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Research Article

Placental Thickness an Ultrasonographic Parameter for the Estimation of Gestational Age of the Fetus

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Abstract

Estimation of gestational age is very important in modern obstetrics as any procedure or intervention is mainly dependent on gestational age.

1. To study the efficacy of the measurement of placental thickness by ultrasound in the estimation of gestational age of the fetus.
2. To compare this parameter with the other parameters of fetal biometry by ultrasound for assessment of gestational age.

In this study Ultrasonographic measurement of placental thickness and its correlation to estimation of gestational age was done on 333 antenatal mothers of various gestational age attending the outpatient department. This study was approved by the Ethical committee board.

Keywords: Placental Thickness; Ultrasonographic Parameter; Gestational Age; Fetus

Introduction

Estimation of gestational age is very important in modern obstetrics as any procedure or intervention is mainly dependent on gestational age. Gestational age is the most important criteria in decision, for managing high risk pregnancies. Proper assignment of expected date of delivery is necessary to appropriately interpret laboratory tests, to plan and execute therapeutic maneuvers and to determine the optional management in certain difficult situations like intrauterine growth restriction, gestational diabetes and Rh disease.

Correct estimation of gestational age lies on the relevant regular menstrual history, pelvic examination, USG biometry parameters, regular follow up, date of quickening and the date on which the fetal heart sounds are heard by doppler.

A women's menstrual history becomes reliable only if,

1. She regularly menstruates.
2. She is able to recall her LMP.
3. There is no recent use of OC Pills within 3 months of her LMP.

Menstrual history is unreliable if,

1. The cycles are irregular.
2. Conception during lactational amenorrhea.
3. LMP is not known.
4. There is recent use of OC Pills within 3 months of her LMP.

Unfortunately 50% of women are unable to recall their LMP [1].

Since ancient times it is customary to divide pregnancy into 10 lunar months or 9 calendar months, with 3 trimesters of 3 calendar months each based on the fact that certain major obstetric complications occur in a particular trimester.

The trimesters are divided into weeks for clinical purpose, First trimester being first 12 weeks after LMP, 2nd trimester being 13 - 28 weeks, 3rd trimester being 29 - 42 weeks [2-8].

It was sir Naegeles, a German obstetrician who first commented on the average duration of pregnancy. According to Naegele's rule, in women who regularly.

Aim and Objectives

1. To study the efficacy of the measurement of placental thickness by ultrasound in the estimation of gestation al age of the fetus.
2. To compare this parameter with the other parameters of fetal biometry by ultrasound for assessment of ges tational age.

Materials and Methods

In this study Ultrasonographic measurement of placental thickness and its correlation to estimation of gestational age was done on 333 antenatal mothers of various gestational age attending the outpatient department. This study was approved by the Ethical committee board.

Study design: Cross sectional prospective study.

Study place: SREE BALAJI Medical College, Chrompet. Chennai-44.

Study Population: Antenatal mother attending out patient department.

Study size: 333.

Year of Study: December 2015 – November 2017.

Inclusion criteria

- Antenatal mothers of gestational age (11 - 40 weeks).
- Known LMP.
- Regular periods.
- Singleton pregnancy.
- Uncomplicated pregnancy.
- Willing to participate

Exclusion Criteria

- Antenatal mothers < 11 weeks and > 40 weeks.
- LMP not known.
- Irregular periods
- Multiple pregnancy
- Pregnancy complications like medical disorder compli cating, Intrauterine growth restriction.
- Fetal and placental anomalies.
- Not willing to participate.

Method

1. A thorough history regarding medical illness and ob stetric history was taken for each patient who satisfied the inclusion criteria, after signing consent form.
2. Complete clinical examination done.
3. Symphysio – fundal height was measured after empty ing the bladder in patients from 20 weeks to 40 weeks.
4. Routine ultrasound scanning was done in the radiology department in all cases, in all trimester, transabdominally with a real time ultrasound.

After estimating the fetal age by CRL, BPD, HC, AC and FL, placental thickness was measured for mothers whose

Results

In this study a total of 333 antenatal mothers were studied. Along with routine fetal biometry like CRL, BPD, HC, AC and FL, placental thickness was also measured in these antenatal mothers. The results were analysed with the regard to the gestational age, placental thickness, location of placenta and fetal biometry like BPD,FL, HC and AC.

The mean value of placental thickness along with the respective standard deviation was calculated for gestational age from 11 - 40 weeks.

Correlation between placental thickness and other fetal parameters like BPD, FL, HC and AC was analysed using Pearson's correlation.

Association of Placental Thickness with Placental location in each trimester was calculated using Student's 't' test.

Association between

- Placental Thickness and Gestational age.
- Other fetal biometry parameters with gestation age was calculat ed using Student's 't' test.

		Cases
Age distribution	**No**	**%**
Below 20 yrs	8	2.4
20 - 24 yrs	101	30.3
25 - 29 yrs	136	40.8
30 - 34 yrs	74	22.2
35 yrs and above	14	4.3
Total	333	100.0

Table 1: Age distribution.

There were total of 333 antenatal women. Age distribution ranged from 18 years to 40 years. There were 8 cases below 20 years, 101 cases between 20 - 24 years, 136 cases between 25 - 29 years, 74 cases between 30 - 34 years, 14 cases above 35 years.

	Cases	
Parity	**No**	%
Primi	149	44.7
Multi	184	55.3
Total	333	100.0

Table 2: Parity.

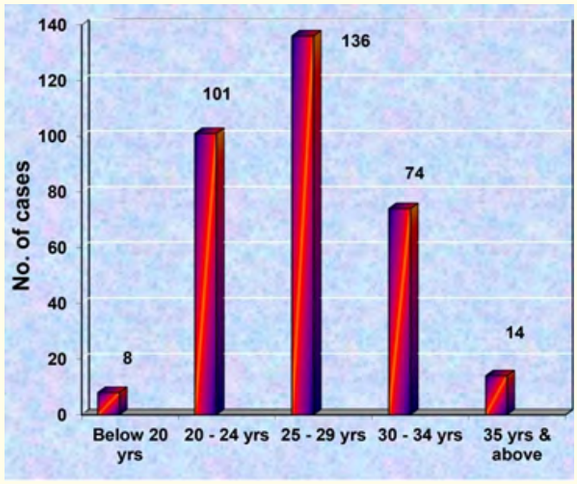

Figure 1: Age distribution.

	Cases	
Parity	**No**	%
Primi	149	44.7
Multi	184	55.3
Total	333	100.0

Table 2: Parity.

Among the total 333 antenatal women 149 were primi and 184 were multi as evident from the table.

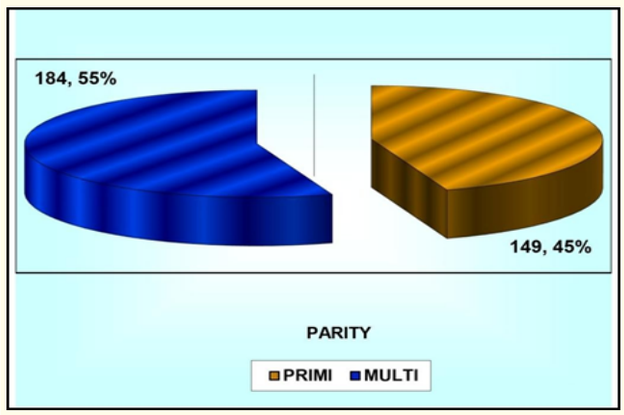

Figure 2: Parity

	Case	
Gestational Age	**No**	**%**
Up to 13 weeks	15	4.5
14 weeks - 27 weeks	145	43.5
28 weeks and above	173	52.0
Total	333	100.0

Table 3: Gestational age.

About 333 antenatal women with varying gestational ages from 11 - 40 weeks were included in the study. There were 15 women in the first trimester, 145 women in second trimester and 173 women in third trimester.

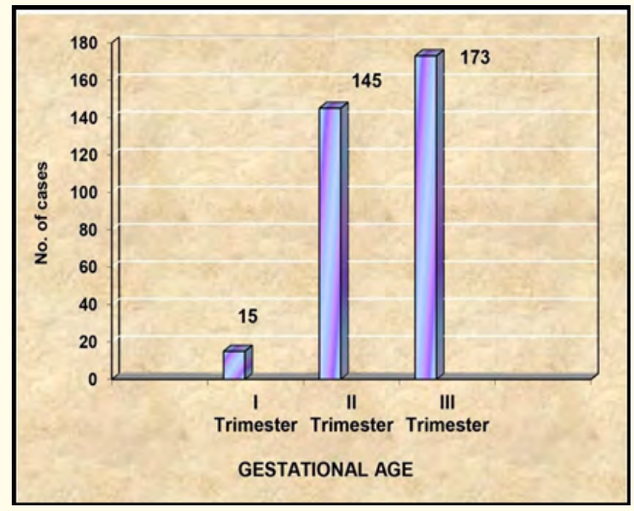

Figure 3: Gestational age.

	Cases	
Placental Location	**No.**	**%**
Anterior	155	46.5
Posterior	155	46.5
Lateral	12	3.6
Fundal	11	3.4
Total	333	100.0

Table 4: Placental Location.

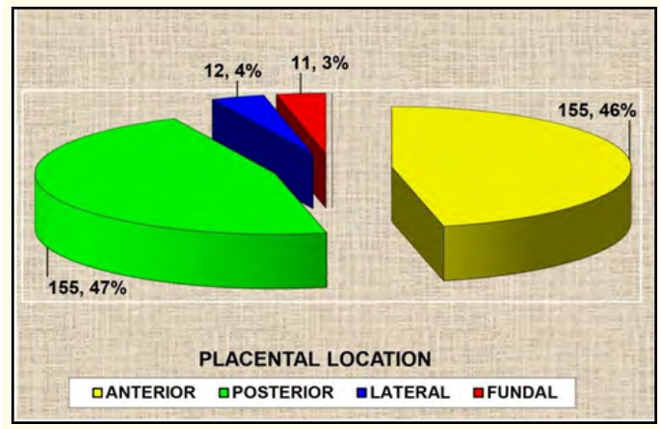

Figure 4: Placental location.

Discussion

In my study a total of 333 antenatal women of various gestational ages were studied for their placental thickness. The mean values of placental thickness was calculated from 11 - 40 weeks. It was observed that placental thickness gradually increased from 14.6 mm at 11 weeks to 38.9 mm at 40 weeks gestation.

In my study, the mean placental thickness was slightly in the higher range for the corresponding gestational age upto 19 weeks. From 20 weeks to 36 weeks of gestation the placental thickness in mm almost matched with corresponding gestational age in weeks. As gestational age increases placental thickness also increases as reported by Nyberg and Finberg [9].

After 36 weeks, placental thickness started decreasing by 0.5 to 1 mm to and did not match with the corresponding gestational age till 40 weeks. Hellman., *et al.* (1970) explained that as placental growth ceases after 37 weeks the thickness becomes lesser in the last four weeks [10-14].

Summary

Accurate estimation of gestational age is necessary for following condition like:

1. In scheduling aneuploidy screening in first trimester and to do invasive procedures like chorionic villous sampling and amniocentesis.
2. In deciding the optimum time for anomaly scan.
3. In assessing the interval growth of the fetus and to dif ferentiate preterm and macrosomia baby.
4. In deciding the timing of induction of labour.

Some women come for their initial antenatal visit in the late second or early third trimester. As their clinical history, symphysio-fundal height, abdominal girth examination and ultrasound parameters becomes less accurate in 3rd trimester, this study was conducted to evaluate the efficacy of the measurements of placental thickness in estimating gestational age.

In my study 333 antenatal women were studied between the age group of 18 and 40 years with maximum number of cases between 25 and 29 years and the parity distribution was equal.

In this study the placental thickness was measured in antenatal women from 11 to 40 weeks of gestation and the results were compiled to find out the correlation and association of placental thickness with other parameters of the biometry.

Placental location with Placental thickness had no significant association.

Placental thickness increased with gestational age and had better association with gestational age from 20 to 36 weeks of gestation.

When correlation of placental thickness with other variables like BPD and FL is assessed, it is found to be significant. The placental thickness measurement is as good as BPD, FL measurements for the estimation of gestational age. Regression equation for assessment of gestational age by placental thickness is given based on all the values.

Conclusion

Assessment of gestational age plays a pivotal role in obstetrics to obtain a good perinatal outcome. Of all the methods used to estimate the gestational age of the fetus, the ultrasound seems to be the most accurate and reliable method.

The parameters like BPD, FL, AC, HC used for GA assessment in second and third trimester gives us a discrepancy of 2 weeks to 3 weeks. To make it better it could be useful if placental thickness is also added on to the above in regular practice for more precise assessment of GA in late second and early third trimester.

In condition where the BPD,FL cannot be measured like Anencephaly, Hydrocephalus, deeply engaged head, constitutionally small or big babies, we can definitely substitute them with placental thickness for gestational age estimation because as previously stated in this thesis the more the parameters, the more is the accuracy of the gestational age.

To conclude, we can say that the measurement of placental thickness is an important parameter for estimation of fetal age. It is helpful in cases where the exact duration of pregnancy is not known especially between the 20 weeks to 36 weeks where the placental thickness almost matches with the gestational age.

But it does come with certain short coming like

- Need for expertise in the measurement of placental thick ness which requires the training of the doctors.
- Installment of an ultrasound machine with doppler facili ties.

More studies are required in this aspect and programming for this new parameter, has to be installed in the ultrasound machine.

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