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A STUDY ON SONOLOGICAL FETAL BIOMETRY AMONG SECOND AND THIRD TRIMESTER PREGNANT MOTHER

Radio-Diagnosis

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ABSTRACT

Fetal biometry is a methodology devoted to measure several parts of fetal anatomy and their growth. Monitoring of intra-uterine growth has remained a very important fetal surveillance tool in the care of pregnant mother. Growth monitoring helps to pick out early cases of abnormal intra-uterine growth pattern. Aims and Objectives: To estimate gestational age using fetal sonological biometry and Hadlock's International standard fetal sonological biometric chart and to find out the deviation, if any, of the fetal age estimated from International standard fetal sonological biometric chart. Materials and Methods: 150 antenatal mothers in second and third trimester of pregnancy who attended in outdoor of Gynaecology and Obstetrics for routine check up and advised by Obstetricians of the Department of Gynaecology and Obstetrics to attend Department of Radiodiagnosis of KPC Medical College and Hospital were studied. Results: The gestational age estimated from the regression analysis was found to deviate from the gestational age determined by Last Menstrual Period. The deviation was revealed to be lowest in case of gestational age estimated by Femur Length. Most accurate sonological predictor of gestational age upto 20 weeks of pregnancy Abdominal Circumference followed by Femur Length. Most predictable sonological parameter of gestational age upto 20-28 weeks of pregnancy is again Abdominal Circumference. In 29-37 weeks of duration of pregnancy and also at or more than 38 weeks, the gestational age was found to be estimated by Femur Length. Conclusion: The present study was done on a particular demography. So, the findings of this study cannot be generalized for the whole West Bengal.

KEYWORDS

Fetal Biometry, Abdominal Circumference, Femur Length

INTRODUCTION

The mean duration of human pregnancy is calculated from the first day of last menstrual period is very close to 280 days or 40 weeks.1 The gestational age of the fetus is reflected by fetal body measurements. In clinical obstetrics, gestational age (GA) is estimated as the time from the first day of the last menstrual period onwards, assuming a menstrual cycle of 28 days.2 Monitoring of intra-uterine growth has remained a very important fetal surveillance tool in the care of pregnant mothers. Growth monitoring helps the clinician to institute timely interventions with a view to optimizing fetal outcome.[3]

At the age of 18-20 weeks of intrauterine life routine scanning is used to confirm the delivery date, placental position and the presence of fetal anomalies that would require critical intervention following birth, such as cardiac defects, ling immaturity, renal agenesis, polyhydramnios and defects of the anterior abdominal wall.[4]

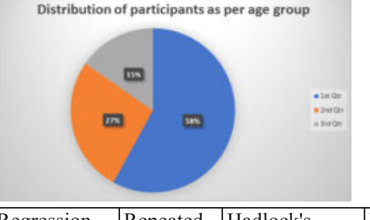
MATERIALS AND METHODS

The study was conducted in a tertiary care hospital after getting approval from the Institutional Ethical Committee over a period of 1 year (1st June, 2021- 31st May, 2022). The study population comprised of 150 antenatal mothers in second and third trimester of pregnancy who attended in outdoor of Gynaecology and Obstetrics for routine check up and advised by Obstetricians of the Department of Gynaecology and Obstetrics to attend Department of Radiodiagnosis of KPC Medical College and Hospital. Biometric parameters by ultrasonography of fetus in utero were measured by sonologist only after a complete antenatal check up by obstetrician and maternal investigations were available.

Four biometric parameters were Bi Parietal Diameter, Head Circumference, Abdominal Circumference and Femur Length. After completion of data collection, compilation of data was done. Analysis was done by using SPSS (Statistical Package of Social Sciences) software version 22.0.

Majority of the study subjects belonged to the age group of 20-25 years (58%). Next belonged between 25-30 years (27%), 15 % were below 20 years.

RESULTS



Sonological Parameters (mm)	Regression Analysis Mean+-SD	Repeated Measure ANOVA	Hadlock's estimated based Mean+-SD	Repeated measure ANOVA
BPD	8.39+-2.08	0.000	-0.35+-1.28	*
HC	8.09+-2.01	0.000	-0.77+-1.23	0.017
AC	-0.48+-1.26	*	-0.48+-1.26	1.000
FL	-0.71+-1.51	1.00	-0.71+-1.51	0.115

*Reference group

Above table shows that the estimated gestational age up to 20 wks of gestation was most precisely predicted by AC and significantly higher deviations were noted in estimations done by using BPD and HC compared to that from AC. However, less deviated estimation was also achieved using FL and the difference between the estimations done by AC and FL was statistically insignificant.

Sonological Parameters (mm)	Regression Analysis Mean+-SD	Repeated Measure ANOVA	Hadlock's estimated based Mean+-SD	Repeated Measure ANOVA
BPD	9.49+-2.70	0.000	0.85+-2.46	*
HC	9.54+-2.99	0.000	-1.15+-2.44	0.236
AC	5.11+-2.39	*	-1.21+-2.26	0.699
FL	5.67+-2.43	0.026	-1.03+-2.27	1.000

*Reference group

Similarly, the estimation of gestational age in 20-28 wks of gestation was found to be reliably done by AC and significantly higher deviations were noted in estimations done by using BPD,HC and FL compared to that from AC.

Sonological Parameters (mm)	Regression Analysis Mean+-SD	Repeated Measure ANOVA	Hadlock's estimated based Mean+-SD	Repeated Measure ANOVA
BPD	9.42+-1.64	0.000	-1.08+-1.67	*
HC	9.39+-1.71	0.000	-1.23+-1.73	1.000
AC	5.51+-1.91	0.131	-1.60+-1.91	0.001
FL	5.20+-1.90	*	-1.45+-1.94	0.133

Sonological Parameters (mm)	Regression Analysis Mean+-SD	Repeated Measure ANOVA	Hadlock's estimated based Mean+-SD	Repeated measure ANOVA
BPD	6.99+-1.46	0.000	-2.56+-88*	0.059
HC	6.31+-1.76	0.000	-4.22+-2.64	0.059
AC	3.58+-2.01	1.00	-3.44+-2.07	0.059
FL	3.39+-2.15	*	-2.89+-2.52	0.059

*Reference group

Figure 1 showing measurement of Bi-Parietal Diameter (BPD) by USG

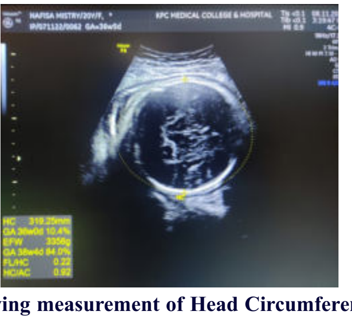


Figure 2 showing measurement of Head Circumference (HC) by USG

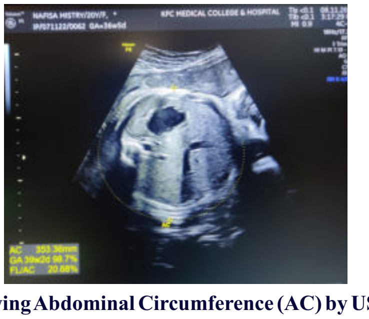


Figure 3 showing Abdominal Circumference (AC) by USG

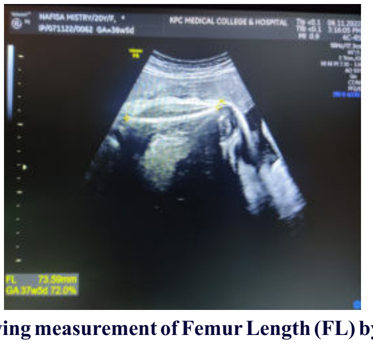


Figure 4 showing measurement of Femur Length (FL) by USG

DISCUSSION:

The study by Ramil et al. 5 showed that the FL values of Malaysian seems to be significantly higher than of the UK6 (t= -2.241) but lower than of the USA7 (t= 4.046). Therefore, as a reference during biometry assessment for local Malaysian fetuses these values should not be used. Comparison showed that the FL values of Malaysian were significantly lower than the FL values of India8 (t= -3.661) and China9 (t= -3.989) population but significantly higher than the FL values of Korea10 (t= 10.524) and Japan11 (t= 10.439) population.

The BPD measurement is most useful from 12th week of gestation upwards.12,13,14 Value of BPD is affected by the shape of the head. When there is presence of abnormal head shapes, the cephalic index (CI) is used. The CI ranges from 75% to 85%. Variation in the growth of BPDs and femoral length have been reported by other researchers.[14]

CONCLUSION

Based on the results of the present study, it cannot be conclusively said that the Hadlock's chart is inapplicable in our perspective. In order to do so, it has to be compared with larger studies with more appropriate design and conducted under more controlled conditions.

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