Volume : 5 | Issue : 5 | May 2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 69.48

Correlation Between Placental Thickness in The Second and Third Trimester and Fetal Weight

Medical Science

KEYWORDS : Fetal weight, Placental thickness, obstetric ultrasonography.

Dr. Pawan singhal — Associate professor, Department of Radiodiagnosis, Rama Medical College Hospital and research Centre, Ghaziabad U.P.

*** Dr. Pratishtha Potdar** — Associate professor, Department of Anatomy , Rama Medical College Hospital and research Centre, Ghaziabad U.P. * corresponding author

ABSTRACT

Objective : The aim was to investigate relationship between placental thickness and fetal weights during second & third trimester.

Material Method : A study was conducted on 100 pregnant females between 13 weeks and 38 weeks of gestation referred from antenatal clinics to department of Radio diagnosis in association with the department of Anatomy from 20152016. All singleton pregnant women aged between 15 and 35 years for routine antenatal ultrasound were included. Patient more than 35years, Twin pregnancy,diabetes, diagnosed cases of fetal hydrops pregnancy with chromosomal anomaly, placenta previa & placenta abruptia

The placental thickness was measured transabdominally by placing the ultrasound transducer perpendicularly to the plane of the placenta, at the level of umbilical cord insertion and mean reading was measured along with fetal weight at second and third trimester. Pearson's correlation analysis was used to establish the degree of relationship between placental thickness and birth weight. Placental thickness and gestational age was correlated and statistically analysed.

Result : The maximum mean placental thickness at 26 th week is 29.76 ±2.163and at 38 th week is 38.12 ± 2.09 mm was recorded. The mean fetal weight at 26 th week is879.5± 59.15 and at 38 th week is 3169.66± 187.5 indicating increase in Placental thickness with fetal weight (r=079 ,p =0001:r =0.50,p =0.004). Placental thickness has a strong positive correlation with fetal weight in 2nd trimester as compare to 3rd trimester.

Conclusion : According to our study, birth weight has a positive relationship with both second and third trimester placental thickness. Obstetric ultrasonography should routinely measure placental thickness as it will indicate earliest sign of Intra-uterine growth rate(IUGR),however placental thickness change could not predict low birth weight.

Introduction

The role of obstetric ultrasonography has proven invaluable, in accurate pregnancy dating & detection of fetal anomalies[1].The placenta is a feto maternal organ which provide physiological link between a pregnant woman & the fetus. The placenta develops from chorionic villi at the implantation site at about the 3rdweek of gestation and by 9thweek, the diffuse granular echotexture of the placenta is clearly apparent at sonography [2,3] . At term placenta is discoid with a diameter of 1525cm & is approximately 3cm thick and weighs about 500600gm[4] .Placental thickness appears to be a promising parameter for estimation of gestational age of the fetus because of increase in placental thickness with gestational age[5].

A placental thickness of less than 2.5cm in second trimester is usually associated with Intrauterine growth rate (IUGR)[6]. Very few workers have measured the placental thickness and correlated with the weight of fetus. In a research held in Nigeria, significant positive correlation were found between placental thickness and estimated fetal weight in second and third trimester (r =0.61 and r=0.57 respectively) .No other data in population of Uttar pradesh state of Indian population is available ,so this prompted us to conduct this study in which the placental thickness is correlated with the weight of fetus.

Material Method

A study was conducted on 100 pregnant females between 13 weeks and 38 weeks of gestation referred from antenatal clinics to department of Radio diagnosis in association with the department of Anatomy from 20152016

Inclusion criteria .

1. All pregnant women aged between 15 and 35 years for routine antenatal ultrasound.
2. Known Last Mesntrual period.
3. Singleton Pregnancy .

Exclusion criteria

Patient more than 35years, twin pregnancy, diabetic, diagnosed cases of fetal hydrops pregnancy with chromosomal anomaly, placenta previa & placenta abruptia .

Technique

Study was carried out on seimen Acuson 300 machine with low frequency tranducer 3.5MHZ convex probe .Patient was placed supine in position with arms above the head. Privacy of patient was maintained.Examination was carried out after consent of patient and after approval of medical ethical committee.

The placental thickness was taken at the level of umbilical cord insertion in the longitudinal direction and a mean reading was taken along with the fetal weight as shown in fig no.1& 2. The placental thickness &fetal weight is then correlated. The mean value of the placental thickness along with the respective standard deviation is calculated for different gestational ages from the 13thto 39thweek. The findings is compared and statistically analysed in order to find possible correlation between placental size and fetal weight.

Volume : 5 | Issue : 5 | May 2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 69.48

Fig:- 1 & 2 Showing measurement of placental thickness & fetal weight in second trimester.

RESULT

A study of 100 antenatal singleton pregnancies of 13thweeks to 38th weeks was conducted after the consent of ethical committee of medical college. The patients were observed for correlation of placental thickness with birth weight of fetus.

Table 1 shows that the mean placental thickness and fetal weight at 26th week of gestation was 29.76 ±2.16 and 879.50±59.15 recorded.

Table 2 shows that the mean placental thickness and fetal weight at 38 th week of gestation was 38.12 ±2.09 and 3169.66±187.51 recorded. The result of our study showed that there was a fairly linear increase in placental thickness with fetal weight

Table 3 shows that there was a significant positive correlation between placental thickness and fetal weight in second and third trimester. Regression analysis yielded a linear relationship between fetal weight and placental thickness as shown in graph no.1 &2.

Table no. 1 Normal values of placental thickness & fetal weight in 50 pregnant women of second trimester

S.No.	EGA (WK)	No. of Measurements	Placental Thickness (MM)	Fetal Wt. (GM).
1.	14	3	14.60 ± 0.17	50.66±8.33
2.	15	7	19.24±1.59	65.28±17.18
3	16	4	19.73 ± 1.12	96.00±5.03
4	17	4	21.86 ± 0.96	157.90±53.23
5	18	3	23.71±0.07	226.33±40.99
6	19	3	24.93±2.87	247.00±19.97
7	20	3	25.37±1.65	293.33±51.31
8	21	2	27.43±0.37	325.00±35.35
9	22	6	26.80±3.53	546.50±146.35
10	23	3	26.56±4.16	601.00±27.22
11	24	2	22.30±0.56	748.00±21.77
12	25	6	26.32±2.63	750.00±20.25
13	26	4	29.76±2.163	879.50±59.15

Correlation of placental thickness.....

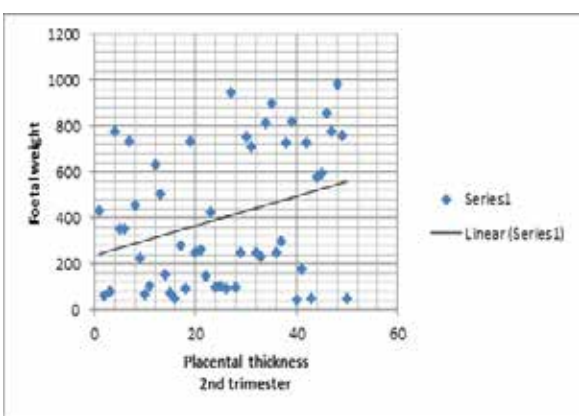
Table no. 2 Normal values of placental thickness& fetal weight in 50 pregnant women of third trimester

S.No.	EGA (WK)	No. of Measurements	Placental Thickness (MM)	Fetal Wt. (GM).
1	27	2	28.84±0.121	903.00±115.96
2	28	3	30.40±2.066	1044.33±54.63
3	29	3	34.52±4.27	1098.20±683.30
4	30	4	36.90±4.90	1436.5±133.90
5	31	3	30.43±0.60	1648.33±21.73
6	32	3	38.21±7.13	1837.66±189.95
7	33	9	38.21±7.13	2131.22±125.67
8	34	3	38.21±2.83	2510.60±366.33
9	35	7	38.21±6.88	2627.25±172.10
10	36	6	38.21±10.77	2685.33±118.24
11	37	4	38.21±7.36	3032.25±339.73
12	38	3	38.12±2.09	3169.66±187.51

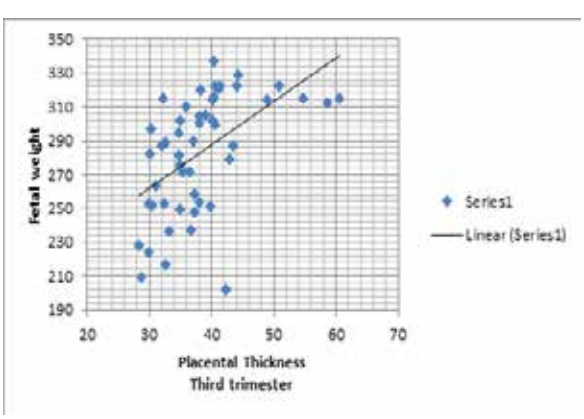
Table no.3 correlation between placental thickness and fetal weight

S.No.	Trimester	Fetal Wt. in Gm.
1	Second (n =50)	r =0.797 p=0.001*
2	Third (n=50)	r =0.50 p=0.003*

Graph No. 1 Showing correlation against placental thickness and fetal weight in second trimester



Graph No. 2 Showing correlation against placental thickness and fetal weight in third trimester



Discussion

Normal placental function and structure is necessary factor for the formation of a healthy foetus and consequently normal birth weight. Early detection of any pathology in placental villi helps obstetrician to consider prenatal care precisely. Several parameters were used to assess fetal growth in order to quantify intrauterine environmental adequacy and fetal well being. So it is clear that normal development of placenta during gestation is necessary for supporting healthy fetus, and impairement in its development may have profound effect on fetal development as placenta provides nutrients and oxygen to the fetus.

Various studies were done to deduce a relationship between placental thickness and gestational age. In present study placental thickness correlation with fetal weight is 0.79 similar to Clapp et al[8], which showed significant correlation (>0.79) between placental growth rate and birth weight on forty singleton pregnant women. Similarly correlation of placental thickness with gestational age and fetal growth reported in research by karthikeyan et al[9]. Cooley et al[10] also suggested that antenatal ultrasound of the placenta may aid detection of placental disease. They showed that placental thickness was less in pregnant female complicated by chorioamninitis.

In present the mean placental thickness at 26 week of gestation was 29.76 ±2.16 and 38 week of gestation was 38.12±2.09 nearly similar to study conducted by C.C Ohagwu et al[11] revealed placental thickness at 26th week of gestation was 32.52±4.94 and placental thickness at 38th week was 42.49±5.79. In present study there was a significant positive correlation between placental thickness and birth weight of fetus in second and third trimester. Regression analysis yielded a linear relationship between fetal weight and placental thickness similar to study of Maryam Afrakhteh et al[11] and Preeti et al.[12] In our study linear increase in placental thickness was found to correlate with birth weight of fetus through out pregnancy similar to study conducted by Elachel et[13]. They also showed a higher percentage of thick placenta in birth weight at term above 4000gm or < than 2500gm. Ultrastructural study of macara et al[14] of placenta indicates that thickening of the basal Lamina and increase deposition of collagen and laminin together with congestion of the erythrocytes is the cause of limited oxygen transfer from intervillous space to growth retarted fetus.

Summary and Conclusion

The result of our study showed that placental thickness increased with fetal weight in fairly linear manner. This relationship suggest that placental thickness can be used as an indicator of fetal growth. Subnormal placental thickness for a particular gestational age may represent sign of intrauterine growth retardation.It is concluded from our study, that placental thickness helps in determination of normal growth of fetus in second and third trimester, so it can be used as an additional sonographic tool in correlating both gestational age and birth weight. Thus it should be recommended routinely during obstetric ultrasound.

References:

1. Cunningham FG Leveno KJ, Bloom SL, et al. In ultrasonography and Doppler, Williams obstetrics. 22nd edition New York; Mc Graw Hill; 2005. P. 389 – 90
1. Cunningham FG Lenevo KJ, Bloom SL, at al. In implantation, embryogenesis and placental development, William's obstetrics, 22nd New York; Mc Graw Hill; 2005, PP 3638.
1. Elsayes KM Trout AT, Fried Kin AM, et al. Imaging of the placenta; a multimodality pictorial review Radio graphics, 2009; 29,1371 – 1391(doi: 10. 1148 rg – 29508242 Pubmed)
2. Sadler, T.W2004 Langman's medical embryology 9th edition Baltimore , MD, Lippincott Williams and Wilkin, PP 177178.
1. Mital P, Hooja N, Mehndiratta K, et al. Placental thickness a sonographic parameter for estimating gestational age of the fetus. Indian J Radio Imaging. 2002; 12(4): 553554.
2. Kuhlmann, R.S. and S. warsof, 1996. Ultrasound of the placenta. Clin, Obstet Gynecol, 39: 519534.
3. Habib FA. Prediction of low birth weight infants from ultrasound measurement of placental diameter and placental thickness. Ann Saudi. Med.2002; 22 (5-6): 312-4
4. Clapp JF 3rd , Rizk KH, Appleby-Wineberg SK, Crass JR. Second – trimester placental volumes predicts birth weight at term. J Soc Gynecol Investig. 1995; 2(1):19-22.
5. Karthikeyan T – Subramaniam RK, Jhonson W, Prabhu K. Placental thickness and its correlation to gestational age and foetal growth parameter – a cross sectional ultrasonographic study. J Clin Diagn Res 2012; 6 (10): 1732-5.
6. Cooley SM, Donnelly JC, Walsh T, McMahon C, Gillan J, Geary MP. The correlation of ultrasonographic placental architecture with placental histology in low – risk primigravid population. J Perinat Med. 2013 March 21:1-5.
7. Maryam Afrakhteh, Aida Moeini, Morteza Sanei Taheri,Hamid Reza Corelationship between placental thickness in second and third trimester and fetal weight ,Rev Bras Ginecol Obstet.2013 ;35(7):317-22.
8. Preeti et al.,Correlation of placental thickness with Gestational A ge and Foetal Outcome. Indian Journal of Neonatal Medicine and Research 2015 Jul Vol -3 (3) 19-24.
9. Elachal U, Ezra Y, Levi Y, Bar-Oz B, Yanai N, Nadjari M, Sonographically thick placenta: a marker for incrased perinatal risk – a prospective cross – sectional study. Placenta 2000; 21(2-3):268-72.
10. Macara L, Kingdom JC, Kaufmann P, Kohnen G, Hair J, More IA, et al. structural analysis of placental – terminal villi from growth restricted pregnancies with abnormal umbilical artery Doppler wave forms. Placenta. 1996; 17(1) : 37-48.