IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 18, Issue 11 Ser.7 (November. 2019), PP 29-36
www.iosrjournals.org

Usefulness of Ultrasonic Measurement of Fetal Kidney Length and Circumference in Estimating Gestational Age after 30 Weeks of Pregnancy

Dr.P.Sruthi[1], Dr.J.Karthiki[i]
[1]*Post Graduate, Department Of Obstetrics And Gynaecology, Santhiram Medical College And General Hospital, Nandyal.*
[2*]*Professor and HOD, Department Of Obstetrics And Gynaecology, Santhiram Medical College And General Hospital, Nandyal.*
Corresponding Author: Dr.J.KARTHIKI

Abstract
Introduction: *Knowledge of gestational age is important to the obstetrician because it affects clinical management in many ways. First, this allows obstetrician to anticipate spontaneous delivery and plan delivery for the optimal perinatal outcome. Second, it helps in scheduling invasive procedures and genetic tests. Third, it helps in evaluating fetal growth because normal ranges of parameters change with advancing age. Virtually all important clinical decisions require knowledge of the menstrual age.*
Materials and Methods: *The study was conducted for a period of one and half year from March, 2018 to July, 2019 at the department of obstetrics and gynecology, Santhiram General Hospital, Nandyal.Pregnant mothers presenting either to the outpatient department or in patients with gestational age more than 30 weeks by their LMP.*
Results: *There were 36cases (36%) with gestational age between 30-34wks of gestation, 36cases(36%) between 34-37wks of gestation, 28 cases(28%) between 37 -40wks of gestation.In these, there were 15 cases (15%) of pregnancy induced hypertension, 20 cases (20%) of anemia and 5cases (5%) of intrauterine growth restriction.The mean gestational age calculated using LMP ,standard biometric parameters (BPD, HC, AC and FL) and that using kidney length and circumference at 30 – 34 wks , 34 – 37 wks and 37 - 40 wks.*
Conclusion: *Women who present to the obstetrician after 30 weeks who do not recall their LMP's or with unreliable LMP's with no visits or ultrasound examination in early trimesters pose a great problem in assessment of gestational age which is very important in managing the obstetric cases more so high risk pregnancies.*
Key Words: *LMP, Hypertension, BPD, HC, AC, FL.*

Date of Submission: 02-11-2019 Date of Acceptance: 18-11-2019

I. Introduction

Knowledgeofgestationalageisimportanttotheobstetrician becauseitaffectsclinical management inmanyways. First, this allows obstetriciantoanticipatespontaneousdelivery and plandeliveryforthe optimalperinataloutcome. Second, ithelpsinschedulinginvasive proceduresandgenetictests. Third, ithelpsinevaluatingfetalgrowthbecausenormalrange of parameters changeswithadvancingage. Virtually all important clinical decisionsrequireknowledgeofthemenstrualage.

Routinely, in obstetrical practice, gestational age was examined clinically by measuring fundal height in weeks and comparingit with menstrual history. The fallacies are,

A:-Women notremembering LMP
B:- Mentioning last day of period as LMP
C:- Reporting missed period asLMP
D:- Abnormalmenstrual cycles
E:- Conception in lactational amenorrhea

as such, the gestational age and menstrual age were found not correlating and creating confusion for management decisions

With the advent of sonogram, fetal parameters likes BPD, HC,AC & FL are standardised and successfully introduced intoclinical practice for determination of gestational age.

It's also observed thatthe first trimester accuracy ofgestational age determinedby sonogram is + or – 5days in comparisonwithmenstrual age. With advancing pregnancy, the accuracy is found to drop gradually to + or –

10days in second trimester and + or – 3weeks in third trimester. As such, there isneed for adding more parameters in the existing sonogram picture / study.
Fetal kidneys can be clearly visualised delineated from other viscera by 30weeks of gestation. Standard kidney parameter measurements like length, anteroposterior diameter, circumferenceand volume areeasily studied through a fullbladder window by abdominal probe.
Therefore our present studytakes upestimating gestationalage usingsonographic measurements of kidney length and circumferenceafter 30weeks ofgestation using again standard parameters like BPD,HC,AC,FL and compare with gestational age calculated from menstrual history.

II. Aims And Objectives

To determine the usefulness of gestational age calculated by ultrasonic measurements of fetal kidney length and circumference after 30 weeks of gestation as compared to standard biometric parameters like BPD, HC, AC AND FL.

- Estimation of gestational age using BPD, HC, AC and FL in pregnant women with gestational age more than 30 weeks.
- Estimation of gestational age using kidney length and circumference in pregnant women with gestational age more than 30 weeks.
- Comparing the above gestational ages theirlastmenstrualperiodandstatisticalanalysisofthedata.

III. Materials And Methods

Thestudywasconductedforaperiodofoneandhalfyearfrom March,2018 toJuly, 2019 atthedepartmentofobstetricsandgynecology, SanthiramGeneralHospital, Nandyal.
SOURCEOFDATA: Pregnant mothers presenting either to the outpatient department or in patients with gestational age more than 30 weeks by their LMP.
Sample size: 100 cases
INCLUSION CRITERIA:

- Pregnant mothers are selected for the study, based on the following criteria:
- Gestational age more than 30 weeks
- Reliable last menstrual period
- Irrespective of any obstetrical complications

EXCLUSION CRITERIA:

- Cases with fetal renal anomalies and twin gestation were excluded.

METHOD:
100 pregnant women attending outpatient department or in patients were included in the study based on the inclusion and exclusion criteria.

GESTATIONAL AGE:
Women with gestational age more than 30 weeks, calculated based on last menstrual period were selected for the study.
RELIABLE LAST MENSTRUAL PERIOD:
Reliability of the last menstrual period is assessed by
a) Regular last three menstrual cycles
b) No oral contraceptive or ovulation induction drugs usage
OBSTETRICAL COMPLICATIONS:
Women with gestational age more than 30 weeks taken for study irrespective of their obstetrical complications like anemia, PIH, IUGR, hydramnios**.**
FETALRENALANAMOLIES:
Caseswithfetalrenalanomalieslikepelvicalicealdilatation,polycystickidneydisease, kidney lengthmorethan7cm,morethan2cystswereexcludedfromthestudy.
Afterclinicalexaminationandbasiclaboratoryinvestigationsthesewomenaresubjectedto2Dtransabdominalultrasoundexaminationusing3.5Hzfrequencycurvilineartransducer.
FetalparametersBPD, HC, AC, FL, kidneylength, kidneycircumferencearemeasuredusingstandardcriteriaspecifiedandcompositegestationalageiscalculatedusingstandardgrowthcharts.(CGA2 – CGA3)
Gestationalageiscalculatedbasedontheirlastmenstrual period(CGA1). Differences in thegestationalagesis calculated statisticallyanalyzed.

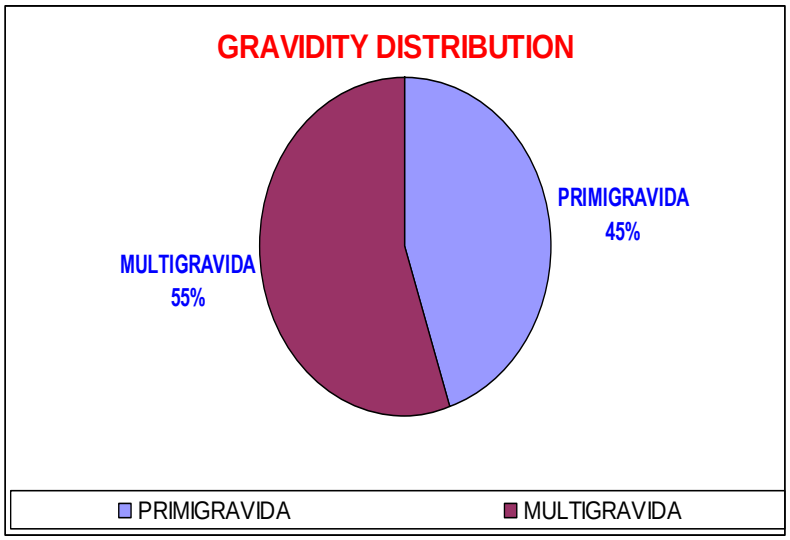
IV. Observations And Results

100 Antenatal women were selected and studied

a) Gravidity distribution in the study population

45 (45%) were primigravida and 55(55%) were multigravida

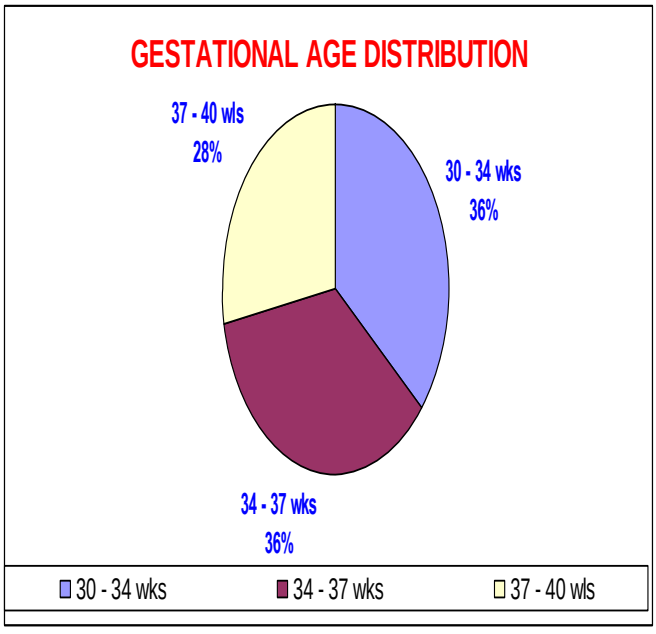
PARITY	NO. OF CASES	% OF CASES
PRIMIGRAVIDA	45	**45**
MULTIGRAVIDA	**55**	**55**



b) Gestational age distribution in study population :

There were 36cases(36%) with gestational age between 30-34wks of gestation, 36cases(36%) between 34-37wks of gestation, 28 cases(28%) between 37 -40wks of gestation.

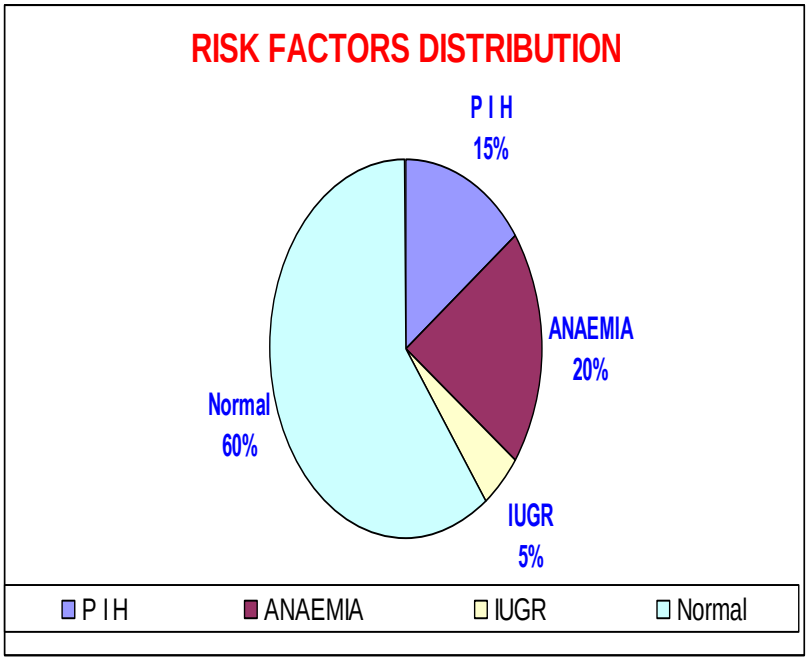
PARITY	NO. OF CASES	% OF CASES
30 – 34 wks	36	**36**
34 – 37 wks	36	**36**
37 – 40 wks	**28**	**28**



c) Risk factors distribution in study population :

In these, there were 15 cases (15%) of pregnancy induced hypertension, 20 cases (20%) of anemia and 5cases (5%) of intrauterine growth restriction.

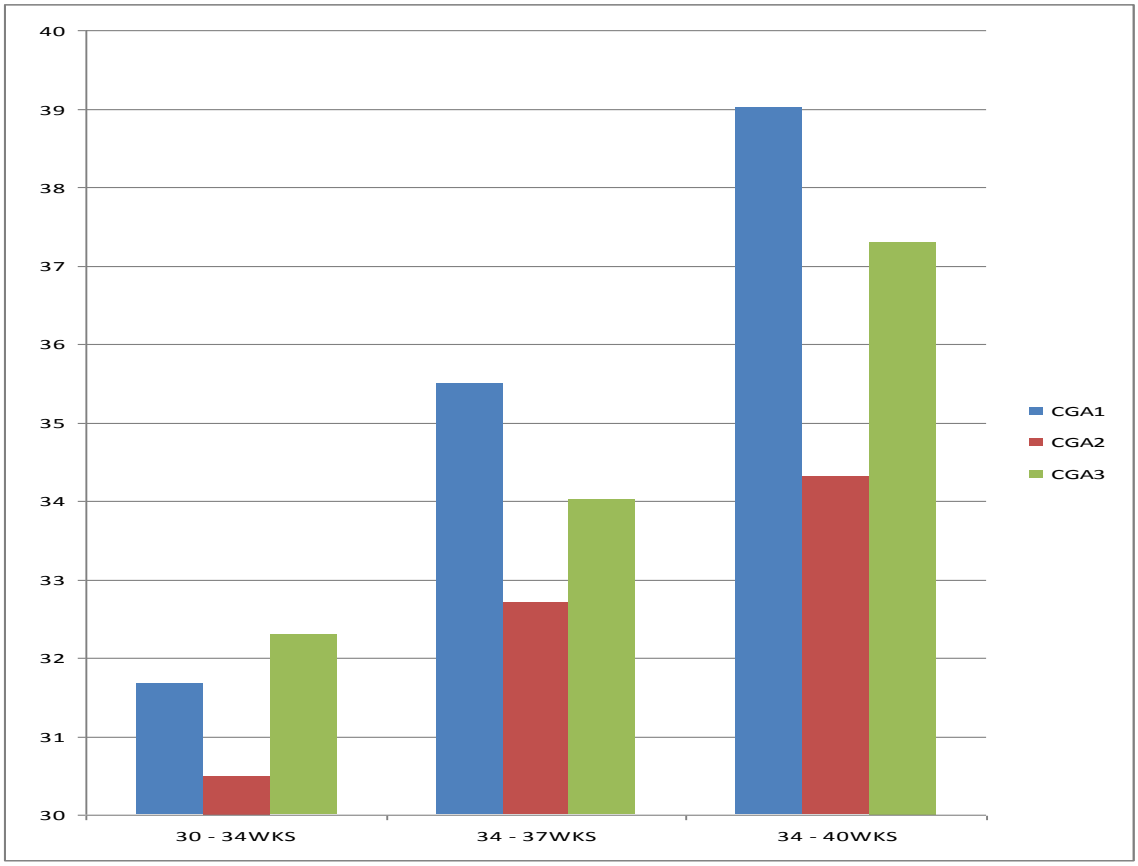
RISK FACTOR	NO. OF CASES	% OF CASES
PIH	15	**15**
ANAEMIA	20	**20**
IUGR	**5**	**5**



The mean gestational age calculated using LMP ,standard biometric parameters (BPD, HC, AC and FL) and that using kidney length and circumference at 30 – 34 wks , 34 – 37 wks and 37 - 40 wks.

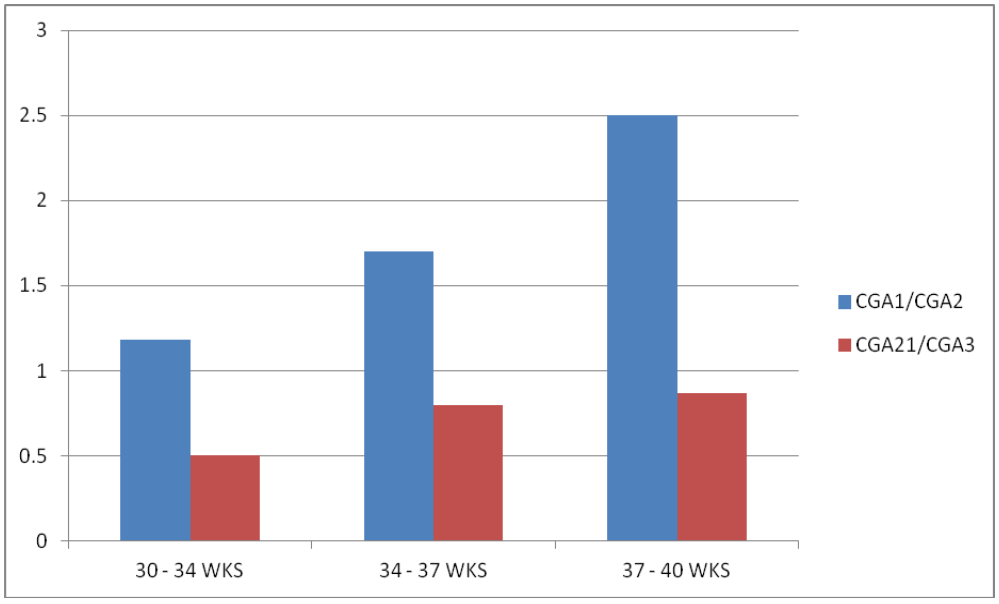
The mean gestational age calculated using LMP was 35.39 wks , it was 32.5 wks using standard parameters , it was 34.53 wks using kidney length and circumference .

WEEKS OF USING	MEAN LMP	MEAN BPD, HC, AC AND FL	MEAN GESTATIONAL KC AND KL
MEAN GESTATIONAL AGE	35.39	32.5	34.53
30 - 34 WKS	31.67	30.49	32.3
34 - 37 WKS	35.5	32.7	34.01
37 - 40 WKS	39.02	34. 31	37.3



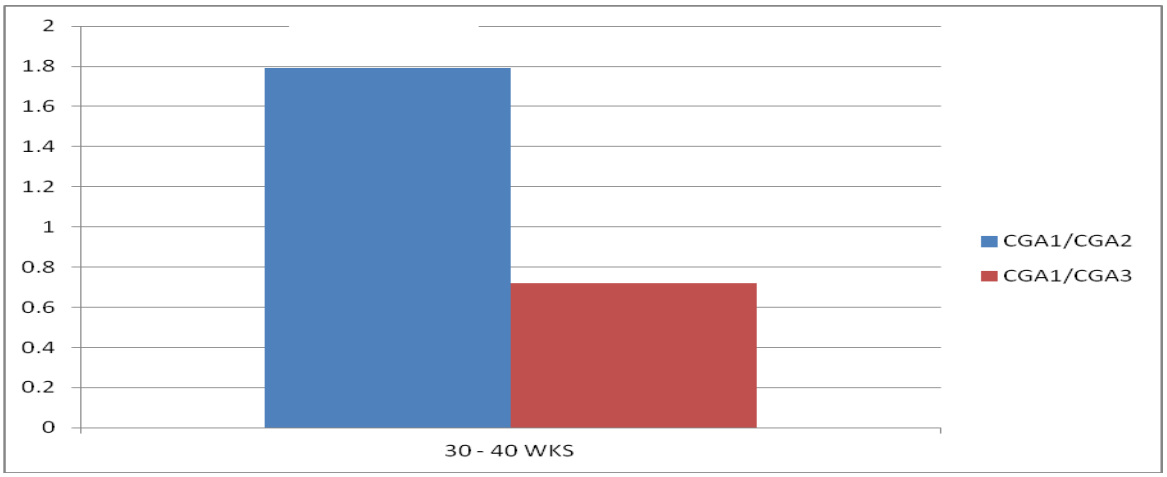
Mean gestational age difference between that calculated using standard parameters and that using kidney length and circumference.

WEEKSOF GESTATION	MEAN DIFFERENCE BETWEEN (CGA1-CGA2) IN WKS	MEAN DIFFERENCE BETWEEN (CGA1 – CGA3) IN WKS
30 - 34 WKS	1.18	0.5
34 - 37 WKS	1.7	0.8
37 – 40 WKS	2.5	0.87



Mean gestational age difference between CGA1 and CGA2 was 1.79 wks and between CGA1 and CGA3 was 0.72 wks.

WEEKS OF GESTATION	CGA1 – CGA3 IN WKS	CGA1 - CGA3IN WKS
30 - 40 WKS	1.79	0.72



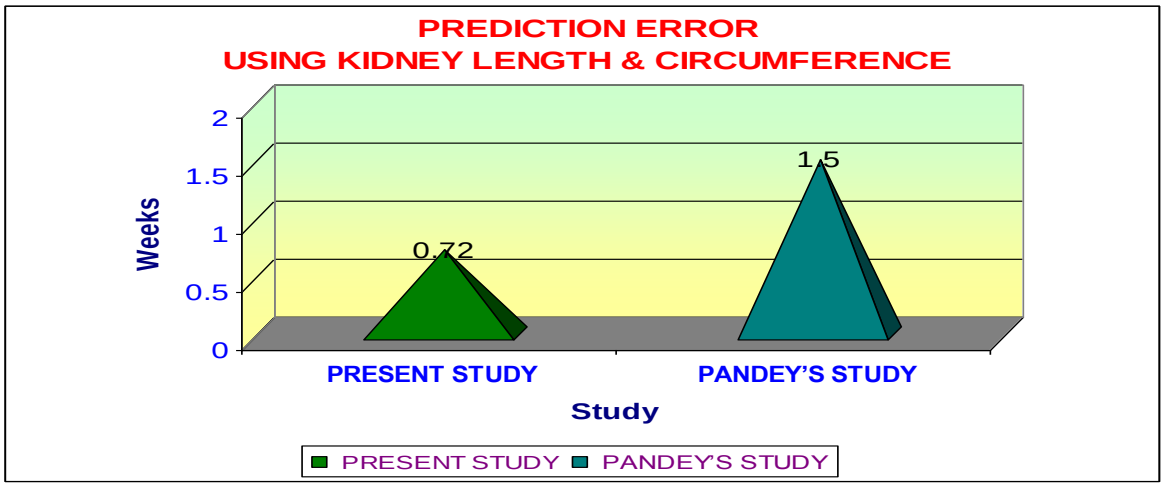
Though the mean gestational age difference using standard parameters and KC & KL was not statistically significant (p = 0.99) the prediction error using KC & KL is less than that of standard parameters.

V. Discussion

Inthepresentstudy100caseswerestudiedandthepredictionerrorincalculatinggestationalageusing BPD,HC,ACandFL was1.79 wksandusingKC andKLwas0.72 wks.

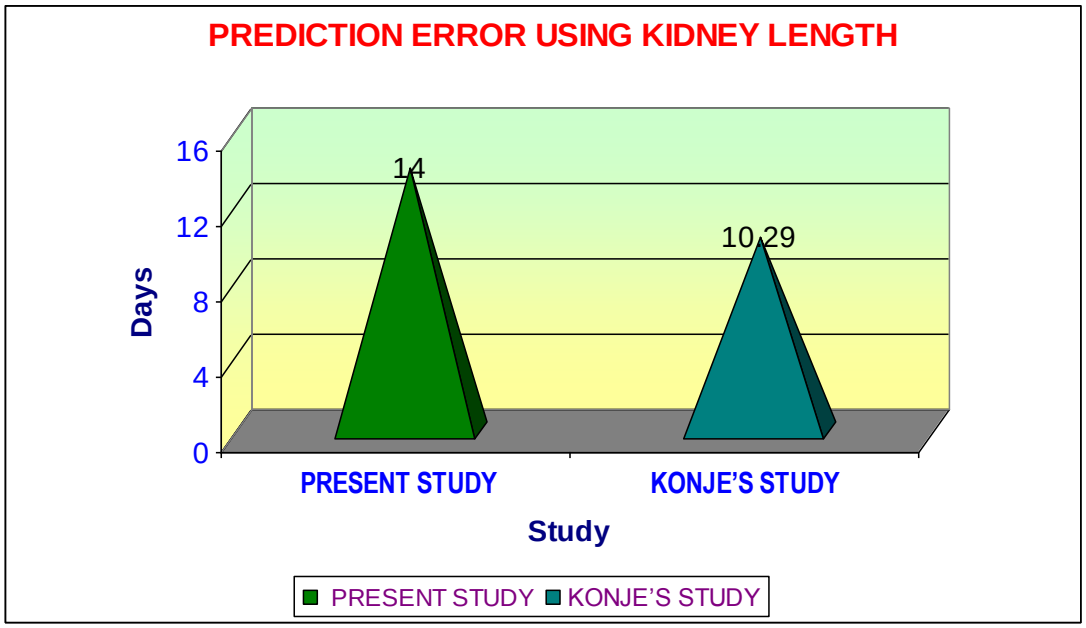
Study conducted by Kiran Pandey, Ajay Bhagoliwal, V.K. Singh published in journal of Obstetric & Gynaec Ind vol. 51 nov/dec 2001 showed the prediction error using KC and KL was 1.5wks.

	PREDICTIONERROR
PRESENTSTUDY	0.72wks
PANDEY'SSTUDY	1.5 wks



R^2value using BPD, HC, AC and FL in the above study was 92.8% and using kidney length and circumference was 98.0%.
The present study showed R_2 value using BPD, HC, AC and FL and using kidney length and circumference to be 94 % and 97.4%
J. C.Konje, K. R. Abrahams S. C. Bell, D. J. Taylor (2002) published study in ultrasound in Obstetrics and Gynec 19(6), showed prediction error using kidney length was 10.29 days.
The present study showed prediction error using kidney length was 14 days.

	PREDICTION ERROR
PRESENT STUDY	14 Days
KONJE'S STUDY	10.29 Days



AlbertChiara (1993) reportedagoodcorrelationbetweenrightkidneylength, leftkidneylengthandgestationalage. Thepresentstudyalsoshowedgoodcorrelationbetween meankidneylengthandgestationalage.
Konjeetal(1997)hasshownthatkidneylengthatdifferentgestationalageisnotsignificantlydifferentinsmallfordateand appropriatefordatebabies. The presentstudypopulationhad5casesofsmallfordatebabiesandthekidneymeasurementscorrelatedwithgestationalage.

VI. conclusion

Womenwhopresenttotheobstetricianafter30weekswhodonotrecalltheirLMP'sorwithunreliableLMP'swithnovisits orultrasoundexaminationinearlytrimesterspose agreatprobleminassessmentofgestationalagewhichisveryimportant inmanagingtheobstetriccasesmoresohighriskpregnancies.
Thesewomenshouldbesubjectedtotransabdominalultrasoundandapartfrommeasuringthestandardbiometricparamet ersmeasurementoffetalkidneylengthcanbeincludedas –

- Thepredictionerrorinestimatingthegestationalageafter30 weeksislessthanstandardbiometricparameters.
- Fetalkidneycouldbereadilyvisualizedafter30weeks.
- Standardchartsareavailablefortheestimationofgestationalageusingkidneylengthandcircumference.

References

1. IanDonaldtextbookofobstetrics.
2. WilliamsObstetrics; vol22, p : 390.
3. NyborgWL. safetyofmedicaldiagnosticultrasound, seminarsinultrasound, CTandMRI2002 : 23(5) : 377-386.
4. MahonyBS, CallenP, FillyAR, thedistalfemoralepiphysealossificationcentreintheassessmentofthirdtrimestermenstrualage:sonagraphicidentificationandmeasuremen t.
5. MillerMW, BraymanAA, AbramowiczJS. obstetricultrasonagraphy-abiophysicalconsiderationofpatientsafety.
6. NoumburgE,BellocoR, CnattigusS,HallP, EkbonA. Prenatal ultrasoundexaminationandriskofchildhoodleukemia : case controlstudy.BMJ2000 ; 320 : 282-3.

7. KielerH,HagloudB,WaldenstromU,AxelsssonO. Routine ultrasoundscreeninginpregnancyandthechildren'ssubsequent growth,visionandhearing.BrJObstetGynaecol1997 ; 104 :1267 72.
8. SalaveenKA,VattenLJ, Eik – NesSH, HugdhalK, BakketeigLS. Routineultrasonographyinuteroandthesubsequenthandedness andneurologicaldevelopment. BMJ1993 ; 307 (6897) : 159-64.
9. Willocks J, Donald I, Duggen T, Day N. Fetal cephalometery by ultrasound. Br J Obstet Gynaecol 1964; 71: 11-20.
10. Hadlock FP, Harrist RB, Deter RL,Park SK. The Use of Ultrasound to determine fetal age : A review. Med Ultrasound 1983;7:95-103.