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Research Article

The Correlation between Placental Thickness and Fetal Age among the Pregnants in Sudan

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Abstract: The placenta is a fetal organ which provides the physiological link between pregnant woman and her fetus. The placenta is highly vascularized organ and its main functions are exchange of metabolic and gaseous products between maternal and fetal blood stream and production of hormones. The aim of this study was to investigate placenta thickness as parameter for estimating gestational age of fetus in normal singleton pregnancies among Sudanese women. This study was carried out at Khartoum state Sudan, in the period from 2009-2010. 110 cases of pregnant women in third trimester had been selected randomly by the technique of non probability sampling. The data was collected by designed clinical data collection sheets which containing all the variables of the study (Placenta thickness, FL, BPD, AC, Placenta grading). There were significant correlations between the placental thickness, Femur length and Bi-parietal diameter in which correlation coefficients are 0.85 and 0.80 respectively. The placental thickness is considered one of the parameters for estimating the GA in the third trimester.
Keywords: Ultrasound, Placenta, Third trimester, Sudan

INTRODUCTION

The placenta is a fetal organ which provides the physiological link between pregnant woman and the fetus. The placenta is highly vascularized organ and its main functions are to exchange of metabolic , gaseous products between maternal and fetal blood stream and production of hormones [1].

The placenta develops from the chorionic villi at the implantation site at about the 5th week of gestation and by the 9th or 10th weeks of the diffuse granular, echotexture of the placenta is clearly apparent at sonography [2]

It is usually 2-4 cm thick and weighs about 600 grams. It is technically defined as the apposition or fusion of fetal organs to maternal tissue for the purpose of physiologic exchange [3].

The placenta thickness appears to be promising parameter for estimation of gestation of intra uterine fetus age. This is due to increase in placental thickness with gestational age [3].

Several studies have reported an increase the placenta thickness with gestational age. The Studies reported by Mital et al. and Anapama et al. have confirmed the placenta thickness as an indication of gestational age of fetus [7, 8].

It was observed that the placenta thickness gradually increased from 15 mm at 11 weeks of gestation to 37.5 mm at 39 weeks. From the 22nd week to the 35th week of gestation the placental thickness coincide almost exactly with the gestational age in weeks [4].

Considering the new technology and advancement in imaging process and doppler ultrasound modalities, here is a first attempt in Sudan as far as authors know to study the placental sonographic appearance and measurement and intrauterine growth. Presently the most effective way to date pregnancy is by use of ultrasound. The aim of this study was to investigate the placenta thickness as parameter for estimating of gestational age of fetus in normal singleton pregnancies among Sudanese women.

MATERIALS AND METHODS

This is a prosepective study used clinical scan ultrasound investigations for pregnant women in 3rd trimester. It was carried out in Khrtoum state Sudan, from 2009-2010. 110 cases of pregnant women in 3rd trimester had been selected randomly by the technique of non probability sampling. The data was collected by designed clinical data collection sheets which containing all the variables of required for this type of

study (Placenta thickness, Femur length (FL), biparietal diameter (BPD), abdominal circumference (AC), Placenta grading). The scanning was performed firstly by the researcher, and secondly confirmed by in house-sonologist in Omdrmman Maternity hospital.

The instrumentation and the technique

The sonography was carried out using Alocka ultrasound machine with 3.5MHz curvelinear transducer. Gestational ages was estimated by BPD, FL and AC.(specification of gestational age). In addition to that the composite average recorded while placental thickness was measured at the point of insertion of the umbilical cord.

While the patient in the supine position using trans abdominal approach. The data was analyzed by computer soft ware program SPSS.

RESULTS AND DISCUSSION

110 pregnant women in 3rd trimester scanned, using transabdominal scanning (Table 1). They were scanned to identify if there is a correlation between the placenta thickness and the estimation of gestational age.

The number of birth among 110 patients was classified as four groups (Table 2). Group 1: the patients who had only one parity (P1) 26 patients, 23.6%. Group 2: two parity (P2) 19 patients, 17.2%. Group 3: three parity (P3) 28 patients, 25.5%, Group 4: ≥ 4 and < 9 parity (P4-P9) 37 patients, 33.7%.

Table 3 showed the location of placenta 49 patients had anterior placenta 44.5%. 43 patients had fundal placenta 39.1%. 18 patients had posterior placenta 16.4%.

Table 4 showed the comparison between the BPD& FL. It was confirmed that the FL is more accurate than the BPD in estimation the GA with P-value 0.00 which was highly significant.

Table 5 showed there was no significant different between the placental thickness and GA with P-value 0.985 which was no significance.

There was a strong correlation between the placental thickness and FL (r = 0.85). So that the placental thickness increases, as the FL increases (Fig. 1).

The study confirmed that there was a significant correlation between the placental thickness and BPD (r = 0.80) . So that the placental thickness increases, as the BPD increases (Fig. 2 and Fig. 6).

The regression value between placenta thickness and AC is 0.07 which mean that the placental thickness is differ than the AC.

The regression value between placental thickness and GA is 0.96 which mean that the placental thickness is not different and a good parameter for estimating the GA.

Finally there was no significant different between the placenta thickness and GA with P-value 0.985 which was no significance.

The present study correlate with Christopher et al., they revealed that the maximum mean placenta thickness of 45.1 ± 6.4mm was recorded at 39 weeks gestation. There was a fairly linear increase in mean placental thickness with gestation age. There was significant and strong positive correlation between placental thickness and gestational age [5]. Present study correlates with the study of Karthikeyan et al. [6].

Mital et al. also found an increasing trend in the values of mean placenta thickness (in mm) with increase in gestational age (in weeks) and the placenta thickness (in mm) coincides almost exactly with the gestational age in weeks [7], so more studies is required to establish this new parameter in calculation the gestational age or confirm the fetus age using this parameter.

Anupama et al. reported similar correlations between placental thickness and gestational age [8].

Table 1: The age groups among sample

Age/Years	Total women	Percent %
15-25	23	21%
26-35	71	64.5%
36-45	16	14.5%
Total	110	100%

Table 2: The distribution of number of birth

Parity	Total pregnancy women	Percentage
P1	26	23.6%
P2	19	17.2%
P3	28	25.5%
P4-P9	37	33.7%
Total	110	100%

Table 3: The distribution of the location of placenta

Location	Number of women	Percent %
Anterior	49	44.5%
Fundal	43	39.1%
Posterior	18	16.4%
Total	110	100%

Table 4: Descriptive Statistic for BPD and FL

Group	Mean(mm)	Std. Deviation	$Mean \pm SD$	P-value
FL	67.02	7.13	67.02 ± 7.13	.000
BPD	85.46	8.29	85.46 ± 8.29	

Table 5: Descriptive Statistic for Placenta Thickness & GA

Group	Mean	Std. Deviation	$Mean \pm SD$	P-value
GA (w)	34.25	3.86	34.25 ± 3.86	0.985
Thickness(mm)	34.24	3.86	34.25 ± 3.86	

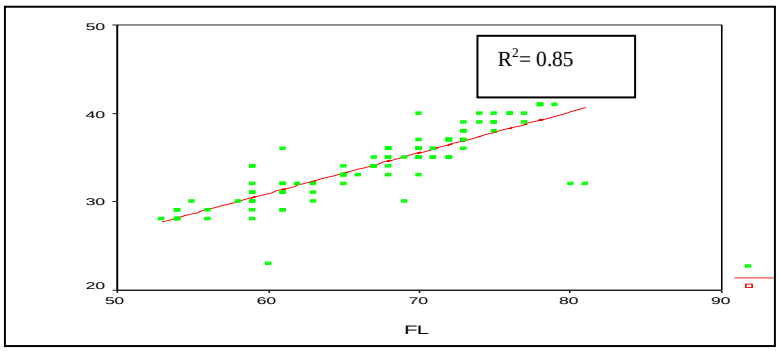


Fig. 1: A Scatter plot of the correlation between Placenta Thickness and FL

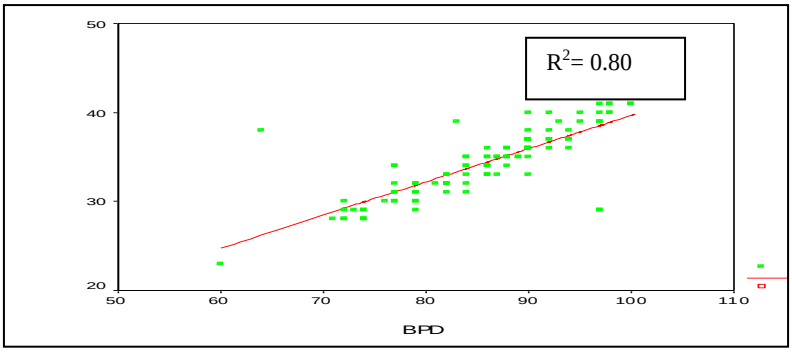
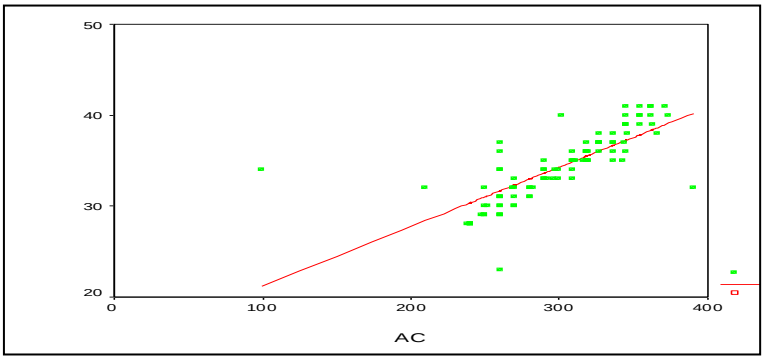
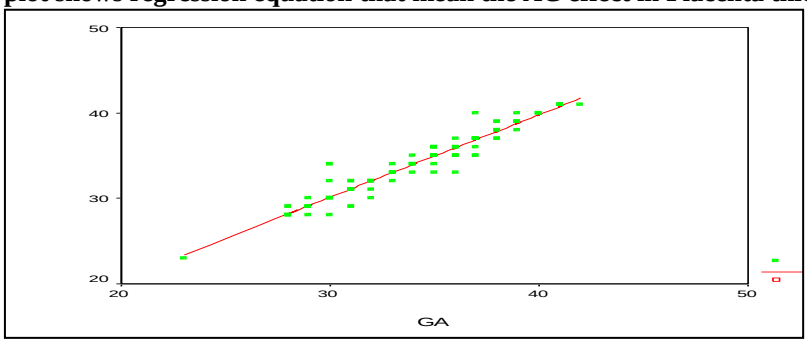


Fig. 2: A Scatter plot shows correlation (r = 0.80) between Placenta Thickness and BPD



(Thickness=14.61+0.07AC)

Fig. 3: A Scatter plot shows regression equation that mean the AC effect in Placenta thickness with (0.07)



(Thickness=1.24+0.96AG)

Fig. 4: A Scatter plot shows regression equation that mean the AG effect in thickness with (0.96)

CONCLUSION AND RECOMMENDATIONS

There was significant correlation between placenta thickness and progressive in gestational age in the third trimester. More studies are required and table establishment is needed now to be programmed in the ultrasound scanner instrumentations based on this new parameter for different nationalities.

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