Journal of Applied Medical Sciences, vol. 3, no. 1, 2014, 31-37
ISSN: 2241-2328 (print version), 2241-2336 (online)
Scienpress Ltd, 2014

Placenta Thickness Measurements during Gestational Age Progress

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Abstract

The placenta thickness has a relationship with fetal growth, since it is the only one way of his feeding. The objective of the study was to compare the fetal age progress and the placenta thickness in Saudi pregnant women. In a cross sectional descriptive study, one thousand pregnant women with mean age of 29 years old, were examined by ultrasound imaging. Inclusion criteria was Saudi pregnant women of normal pregnancy, exclusion criteria included fetal or maternal disorders. 3.5MHz, 5MHz convex probes and 7-10 MHz linear probe were used to examine the participants and to get the required measurements of placenta thickness and gestational age (GA) through measuring the biparietal diameter (BPD), abdominal circumference (AC) and femoral length (FL). In the (12^{th} -25^{th}), (26^{th} -36^{th}) and (37^{th} -40^{th}) Weeks the GA were; 18.9 ± 4.2, 33.2 ± 2.9 and 38.1± 0.89 respectively. While the placenta thickness measurements were; 23.1mm ± 5.5, 35.0 mm ± 6.2 and 39.6 mm ± 7.0 respectively for the same periods. The highest frequency of placenta grading was Grade2 which is (36.0% of 1000). The highest frequency of placental location was Anterior Fundal which is (22.1% of 1000). There was strong statistical association between the increasing of placenta thickness and the GA, P = 0.000. The placenta thickness measurements can be carried on consideration with the other GA measurements parameters.

Keywords: Placenta, Gestational Age, Ultrasound

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Article Info: *Received :* December 11, 2013. *Revised :* December 29, 2013.
Published online : March 15 , 2014

1 Introduction

Evaluation of the placenta generally should be part of routine obstetrical ultrasound study in 2nd and 3rd trimester as indicated in American Institute of Ultrasound in Medicine, Antepartum Obstetrical Ultrasound Examination Guidelines (The placental appearance, location, , and its internal cervical os relationship should be reported)[1].

Placental thickness and fetal wellbeing has closely relation and may be a predictor in prenatal outcome.(Spirt BA, et al.[2])

The most commonly sonographic evaluation of gestational age routine composite dating calculations which are computer-assisted analysis during 2nd& 3rd trimesters were Fetal Head (BPD) Biparietal Diameter & (HC) Head Circumference, Fetal body (AC) Abdominal Circumference, & Extremities (FL) Femur Length. (Mongelli M et al.[3]).

The placenta plays a very important role in the child birth process. A placenta of greater than 4 cm in thickness has been regarded as abnormal.(Anna J. Lee et al. [4]). This study objected to compare the fetal age progress and the placenta thickness in Saudi pregnant women.

2 Preliminary Notes

GA	Gestational age
BPD	Biparietal diameter
FL	Femoral length
AC	Abdominal circumference
HC	Head circumference

3 Materials & Methods:

3.1 Study Design & Population

In a cross sectional prospective descriptive study 1000 Saudi pregnant women, were examined at King Abdul Aziz Specialized hospital- Riyadh, KSA. Inclusion criteria was Saudi pregnant women of normal pregnancy, exclusion criteria included fetal or maternal abnormality.

3.2 Ultrasound Technique & Measurements

Ultrasound machine with 3.5MHz, 5MHz TVS, and 7-10 MHz linear probes were used, to get fetal age estimation in weeks by measuring (BPD, FL& AC) (Figure1). Also the placental center thickness measurements in millimeters, one caliper placed at the amniochorionic surface and the second caliper placed at the basal surface perpendicular to each others. All participants examined in supine position according to the protocol of obstetric U/S (Sandra L. Hangen, [5])

3.3 Data Collection

To collect the data, Gestational ages were divided into three Categories and correlated separately with placental thickness; the first category (12^{th} -25^{th}) weeks, the second category (26^{th} -36^{th}) weeks; and the third category (37^{th}-40^{th}) weeks.

3.4 Statistical Analysis

The collected data was analyzed through SPSS computer program. Chi-Square Tests were applied to achieve the statistical values of relation between placenta thickness and the GA.

4 Main Results

Thousand pregnant women were examined using ultrasound, their ages (16 to 45), the mean was 29 years old. Gestational ages(GA) of their fetuses were from(12^{th} -40^{th}) weeks.

21.9% of the participants were primagravida (PG). Regarding the placenta grading, the highest frequency was Grade2 which is (36.0% of 1000). The highest frequency of placental location was Anterior Fundal which is (22.1% of 1000).

Figures (2) through (7) summarize the comparison between the GA and the placenta thickness (PT), in (12^{th} -25^{th}) Weeks for 123 participants , the mean GA was 18.9 ± 4.2 and The mean placental thickness was 23.1mm ± 5.5. In (26^{th} -36^{th}) weeks for 519 participants, the mean GA was 33.2 ± 2.9 and The mean placental thickness was 35.0 mm ± 6.2. In (37^{th} -40^{th}) weeks for 358 participants, the mean GA was 38.1± 0.89 and the mean placental thickness was 39.6 mm ± 7.0.

Chi – Square tests showed strong statistical association between the increasing of placenta thickness and the GA, P = 0.000 (Table:1).

Table 1: Chi- Square test for the association between the increasing of placenta thickness and the GA in 1000 cases.

Chi-Square tests	Value	Asymp.Sig (2-sided)
Pearson Chi-Square	13030.452[a]	.000
Likelihood Ratio	3461.428	1.000
Linear –by-Linear Association	449.242	.000

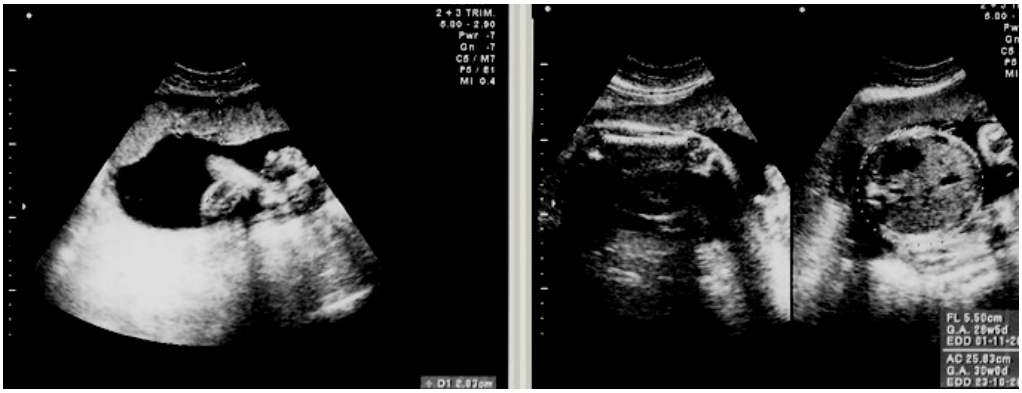

Figure 1: Shows side of measuring the GA for participants.

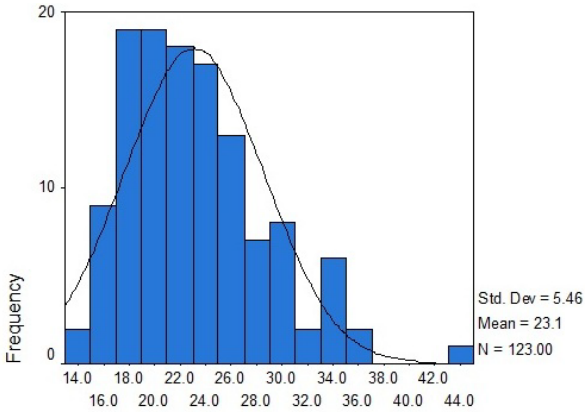

Figure 2: Placenta thicknesses for 123 participants.

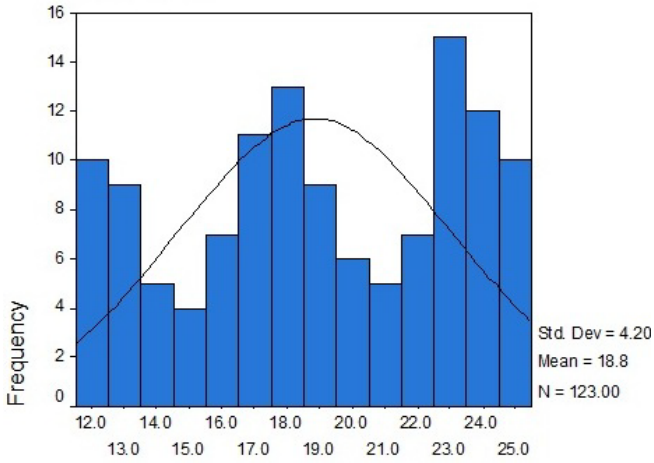

Figure 3: Mean of GA for 123 participants.

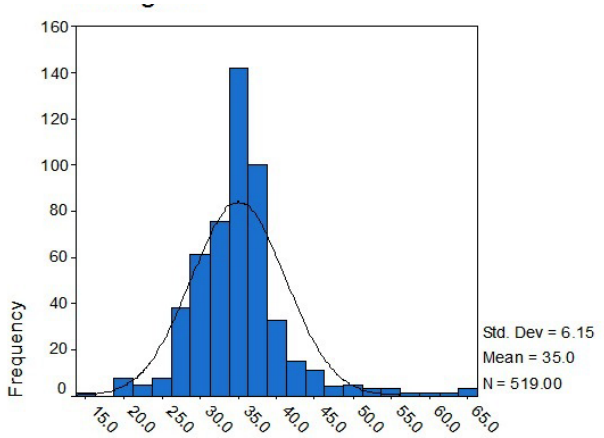

Figure 4: Placenta thicknesses for 519 participants.

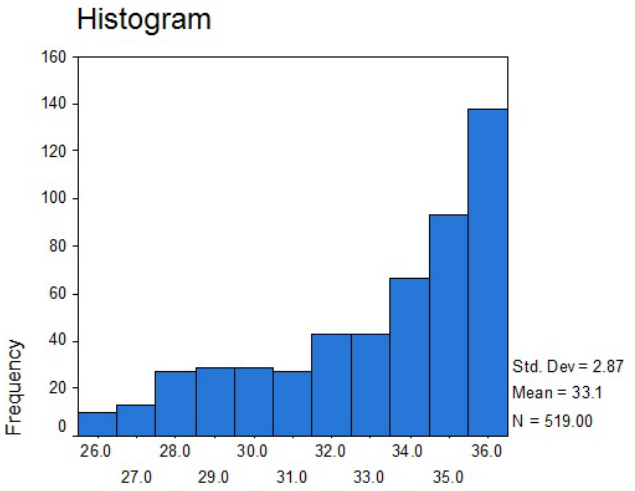

Figure 5: Mean of GA for 519 participants.

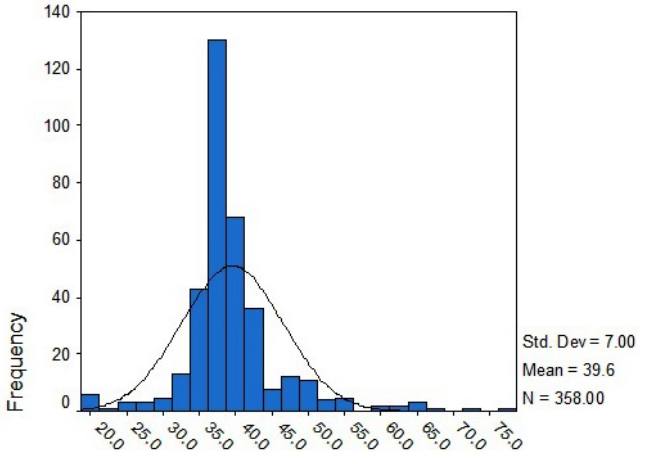

Figure 6: Placenta thicknesses for 358 participants.

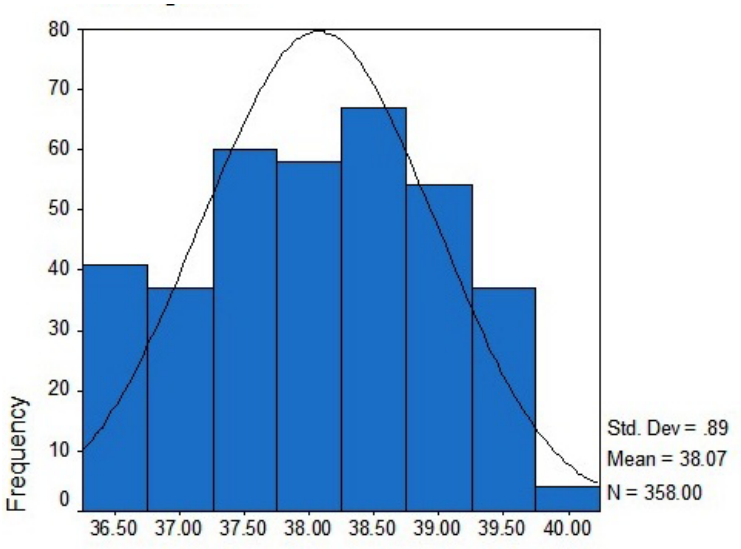

Figure 7: Mean of GA for 358 participants.

5 Discussion

The placenta is the important influent organ on fetal birth weight, and it is thought that abnormalities of placental growth may precede abnormalities in fetal growth.

The result of this study showed that the placenta thickness is increase with the GA progress(Figueres2 through7), this is totally agreed with Anupama Jain et al.[6] who suggested that the rate of average placental thickness increases with progress of gestation. Also the study matched with (T Karthikeyan et al.[7]) results, who showed that there was a strong positive correlation between PT and GA, although their study sample was small(211) participants and this current study was 1000 participants.

Previous study (Ohagwu et al.[8]) showed that the maximum mean placental thickness of 45.09 ± 6.37 mm was recorded at the 39 week of gestation, this is exceed the current study results which suggested that the maximum mean placental thickness in the group (37^{th} -40^{th}) weeks was 39.6 ± 7.0 mm (Figure6).

The study suggested that there is strong statistical association between the increasing of placenta thickness and the GA, P = 0.000.

6 Conclusion

The placenta thickness measurements can be carried on consideration with the other GA measurements parameters, in pregnancy follow up and sonographic assessments.

ACKNOWLEDGEMENTS: The researchers wish to send their gratitude to King Abdul Aziz specialty hospital in Taif for the co-operation and facilitations for conducting this study. Special thanks were extended to the deanship of scientific research at King Saud Unviversity.

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