ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 01 | January - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

THE RELATIONSHIP OF PLACENTAL THICKNESS WITHGESTATIONAL AGE IN THIRD TRIMESTER AND PROBABLE FETAL OUTCOME

Obstetrics and Gynaecology

Dr. Sambhunath Bandyopadhyay Associate Professor, Dept. of Obstetrics and Gynaecology, IPGME&R, SSKM Hospital, Kolkata.

Dr. Ritayan Sasmal* Dept. of Obstetrics and Gynaecology, IPGME&R, SSKM Hospital, Kolkata. *Corresponding Author

Dr. Debarshi Jana Dept. of Obstetrics and Gynaecology, IPGME&R, SSKM Hospital, Kolkata.

ABSTRACT

Accurate gestational age determination is very important for management of continuation and termination planning of the pregnancy.
To establish placental thickness as a parameter for determination of gestational age and fetal growth pattern at 3rd trimester.
100 primigravida women who are fulfilling the inclusion criteria and attend gynae &obs OPD or admitted in their third trimester at IPGME&R from January 2017 to june 2018.
Placental thickness at 3rd trimester USG scan is moderately correlated with gestational age, if placental thickness expressed in millimeter then it correlated with gestational age at weeks.
Placental thickness with >3.2 cm (32 mm) at 3rd trimester almost associated with good fetal outcome, with APGAR score >8 at 1st min and birth weight >2500 gm.

KEYWORDS

Placental Thickness, Gestational, Third Trimester and Fetal Outcome

INTRODUCTION

Accurate gestational age determination is very important for management of continuation and termination planning of the pregnancy.

A baby delivered in proper maturity always better than premature or post mature.

There are many conditions where maternal and fetal prognosis depends upon gestational age, both can be benefitted in a timed delivery, and there is iatrogenic prematurity due to wrong gestational age assessment.

Conditions like gestational hypertension, diabetes/GDM, obstetric cholestasis, Rh negative pregnancy, bad obstetric history, require timely intervention and proper planning regarding delivery. So a more accurate determination of gestational age is always desired by obstetricians.

Iatrogenic Preterm delivery, delayed delivery when needed earlier lead to medico legal complications and professional hazards[1].

Determination of gestational age can be done by various method.
1. LMP
2. USG
3. CLINICALASSESSSMENT

Pregnancy dating is most accurately performed in 1st trimester of pregnancy.

Routine use of USG results in more accurate measurement of EDD than LMP dating,or physical examination in women with regular and certain menstrual date.

USG become the most routine and trusted tool for gestational age determination in modern obstetrics. An early trimester USG is more accurate than LMP(when cycle is regular and certain).

Various parameters(AC, FL, BPD,HC) measured in USG scan and sensitivity and specificity of those depends on gestational period.

Ultrasound Predictors of Gestational Age stated in the table below-

Parameters	Estimated Range for95% of Cases
Gestational sac mean diameter	± week
Crown-rump length	± 5–7 days
BPD, 12–26 weeks	± 10–11 days
HC, 12–26 weeks	± 10–14 days
AC, 12–26 weeks	± 10–14 days
FL, 12–26 weeks	± 10–20 days
BPD, 27–42 weeks	± 2–3 weeks
HC, 27–42 weeks	± 2–3 weeks
AC, 27–42 weeks	± 2–3 weeks
FL, 27–42 weeks	± 2–3 weeks

So during the 3rd trimester error in measurement increases in conventional parameters, thus there is always need of new parameter which can be helpful independently or with conventional parameters for more accurate determination of gestational age.

Now, we will discuss regarding placenta and its role in fetal wellbeing and thus its role to determine the fetal growth with progressive gestation-

The placenta is a foeto-maternal organ which nourishes and protects the foetus. Developmentally it has both fetal & maternal component. Since it is closely related to the foetus and the mother, it acts like a mirror, reflecting the statuses of both the mother and the foetus.

The maximum thickness of a normal placenta at any point during pregnancy is often considered to be 4 cm. Anterior placentas are ~0.7 cm thinner than posterior placentas and maximum thickness for an anterior placenta is ~3.3 cm [as per published data].

But there is variability of placental thickness. During measurement of placenta those conditions should be kept in mind.In our study we also studied the fetal outcome by measuring birth weight, APGAR score at birth (1 min), and whether newborn needed any NICU support. An abnormal outcome of pregnancy was defined as birth weight below the tenth percentile of the birth weight chart or birth weight <2,500 gm.

The prospective of this study is to establish placental thickness as a parameter for detection of gestational age and fetal growth pattern.

As we understand more we accurately determine the gestational age and fetal growth, outcome of the pregnancy will be better[2].

1. To determine the relationship between placental thickness and gestational age along with the conventional foetal growth parameters in normal singleton pregnancies of primigravida in their third trimester.
2. To determine the relationship between placental thickness and probable outcome of pregnancy.

MATERIALS AND METHODS

Study design: this is a hospital based prospective observational study
Data collection: Data of clinical and ultrasonographic parameters

were collected at at 18-22 wks of gestation and then again at 32-36 wksof gestation and the fetal outcomes were noted till discharge from the institution.

Place of study:
O.P.D. and Indoor ward of Gynae and Obstetrics dept of I.P.G.M.E&R and SSKM Hospital, Kolkata. Radio diagnosis Dept of I.P.G.M.E&R and SSKM Hospital,Kolkata from January 2017 to june 2018.

Study population: 100 primigravida women who are fulfilling the inclusion criteria and attend gynae &obs OPD or admitted in their third trimester at IPGME&R

INCLUSION CRITERIA:
1. Primigravida with singleton pregnancy at 18-36 weeks of gestation without any complications as mentions in exclusion criteria
2. The known last menstrual period.
3. A history of regular menstruation.

EXCLUSION CRITERIA:
1. Multigravida
2. Multiple pregnancy
3. Foetal anomalies.
4. Maternal Diseases - Gestational Diabetes/known diabetic, Hypertension and known heart disease, Anemia, hypothyroid, CKD and any other metabolic disorder.
5. Placenta previa, H/O-hemorrhage in early pregnancy,
6. Placental and or cord anomalies and poorvisualization of the placenta
7. Oligohydramnios,polyhydramnios
8. Last menstrual period not known or irregular menstrualperiods.
9. Those who did not give consent for studies.

STATISTICALANALYSIS
For statistical analysis data were entered into a Microsoft excel spreadsheet and then using Software SPSS 27.0 .

Data summarized as mean and standard deviation for normally distributed numerical variable, median and interquartile range for skewed variables and counts and percentages for categorical variables. Key variables expressed with the 95% confidence interval. The relationship between gestational age and third trimester placental thickness quantified by pearson's or spearman's correlation coefficient. A moderate correlation observed.

Receiver operating characteristic (R.O.C) curve analysis done to identify placental thickness cut-off for predicting FGR (Birth Weight < 2500 g at term).

RESULTS AND ANALYSIS
We screened 118 subjects and with 15% dropout we were able to analyze data of 100 subject

Analysis of data pertaining to thesis project-
The relationship of placental thickness with gestational age in third trimester and probable fetal outcome.

Variables are normally distributed by Kolmogorov-Smirnov goodness-of-fit test other than Age, Abdominal Circumference, Symphysio fundal Height, Hb% values3 rd trimester-USG measured AC, FL, HC, Placental thickness (PlThick), AFI, USG wise Gestational Age, Expected Fetal Weight, Birth Weight, Placental Weight and Apgar score at1minute.

Descriptive statistics of numerical variables elaborated in various tables then analysis done between key variables to found the correlation and at the end ROC curve analysis done.

1st column for baseline parameters i.e.- Age, BMI, Hb% at 3rd trimester and Gestational age at the time of delivery (in days).
2nd column described range, and mean value along with standard deviation specific for those parameters.
1st column for clinical parameter i.e.- symphysio fundal height and abdominal circumference (in cm) measured before delivery.
2nd column described their range , mean and standard deviation in study subjects.
1st column for parameters which directly taken from 3rd trimester USG i.e.-gestational age(by USG) , AC, FL, HC.
2nd column described their range, mean value, standard deviation, median value and Interquartile range.
1st column for parameters which determined placental growth i.e.- placental weight, placental thickness.
2nd column described their range, mean value, standard deviation, median value and Interquartile range.
1st column for parameters of fetal outcome i.e.-expected fetal weight, birth weight, APGAR score.
2nd column described their range, mean value, standard deviation, median value and Interquartile range.

Expected fetal weight in this table detected by 3rd trimester ultrasound.
There is moderate correlation between placental thickness and gestatinal age in 3rd trimester.

There is also poor correlation between placental thickness and placental weight.

There is poor correlation between placental thickness with APGAR score, but the APGAR scores observed in samples are indicative of good neonatal outcome except in one case where only 1 day of SNCU care needed.

It was observed that-When placental thickness ≤3 cm , then with 100% sensitivity and 97.85% specificity FETAL GROWTH RESTRICTION can be determined.

DISCUSSION
Accurate assessment of gestational age is an important part of any obstetric examination and presently the most effective way to date pregnancy is by the use of ultrasonography. Several sonographically derived fetal parameters are used to date pregnancy. They are fetal crown-rump length (CRL), biparietal diameter (BPD), head circumference (HC), femur length (FL) and abdominal circumference (AC). However, there are some drawbacks in these parameters in estimating the gestational age. So we always combine all these parameter available to calculate a appropriate gestational age. There is always search for a better parameter and there will be. Placenta is the organ which provide nutrition to baby and it has been proved that placenta grow with the growth of the fetus. Thus it is obvious placental growth is directly related to growth of fetus and if placenta not developed properly the growth of fetus will be stunted. Placental thickness, placental weight, placental volume, maturity of placenta all are the parameter for proper development of placenta.

In this study we take the placental thickness and compared with other established ultrasonographic parameter like AC, HC and FL regarding estimation of gestational age in third trimester and assessment of fetal wellbeing by the fetal weight, APGAR score, requirement of NICU care needed or not.

This study showed that the placental thickness (in cm) increases with increasing gestational age (in weeks converted to days for analysis purpose) but there is moderate correlation between them. And there are also moderate correlation with other conventional parameter of USG like AC, HC, FL.

When we use ROC curve we found that when placental thickness ≤3 cm, then with 100% sensitivity and 97.85% specificity FETAL GROWTH RESTRICTION can be determined, that is a opportunity for further research and analysis.

The results of the present study are consistent with the observations made by authors of previous studies.Placental evaluation by ultrasonography has been used to characterize placental position and morphologic changes as the placenta matures. Abnormal thickness of placenta is well recognized as a diagnostic harbinger in a wide spectrum of pathologic events. Placental thickness can contribute to the management of fetus at risk. [3] Few authors have studied the role of placental thickness as a new parameter for estimating gestational age and placental thickness nomograms in relation to gestational age have been published. [4-6]

In the present study, there is moderate correlation between gestational age with placental thickness .and from ROC curve analysis, it can be stated that fetal growth restriction determination from placental thickness is possible with good sensitivity and specificity.

If we look into the data then observations make it clear that with a placental thickness >3.2cm at 3rd trimester all the baby delivered having good APGAR score(>8) and there is no LBW baby or fetal growth restriction , and most of the cases gestional age in weeks (determined by conventional multiple parameter) grossly same with placental thickness expressed in millimeter i.e.-at 34 weeks gestation placental thickness about 34 millimeter(more or less).

In the present study placental thickness not strongly correlated with APGAR score but that may be due to scoring pattern. As all the baby with delivered with good APGAR score(>8) except one who required SNCU admission for 1 day. But, this data is not sufficient enough to apply for every mother, as the sample populations are only healthy singleton pregnancy without any obvious comorbidities. So in case of general population this situation expected to be different.

So further research with vast and diversified population may explore the possibility of using placental thickness as a parameter for determining fetal wellbeing.

CONCLUSIONS & LIMITATIONS

1. Placental thickness at 3rd trimester USG scan is moderately correlated with gestational age, if placental thickness expressed in millimeter then it correlated with gestational age at weeks.
2. Placental thickness with >3.2 cm (32 mm) at 3rd trimester almost associated with good fetal outcome, with APGAR score >8 at 1st min and birth weight >2500 gm.
3. Placental thickness <3 cm(30 mm) at 3rd trimesterwith good sensitivity and specificity FETAL GROWTH RESTRICTION can be determined.

These are the conclusions from the study, but a larger study with diverse population sample needed before applying in general population

REFERENCE

1. Hadlock FP, Deter RL, Harrist RB, Park SK: Estimating fetal age: Computer-assisted analysis of multiple fetal growth parameters. Radiology 152: 497, 1984
2. Kobayashi M, Hellman LM, Fillisti L. Placental localization by ultrasound. Am J Obstet Gynecol. 1970; 106: 279-85.
3. Gottesfield KR, Thompson HE, Holmes JH, Taylor ES. Ultrasonic placentography – a new method of placental localization. Am J Obstet Gynecol. 1966; 96: 538-47.
4. Jauniaux E. Placental ultrasonographic measurements: What can we learn and is it worth doing routinely? Ultrasound Obstet Gynecol. 1992; 2: 241-2.
5. Mital P, Hooja N, Mehndiratta K. Placental thickness: a sonographic parameter for estimating gestational age of the fetus. Indian J Radiol Imaging. 2002; 12: 553-4.
6. Jain A, Kumar G, Agarwal U, Kharakwal S. Placental thickness –a sonographic indicator of gestational age. J ObstetGynaecol Ind. 2001; 51: 48-9.