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A STUDY OF CORRELATION OF TRANSVERSE CEREBELLAR DIAMETER WITH GESTATIONAL AGE IN THE NORMAL FETUSES

Radiodiagnosis

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ABSTRACT

Introduction. Transverse cerebellar diameter (TCD) measurement is very accurate in assessment of gestational age especially in cases where the LMPs are not exactly known. Normally value of the transverse cerebellar diameter in mm is considered roughly equivalent to the gestational age in week (particularly between the 14-20 weeks of gestation). It is of utmost importance to identify the fetal growth restriction during the antenatal period because it involves perinatal mortality and morbidity. TCD is a useful parameter for assessing fetal growth retardation. The purpose of my study is to evaluate the accurate measurement of transverse cerebellar diameter as against the conventional parameters in assessment of gestational age in normal pregnant women between 16 to 38 weeks.

Material and Methods: It was a prospective cross-sectional study and All data were collected from 100 antenatal women of gestational age 16-40 weeks referred to Department of Radio diagnosis, Father Muller Medical College and Hospital for routine antenatal scans from May 2018 to October 2018 based on inclusion and exclusion criteria.

Results: In this study 100 cases were studied. Age distribution of normal pregnancies was ranged from: 18 to 35 years. 63 cases were multigravida and 37 were primigravida. In 95 cases the estimated gestational age predicted by measuring BPD, HC, AC and FL was also closely correlated with gestational age estimated from transverse cerebellar diameter measurements with a p value of 0.001. In 5 cases it was poorly correlating. We found good curvilinear relationship between the TCD and gestational age (R2=0.956) and (P=0.00012).

Conclusion: So our study shows that the TCD in the estimation of gestational age is consistently correlating with gestational age.

KEYWORDS

Transverse cerebellar diameter (TCD), Gestational age (GA). wks- weeks PTS- Patients SD – Standard deviation.

INTRODUCTION

The commonest problem an obstetrician encounters is the assessment of fetal maturity either during prolonged pregnancy or termination in complications such as fetal distress and Rh incompatibility disorders.

The most widely accepted for estimating fetal maturity are:
1) Gestational age.
2) Weight of fetus.

The methods which are used to estimate the gestational age (GA) and predict the expected date of delivery (EDD) are[1]:

Menstrual history: Gestational age is calculated from the date of the last menstrual period (LMP). This calculation predicts that conception occurs on day 14 of the cycle. The average duration of pregnancy is 266 days from conception and 280 days from the date of last menstrual period in a woman with 28 days cycle.

Clinical examination: The size of the uterus can be measured by examination of pelvis or by palpating the abdomen. However size can lead to misinterpretation in cases of multiple pregnancy, uterine fibroids, or even during full bladder. Measurement of the symphysis-fundus height with a tape may be useful up to 28-30 weeks of gestation, beyond which it becomes inaccurate for dating.

Perception of fetal movement: Quickening often referred as perception of fetal movement is relatively late sign of pregnancy, usually occurring at 19-21 weeks gestation in nulliparous women and 17-19 weeks in multiparous women.

The Nagele's rule: In women who have regular cycles and LMP is certain, the EDD is calculated by adding 7 days to the first day of the LMP and by adding 9 months to it.

The most common indication during obstetric ultrasound is related to uncertainty relating the gestational age and presently the most accurate way to date pregnancy is by the use of ultrasound.

Due to Ultrasound availability the accurate assessment of gestational age of fetus, congenital anomalies, fetal growth and well-being became possible[2].

Ultrasound plays a major role in estimating the duration of pregnancy based on measurement of fetus by using size as indirect indicator of menstrual age.

Presently we use the following parameters i.e Crown rump length (CRL) , the Biparietal diameter (BPD), Head circumference (HC), Abdominal circumference (AC) and Femur length (FL) and Placental thickness (in mm)[3,4,5].

However the assessment of gestational age with these parameters goes on increasing with increasing gestational age.

Transverse cerebellar diameter (TCD) measurement is very accurate in assessment of gestational age especially in cases where the LMPs are not exactly known[6].

Normally value of the transverse cerebellar diameter in mm's is considered roughly equivalent to the gestational age in week (particularly between the 14-20 weeks of gestation)[7].

It is of utmost importance to identify the fetal growth restriction during the antenatal period because it involves perinatal mortality and morbidity[8,9].

TCD is a useful parameter for assessing fetal growth retardation[10,11,12].

The purpose of my study is to evaluate the accurate measurement of transverse cerebellar diameter as against the conventional parameters in assessment of gestational age in normal pregnant women between 16 to 38 weeks.

OBJECTIVES

- To measure the transverse cerebellar diameter in order to evaluate its usefulness in assessing gestational age against the routinely done fetal parameters like biparietal diameter and femur length in normal pregnant women aged between 16 to 38 weeks.
- To get normograms of transverse cerebellar diameter measurements in order to estimate the gestational age of the fetus.

MATERIALS AND METHODS

STUDY DESIGN

Our study was prospective cross-sectional study.

SOURCE OF DATA

All data were collected from 100 antenatal women of gestational age 16-40 weeks referred to Department of Radio diagnosis, Father Muller Medical College and Hospital for routine antenatal scans from May 2018 to October 2018,

INCLUSION CRITERIA:

- Pregnant women with known LMP.
- Pregnant women between 16 to 40 weeks gestation.
- Singleton Pregnancy.

Exclusion criteria:

- Congenital malformations.
- Multiple pregnancies.

Machine details:

PHILIPS IU 22 and PHILIPS AFFINITY 50 G by using 3.5 MHz convex array transducer.

Examination method:

Informed consent was taken from the patient. The patient was examined under the presence of female nursing attendant. Then the patient was placed in supine position. Convex transducer was placed on the maternal abdominal skin surface after applying the ultrasound gel.

Methodology of measurement of various parameters:

Firstly in all the patients BPD, HC, AC, FL were measured and estimated gestational age was recorded[2].

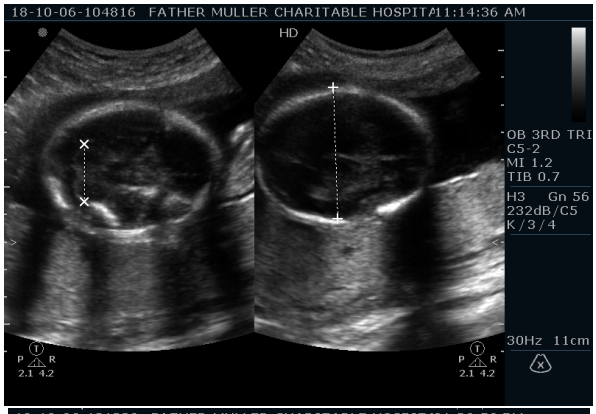
Secondly TCD was measured by keeping the transducer in axial plane and visualizing the bilateral thalamus, cerebellar hemispheres, Cisterna Magna and Cavum septum pellucidi in single view. In this view cerebellum will characteristically appears as two lobules on either side of the midline in the posterior cranial fossa. The widest diameter of the cerebellum was measured in mm by placing electronic calipers at outer to outer margins of cerebellum[2].

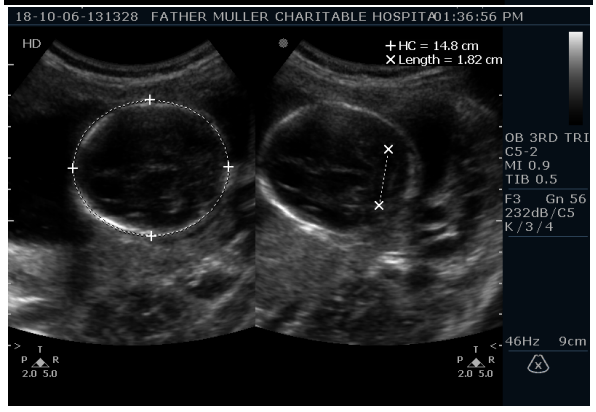
RESULTS AND DISCUSSION

In this study 100 cases were studied. Age distribution of normal pregnancies was ranged from: 18 to 35 years. 63 cases were multigravida and 37 were primigravida. In 95 cases the estimated gestational age predicted by measuring BPD, HC, AC and FL was also closely correlated with gestational age estimated from transverse cerebellar diameter measurements with a p value of 0.001. In 5 cases it was poorly correlating. The disparity in gestational age estimated by BPD, HC, AC, FL and gestational age by TCD was consistently greater than 2 weeks. For both groups mean age and the range of deviation were calculated using student t test and p values were estimated. The p value was found to be 0.89 which indicates that there is no statistically significant difference between the age distributions of two groups.

We found good curvilinear relationship between the TCD and gestational age (R^2=0.956) and (P=0.00012).

GA in wks	No.of PTS	MEAN TCD (mm) WITH SD	%
16	7	16.11±0.35	7
17	5	17.2±0.52	5
18	8	18.4±0.34	8
19	7	19.5±0.41	7
20	9	20.3±0.56	9
21	5	21.3±0.75	5
22	4	22.9±0.85	4
23	5	23.3±0.54	5
24	4	24.5±0.81	4
25	6	26.2±0.46	6
26	8	27.8±1.43	8
27	4	29.4±0.83	4
28	3	30.1±0.82	3
29	4	31.3±0.77	4
30	5	33.5±1.51	5
31	3	35.7±1.62	3
32	2	37.2±2.05	2
33	1	38.7±2.93	1
34	3	40.4±2.43	3
35	1	43.6±2.50	1
36	2	44.3±1.01	2
37	2	46.6±0.91	2
38	2	48.7±1.21	2





CONCLUSION

So our study shows that the TCD in the estimation of gestational age is consistently correlating with gestational age.

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