

Correlation between Crown Rump Length of Fetus and Gestational Age in First Trimester of Pregnancy in North Indian Population

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ABSTRACT

Background: Determination of correct gestational age is fundamental to obstetric care and is important in variety of situations. Obstetric management is also dependent on gestational age. Proper decisions regarding presumed preterm labor or postdated pregnancies are only possible when gestational age is accurately estimated. Ultrasound is a reliable method for establishing the gestational age. In first trimester crown rump length correlates with gestational age and is used to estimate EDD. Our study was conducted to assess the correlation between crown rump length of fetus and gestational age in first trimester.

Materials and Methods: The present study was performed amongst the subjects of Department of Obstetrics and Gynaecology for a period of one year. A trained examiner was made to perform the ultrasound with the same equipment amongst all the subjects to avoid any error. All the data thus obtained was arranged in a tabulated form and analyzed.

Results: The result of the present study showed direct correlation of gestational age and crown rump length in first trimester of pregnancy.

Conclusion: From our present study we concluded that measurement of crown rump length directly correlates with the gestational age in first trimester of pregnancy. So CRL measurement can be used as gold standard to calculate gestational age, fetal growth and EDD.

Keywords: Length, Ultrasound, Obstetric.

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INTRODUCTION

Gestational age calculation has for many centuries been based on women's last menstrual period. The EDD is been calculated by adding 280 days to the Last Menstrual Period (LMP) or by using naegels rule.¹ This method of dating a pregnancy is inaccurate when date of LMP is not sure or when cycles are not regular. Certainty of LMP has been reported as low as 32%.² There are variation in follicular phase that means ovulation phase cannot be estimated accurately.^{3,4} So LMP cannot be considered as reliable tool to calculate gestational age.

With the advent of ultrasound wide number of parameters has been devised to calculate the correct gestational age. Ultrasound assessment of gestational age is feasible in majority of pregnancies and may be used to establish gestational age with greater accuracy than physical examination. In the first trimester, gestational sac mean diameter and crown rump length measurements have become the primary means of evaluating

gestational age.^{5,6} In the second and third trimesters foetal head, body and extremity measurements have been commonly used to assess gestational age. These include biparietal diameter⁷, head circumference⁸, abdominal circumference⁹ and femur length.¹ Measurement of crown rump length in the first trimester and then estimating gestational age and predicting EDD is routinely used.¹¹ CRL is a measurement of the embryo usually identified at 6-7 wks of gestation.¹¹ The embryo is measured along its longest axis along the spine to obtain the CRL measurement. Length is taken from cephalic end to caudal end. After 12 weeks of gestation due to excessive curvature of the foetus, CRL cannot be estimated correctly. So there after other parameters are to be used.

MATERIALS AND METHODS

The present study was conducted among the subjects of Department of Obstetrics and Gynaecology for a period of one

year. Ultrasound examination of all the subjects was performed. Pregnant females with living singleton pregnancy and gestational age less than 12 wks were enrolled in the study. Fetus with congenital anomaly were excluded from the study. The study was

approved by the ethical committee of the institute and the subjects were informed about the study. A trained examiner was made to perform the ultrasound with the same equipment amongst all the subjects to avoid any error.



Fig 1,2: Measurement for CRL

Table 1: Results in present study

Gestational Age	Crown Rump Length
7wks - 8wks	11-20mm
8wks - 9wks	20-24mm
9wks - 10wks	24-32mm
10wks - 11wks	32-41mm
11wks - 12wks	41-54mm

RESULTS

A total of 100 females were enrolled in the study. The mean age of the subjects was 25-35 years. Result was tabulated in table form. The result showed direct correlation between CRL and gestational age. The mean CRL was between 11-20 mm when gestational age was between 7-8 wks, the mean CRL was between 20-24 mm at gestational age of 8-9 wks, the mean CRL was between 24-32 mm at gestational age of 9-10 wks. The CRL was between 32-41mm at gestational age between 10-11 wks and the mean CRL was between 41-54 mm at gestational age between 11-12 wks.

DISCUSSION

A reliable determination of gestational age is important information for proper antenatal care and management. The national institute of health and care excellence (NICE) guidelines for the routine antenatal care and international society of ultrasound in obstetrics and Gynaecology (ISUOG)¹² recommended that all pregnant females should be offered an early ultrasound examination to date pregnancy.¹² Studies have shown that crown rump length during first trimester is a useful predictor of whether a growing foetus is of apt size for that gestational age.¹³ Our present study also showed that measuring CRL gives us gestational age and from which EDD was calculated. Our study has shown that with increasing

gestational age crown rump length was also increasing proportionately. An accurate estimation of foetal gestational age in early pregnancy is important for assessment of the due date^{14,15} and fetal growth.¹⁶

CRL has been recommended as the standard parameter for assessment of fetal gestational age in the first trimester.¹⁴ A study showed an association between first trimester CRL and weight of infant at birth. Further the usage of CRL cut off value in prediction of low birth weight still needs to be confirmed.¹⁷ Disparities in CRL dimensions may hugely effect the risk evaluation of chromosomal abnormalities within the first trimester of pregnancy.^{18,19} Study Conducted by Babuta S et al concluded that Variation in predicted gestational age by ultrasonography (USG) is attributed to the anthropometric difference between the two populations due to racial, genetic, nutritional, and socioeconomic factors.²⁰

As per study conducted by shiraz a smaller than expected CRL was observed during first trimester and was associated with neonatal low birth weight, adverse outcomes of pregnancy and related relative risk. The difference between expected and observed CRL was significantly related with low birth weight.

CONCLUSION

From our present we concluded that gestational age can be well calculated by measuring the crown rump length of fetus in first trimester of pregnancy. So CRL is one of the important parameter to assess fetal growth in first trimester whereas in other trimester other parameters are to be taken in consideration.

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