

Assessment of Gestational Age of Fetus by Real Time Ultra Sonographic Measurement of Placental Thickness

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Abstract

Aim: The study was conducted with the aim of evaluating the placental thickness, as a parameter for estimating gestational age of the fetus. **Materials & Methods:** This study consists of 100 pregnant females, between 13th to 39th weeks gestation with their age ranging from 18-35 years, attending antenatal clinic at the department of Obstetrics and gynecology, Pt.J.N.M. Medical College & Dr. B.R. Ambedkar Memorial Hospital Raipur (C.G.) from October 2008 to August 2009. USG was done by using Gray scale real time (LOGIQ 400) machine employing a 3.5 MHz convex transducer. After estimating the fetal age by BPD, HC, AC, and FL the placental thickness (PT) was measured perpendicular to the basal and chorionic plates, in the mid portion of the placenta at the level of insertion of umbilical cord. **Results:** It was observed that the placental thickness gradually increased from 16 mm at 15 weeks of gestation to 37 mm at 39 weeks. From 23rd week to the 34th of gestation the placental thickness coincide almost exactly with the gestational age in weeks. **Conclusion:** To conclude, the measurement of the placental thickness is an important parameter for estimation of fetal age along with other parameters especially in the late mid trimester and early third trimester, where the exact duration of pregnancy is not known.

Key words: Placenta; Gestational Age; Placental Thickness; Fetal Maturity.

Introduction

The physiological link between a pregnant woman and the fetus is provided by a fetal organ known as the placenta. Its main functions are exchange of metabolic and gaseous products between maternal and fetal bloodstreams, and production of hormones [1]. It is a highly vascularized organ having composite development i.e., partially from maternal tissue and partially by fetal cells. The placenta develops from the chorionic villi at the implantation site at about the fifth week of gestation. Placental formation begins in the latter-half of the 2nd month of the pregnancy and is usually completed by the 4th month. It reaches its maximum growth at term [2].

Ultra-sonographic assessment has advanced obstetric practice by enabling relatively detailed assessment of the fetus in utero, including an accurate estimate of gestational age. By the ninth or tenth week the diffuse granular echotexture of the placenta is clearly apparent at sonography. Placental thickness appears to be a promising parameter for estimation of gestational age of fetus. Placental thickness can be measured at the level of the umbilical cord insertion. Gestation is the period between conception and birth of a baby, during which the fetus grows and develops inside the mother's uterus. Gestational age is the time measured from the first day of the woman's last menstrual cycle to the current date and is measured in weeks. This is because of increase in placental thickness with gestational age. Several studies have reported an increase in placental thickness with gestational age [3-5]. Studies by Mital et al and Anupama et al have reported the use of placental thickness as an indicator of gestational age of fetus [6,7]. Hence the present study was undertaken to investigate placental thickness as a parameter for estimating gestational age of fetus in normal singleton pregnancies using real time ultra-sonographic assessment.

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Materials and method

This study was performed in Department of Anatomy in close association with the Department of Radiodiagnosis, tertiary care hospital of state medical college. This study consists of 100 pregnant females, between 13 weeks to 39 weeks gestation with their age ranging from 18 -35 years. The pregnant females with history of regular menses, known last menstrual period, singleton and viable fetus and with the ability of patient to come for follow-up at regular intervals were included. Pregnancy complicated by medical disorders such as anemia, diabetes mellitus in mother, twin pregnancy and any congenital disorders in fetus were excluded from the study.

Real time ultrasonographic scanning for placental thickness: ultrasonographic assessment was performed using a Gray scale real time machine (LOGIQ 400) employing a 3.5 MHz convex transducer. The area between the pubic symphysis and umbilicus was exposed. The ultrasonic jelly was applied uniformly to the skin and transducer's head. The anatomical plane chosen for measurement of various fetal parameters was obtained by placing the transducer over abdomen in the middle sagittal

section. The fetal head was then looked for the lie of the fetus then placing the transducer over parasagittal plane to define other fetal parts. The placenta was located and placental thickness was measured perpendicular to the basal and chorionic plates, in the mid portion of the placenta at the level of insertion of umbilical cord. To interpret, the data was analyzed statistically.

Results

The mean values of placental thickness along with respective standard deviation were calculated for different gestational ages from 15th weeks to 39th week.

It was observed that the placental thickness gradually increased from approximately 16mm at 15 weeks of gestation to 37mm at 39 weeks of gestation.

In our study the placental thickness is exactly correlated with gestational age during 23rd week to 34th week of gestation, (1-3 mm) higher up to 22nd week and (1-2 mm) lower from 35th weeks onwards.[Table 1]

Table 1 Correlation between Gestational age (in weeks) and placental thickness (in mm)

Gestational age (in wks)	No. of cases	Placental thickness in mm (mean \pm SD)
15	3	16.66 \pm 0.94
16	3	19.5 \pm 0.70
17	4	19.5 \pm 0.5
18	5	20.86 \pm 0.71
19	5	21.22 \pm 0.87
20	3	21.9 \pm 0.69
21	2	22.5 \pm 0
22	2	23 \pm 0
23	2	23.2 \pm 0.14
24	4	24.07 \pm 0.12
25	4	25.22 \pm 0.17
26	5	26.2 \pm 0.27
27	3	27.13 \pm 0.18
28	3	28.16 \pm 0.12
29	2	29.2 \pm 0.1
30	8	30.16 \pm 0.22
31	3	31.6 \pm 0.03
32	4	32.10 \pm 0.12
33	6	33.33 \pm 0.24
34	4	34.2 \pm 0.12
35	13	34.47 \pm 0.49
36	5	35.06 \pm 0.75
37	5	35.82 \pm 0.45
39	2	37.7 \pm 0

The value of mean placental thickness increases with advancing gestational age almost matching from 23rd week to 34th week of gestation as shown in graph 1[Graph 1]

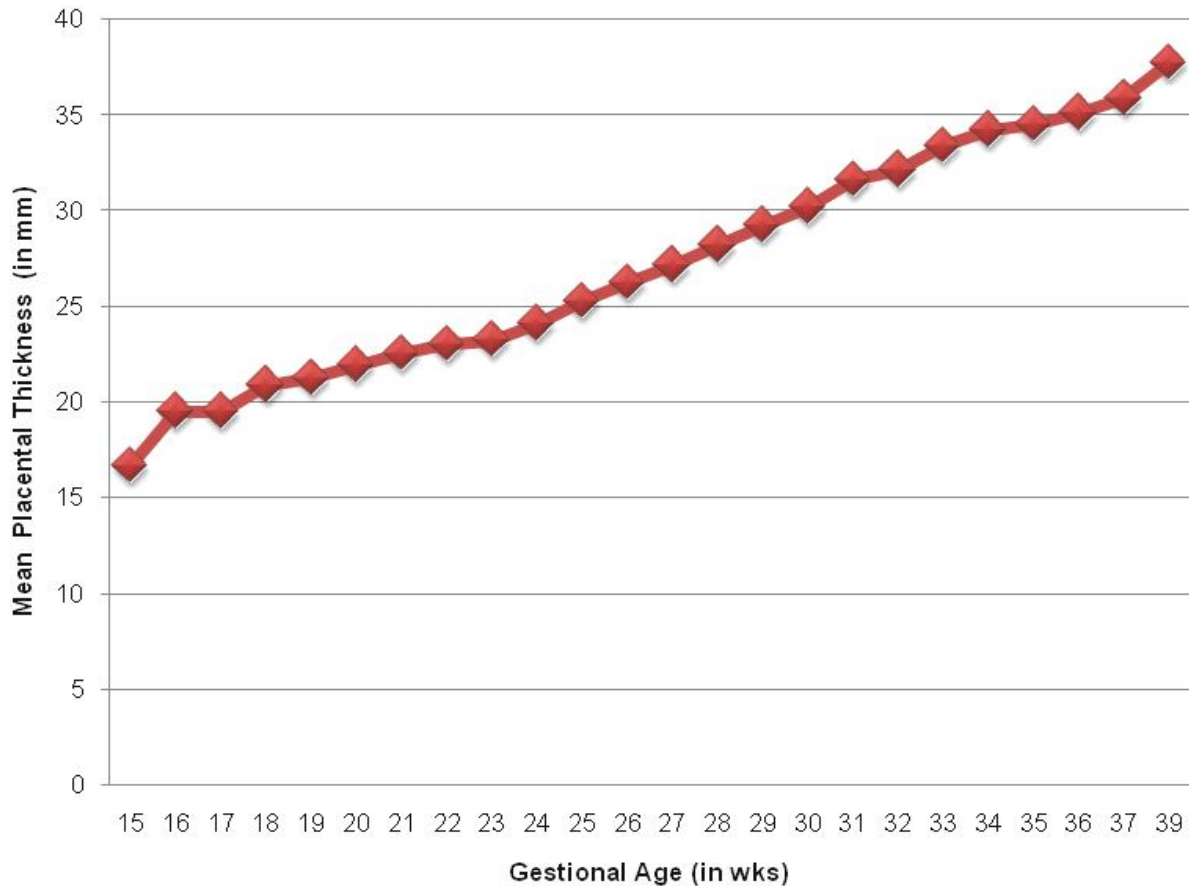


Fig. 1 Lines diagram shows correlation between Gestational age (in weeks) and placental thickness (in mm).

Discussion

The present study assessed the relationship between gestational age (in weeks) and placental thickness (in millimeters) by USG.

Early reports of placental localization by ultrasound examination were published by Donald et al (1960), Kobayashi M et al (1970) and Gottesfield KR et al (1966), Nyberg and Finberg (1990) also reported that placental thickness in millimeter is parallel to gestational age in weeks.

Our findings are consistent with observations made by Jain A et al (2001), Mittal P et al (2002), and Sheikh Mohd. T.(2006), who reported that the value of mean placental thickness increases with advancing gestational age almost matching from 22nd week to 35th weeks.

Conclusion

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 (specially between the 22nd week and 35th week) where the placental thickness almost matches with the gestational age.[7]

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