ORIGINAL RESEARCH PAPER

Volume-7 | Issue-5 | May-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ROLE OF FOETAL KIDNEY LENGTH AND CIRCUMFERENCE IN ESTIMATION OF GESTATIONAL AGE.

Radiology

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ABSTRACT

Role of foetal kidney length (FKL) and circumference has become more demanding and useful for obstetricians and patients to take certain important decisions prediction of foetal health and labor dating. A prospective study on 120 pregnant women between 20-30 yrs after 30 weeks of pregnancy with known Gestational age(calculated from LMP) the aim of study was to see if there is any correlation between FKL and circumference in prediction of Gestational age(GA) to other biometric indices (BPD,HC, AC AND FL). Results shown that mean GA was 32.50 weeks by biometric indices and 34.70 weeks by kidney length. This confirms and concludes that FKL can be used readily and better prediction of GA than other biometric indices.

KEYWORDS

Foetal Kidney Length(FKL) , Ultrasound, Gestational Age(GA), USG Bio metric parameters

Introduction:
Foetal gestational age is essential, first and foremost duty of obstetrician and fundamental in management of all pregnancies especially high risk pregnancies. It is particularly important in high risk pregnancies as in some cases early termination is essential as soon as foetus become mature i.e., severe pre-eclampsia & eclampsia, chronic hypertension, chronic renal disease, severe IUGR, diabetic patient, sensitized Rh-Ve mother, central placenta previa etc. errors in determining GA date may interfere with critical management decisions such as in preterm labor as well as growth disorders leading causes of neonatal morbidity and mortality [(1)]. Accurate evaluation of gestational age is necessary to obtain materials for different tests[(2)]. The patients Last Menstrual period(LMP) is conventional method for calculation of EDD but only 71% women could actually tell their LMP[(3)] and Gard el al showed that 30% of women cannot recall their exact date of LMP[(4)]. Other difficult factors in estimation of gestational age are irregular menstrual cycle, Patient fails to recollect LMP or reports inaccurately, Pregnancy occurs during lactational amenorrhoea and if patient had bled in early pregnancy [(5,6,7)]. Gestational age can be calculated by lot of feasible parameters like biparietal diameter (BPD), head circumference (HC), femur length (FL), abdominal circumference (AC), length of other long bones are the frequently used parameters for determining the gestational age. Most of these methods can predict gestational age with accuracy. However these methods are not reliable in third trimester of pregnancy [(8,9)].

Previous studies concluded that FKL correlates with gestation age that can be used in estimation of FGA in uncertain LMP or even women coming for ultrasound foetal biometry dating in third trimester itself [(10,11,12)].in developing countries like India where women fails to report about their lmp and report in third trimester itself with irrelevant and unreliable menstrual history foetal kidney length and foetal circumference (KL,KC) measurement gives better prediction and knowledge about FGA in addition to other routine parameters.

This study attempts to estimate FGA my measuring KL,KCwith ultrasonography after 30 weeks of gestation and compared with normal biometric parameters.

Materials and methods:
A Prospective study of 120 antenatal women was conducted in gold field medical college. Faridabad. All patients were aged between 20-30 years attending O.P departments for antenatal checkups after 30weeks of pregnancy were selected. Antenatal women with twin gestation and hypertensive were excluded from the study. After obtaining consent form and proper clinical examination and basic lab investigations these women were subjected to 2D trans abdominal Ultrasound examination using 3.5 HZ frequency curvilinear transducer. Measurements needed for foetal biometry (BPD,HC, ACAND FL)were calculated using standard growth charts. FKL were measured from upper pole to lower pole atleast thrice and mean measurements were taken. Care was taken to exclude adrenal glands. Level of significance was expressed as P-Value <0.05

Results:
Among 120 antenatal women population the gravidity distribution was primigravida 68 cases(57%) and multigravida was 52(43%) cases presented in pie diagram-1.

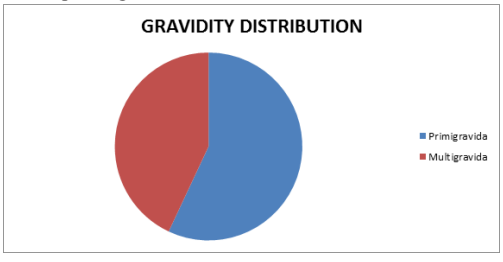

Table-1: The mean gestational age with different parameters i.e., LMP, standard USG biometric parameters (BPD,HC, AC AND FL) and Kidney length and circumference presented in table -1.

WEEKS OF GESTATION	MEAN GESTATIONAL AGE (LMP)	MEAN GESTATIONAL AGE (BPD,HC, AC AND FL)	MEAN GESTATIONAL AGE (KC AND KL)
30-33 WKS	31.52	30.42	32.10
34-37 WKS	35.68	33.01	34.05
38-41 WKS	39.72	37.20	38.06
Overall (30-41 WKS)	**35.64**	**32.50**	**34.73**

Table-2: MEAN DIFFERENCES BETWEEN DIFFERENT PARAMETERS AND OVERALL DIFFENCE

WEEKS OF GESTATION	LMP- USG Biometric	LMP- KC & KL	KC & KL-USG Biometric
30-33 WKS	1.1	0.58	1.68
34-37 WKS	2.67	1.63	1.04
38-41 WKS	2.52	1.66	0.866
Overall (30-41 WKS)	**2.07**	**1.29**	**1.19**

Discussion : If the menstrual history of patient is uncertain, not accurate it is hard to find the EDD. As the knowledge of accurate GA is important to obstetrician in prenatal medicine and early termination of pregnancy become urgent in high risk pregnancies such as placenta previa, chronic hypertension and Rh immunization. With the advent of high resolution ultrasound the ability to image various organs in utero had improved dramatically.

The appearance of foetal kidney changes with advancing gestational age with increase edechogenesity from perinepric fat, this helps in easier identification and separation from surroundings[13]. Technical error and maternal obesity may result in poor scans and prevent in identification of foetal kidney and probably explain different results in different studies[14,15].so after 30 weeks of antenatal life their size is adequate to accentuate the normal renal parenchyma & identification is relatively simple[16] because current ultrasound has improved resolution and transducers. By overcoming all these obstacles, if renal length can be measured properly, it would be a great asset and good parameter to assess the gestational age of the fetus[5].

After calculation of gestational age by LMP, Biometric USG parameters like BPD,HC,AC,FL and kidney length they are statistically analysed, the mean GA of all subjects was35.64,32.50 and 34.73 respectively. The difference being 2.07 weeks and 1.29 weeks of USG biometric and kidney length parameters respectively.

The present study showed good correlation between kidney length and gestational age found similar with study done by Chiare A el al (1989)[17] similarly cohen et al concluded that kidney length correlates well with gestational age[14].

In the present study GA by combining USG biometric parameters it is 14-15 days slightly different from study done by konje et al it is ±9.45 days[12] and it was ±8-10 days of GA when measured with kidney length which is in accordance with the values calculated by Konje et al of SE ± 10.29 days. In the present study , the prediction error in calculating gestational age using BPD, HC, AC and FL was 2.07 weeks and by using KC and KL was 1.29 wks. Present study correlates with study done by pandey k et al [18]and konje et al [12]. Ultimately, foetal kidney length is a feasible measurement with high predictive value that can be used as an adjunct parameter. FKL determination would also help in early detection of renal malformation when renal lengths can be compared with normal values. So it is found in our study that renal length and circumference could well be used in estimation of Gestational age and supports other studies. Similar results have been reported by Lawson et al[11] and Fong and Ryan[16] also reported that measurements of FKL in mm is approximately the sameas GA in weeks.

Limitations: The limitation of our study is the disability to determine the standardized values for mean foetal kidney length per each week of GA due to the small sample size.

Conclusion: this study concludes that measurement of foetal kidney length by ultra sound can be better used as a alternative parameter. This study also helps obstetricians to find the EDD in patients in case of illiterates and menstrual abnormalities. Still more studies are required to determine the accuracy of correlation between renal length and other parameters like BPD, AC, FL, and GA of the foetus to prevent preterm induction thereby reducing prenatal mortality and morbidity.

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