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Research Article

FETAL KIDNEY LENGTH AND CIRCUMFERENCE AS PARAMETERS FOR DETERMINATION OF GESTATIONAL AGE IN PREGNANCY BY ULTRASONOGRAPHY AFTER 30 WEEKS OF GESTATION

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ABSTRACT

Accurate gestational age (GA) estimation is important to an obstetrician. The Fetal parameters usually taken into account while assessing Gestational age are: Femur length (FL), Bi-Parietal Diameter (BPD), Head Circumference (HC) and Abdominal Circumference (AC) after 24 weeks of gestation. Fetal kidney length and circumference were such non-traditional parameters for estimating GA under study. It is the more accurate method of assessing GA estimation by Fetal kidney length and circumference rather than BPD, FL, HC and AC after 30 weeks of Gestation. This study attempts at estimating gestational age using fetal kidney length and circumference after 30 weeks of gestation and comparison made with gestational age calculated from their last menstrual period and gestational determined by standard biometric measurements. Materials and Methods: 100 pregnant women are included in study with regular periods and without fetal renal anomalies. Results: The mean deviation from the gestational age at all weeks is least for fetal kidney length and circumferences and indicates kidney length and circumferences correlates well with gestational age. Conclusion: FKL & FKC are the most accurate parameters for estimating GA than other biometric indices in late 2nd and 3rd trimester of pregnancy.

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INTRODUCTION

As accurate gestational age is important to the obstetrician as this allows obstetrician to anticipate and plan delivery for optimal perinatal outcome, it also helps for scheduling invasive procedures and genetic tests and evaluating fetal growth because normal range of parameters change with advancing age.

Before the advent of sonography, menstrual age was established using menstrual history, physical examination of uterine height and confirmed by postnatal examination. Three of these either alone or in combination are notoriously inaccurate. Menstrual history could be especially misleading for number of reasons like irregular cycles and non remembrance of LMP. So the use of sonography as a tool for determining menstrual dates has been readily accepted into the practice of clinical obstetrics.

Commonly Used Parameters for Determination of GA are

- i. Biparietal diameter (BPD),
- ii. Head circumference (HC),
- iii. Abdominal circumference (AC),

iv. Femur length (FL)

The accuracy of these measurements is infallible in estimating gestational age in the first trimester (+/- 5days) and in the second trimester (+/- 10days). But in the accuracy of these measurements fall in the third trimester +/-3weeks. Hence search for alternate parameters were being made. Standard measurements of various kidney parameters like kidney length, antero -posterior diameter, transverse diameter, circumference, volume are available. These were used to estimate the gestational age in many studies.

This study attempts at estimating gestational age using fetal kidney length and circumference after 30 weeks of gestation and comparison made with gestational age calculated from their last menstrual period and gestational age determined by standard biometric measurements and statistical analysis was made.

METHODS

This is a cross sectional study conducted in department of obstetrics and gynecology ASRAM medical college, Eluru for a period of one year. During the study period 100 pregnant

women with known dates menstruation and of different parity and ages. Women were evaluated as per history, general physical examination and routine antenatal investigations and third trimester FKL, FKC along with HC ,AC, and BPD were measured using Ultrasonography. Gestational age was calculated from mean FKL and FKC using normogram by Altman and chitty. These values were then compared with actual GA derived from actual dates taken as standard.

The subjects were informed about the study and informed consent was taken from the study group.

Inclusion Criteria

1. All cases in 30-40weeks of gestation and given the informed consent
2. Those with known LMP.
3. Those having regular cycles.

Exclusion Criteria

1. Those having fetal renal anomalies.
2. Those with multiple pregnancies.

METHODOLOGY

All the Patients who are taken in to the Study are Subjected to Following set of Investigations

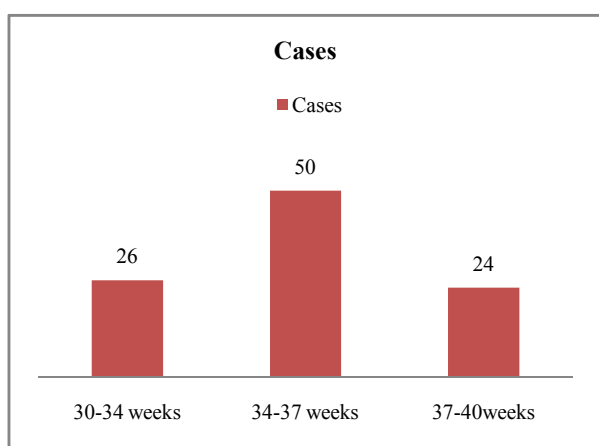
1. CBP
2. Blood Grouping and Typing
3. Serum Creatinine
4. USG Abdomen
5. Fetal anomaly scan

RESULTS

Gestational age Distribution in Study Population

There were 26 cases with gestational age between 30 – 34 wks of gestation, 50 cases between 34 – 37 wks of gestation, 24 cases between 37 – 40 wks of gestation.

Weeks of gestation	No. Cases	% of cases
30 - 34 WKS	26	26
34 - 37 WKS	50	50
37 - 40 WKS	24	24



In this present study the maximum number of students fall in the 34 – 37 weeks gestation. The mean gestational age calculated using LMP was 35.39 wks, it was 32.5 wks using

standard parameters, it was 34.53 wks using kidney length and circumference.

Using	lmp	bpd, hc, ac and fl	kc and kl
Mean Gestational Age	35.39 weeks	32.5weeks	34.53weeks

Weeks of gestation	Lmp ga-ga by hc, ac & fl	Lmp ga-ga by fkl&fkc
30 - 40 WKS	1.79	0.72

In the present study, GA was ranging from 30-40weeks and their mean kidney length ranging from 30.00mm to 40.50mm. Maximum cases with GA 34 weeks and minimum 39 & 40 weeks with 4 cases in each.

P value was <0.001 which show high significant correlation between KL, KC and GA.

DISCUSSION

Our study, done over the period of one year in which 100 Antenatal cases were studied with the age group ranging from 18 to 33years.

In our study all cases with all obstetric complications (PIH, GDM, IUGR, oligohydramnios) taken except multiple gestation which showed fetal kidney measurements wont effect by conditions like IUGR.

In our study, the Gestational Age ranged from 31 to 40 weeks, with maximum cases falling between 34 to 37⁶ weeks gestation. In our study, the Mean Gestational Age difference between standard parameters and Kidney Length and circumference is very less with P – value = 0.000 which is very significant.

Our study correlated with the study done by Cohen *et al* reported strong correlation exists between renal length and gestational age. Another similar study done by J.C. Konje⁴ at al reported that mean kidney length increases from 24.2 ± 1.2 mm at 24 weeks gestation to 40.1 ± 2.4 mm at 38 weeks gestation. There was a significant correlation between GA and KL (mm)(p<0.002). The kidney length measurements of Mohammed Adam *et al* are longer than my study. One more study done by Kuldeep Kumar *et al*⁶ reported measurement of fetal kidney length shows good correlation with GA with correlation coefficient 0.985 and p<0.0001. The study conducted by Nirmala Shivalingaiah *et al*⁷ reported that mean deviation from the GA at all weeks is least for KL. The study concluded that KL is a good indicator for GA.

The study conducted by Diana Laishram *et al*⁸ reported that highest correlation with GA is shown by fetal KL during 33-38wks.

The study done by Mete.G. Ugur *et al*⁹ also concluded there is strong correlation between fetal kidney length and GA (p=0.001), which can use as an eligible parameter in dating labour. Similar inference was obtained in the study done by Sunipa Chatterjee *et al*¹⁰. The study done by Lawson *et al* stated the thumb rule that kidney length approximates gestational age.

The study done by S.M. Ansari *et al*¹³ reported that a strong correlation was found between kidney length and gestational age as predicted by BPD ($r = 84$) and FL ($r = 86$).

CONCLUSION

Fetal kidney readily visualize after 30 weeks with a positive correlation between kidney length, circumference and gestational age. kidney length in mm approximates gestational age in weeks. kidney length can be used as reliable parameter in late second & third trimester for gestational age estimation.

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