

Sonological Evaluation of Placental Thickness with Respect to the Gestational Age

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Abstract

Background: Placenta is an extremely important organ, which provides vital support to the fetus during gestation. It has significant nutrition, endocrine, metabolic and immunological support. Placenta has a direct role in modulating the maternal environment for normal fetal development. **Method:** Fifty Antenatal women's each of from eleven week to forty week considered in this study. The study was carried out in the Departments of Gynecology and Radiology. **Results:** Fifty antenatal patients age from 18 -39 were included in this study. Out of 50 antenatal women's studies, 16, Fundal anterior, 15 fundal posterior, 6 anterior wall, 7 posterior wall, 6 lateral wall were seen. Placental thickness were raised with each week of gestation. In Correlation between gestation age & placental thickness were significant in 11-35 week and no significance occur in >35 weeks. **Conclusion:** This study conclude that, the thickness of placenta by solography in singleton pregnancies can be used as an additional tool in the assessment of gestational age because of its linear correlation with gestational age.

Keywords: Antenatal women's , Sonological, Placental Thickness, Gestational Age

INTRODUCTION

Placenta is an extremely important organ, which provides vital support to the fetus during gestation. It has significant nutrition, endocrine, metabolic and immunological support. Placenta has a direct role in modulating the maternal environment for normal fetal development. Thus it provides important physiological relation between a pregnant woman and the fetus.^[1] The development of placenta starts by 5th week of gestation. From the stage of chorionic villi, it attains the diffuse granular echotexture by 10th week of gestation.^[2,3] In various studies, the role of antenatal sonography has been discussed in the evaluation of placental abnormalities as of gestational diabetes, IUGR and non-immune hydrops. Normal physiological pregnancy from pregnancies complicated by various pathological processes can be differentiated by measurement of thickness of placenta,^[4] It has been illustrated in various studies that intra uterine growth retardation(IUGR) is associated with reduced placental thickness.it has been found that growth retardation is associated with maldevelopment of chorionic villi and impaired fetoplacental angiogenesis.^[5,6] in several studies, various aspects of placental growth such as weight , volume and plate area have been investigated to find out their correlation with gestational age and fetal well being. It has been proposed that the thickness of placenta is directly proportional to the gestational age of the fetus. Thus, measurement of placental thickness can contribute in diagnosis of fetus at risk. Though placental size can be more accurately estimated by placental volume then by placental thickness. Yet the placental thickness is measured as it is simple, rapid and easily reproducible.^[7] For assessment of growth of fetus and to plan for delivery, accurate assessment of gestational age (GA) is essential.

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Several researchers have evaluated that changes in the placenta during mid-pregnancy between 17-20 weeks, correlate well with the development of the foetus and can also predict foetal abnormality.^[8-10] the sonological parameters are presently the most effective methods to date pregnancy.^[11-12] Placental thickness (PT) measurement can be used as a new parameter to estimate gestational age and obstetricians for estimating GA as a routine in pregnant women.^[13-18]

METHODS

Study Population:

Fifty Antenatal women's each of from eleven week to forty week considered in this study.

Study Area:

The study was carried out in the Departments of Gynecology and Radiology in a tertiary care centre.

Study duration:

Duration of this study was six month.

Sampling technique & Data collection:

The trans-abdominal sonography was performed on each subject using Philips Envisor equipment, which has a multi frequency convex transducer with frequency range of 2 to 5MHz. Thickness of placenta was measured from the echogenic chorionic plate to placental myometrial interphase (excluding myometrium and subplacental veins). All these measurements are taken when uterine myometrium is in relaxed phase. Sonologically site of umbilical cord insertion was identified as a 'V' shaped hypo echoic areas close to the chorionic plate, where placental thickness was maximum. Calculation of gestational age in 1st trimester was done by measuring CRL (crown-rump length) using hadlock tables and for 2nd & 3rd trimesters composite of fetal measurements like biparietal diameter,^[19-20] circumference of head and abdomen taken at appropriate levels and femur length are used.^[21-23]

Inclusion Criteria:

1. Antenatal women's
2. Each of from eleven week to forty week

Exclusion Criteria:

- Subjects with multifetal gestation, fetal hydrops, fetal growth retardation and congenital malformations.
- Systemic diseases complicating the pregnancy like diabetes mellitus, hypertension and also the liquor abnormalities like poly/oligohydromnios.
- Morphological variants of placenta like succenturiate lobe and circumvallate placenta.

Data Analysis:

Data were analyzed by statistically and by using Microsoft excel.

RESULTS**Table 1: Distribution of age**

Age	Number of patients	Percentage
18-20	4	8%
21-25	36	72%
26-30	7	14%
31-35	2	4%
36-39	1	2%
Total	50	100%

Table 2: Position of placenta

Position of placenta	Number of patients	Percentage
Fundal anterior	16	32%
Fundal posterior	15	30%
Anterior wall	6	12%
Posterior wall	7	14%
Lateral wall	6	12%
Total	50	100%

Table 3: Placental thickness raised with each week of gestation

Gestational age in weeks	Number of patients	Mean placental Thickness (in mm)
11	1	11.51
12	1	11.86
13	2	12.62
14	1	13.53
15	1	14.98
16	2	15.59
17	1	16.66
18	2	17.53
19	2	18.53
20	1	19.11
21	2	20.66
22	2	21.17
23	1	22.59
24	2	23.61
25	2	24.13
26	2	26.2
27	2	26.53
28	1	26.66
29	2	28.61
30	2	30.33
31	2	31.27
32	5	31.33

33	2	32.39
34	1	32.79
35	1	34.54
36	1	35.46
37	2	36.75
38	1	36.23
39	2	37
40	1	37.13

Table 4: Correlation between gestation age & placental thickness

Correlation	P value	
Gestational age (11-35wks) and placental thickness	<0.001	Significant
Gestational age (>35wks) and placental thickness	>0.247	Not significant

Fifty antenatal patients age from 18 -39 were included in this study. Out of 50 antenatal women's studies, 16, Fundal anterior, 15 fundal posterior, 6 anterior wall, 7 posterior wall, 6 lateral wall were seen. Placental thickness were raised with each week of gestation. In Correlation between gestation age & placental thickness were significant in 11-35 week and no significance occur in >35 weeks.

DISCUSSION

Previously the role of placenta was limited for determination of its position or to know any premature separation. With advancement of sonographic modalities, more detailed examination of placenta is possible which lead to the better understanding of possible morphological changes easily measured through sonography which are an expression of normal growth of fetoplacental unit. Altered placental thickness have been associated with a number of fetal-maternal pathological conditions and increased morbidity. Thus, measurement of PT has an important role in screening of pregnancy related complications. PT must be measured for each week of gestation, so that abnormalities of fetus are noticed just by calculating the placental thickness, as this is altered due to pathological processes.^[24] For posteriorly located placentas, recognition of this region is done by acquiring images, where fetal accosting shadowing is least. For anteriorly located placentas correct positioning of transducer and proper adjustment of gain settings will decrease the near field and reverberation artifacts. Accuracy of placental measurements depends on detailed acquisition and interpretation of images. Error rate can be minimized by taking accurate measurements. For e.g. imaging obliquely through the placenta shows falls increasing placental thickness. To reduce these measurement errors, it is better to have all examinations by the same equipment's and examiners.

CONCLUSION

This study conclude that, the thickness of placenta by solography in singleton pregnancies can be used as an additional tool in the assessment of gestational age because of

its linear correlation with gestational age. Abnormal thickness of placenta in respective of gestation age may increase the suspicion of any underlying pathological process at earlier stages which may affect the pregnancy outcome. This early identification of abnormalities may help the obstetrician to consider precise antenatal care. Therefore routine antenatal ultrasound examinations should include measurement of placental thickness, as it assist in quantifying intrauterine environmental adequacy and fetal well-being.

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