

Fetal Gestational Age Determination by Biparietal Diameter

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Citation this Article: Dr. Banwari Lal Nayak, Dr. Deepak Meena, “Fetal Gestational Age Determination by Biparietal Diameter”, IJMSIR- March - 2021, Vol – 6, Issue - 2, P. No. 47 – 49.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: To find out correlation between biparietal diameter and gestational age

Methods: This was a cross sectional study of uncomplicated pregnant women who presented for routine obstetric ultrasound. Informed consent was obtained from the patients before inclusion in the study. Only singleton pregnancies were included.

Results: The cases were in the age group of 18 to 40 yrs. Maximum number of cases are in middle age group and minimal in elderly age group. Mean BPD at 41 weeks of gestational age was 89.00 mm and 40 weeks of gestational age was 88.00±3.42 mm.

Conclusion- It can be concluded from the study that there is good correlation of BPD measurement by ultrasonography and gestational age. It is a reliable tool especially in those women where LMP is not known or doubtful, for assessing gestational age.

Keywords: Gestational Age, Biparietal Diameter, Trimester, Pregnant Women

Introduction

The correct clinical diagnosis of fetal growth disturbances has important implications for proper prenatal care and for determination of the delivery time.

Many curves and reference tables for fetal biometry have been published in the literature, using mean values of the bi-parietal diameter (BPD), head circumference (HC), abdominal circumference (AC), and femur length FL, which allow estimation of the fetal weight. Fetal biometry by ultrasonography is the most widespread method used to establish gestational age, estimate fetal size and monitor its growth¹. Researchers have been focusing in recent years on population specific fetal biometric parameter charts for various ethnic groups and the inter population variability in foetal growth patterns.² Campbell S. et al³ and Waldenstrom U et al⁴ observed that bi-parietal diameter was more accurate predictive of expected date of delivery (EDD) than that calculated from the first day of last menstrual period (LMP).

Material and Methods

This was a cross sectional study of uncomplicated pregnant women who presented for routine obstetric ultrasound.

Informed consent was obtained from the patients before inclusion in the study. Only singleton pregnancies were included.

Exclusion criteria included pregnant women who had concomitant disease that could possibly affect fetal growth (e.g. diabetes mellitus, asthma, hypertension, renal disease, thyroid disease), complicated pregnancy (e.g. bleeding, preeclampsia), foetal abnormality detected during the examination, women with a history of obstetric complications, intrauterine growth retardation and macrosomia.

The data collected included the gestational age, date of the last menstrual period and BPD. All BPD measurements were performed by the same investigator using ultrasound machine.

Fetal biparietal diameter measurements were made from the outer edge of the closest parietal bone to the inner edge of the opposite parietal bone.

Statistical Analysis

We used only sonographic gestational age because it assumes nearly identical growth in all fetuses and simply translates a measure of size into a gestational age using reference data. In this study, collected data of measurement of the biparietal diameter was grouped by gestational age and mean biparietal diameter and SD were calculated.

Results

Table 1: Mean and standard deviation of gestational age derived BPD compared with clinical gestational age:

Gestational age in weeks	BPD	
	Mean	SD
24	63.00	0.00
25	62.40	5.50
26	67.67	6.03
27	66.67	3.06
28	69.67	1.53
29	73.40	3.78

30	76.00	3.85
31	79.17	4.67
32	77.80	3.27
33	79.90	2.02
34	82.67	3.84
35	85.36	3.07
36	84.29	2.43
37	86.83	2.56
38	86.20	4.13
39	86.65	5.02
40	88.00	3.42
41	89.00	0.00

Mean BPD at 41 weeks of gestational age was 89.00 mm and 40 weeks of gestational age was 88.00±3.42 mm.

Discussion

The biparietal diameter has been described as a reliable method of determining gestational age. While the biparietal diameter was the first fetal parameter to be clinically utilized in the determination of fetal age in the second trimester, more recent studies have evaluated the use of several other biometric parameters including head circumference, abdominal circumference, femur length, foot length, tibial length, ear size, orbital diameter, cerebellum diameter and others⁵. The prediction of gestational age by biparietal diameter measurements before 30 weeks gestation can provide accuracy but its precision declines thereafter⁶. It has been documented that proper measurement of biparietal diameter can often be difficult under the following conditions: deeply engaged fetal head, direct occipito-anterior and occipito-posterior positions and in breech presentation. Furthermore, with the aid of real time ultrasound, the femur length can easily be measured under the conditions in which biparietal diameter measurement is difficult.

Many studies have demonstrated a progressive increase in variability in BPD measurements from 20 weeks to term, but the degree to which the variability increases in the late third trimester of pregnancy has been a subject of some disagreement in the literature. In the studies of patients with optimal menstrual histories, the variability of late third trimester BPD age predictions has been consistently demonstrated to be approximately + 3.5 weeks.⁷

Conclusion

Accurate gestational age assessment is also essential in the evaluation of fetal growth and the detection of intrauterine growth restriction. There are various methods and techniques to determine gestational age but USG is most widely used, safe and accurate mode. Various parameters like biparietal diameter, head circumference, abdominal circumference, femur length, foot length and others are used for estimating the age of developing fetus.

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