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The Songraphic Measurement of Retroplacental Thickness in the Second and Third Trimesters

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Abstract: ***Assessment of thickness of the retroplacental zone of normal pregnancies with ultrasound provides important clinical data as there were several placental disorders their diagnosis depend on the size and presence or absence of this vital region. The study aims to assess the normal thickness using ultrasound in order to help diagnosis of placental diseases. There were 100 normal pregnancies had been selected for the study. They had been scanned with ultrasound using the obstetric protocol. The retroplacental hypoechoic area was determined and the thickness had been measured. The results showed that the retroplacental thickness of Sudanese preganancies lies within the normal range, the mean value was 10.239mm. The retroplacental thickness increases as maternal age advances and also increases with increasing growth of the fetal gestational age. It was observed the retroplacental thickness changed significantly with gravida status.***

Keywords: sonographic, measurement, retroplacental, thickness, trimesters

1. Introduction

The placenta is a fetal organ with important metabolic, endocrine and immunologic functions besides being responsible for nutrition, respiration and excretion for the fetus. Lastly acting as a barrier, it has a role in protecting the fetus from noxious agents [1]. 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].The retroplacental zone is the region between placenta and myometrium and represents the decidua basalis which is a maternal vasculature layer. The retroplacental complex refers to the hypoechoic space behind the placenta that is normally 10 to 20 mm thick. A retroplacental hypoechoic line is usually seen with normal placentation. It is very important to evaluate the thickness of this retroplantal zone as there were many placental disorders which the diagnosis depend on this vital region. Absence of this hypoechoic line or clear space has been described with placenta accreta. However, absence of the hypoechoic line has also been seen in normal pregnancies and absence of the clear space alone is not predictive for placenta accreta.

With the new advances in grey scale and Doppler sonography, we are able to study the placental and retroplacental sonographic appearance and its relationship to uteroplacental blood flow measurement and intrauterine growth. Presently the most effective way to date pregnancy is by use of ultrasound. Several sonographically derived fetal parameters used to date pregnancy include fetal crown - rump length (CRL), biparietal diameter (BPD), head circumference (HC), femur length (FL), and abdominal circumference (AC) [3]. Placental thickness measured at the level of the umbilical cord insertion can be used as a new parameter to estimate gestational age of the fetus. The present study was undertaken to evaluate the retroplacental thickness with relation to gestational age, parity and gravidus status in normal pregnancies.

Ultrasound is the first-line modality in imaging the placenta and retroplacental zone due its wide availability and its use of non-ionizing radiation. The placenta appears as a uniformly echogenic (intermediate echogenicity) structure along uterine wall. The retroplacental zone appears on ultrasound as a deep hypoechoic band separating it from normal uterine myometrium. This retroplacental hypoechoic band is vital to rule out implantation disorders and its normal appearance should not be confused with retroplacental hematoma [4]. There may also be numerous anechoic areas, representing venous lakes, within the placenta itself [5]

2. Materials and Methods

This is a descriptive cross-sectional study conducted in different hospitals and clinical Centers in Khartoum State from the period of April to November 2012. There were 100 pregnancies in the 2nd and 3rd trimesters had been selected for the study. They had attended in the ultrasound department for routine antenatal care. Ultrasonographic evaluation was performed with expert Sonologists using ultrasound machine (3.5MHz probe). Women with multiple gestation, diabetes, or growth retardation were excluded from the study. Real ultrasound images of placenta and retroplacental space were taken. The placenta is normally seen as a focal mass that causes indentation of the gestational sac and is more hyperechoic than the underlying myometrium. The myometrium is seen as a thin, well-demarcated rim of hypoechoic tissue. In the second trimester, the placenta is homogeneous and granular in echotexture. By the third trimester, calcifications and multiple vascular lakes are often seen, which can give the placenta a more heterogeneous appearance.

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2.1The Ultrasonographic Procedure

The pregnant lies supine with comfortable position; amount of songraphic gel is poured at the anterior abdomen, then the investigation begins with using a lower transducer frequency (3.5 MHz). Longitudinal and transverse scanning were obtained across the placenta. Adjacent to the myometrial side of the placenta is a thin retroplacental (subplacental) clear space which appears as hypoechoic band. The caliper was placed between outer edge of placenta and the inner edge of myometrium to measure the thickness. Three to four measurements were taken and the mean was calculated to represent final thickness.

2.2 Statistical Analysis

Statistical Package for Social Sciences (SPSS) version 16 was utilized for statistical analysis. P-values less than 0.05 were considered to be significant. Most of the variables were quantitative data, so standard deviation and mean values had been calculated. The age of pregnancies, gestational age, parity and gravida status had been categorized into groups.

2.3 Ethical Consideration

The research was firstly approved from the research committee of faculty of Radiological Sciences and Medical Imaging at Alzaiem Alazhari University. Informed consent was taken from every participant, no name or personnel details were mentioned in the study

3. Results

There were 100 pregnant women in the third and third trimesters had been scanned with ultrasound. The age of pregnancies was ranged between 15 to 45 years old and had been categorized into 3 groups. Most of the pregnancies their age lie between 26-35 years old and represent 59% as shown in table 1. The fetal gestational age was extended from 15 weeks up to 45 weeks (second and third trimesters). Most of the fetal gestational age was ranged at 23 to 35 weeks (44%) as shown in table 2. The gravida status of the pregnancies was categorized into 3 groups; primigravida, multigravida and grand gravida. It was observed most of them were multigravida (75%) as shown in table 3.

The measurement of retroplacental space was obtained and the mean value was 10.239 millimeter (mm) as revealed in table 4. In table 5, a comparison was taken between maternal age and retroplacental thickness; there was high significant difference (p-value = 0.000). There was a positive correlation between the age of pregnancies and retroplacental thickness but were not calculated. The retroplacental thickness increases as age advances, shown in table 5.The retroplacental thickness also showed high significant difference between 2nd and 3rd trimesters. It was significantly higher in the 3rd trimester than the second trimester (p-value = 0.000) as shown in table 6. The retroplacental thickness was observed to be significantly different at stages of gravida status. It was significant higher in primigravida than multigravida (p-value = 0.000) and also cited inside the manuscript (example: page numbers, year of publication, publisher's name etc.).

Table 1: age distribution of the study population

Age groups(years)	Frequency	Percent%
15-25	33	33%
26-35	59	59%
36-45	8	8%

Table 2: Distribution of the fetal gestational age

Fetal gestational Age (years)	Frequency	Percent%
14-22 weeks	27	27%
23-31 weeks	44	44%
32-40 weeks	29	29%

Table 3: Distribution of gravida status among the pregnancies

Gravida status	Frequency	Percent%
Primigravida	24	24%
Multigravida	75	75%
Grand gravida	1	1%

Table 4: measurements of the retroplacental thickness

Retroplacental thickness(millimeter)	Frequency	Percent %	Mean value
7-8mm	7	7 %	10.239mm
8-9mm	16	16 %	
9-10mm	26	26%	
10-11mm	19	19%	
11-12mm	10	10%	
12-13mm	11	11%	
13mm	11	11%	

Table 5: Comparison between maternal age and retroplacental thickness

Age of pregnancies	*Mean of placental thickness*	*Standard deviation*	*p-value*
15-25years	8.58 mm	2.3 mm	0.000
26-35years	10.27 mm	2.4 mm	
36-45years	10.43 mm	2.4 mm	

Table 6: relationship between gestational age and retroplacental thickness

Fetal Gestational age	Mean of placental thickness	Standard deviation	p-value
Second trimester(13-26weeks)	8.58 mm	1.53 mm	0.000
Third trimester(27-40 weeks)	10.27 mm	1.56 mm	

Table 7: Relationship between gravida status and retroplacental thickness

Gravida status	Mean of placental thickness	Standard deviation	P-value
Primigravida	9.35 mm	1.90 mm	0.000
Multigravida	10.39 mm	1.68 mm	
Grand multigravida	11 mm	0 mm	

4. Discussion

An analysis of the retroplacental area is important in making the diagnosis of several placental disorders such as placenta accreta. Ultrasound has been the primary diagnostic tool for placenta accreta and has been shown to help detect this

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disorder in 50%–80% of cases [6], [7], [8] and this depend mainly on sonographic evaluation of retroplacental hypoechoic region. For example, in placenta accreta, the normally hypoechogenic, 1- to 2-cm area is absent or markedly thinned (< 2 mm), and there is loss of the normal decidual interface between the placenta and myometrium.

There were few papers reporting the normal measurement of the retroplacental space in normal pregnancies. The measurement of retroplacental thickness can effectively differentiate normal pregnancies from affected pregnancies requiring invasive work-up. I present study, the mean value of the normal retroplacental thickness was 10.239mm. This was consistent with the general measurement that reported in the literature review. McGahan et al., described the sonographic appearance of the retroplacental region as sonulucent area and he reported that it was ranged from 5-20 mm in thickness [9].The mean value of our study is not different from this result and lies at the range. Other study showed that the retroplacental thickness was normally measured 1cm after 18 weeks [10].

In our study we found that there was significant increase in retroplacental thickness as maternal age advances. It was observed to be lower at the age group of 25-36 years old. We found no study focusing on correlation of maternal age with the retroplacental thickness. It was observed that the mean value of retroplacental thickness at the second trimester was significantly lower than that of the third trimester. This might be attributed to the rapid growth of placenta and myometrium at the beginning of the third trimester to date of delivery. The retroplacental thickness is also different in accordance to the gravida status. In primigravida the retroplacental thickness is significantly lower than multigravida and grandgravida. This result indicates that retroplacental thickness changed with the gravida status and showed significant increasing..

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