A Comparative Study of Gestational Age by L.M.P and Foetal Parameters Using Ultrasound

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Abstract: *Back Ground-. Rapid and accurate determination of gestational age (GA) may be vital to identifyind the expected date of delivery and also in treating the critically ill pregnant patient and improve obstetric care through allowing the optimal timing is necessary.In this study an attempt has been made to know the correlation of ultra sound parameters with LMP. OBJECTIVES-The aim of the study is to correlate Gestational age by Last Menstrual period and Gestational age by fetal parameters like Biparietal Diameter, Head circumference, Abdominal circumference and Femur Length.and To find out which parameter is most positively correlates with Gestational age. MATERIALS AND METHODS- All the pregnant woman of 2nd and 3 trimester of pregnancy attending the antenatal clinic was registered and included in the study. Ultra sonogram to all the registered pregnant was done by sonologist and biparietal diameter, head circumference,femur length and abdominal circumference recorded. RESULTS- Among all the 4 parameters femur length found to be most reliable parameter in estimating gestational age in 2nd and 3rd trimesters. CONCLUSION: FL observed in present study showed a high degree of positive correlation ship with GA.*
Key Words: LMP,GA,BPD,AC,HC,FL

Date of Submission: 03-05-2018   Date of acceptance: 18-05-2018

I. Introduction

Gestational age is the period of time between conception and birth.duri ng this time the baby grows in mothers womb.Gestational age is related to the fetus growth and cognitive development and physical development.Gestational age is important in determining the effect of toxins and infections over the fetus and also in planning the medical treatment for the same.Gestational age is measured by the days that have passed from the mothers first day of last menstrual period.this method has inaccuracies because of the ovulation dates.Gestational age of 7-8 weeks-vital organs and bones and cartilage are formed 9-13 weeks-genitalia are formed.21-23 weeks, eyes develop.The duration of gestation and weight of the fetus has direct relationship . any deviation from the weight gain may be associated with maternal malnutrition,maternal disease,fetal infections(CMV,RUBELLA),genetic abnormalities,fetal congenital malformations.Gestational age estimation is also very important for Medical termination of pregnancy.Ultrasound is one of the best tools for estimation of gestational age[1]. The best time to estimate Gestational age by ultrasound is 8-18 weeks.estimation of Gestational age by ultrasound is done by Biparietal diameter[2], Head circumference,Abdominal circumference,Femur length. Rapid and accurate determination of gestational age (GA) may be vital to the appropriate care of the critically ill pregnant patient and improve obstetric care through allowing the optimal timing of necessary INTERVENTIONS and the avoidance of unnecessary ones. Ultrasound scans are considered to be the most cost-effective, accurate and safe methods for measurement of various fetal parts in pregnant womb. AIMS AND OBJECTIVES-1.The aim of the study is to correlate Gestational age by Last Menstrual period and Gestational age by fetal parameters like Biparietal Diameter, Head circumference, Abdominal circumference and Femur Length.and To find out which parameter is most positively correlates with Gestational age.

II. Materials And Methods

Study was conducted with the help of sonologist in tirupati. Cross sectional study design was used. There are 1241 pregnant women registered during the period of 9 months period of study. Written consent was taken from all the pregnant women. College ethical committee approval was taken .All the pregnant woman of 2nd and 3 trimester of pregnancy attending the antenatal clinic was registered and included in the study. Only

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women with single live fetus were included in this study. Women who participated in the study were selected on following criteria: Regular menstrual cycles, known date of last menstrual period and previous live normal neonates in multipara. Women with hypertension ,diabetes mellitus, oligo hydromnias, multiple pregnancies and poly hydromnios were excluded in this study. Gestational age calculated with the date of last menstrual period. Ultra sonogram was done by sinologist and biparietal diameter, head circumference,femur length and abdominal circumference recorded. Gestational age was calculated with and biparietal diameter, head circumference,femur length and abdominal circumference . gestational age with last menstrual period and gestational age with biparietal diameter, head circumference,femur length and abdominal circumference were compared statistically with pearson correlation coefficient .

III. Results:

the study was conducted in 1241 pregnant women who were attending antenatal clinic and identified that 738 women were with 2nd trimester (mean age of mother was 23.6 years) and 3rd trimester were 503 women(mean age of mother was 23.9 years). FIG-1 shows that comparision between gestational age by last menstrual period and gestational age by biparietal diameter fetal mean BPD showed linear increase from 13 to 36 weeks and statistically significant correlation was found between GA and BPD mean BPD showed increase of 2.36 cm in 13-20 weeks, 2.16 cm between 20 and 27 weeks and only 1.70 cm from 27 to 34 weeks. Average growth rate of BPD was found to be 0.31 cm/week from 13 to 28 weeks which then later reduced to 0.23 cm/week from 28 to 36 weeks of gestation. Bi-Parietal diameter (BPD): It was found that between GA of 16-30 weeks BPD was a good indicator of maturity.In the later period of gestation (30-40 weeks), the accuracy of predicting GA by BPD decreases (4-5 mm difference). The maximum error in predicting GA was 4.1 weeks with a mean error of 0.8 weeks. Scatter graph was plotted between BPD and GA, and their correlation was calculated. The overall correlation coeffi cient between the two was found to be equal to 0.8620[3,4].
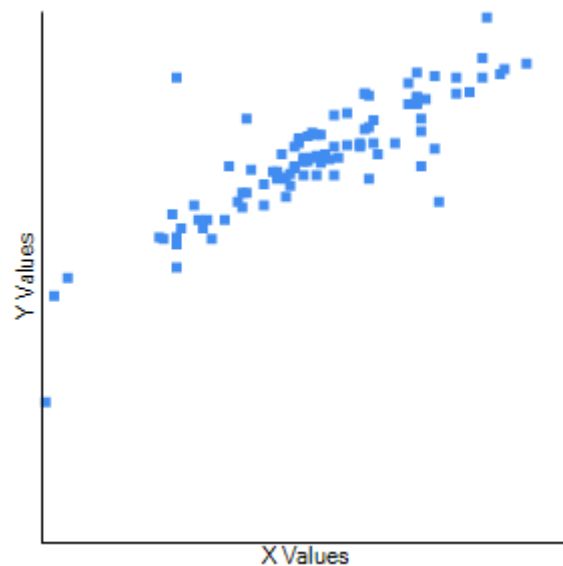
Fig-1- Gestational Age With Lmp Vs Gestational Age With Bpd
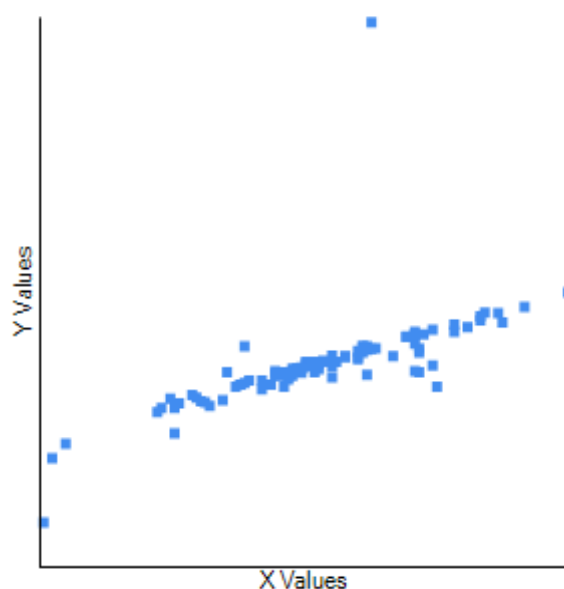
x is gestational age with lmp
Y is gestational age with BPD

FIG-2-Shows the correlation between gestational age by lmp and gestational age with head circumference. • HC. With GA between 16 and 30 weeks, HC was also found to be a good predictor age. Beyond 30 weeks on an average (5-6 mm difference was found between standard and present study data). It was a good parameter when BPD was diffi cult to detect in cases where the head was in transverse lie or dolichocephaly. The scattered graph was plotted between HC and GA, and their correlation was calculated. Coeffi cient of correlation was found to be equal to 0.8632 indicating it to be a good parameter for assessing GA[5]. The maximum error in predicting GA was 3.5 weeks with a mean error of 0.93 weeks.

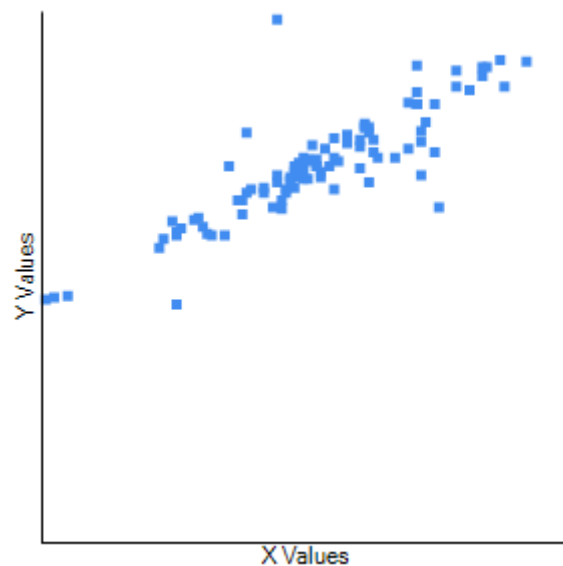**Fig-2-** Gestational Age With Lmp Vs Gestational Age With Hc

X is the gestational age with LMP
Y is the gestational age with HC

FIG-3 Shows the correlation between gestational age by lmp and gestational age with abdominal circumference.
• AC: It was found to be a good predicator of GA in early second trimester, however, in late second trimester and third trimester was found to be an unreliable indictor with maximum error in predicting GA up to 5 weeks and mean error 1.62 week. Nonetheless, it can be used as a predictor of GA in the case in which BPD is technically impossible or in cases in which molding of head can signifi cantly alter the accuracy of BPD[6],[7]. Coeffi cient of correlation was found to be equal to 0.8553.

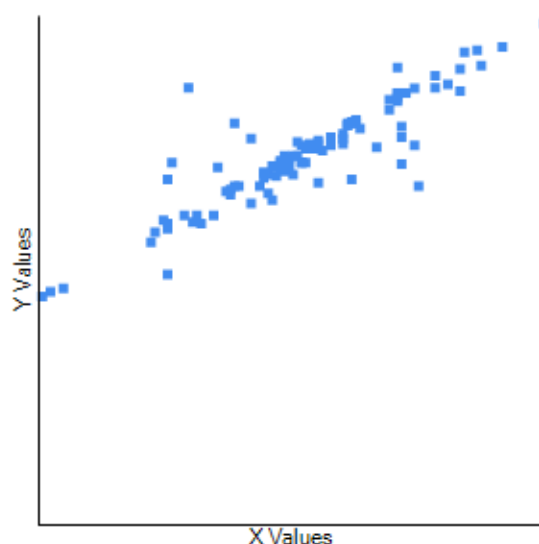**Fig-3-** Gestational Age With Lmp Vs Gestational Age With Ac

X is the gestational age with LMP
Y is the gestational age with AC

FIG-4 Shows the correlation between gestational age with lmp and gestational age by femur length. • FL. Beyond 32 weeks, the FL was 2-3 mm less than standard value. The maximum error in predicting menstrual age was found to be 3 weeks and mean error 0.6 weeks. A highly signifi cant coeffi cient of correlation (0.8874) between FL[8] and GA was observed indicating it to be a reliable predictor[9].

Fig-4- Gestational Age With Lmp Vs Gestational Age With Fl

X is the gestational age with LMP
Y is the gestational age with FL

IV. Discussion:

In present study 1241 pregnant women who were attending antenatal clinic and identified that 738 women were with 2nd trimester (mean age of mother was 23.6 years) and 3rd trimester were 503 women(mean age of mother was 23.9 years)registered. ultrasound done for all the pregnant women and biparietal diameter, head circumference.abdominal circumference and femur length noted. Pearson correlation was done in between gestational age by LMP and gestational age by BPD IN 2ND AND 3RD trimesters with r=0.8620, indicating a positive correlation signifying that BPD can be used as preferable parameter in 2nd trimester for the estimation of GA . Pearson correlation was done in between gestational age by LMP and gestational age by HC 2ND AND 3RD trimesters with r=0.8632, indicating a positive correlation signifying that HC can be used as preferable parameter in 2nd trimester and 3rd trimesters . Pearson correlation was done between gestational age by LMP and gestational age by FL IN 2ND AND 3RD trimesters with r=0.8874, indicating a positive correlation signifying that FLcan be used as preferable parameter in 2 nd trimester and 3rd trimeters. Pearson correlation was done and between gestational age by LMP and gestational age by AC IN 2ND AND 3RD trimesters with r=0.8553, indicating a positive correlation signifying that AC can be used as preferable parameter in 2 nd trimester. Among all the 4 parameters femur length found to be most reliable parameter in estimating gestational age in 2nd and 3rd trimesters[11,12,13].

In the present study positive correlation was observed between gestational age by LMP and gestational age with BPD (r=0.8620) which is in agreement with the study Relation of BPD with gestational age in Bangladeshi fetus by Moslem F, Latifa S, Iffatara B, Shamsuddin AK, Nasreen M, Momen A, et al[3]. . Ultrasound assessment of fetal BPD during normal pregnancy in Bangladeshi women and review of literatures studied by Bala KG[4] is in accordance with the present study. Frank P. Hadlock[5] has extensively worked on the fetal head circumference in relation to menstrual age which were in correlation with the present study. Researchers SABRINA Q [6]. RASHID[7] have studied the relationship of gestational age with abdominal circumference results were similar with the present study. Gestational age with femur length correlated with the gestational age by LMP . positive correlation was observed .similar results were given by Honarvar M, Allahyari M[9] and also by Kovac CM, Brown JA, Apodaca CC, Napolitano PG, Pierce B, Patience T[13].

Limitations: The study population is middle income and also poor socioeconomic status.high income group attend at corporate hospitals. The study limited to middle income and poor income groups only.

V. Conclusion-

The coeffi cient of correlation of BPD (r = 0.8620), FL (r = 0.8874), HC(r = 0.8632), AC (r = 0.8553), and FL observed in present study showed a high degree of positive correlation ship with GA. Hence FL could be reliable parameter for estimation of gestational age.

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