



Correlation of Gestational age by real time ultrasonographic measurement of fetal Biparietal diameter (BPD) with existing standard normograms.

KEYWORDS

Biparietal diameter. Gestational age, ultrasonography.

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ABSTRACT Aim: The study was conducted with the aim of evaluating the fetal biparietal diameter as a parameter for assessment of gestational age and its correlation with existing standard normograms.

Material & Methods : This study consists of 100 pregnant females, between 13th to 39th weeks gestation with their age ranging from 18 -35 years, USG was done by using Gray scale real time (LOGIQ 400) machine employing a 3.5 MHz convex transducer. The biparietal diameter was measured from the outer surface of skull table of one side, to the inner margin of skull table on opposite side.

Result: The mean biparietal diameter value for each gestational age was compared with the western standard showed the discrepancy of ± 3 mm and high degree of linear relationship with gestational age.

Conclusion: The significance of assessment of gestational age by biparietal diameter is decreases with advancing gestational age.

Introduction

Fetal biometry is a methodology devoted to the measurement of the several parts of fetal anatomy and their growth. Fetal growth is defined as the time dependent changes in body dimensions that occur throughout the pregnancy. The growth rate of various parameters is rapid especially in the 1st and 2nd trimesters. They change significantly with the advancement of pregnancy and must be evaluated against normal value at that age. Multiple fetal biometric parameter are available for prediction of gestational age. The biparietal diameter (BPD) is most frequently used ultrasound measurement for fetal age assessment in the 2nd trimester from 13th weeks onward. The biparietal diameter is a more reliable method predicting date of spontaneous delivery with greater certainty than even certain last menstrual period (LMP). The biparietal diameter is measured from the outer surface of the skull table of one side, to the inner margin of the skull table on opposite side (outer to inner).

Gestation is the period between conception and birth of a baby, during which the fetus grows and develops inside the mother's uterus. Gestational age is the time measured from the first day of the woman's last menstrual cycle to the current date and is measured in weeks. This is because of increase in biparietal diameter with gestational age, several studies have reported that growth of the biparietal diameter in the mid trimester is linear and rapid and biological variation at each week of gestation is small. The measurement of biparietal diameter from 14-26 weeks predicts the correct duration of gestation to the extent of ± 9 days in 95% of cases.

Hence the present study was undertaken biparietal diameter as a fetal parameter in our population in normal singleton pregnancies by using real time ultrasonographic assessment and it is correlated with existing standard normograms to evaluate its usefulness for assessment of gestational age.

Materials and method:

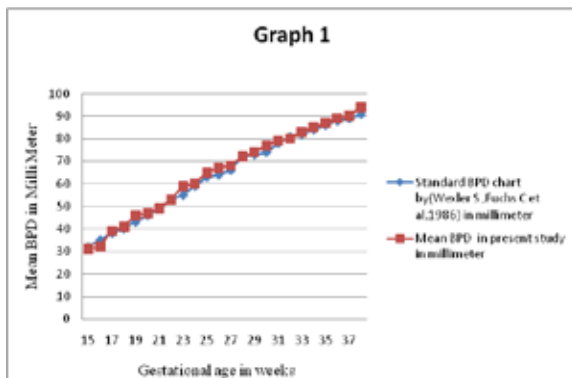
This study was performed in the department of Anatomy in close association with the department of Radiodiagnosis tertiary care hospital of state medical college. This study consist of 100 pregnant females, between 13 weeks to 39 weeks gestation with their age ranging from 18-35 years. The pregnant females with history of regular menses, known last menstrual period, singleton and viable fetus and with the ability of patient to come for follow-up at regular intervals were included. Pregnancy complicated by medical disorders such as anemia, diabetes mellitus in mother, twin pregnancy and any congenital disorders in fetus were excluded from the study.

Real time ultrasonographic scanning for fetal Biparietal diameter: ultrasonographic assessment was performed using a gray scale real time machine (LOGIQ 400) employing a 3.5 MHz convex transducer. The area between the pubic symphysis and umbilicus was exposed. The ultrasonic jelly was applied uniformly to the skin and transducer's head. The anatomical plane chosen for measurement of various fetal parameters was obtained by placing the transducer over abdomen in the middle sagittal section. The fetal head was then looked for the lie of the fetus then placing the transducer over parasagittal plane to define other fetal parts. After asserting the position of the fetal head, serial scan were made in the plane transducer to the fetal head. The biparietal diameter was measured in the scan which shows the widest diameter at the level showing a midline falx echo, two lateral ventricles and the thalami. The reference point for fetal biparietal diameter was the outer margin of the proximal skull interface to the inner margin of the distal skull interface. To interpret, the data was analyzed statistically.

TABLE 1
COMPARISON OF BPD MEASUREMENT WITH WESTERN NOMOGRAM

S.No.	Gestational Age in Weeks	Standard BPD chart by (Wexler S,Fuchs C et al,1986)	Mean BPD in Present study	P.
1	15	32	31	0.0062
2	16	35	32	
3	17	38	39	
4	18	40	41	
5	19	43	46	
6	20	46	47	0.0095
7	21	49	49	
8	22	53	53	
9	23	55	59	
10	24	59	60	
11	25	63	65	0.013
12	26	64	67	
13	27	66	68	
14	28	72	72	
15	29	73	74	
16	30	74	77	0.0078
17	31	78	79	
18	32	81	80	
19	33	82	83	
20	34	84	85	
21	35	86	87	0.115
22	36	88	89	
23	37	89	90	
24	39	91	94	
	Mean	64.21	65.29	
	SD	18.89	19.34	

Table 1 showed the comparison of present study values of BPD measurement with Western Nomogram (chart formulated by Wexler S. et al 1986), it was found that in values of present study there is maximum difference of ± 4mm in 2nd and ±3mm in 3rd trimester.



the fetal biparietal diameter increases gradually and it shows the linear relationship with gestational age.

Result :

The mean values of fetal biparietal diameter were calculated for different gestational age from 15th to 39th week.

It was observed that the fetal biparietal diameter gradually increased from 31mm at 15th week to 94 mm at 39th week of gestation.

In our study the biparietal diameter is correlated with western standard nomogram showed the difference of ± 4 mm in 2nd trimester and ± 3 mm in 3rd trimester. [Table 1]

In case of normal intrauterine expansion the fetal biparietal diameter increases gradually and it shows the linear relationship with gestational age. [Graph 1].

Discussion:

The present study assessed the relationship between gestational age (in weeks) and biparietal diameter (in millimeters) by USG.

Early reports of biparietal diameter by ultrasound examination were published by Callen P (1991), demonstrated the biparietal diameter value to be an accurate predictor of menstrual age before 20 weeks. Campbell S et al (1985), also demonstrated that the biparietal diameter measurement done, between 12 to 18 weeks gestation were significantly more accurate in gestational prediction (89.4%). It is concluded that ultrasound cephalometry before 18 weeks is single best dating parameter. Mongelli M et al (2003), they compared the accuracy of ultrasound dating formulae in late second trimester of pregnancy results were marginally less accurate than the early second trimester.

In our findings the mean biparietal diameter value between 15 to 20 weeks of pregnancy was compared with the chart formulated by Wexler S et al (1986), the discrepancy of 3 mm was found, which may be due to the variability of the lifestyle and environment.

Conclusion: . To conclude, we can say that biparietal diameter is a very much reliable factor for assessment of gestational age of fetus during early 2nd trimester. (If p value is less than < 0.05 that means it is significant).

It is highly significant in early 2nd trimester (15-20 weeks) of gestation (p value = .0062) and highly insignificant in late 3rd trimester (36-39 weeks) of gestation (p value = .115).

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