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Research Article

**SONOGRAPHIC CORRELATION OF PLACENTAL
THICKNESS WITH FETAL WEIGHT IN SECOND THIRD
TRIMESTERS IN NORMAL PREGNANCIES**

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Abstract:

Objective: To correlate placental thickness with fetal weight sonographically, in second third trimesters of normal pregnancies

Material and method: This was a cross-sectional analytical study conducted in Gillani Ultrasound Center, Pakistan. Three-hundred and eighty-five normal pregnant women of 2nd and 3rd trimester of pregnancy with complete routine checkup were included. Pregnancies with complication, anomalies and other comorbidities like diabetic mellitus, hypertension were excluded. Toshiba Xario equipped with 3-7.5 MHz curvilinear array transducer and Honda HS-2000 ultrasound machine was used for this study. American Institute of Ultrasound in Medicine AIUM obstetrical ultrasound guidelines were observed in this study. SPSS version 24.00 was used to analyze the data.

Results: Mean age of the 385 pregnant females included in the study was 25.5 with a minimum age of 18 and maximum age of 37 years. The mean fetal weight was 1195.36 with minimum fetal weight 28g and maximum 3732g. The mean of placental thickness was 26.86mm with minimum placental thickness was 13.50mm and maximum placental thickness is 41.80mm.

Conclusion: It was concluded from this study that there was a positive strong correlation between placental thickness and fetal weight.

Keywords: Biparietal diameter BPD, Estimated fetal weight EFW, Abdominal circumferences AC, Last menstrual period LMP, Estimated delivery date EDD.

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INTRODUCTION:

Placental thickness normally increases as gestational age increases. On ultrasound, we scan that placental thickness increases nearly 1mm per week. Somehow, placental thickness reaches up to 4 cm. In my study, I measure placental thickness to correlate it with fetal weight in 2nd and 3rd trimester. As we know that fetal weight and placental thickness increases with gestational age¹ A very strong positive correlation we expected among placental thickness and fetal weight. Ultrasound gives a variety of choices to measure the thickness of turgor placental in vivo [2]. By depiction a correlation coefficient between placental thickness and fetal weight, we'll be able to the assessment of fetal weight with the measurement of placental thickness with the help of ultrasound [3]. The complete placenta mostly noticeably evident on ultrasound from about 9 or 10 weeks of gestation, when it exposes a homogenously grainy echogenic outline [4]. Ordinary on ultrasound we measure the placental width in mm at the 2nd trimester and decide either the measurement should be used for gestational age and the placental position [5]. A "point of confinement" is that the placental width of 18.5 cm placental thickness of 2 cm at 35 weeks calculates a small conception weight neonate⁶. Thickness of placenta measured in millimeters increasing with gestational age from 10 weeks to 36 weeks. Gestational age could be predictable from the placental thickness, in women in that the last menstrual period is irregular or is not known [7]

Placental thickness is a commendable factor for calculation of gestational age essentially in the late 2nd trimester and start of 3rd trimester [8]. Ultrasonography US agree to the assessment of the placenta and the finding of placental abnormalities using altered parameters such as placental thickness [9]. The role of obstetric ultrasonography has sure vibrant and irreplaceable in exact pregnancy dating & finding of fetal abnormalities. Now the most current way to date pregnancy is by the practice of ultrasound. Several sonographic studies resultant fetal parameters used to date pregnancy, take a fetal crown-rump length CRL, head circumference HC, Biparietal diameter BPD, abdominal circumferences AC and femoral length FL [10] The sonographic occurrence of thick, assorted placenta is violently correlated with an inimical pregnancy outcome and every so often with perinatal death [11]. usually the placenta shape is discoid with a diameter of 15 to 25 cm and is around 3 cm thick and its mass is about 500 to 600 g [12]. In 2nd trimester, the placenta is the same and granular in echotexture [13]. The placenta is the fetal organ that provides the exchange

of food among mother and fetus. This organ needs to provide its function such as path and exudation even through its growth and hence all tolerant changes need to be in union with its function [14]. The placenta is a body part that develops in your uterus all over pregnancy [15]. This organ conveys oxygen and nutrients to your developing baby and excludes fresh products from your fetal blood [16]. The placenta implants to the wall of mother's uterus, and fetal umbilical cord coming from it. Mostly in pregnancies, the placenta attaches to the upper side or only any one side of the uterus [17]. Ultrasound is the main modality in imaging the placenta due to its well-known availability. The placenta looks like an inconsistently echogenic structure alongside the uterine wall, with a deep hypoechoic band untying it from normal uterus myometrium [18]. This retroplacental hypoechoic lining band is foremost to rule out attaching disorders and its regular existence should not be messy with a retroplacental hematoma. There may also be many anechoic zones, presenting venous lakes inside the placenta [19]. Usually, the exterior surface between mother and embryonic tissue clarifies the volume of bidirectional mother to fetus transfer of ingredients [20]. The scanty contact superficial between mother and fetus, as succeeds with a discoid placenta, is rewarded by a demanding interdigitation between the two tops [21].

LITERATURE REVIEW

Jennifer Faraone & Dr Carol Ann Weis defines placenta as body part which links the mother and fetus, conveying O² and nutrients from the motherside to the baby and allowing the relief of CO² and waste material from the fetus. Harald Lutz, Elisabetta Buscarini explains that placenta can be sited anywhere on the outward of the uterus. The forward-facing wall was called anterior wall and the backside wall was called posterior wall. The side walls are named left lateral and right lateral. The upper topmost wall was called fundal. Kanan Yelikar explains in middle of pregnancy the placenta inhabits 50% of the uterine layer. By 40 weeks 'of pregnancy, the placenta only covers 17 - 25% of the uterus area. It will not contract, but during pregnancy develops more and the uterine area enlarges. Tania G Singh writes due of uterine area enlarges many pregnancies having a low-lying placenta at 18-20 weeks of pregnancy, but they do not have a low-lying placenta at the end time of the gestation. According to Keith L. Moore, T. V. N. Persaud, Mark G. Torchia the placenta does remains low-lying and then we named it placenta praevia. If the placenta entirely covers the area then there was no mode the baby can deliver

vaginally without producing huge haemorrhage from mother and baby.

Steven G. Gabbe stated that placenta can redirect the fetus condition, and any anomalies can be specified by an abnormal placental size in 3rd trimesters. Growth restraint was showed by small placenta. Further than 5 cm before 40 weeks are measured abnormal. There are 4 grades of placenta during pregnancy. Gabbe SG explain in his studies the body of the placenta has a consistent texture without the existence of linear echogenic foci; the chorionic plate was plane and definite. The body of the placenta has a consistent texture with dispersed comparable to basal layer linear 1-4mm calcifications, limited of the basal layer, and it exact surging chorionic plate. There was clear basal plate calcification, with casually spread rebounds in the pie central material and depressions of the chorionic plate Moderate to noticeable basal and diffuse calcifications divided by echogenic septations of the chorion that spread, continuous, to the basal plate; central "drop-out" areas which present in these cubicles. Siegfried Zabransky explains in this way that in second trimester EFW ranges in between 1 gram to 875 grams. In third trimester EFW ranges between 1000 grams to 3685 grams. Roy G. Farquharson et al. in their book about early pregnancy describes about placental thickness has a tendency to regularly increase with gestational age in a linear way. On ultrasound, this can be seen to be around 1 mm per week and the thickness of the placenta also be used to estimated gestational age:

Approximate gestational age in weeks = placental thickness +/- 10 mm.

Farquharson RG et al. describes extreme thickness of a normal placenta at any idea during pregnancy was frequently taken considered to be 4cm. Anterior placentas are 0.7 cm less than posterior side placentas and extreme thickness for an anterior placenta was 3.3cm.

J. P. Bernard explains EFW was an advantageous parameter with which to calculate birth weight and outcomes when it was considered a few days before delivery. It has accurateness like that of clinical ultrasound check-up for delivery at or beyond 37 weeks' gestation, whereas it was suggestively higher to clinical approximations of weight for preterm birth. When EFW was considered former to delivery in order to advantage in decision making, it can be

associated to birth weight reference charts and, in skilled hands, nearly 80% of EFWs are within 10% of the real birth weight, with most of the rest being within 20% of real birth weight.

MATERIAL AND METHODS:

This was analytical study and the calculated sample size was 385. Sampling techniques were nonprobability sampling. The study was conducted in Gillani Ultrasound Center & Afro Asian Institute. The study completed within 6 months after approval of synopsis. All normal pregnant women of 2nd and 3rd trimester of pregnancy with complete routine checkup are included. Pregnancies with complication, anomalies and other comorbidities like diabetic mellitus, hypertension, smoking, and hepatitis, are excluded.

This study performed under the supervision of a competent sonologist and researcher. Toshiba Xario equipped with 3-7.5 MHz curvilinear array transducer used for this study. The observation made on a grey scale and Doppler ultrasound. Outcome variables are gestational age, fetal weight and placental thickness on gray scale ultrasound. International protocols of AIUM obstetrical ultrasound followed which are routinely observed in this department. No special preparation was needed for the patient preparation for both diagnostic. The Data collection sheet used to record observed data while Microsoft Excel and SPSS version 24.00 used to record and analyze the data. The quantitative variables like women age, height, weight, fetal weight, gestational age, LMP and placental thickness present ads mean and standard deviation and qualitative variables as an occupation will be present in frequency and percentage. Pearson correlation t-test was applied to compare placental thickness and gestational age.

RESULTS:

In this study, I took total 385 patients of Gillani ultrasound center with minimum age 18 years, maximum age 37 years and the mean age 26 years. In 2nd & 3rd trimester minimum, the placental thickness is 13mm, the maximum placental thickness is 41mm and mean of placental thickness is 26mm. Graph-I. In 2nd and 3rd-trimester minimum fetal weight 28g, maximum fetal weight 3732g and mean fetal weight is 1144g. Correlation between placental thickness and fetal weight is significant at the 0.01 level 2-tailed. Table-I.

TABLES AND GRAPHS

Graph-I: Sonographic correlation of placental thickness with fetal weight in second third trimesters in normal pregnancies

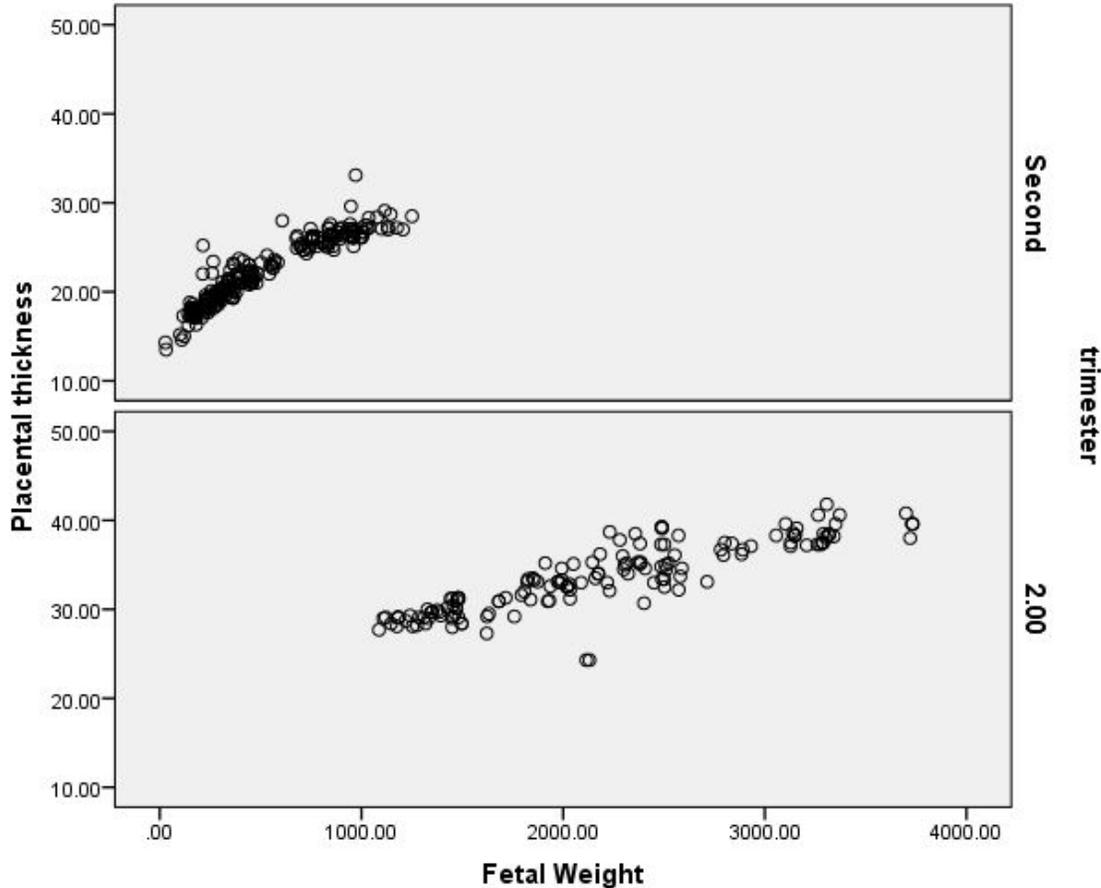


Table-I: Correlation placental thickness and fetal weight

		Placental thickness	Fetal Weight
Placental thickness	Pearson Correlation	1	.952**
	Sig. (2-tailed)		.000
	N	405	405
Fetal Weight	Pearson Correlation	.952**	1
	Sig. (2-tailed)	.000	
	N	405	405

** . Correlation was significant at the 0.01 level (2-tailed).

DISCUSSION:

We consider conventional transabdominal ultrasonography a dependable, safe and easy technique for viewing fetus and its growth before

birth as well as we can see the placenta. Even we can measure all fetal organs and their growth before birth. Placental wideness is less than 20 mm at 35 weeks' of gestation as per a complex fact for detecting low birth

weight newborns. A placental thickness more than 4 cm typically linked with gestational diabetes, intrauterine toxicities and hydrops²². Earlier reports defined link of thick placentas with the higher danger of adversative perinatal result, for instance, abruption placenta, admittance in neonatal intensive care unit, genetic abnormalities, perinatal death, fetal growth restriction FGR, heavy-for-gestational-dates infant HFD, pregnancy-induced hypertension PIH, preterm labor pains²³. On the ultrasound taking size of placental thickness is a modest method to the estimation of placental size, and a dense placenta may be an expedient predictor of adversarial pregnancy endings [24].

Jacques S. Abramowicz Proved in his study there is a positive correlation between placental thickness and normal gestational age. And there is an optimistic correlation between placental thickness and bi partial diameter BPD, femur length FL and abdominal circumference AC in turn [25]. Joseph J. Volpe itemized that uncharacteristically thick placentas must be correlated with adversarial pregnancy ending. Similarly, further frequent thick placentas in circumstances with absent end-diastolic umbilical arterial stream existed. It appears that fused more slowly when it is compound or too compact [26]. In a current study, Silver RM suggested that ultrasonographic raise of placental thickness through 2nd trimester is because of above-rise of the intervillous space by mother blood somewhat by the adaptive development of functional placental soft tissue [27]. Mathai BM et al researchers legitimately direct increase in mean placental thickness through gestational age was perceived in correlation analysis studies accompanied to determine the link between placental thickness and gestational age. The value of the average placental thickness increased with proceeding gestational age, just about similar from the twenty-two to the thirty-five weeks. Noteworthy positive correlations among placental thickness and expected fetal weight in the 2nd and 3rd trimester's $p < 0.05$ in a non-intrauterine growth restriction group were also verified. A helpful correlation, with growing placental volume with increasing gestational age, was also detected; however it stayed reduced in the growth-limited unborn babies. Efficacy of relationship among thickness placenta of and growth factors is that substandard placental thickness for a gestational age can be the initial sign of fetal growth obstruction. This study, an important strong correlation is seen between thickness of placenta and the sonographic gestational age in days in both groups p-value of 0.01 [28].

CONCLUSION:

Ultrasonography is the latest technique to view the fetal growth and placenta before birth trans-abdominally. Previous studies proved strong correlation between fetal weight and placental thickness in 2nd and 3rd trimester in normal pregnancies. This study also suggests that the correlation between thickness of placental and fetal weight in 2nd & 3rd trimester in normal pregnancies is significant.

Figure-1:

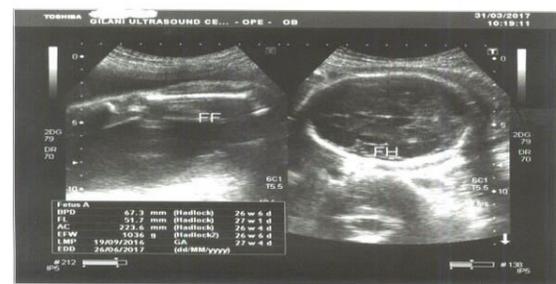


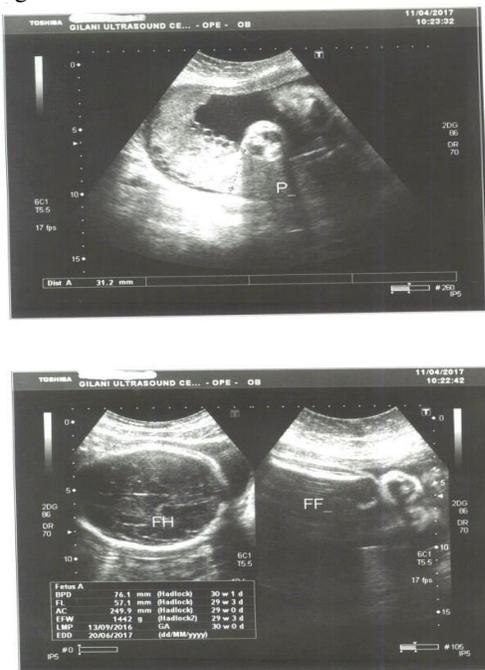
Figure-2:



Figure-3:



Figure-4:



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