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Research Article

**ACCURACY OF TRANS CEREBELLAR DIAMETER AND BPD
IN DETERMINING THE GESTATIONAL AGE AS COMPARED
TO LMP IN THIRD TRIMESTER OF PREGNANCY**¹Dr Mehak Mariyam, ²Dr Aamna Iqbal, ³Muhammad Aamir¹IMO ZCD wattakhel, Mianwali²KEMU Lahore³Mufti Mehmood Memorial Teaching Hospital D I Khan**Article Received:** October 2020**Accepted:** November 2020**Published:** December 2020**Abstract:**

The purpose of the study was to analyze the diagnostic accuracy of transcerebellar diameter and BPD in determining the gestational age when the LMP is known in third trimester of pregnancy

Methodology: *The current study was conducted in Radiology Department of Lahore General Hospital from time period of September 2018 to October 2019. The sample size selected was 150 women with singleton pregnancy in third trimester. Ultrasound was performed on 150 women and trans cerebellar diameter, biparietal diameter (BPD) and also FL (femur length) were measured.*

Results: *The results of the study showed that all the women (150) included with known LMP have no significant difference in gestational age calculated by trans cerebellar diameter and BPD by ultrasound measurements and the gestational age calculated by the LMP. The mean gestational age calculated was 35.20 ±3.42 weeks (26-40 weeks range). Therefore, TCD is a reliable parameter of gestational age predicting. It is very helpful in special cases like IUGR for timely intervention.*

Conclusion: *Trans cerebellar diameter is considered accurate along with biparietal diameter and femur length in predicting the gestational age in pregnancy in last trimester.*

Key Words: *Singleton pregnancy, Transcerebellar diameter, femur length, gestational age*

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INTRODUCTION:

It is vital to measure the gestational age accurately in obstetrics in order to plan the ante partum support to the patient and timely intervention in high-risk pregnancy.

The gestational age is measured conventionally with the help of last menstrual period and clinical assessment is made by fundal height. Ultrasound has also helped in measuring gestational age by measuring the fetus biometry (1). The EDD (expected date of delivery) is calculated by Naegle's formula which is calculated from first day of LMP by adding seven days, subtracting three months and adding one year.

The gestational age of fetus can be measured with the help of ultrasound and is considered reliable in first two trimesters but as the pregnancy advances the reliability of single parameter of ultrasound reduces (2). In third trimester of pregnancy the trans cerebellar diameter is reliable parameter to assess the gestational age. (2). The fetus growth acceleration or any restriction in growth don't affect significantly on the size of cerebellar (3). The estimated gestational age by trans cerebellar diameter is considered within a week between the week of 29-36 and at the 37th week of pregnancy is nine days from actual age of gestation. The diagnostic accuracy of trans cerebellar is 94% in last trimester of pregnancy (4).

With the help of ultrasound fetus biometry is measured. The measurements are based upon the fetus anatomy and growth. The most common parameter used to measure the gestational age is femur length, biparietal diameter and trans cerebellar diameter. For better antenatal care the BPD measurement scan in second trimester is performed. The fetus head growth abnormalities results are not accurate by BPD. Therefore the most reliable parameter to predict the fetus growth is considered trans cerebellar diameter in ultrasound. The cerebellum is well protected in fetal head and among all organ of the body. It is last organ to be affected by reduced blood flow. TCD is least affected in growth restricted fetuses suggesting a cerebellar growth protection mechanism as compared to other encephalic areas.

The growth in third trimester is related with the gestational age of the fetus in trans cerebellar scan (4). The purpose of the recent study was to analyze the diagnostic accuracy of trans cerebellar diameter in identifying the fetus gestational age when LMP is known in third trimester.

METHODOLOGY:

The study was performed in the Radiology Department of Lahore General Hospital from the Period of September 2018 to October 2019. The criteria for the selection of sample was young pregnant women from the age group of 22 to 37 years having singleton pregnancy and were sure about their last menstrual period. The exclusive criteria for the sample selection were women with high-risk pregnancy, fetus growth abnormalities and those who were not sure about their last menstrual period. The cerebellar was measured by the ultrasound in mm using the trans cerebellar diameter.

Ultrasound was performed in the study by PHILIPS HD7 (2.0.1) using a 3-5 Mhz curvilinear transducer. The measurement of the trans cerebellum was recorded by putting the transducer at the margins of cerebellum.

By placing electronic calipers at outer margin of cerebellum landmarks of thalamus and third ventricle were identified. Therefore, slightly rotating the transducer below thalamic planer the posterior fossa is identified with characteristic butterfly like appearance of cerebellum.

Biparietal diameter was observed and measured which appeared occiput (rounded at back) and synciput (front part is pointed) of the skull and seems like football. An equal distant midline was observed between the distal and proximal scale echoes. The midline was bisected by the cavum septum pellucidum from 1/3 of the distance from occiput to synciput. The posterior and anterior horns of lateral ventricles were observed in the midline. Upper parietal bone thickness was included in biparietal diameter.

Femur length was measured by measuring the circumference of Abdomen. Probe was rotated till the iliac bones were observed and the cross section of the femur was also noted. The femur length was measured from the center of the U shape.

Trans cerebellum diameter was measured at the angle of 90 degree from the cerebellum long axis. TCD in mm is roughly equivalent to gestational age in weeks (particularly from 14-20 weeks of gestation)

RESULTS AND DISCUSSIONS:

The sample size of the study was 150 pregnant women in their last trimester. The mean age calculated was 26.14 ± 4.54 years (age group was from 22 years to 37 years). The women were in their last trimester ranging from 26 week to 40 weeks when the last menstrual period was known and according to LMP the

gestational age mean calculated was 35.20 ± 3.42 weeks. From the results it was observed that 60 % (90 women) of the sample was in 36th week of pregnancy or above. And 40 % of the women were less than the 36th week of their gestation age. From the ultrasound

results and the gestational age calculated by LMP was correlated and was found significant. The correlation significance of FL, BPD and TCD was ($r=0.663$, $p=0.001$)

Table 1

Parameters	Mean \pm SD	Min week of pregnancy	Max week of pregnancy
Women age group	26.14 \pm 4.54 years	23	37
Gestational age of fetus	35.20 \pm 3.42 weeks	27	39
TCD mm	37.47 \pm 5.642 mm	27	39

It is vital to measure the gestational age for managing the pregnancies when the last menstrual date is known clinically and ultrasound has also helped to measure the gestational age of the fetus by measuring various parameters which are important for managing the obstetrics. It helps to predict the fetus growth and time of delivery for better obstetric results (6). From the recent study there was found no significant difference between the gestational age estimated by LMP when compared with the gestational age calculated by the TCD and BPD/FL.

From the study of Hill et al it was found that trans cerebellar diameter was within two SD in 40 percent of the intra uterine growth restriction and 60 % of the cases SD was less than the mean(8). Lee et al from his study concluded that transcerebellar diameter is a parameter which helps to measure the gestational age of the fetus with or without growth restriction (9). . Vinkesteyn et al in his study found that the TCD is helpful in identifying the growth restriction in fetus in last trimester. His sample size was 360 women in second and last trimester of pregnancy. (10). Smulian et al from his study concluded that the cerebellar size was unaffected from the growth abnormalities significantly. AC (abdominal circumference) change was clear in growth abnormalities (11).

Chavez et al in his study found that positive correlation exist between the fetus transcerebellar diameter and the gestational age of fetus in second and last trimester but as the pregnancy advances near full term cerebellar shows slight fluctuation in growth curve which became difficult to measure TCD after 37th week of pregnancy (12).

The reasons for fluctuation in growth curve was explained by the study of Malik et al .He found that variations in curve is when the fetal head fix into pelvis and the amniotic fluid reduces. At this point contact between the fetus and mother is close and it become hard for ultrasound beam to reach to posterior fossa of

the fetus and the occipito-posterior position of the head of fetus at the end of the gestation (7)

Chavez et al in his study found that although TCD is accurate and also reliable in identifying the gestational age even when the fetus growth was observed extreme. TCD is also helpful in measuring fetus gestational age when there is a risk of IUGR. He also concluded in his study that TCD when combined with additional fetus biometric parameters like femur length, BPD and HC can accurately identify the gestational age in cases where the IUGR is suspected and when the fetus is large. (12)

CONCLUSION:

It can be concluded from the recent study that TCD along with BPD and FL can accurately measure the gestational age of the fetus. It is helpful and reliable parameter in special cases like IUGR.TCD measurement are not affected by the conditions which affect BPD like dolicocephaly, moulding and unossified epiphysis in FL.

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