikakulam one of the medical institutes present in the rural areas of North costal Andhra Pradesh, South India.
***Keywords:** Neonatal birth weight, placental weight, feto-placental ratio*

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I. Introduction

Placenta is an organ which provides nutrition to the fetus, removes waste products and provides protection to the fetus. It plays a major role in the growth of the fetus. The proper growth of the placenta is required for adequate growth of the fetus. It is viewed as, the number of grams of placenta that supports the number of grams of fetal growth. The ratio of weight of placenta to the weight of the fetus[7, 8, 9, 10] is known as the feto-placental ratio and is a determinant of fetal growth. The feto-placental weight ratio keeps changing along with the gestational period and abnormally high and low ratios were known to be associated with adverse pregnancy outcomes[17, 18, 20, 22].

The placental weight increases with gestation and gradually decreases as pregnancy advances. Even though the morphometric measurements of the placenta are determinants of the functional efficiency of the placenta, the weight also plays a major determining role in the growth of the fetus[11]. Placental examination[4] immediately after delivery provides valuable information about the fetal development[10,11]. A definite correlation exists between the placental growth and the fetal growth[11, 12] and measuring both at term is likely to provide insight into the developmental aspects of the fetus.

II. Objective

To determine the fetal birth placental ratio[13], fetal-placental weight ratio in normal pregnancies.

III. Materials And Methods

The present study was conducted at the Rajiv Gandhi Institute of Medical Sciences, Srikakulam ,North costal Andhra Pradesh, South India between January 2017 and July 2018 on 100 placentae collected form the labor room from singleton term and near term uncomplicated deliveries along with the necessary data.

All the placentae were collected[3, 4] immediately after delivery with 5cms of the cord after due ligation. It was then washed under running tap water and weighed on a digital weighing scale and the weight recorded with an accuracy of 1gm.

The mothers suffering from medical conditions such as Diabetes, Hypertension, twins, multiple pregnancies etc. were excluded from the study.

PBWR which is calculated as a percentage using the formula PW/BW X100 gives a measure about the placental efficiency whereas the birth weight to placental weight ratio[15] is calculated by dividing the Birth weight by Placental weight and is shown as a ratio(BPR) and has been used to indicates adequacy of fetal nutrition.

IV. Results

Table.1 – Showing the various data.

Gestation in weeks	Wt of fetus in gms	Wt of placenta in gms	PBWR PW/BWX100	F:P ratio
39	1800	298	16.55	6.040
40	1800	335	18.6	5.373
39	2400	347	14.4	6.916
38	2600	347	13.3	7.492
39	2500	384	15.3	6.510
39	2300	384	16.6	5.989
38	2800	389	13.8	7.197
37	2300	389	16.9	5.912
38	2600	395	15.1	6.582
38	2600	395	15.1	6.582
42	1600	404	25.25	3.960
39	2800	404	14.4	6.930
37	2500	406	16.2	6.157
38	2700	406	15.0	6.650
38	2700	409	15.1	6.601
37	2600	409	15.7	6.356
38	3000	412	13.7	6.310
39	2800	412	14.7	6.976
39	2900	413	14.2	7.021
39	2800	413	14.7	6.779
38	2700	413	15.2	6.537
37	2600	420	16.1	6.190
39	2900	420	14.4	6.904
39	2900	420	14.4	6.904
37	2500	420	16.8	5.952
38	2800	420	15.0	6.666
39	2900	420	14.4	6.904
38	2500	422	16.8	5.924
38	3100	422	13.6	7.345
39	2700	422	15.6	6.398
42	2400	422	17.58	5.687
38	2900	427	14.7	6.791
38	2900	427	14.7	6.791
41	2500	430	17.2	5.813
40	2400	430	17.9	5.581
38	2800	430	15.3	6.511
37	2800	430	15.3	6.511
39	3000	435	14.5	6.896
38	2900	435	15.0	6.666
38	2700	435	16.1	6.206
38	2700	442	16.3	6.108
39	2800	442	15.7	6.334
39	3100	442	14.2	7.013
40	2400	451	18.7	5.321
38	3000	451	15.0	6.651
38	2700	451	16.7	5.986
39	3100	451	14.5	6.873
41	2400	451	18.7	5.321
38	2800	451	16.1	6.208
39	2900	451	15.5	6.430
39	2900	451	15.5	6.430
40	2600	451	17.3	5.764
37	3000	454	15.1	6.607
40	2600	454	17.4	5.726
39	2700	454	16.8	5.947

38	2700	454	16.8	5.947
39	3100	454	14.6	6.828
39	2900	454	15.6	6.387
38	2700	454	16.8	5.947
39	3500	459	13.1	7.658
40	2600	459	17.6	5..664
37	3000	459	15.3	6.535
38	3000	459	15.3	6.535
39	2900	459	15.8	6.318
40	2600	459	17.6	5.664
40	2600	459	17.6	5.664
40	2600	459	17.6	5.664
37	3000	467	15.5	6.423
41	2500	467	18.6	5.353
40	2700	467	17.29	5.781
39	3200	467	14.5	6.852
38	3500	472	13.4	7.415
40	2700	472	17.4	5.720
40	3500	472	13.4	7.415
39	3200	472	14.75	6.779
38	3000	472	15.7	6.355
42	2200	487	22.1	4.517
40	2700	487	18.03	5.544
39	3100	487	15.7	6.365
39	2900	487	16.7	5.954
40	2700	487	18.03	5.544
40	2900	492	16.9	5.894
41	2800	492	17.5	5.691
41	2600	492	18.92	5.284
39	3100	492	15.8	6.300
39	3500	495	14.1	7.070
39	3400	495	14.5	6.868
41	2800	495	17.6	5.656
38	3000	495	16.5	6.060
39	3300	498	15.0	6.626
39	3100	498	16.0	6.224
38	3200	498	15.5	6.425
40	2900	498	17.1	5.823
39	3300	501	15.1	6.586
42	2500	501	20.0	4.990
39	3500	501	14.3	6.986
38	2700	505	18.7	5.389
39	3500	505	14.4	6.986
41	2700	518	19.9	5.212
39	3000	518	17.2	5.791
3896	279600	44340	1608	621.254

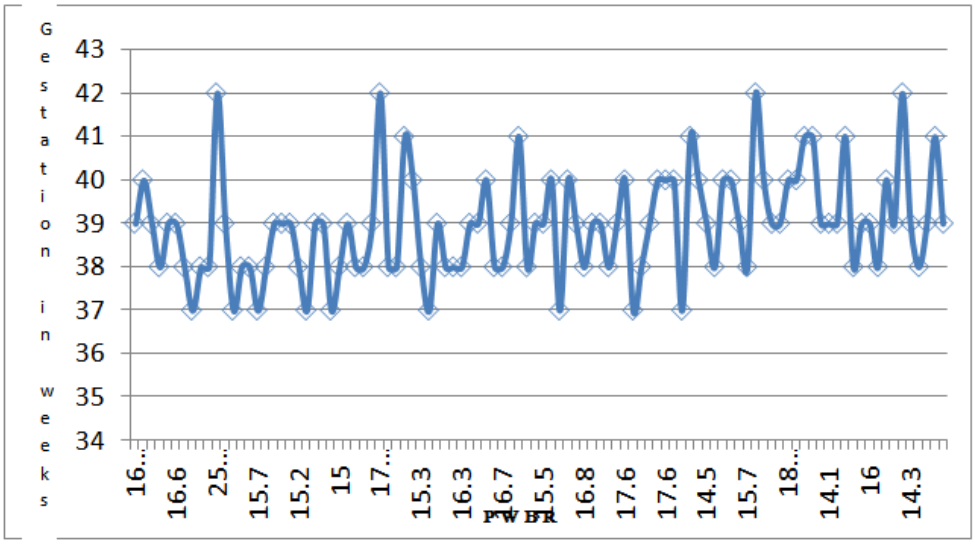

Figure.1.Showing the relation between the Gestational period and PWBR.

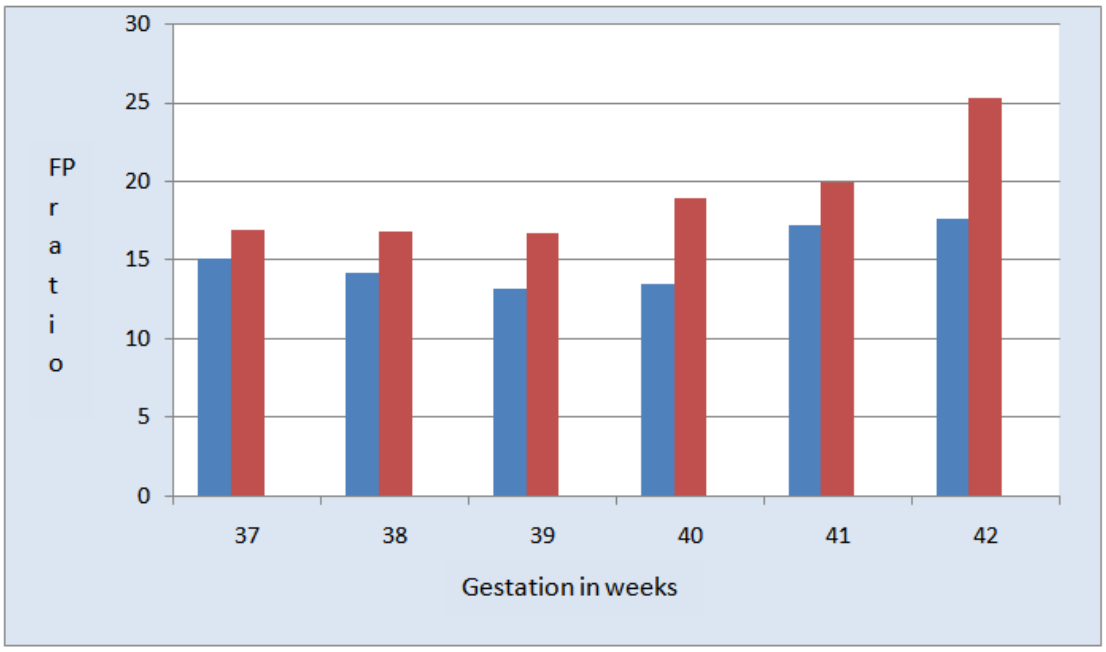

Figure.2. Showing the relationship between Gestational age and FP ratio.

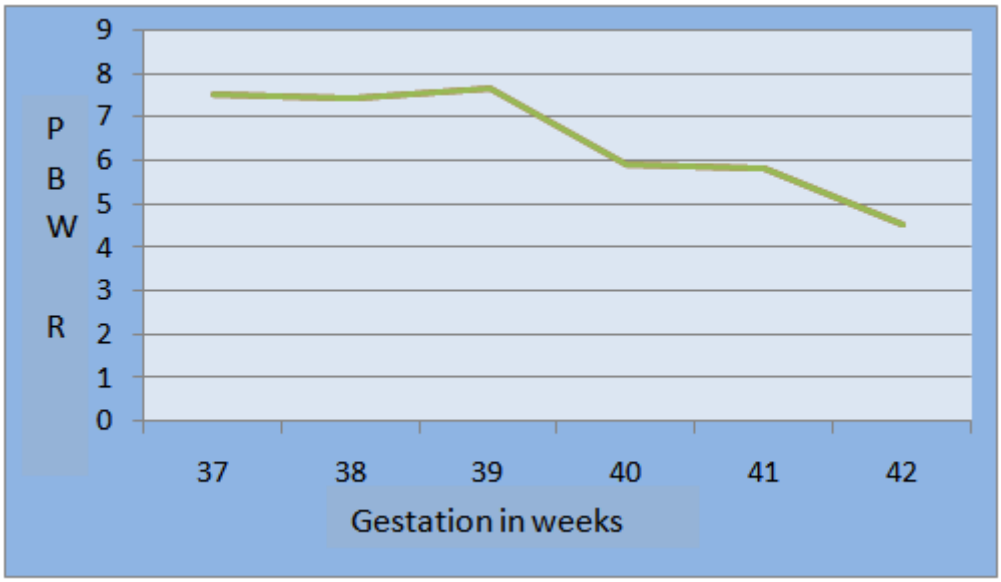

Fig.3. Showing the PBWR with increase in gestational period.

The mean placental weight[16, 17]in the present study was 443gms with range from 298gms to 518gms and the birth weight of the neonate[16] ranged from 1800gms to 3500gms with the mean weight 2796gms.Mean fetal-placental birth weight ratio[14] was 6.21 with a range of 3.96-7.65.The age of the patient was between 18 – 28yrs and the gestational age[14] was between 37 weeks to 42 weeks.

V. Discussion

In addition to the various functions performed, the basic function of the placenta is to provide nutrition for regulated growth of the fetus. To achieve this objective, the placenta grows proportionately in tandem with the fetus. The growth of these two along with proper utero-placental function is necessary for optimal fetal growth. Weight is one of the parameters for assessing the growth[21]. The mean placental weight of 443 gms which has been seen in this study is lower to the values of the other parts of the world which could be due to ethnic variations.

The mean birth weight[19,20] of 2796 gms recorded could be due to maternal malnutrition and other associated factors.

The mean PBWR of 16.8% even though comparatively low, shows the positive correlation between the placental weight and neonatal birth weight has been depicted in previous studies.

An abnormally high and low PBWR would indicate an abnormal placenta with impaired function.High PWBR of more than 18 are associated with prolonged gestation periods[18].FP ratio[14] of less than 5.3 were associated with low birth weight babies[17].The ratio of the placenta and fetal weights at term is seen to decrease as the gestational age advanced indicating that prolongation of pregnancy at term may adversely affect the fetus.

VI. Conclusion

The placental weights and the fetal weights were taken from the Population of North Costal Andhra and the feto-placental weights calculated. Impressions showed a definite correlate between the fetal and the placental weight[17, 18]. There was a proportional increase in fetal weight when compared to the placental weight up to the age of 39 weeks and declined from then onwards to term.

The mean feto-placental weight ratio[16, 17, 18] in the present study was 6.21. It was found to change with gestational age as the placenta matured. Abnormally high and low ratios were seen to be associated with high risk of perinatal mortality[12, 17]. Thus feto placental ratio was seen to act as a direct indicator to the fetal growth[13].

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