ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Morphology and Morphometry of Placenta.

Daniel Rajendran[1], Karthikeyan T[2], Johnson WMS[1], Kavimani M[1]*, and Manikanta Reddy V[3].

[1]Department of Forensic Medicine, Sree Balaji Medical College and Hospital, Bharath university, Chrompet, Chennai, Tamil Nadu, India.
[2]Department of Anatomy, Sree Balaji Medical College and Hospital, Bharath university, Chrompet, Chennai, Tamil Nadu, India.
[3]Department of Anatomy. Pondicherry Institute of Medical Sciences, Pondicherry, India.

ABSTRACT

To compare the morphometry placenta in normal and pregnancy complicated by gestational diabetes, pregnancy induced hypertention and anaemia.Morphology of placenta also studied. A total number of 127 placentae were collected from pregnant women between 34 – 39 weeks and were grouped into term pregnancy without complication and term pregnancy with complication like pregnancy induced hypertension, gestational diabetes mellitus, anaemia. Placentae were washed in tap water and membranes examined. The specimen were transported to the Anatomy dept. in 10% formalin filled bucket. Weight , diameter Thickness , No. Of cotyledons, Shape, Calcification of the placenta were measured along with baby weight. Mean diameter of placental diameter is decreased in PIH and increased in GDM& anaemia as compared to normal pregnancy with significant p value < 0.05 and the difference is highest in anaemia. There is statistical difference between male & female baby with p value of 0.009. the mean placental thickness is decreased in PIH & GDM as compared to normal pregnancy but its statistically insignificant (p value 0.126)and its same as anaemia. There is no statistical difference between male & female baby. : baby weight is decreased in PIH & anaemia and increased in GDM with significant statistical difference and no statistical difference between male & female baby.

Keywords: placenta, gestational diabetes mellitus, pregnancy induced hypertention, placental coeffiecient.

Corresponding author

ISSN: 0975-8585

INTRODUCTION

The latin root Placenta means a cake; Greek root means flat. Placenta is a diplomatic intermediary between mother and child, nourishes the still helpless foetus, eminent emissary of foetal waste, intimidating the harmful intruders.Placenta is the most accurate record of the infants prenatal experiences. The foetus, cord and the placenta constitute genetically identical parts of a unit that share the uterine environment. Evolution of knowledge of placenta starts from the Biblical times. Egyptians believed that the placenta was the external soul. Teasdale F et al [1] says that placental dysfunction can be evaluated through the quantitative analysis of the morphological changes in the placental structures that are intimately related to the transfer function of the placenta. He concludes that morphometry is presented as an indirect and noninvasive approach to study the physiology and pathology of gestation in the human.Prevalence of anaemia in pregnant women is higher in India than the surrounding developing countries adding economic burden and morbidity [2]. In different conditions complicating pregnancy placental morphology is deranged. Aleschchenko E et al [3] states that morpho-functional state of the placenta is altered in hyperthyroidism in pregnancy. Yin L Liu[4] states that placental weight and function is reduced in postdated pregnancy. Stoz et al [5] observed that significant differences in placental retardation are between diabetics and control. The malformations in new born correlate with the unsatisfactory metabolic management. Las Heras et al [6] have found out that the lumen to whole diameter of foetal arteries are reduced in pregnancy induced hypertension.Variety of disorders complicating pregnancy have variable degrees of effects over the developing foetus. Since placenta also share the same environment, the pathological process have the imprints over it. If we fail to spend some time in observing the placental morphology, we may together bound to miss the prognostic or adverse factors which may influence the new born management.In this study we compare the placental morphometrics of uncomplicated normal pregnancy and pregnancy complicated by Gestational Diabetes Mellitus(GDM), Pregnancy Induced Hypertension(PIH), Anaemia of both sexes.

MATERIALS AND METHODS

After getting institutional ethical committee clearance pregnant women between 34 – 39 weeks were grouped into term pregnancy without complication and pregnancy with complication like pregnancy induced hypertension, gestational diabetes mellitus, anaemia. Parity ranges between primi & gravida 5.Placentae obtained by both normal delivery and caesarean section from the above said patients were taken for the study. A total number of 127 placentae were collected from Sree Balaji Medical College Hospital – OG dept. Placentae were washed in tap water and membranes examined. The specimen were transported to the Anatomy dept. In 10% formalin filled bucket. The following parameters were taken into consideration for the study of placenta are, Weight of the placenta using a weighing scale. The diameter of the placenta was measured by a measuring tape, thickness was measured at the site of cord insertion using Weber's compass, baby weight was measured by baby weighing scale, No. Of cotyledons, shape of placenta, and calcification. The various parameters were compared between normal pregnancy and pregnancy complicated by GDM, PIH, Anaemia. Parameters were analysed using SPSS software 7 and excel 2007. Test of significance for non-parametric variable done by Independant samples Kruskal- Wallis test.

RESULTS

Placental diameter

From table I it is inferred that the mean diameter of placental diameter is decreased in PIH and increased in GDM& anaemia as compared to normal pregnancy with significant p value < 0.05 and the difference is highest in anaemia. There is statistical difference between male & female baby with p value of 0.009. Placental thickness: the mean placental thickness is decreased in PIH & GDM as compared to normal pregnancy but its statistically insignificant (p value 0.126)and its same as anaemia. There is no statistical difference between male & female baby. Placental weight: the mean placental weight is increased in all the complicated pregnancy which is statistically significant, GDM being the highest followed by anaemia and least is PIH. There is no statistical difference between male & female baby.Baby weight: baby weight is decreased in PIH & anaemia and increased in GDM with significant statistical difference and no statistical difference between male & female baby. Cotyledons: the mean no of cotyledons is increased in GDM & anaemia and decreased in PIH Foetal wt:placental wt ratio is the ratio of baby weight to placental weight. It's decreased in all complicated pregnancy as compared to normal pregnancy with anaemia being the least.Placental

ISSN: 0975-8585

coeffiecient is a value obtained by dividing the placental weight in gm by baby weight in gm. It is found to be increased in PIH & GDM and same in anaemia as compared to normal pregnancy. Out of all placentas 2 oval shapes were found in normal pregnany, 1 in GDM and all others were in circular in shape. Placenta succenturiata was noted in one placenta of anaemia. Placental calcification is noted in 5 normal pregnancies, 12 in PIH, 7 in GDM and 3 in Anaemia.

Table 1

Baby sex	Pregnancy category	*Parameter*	Mean	Stand.Error	Median	Mode	Stand. Dev.	Sample Variance
M	Normal	*Placental diameter(cm)*	19.5	0.28	19	19	1.53	2.33
		Placental thickness(cm)	2.4	0.65	2.3	2.3	.357	12.76
		Placental weight(gm)	496.67	9.08	500	450	49.73	2472.99
		Baby weight(gm)	2.89	0.07	2.8	3.1	0.36	0.13
F		*Placental diameter(cm)*	19.93	0.37	20	19	2.05	4.20
		Placental thickness(cm)	2.4	0.73	2.4	2.3	.4	16.18
		Placental weight(gm)	473.67	9.82	460	450	53.80	2894.71
		Baby weight(gm)	2.775	0.06	2.775	2.5	0.32	0.10
M	PIH	*Placental diameter(cm)*	18.87	0.32	19	19	1.74	3.02
		Placental thickness(cm)	2.2	0.69	2.1	2.4	.379	14.37
		Placental weight(gm)	530	15.98	530	450	87.53	7662.07
		Baby weight(gm)	2.65	0.06	2.7	2.7	0.31	0.09
F		*Placental diameter(cm)*	19.7	0.42	20	20	2.28	5.18
		Placental thickness(cm)	2.3	0.68	2.3	2.5	.375	14.07
		Placental weight(gm)	527.67	15.76	545	550	86.33	7452.99
		Baby weight(gm)	2.6	0.06	2.5	3	0.33	0.11
M	GDM	*Placental diameter(cm)*	19.67	0.32	19	19	1.75	3.06
		Placental thickness(cm)	2.3	0.67	2.3	2.8	.36	13.36
		Placental weight(gm)	595.67	17.14	600	650	93.91	8818.51
		Baby weight(gm)	2.99	0.06	3	3	0.32	0.10
F		*Placental diameter(cm)*	20.7	0.50	20	19	2.72	7.39
		Placental thickness(cm)	2.4	0.69	2.5	2.8	.379	14.37
		Placental weight(gm)	620.33	16.45	650	650	90.08	8113.68
		Baby weight(gm)	2.99	0.06	3	3	0.35	0.12
M	Anaemia	*Placental diameter(cm)*	20.67	0.39	20.5	22	2.15	4.64
		Placental thickness(cm)	2.4	0.89	2.4	2.8	.485	23.57
		Placental weight(gm)	564.67	18.43	590	600	100.95	10191.26
		Baby weight(gm)	2.58	0.07	2.6	3	0.37	0.13
F		*Placental diameter(cm)*	21.97	0.48	22	22	2.63	6.93
		Placental thickness(cm)	2.3	0.84	2.4	2.8	.460	21.13
		Placental weight(gm)	566.33	18.78	600	450	102.87	10582.64
		Baby weight(gm)	2.58	0.06	2.55	2.5	0.31	0.10

Table 2

Pregnancy category	Mean No. Of cotyledons	Foetal wt:placental wt ratio	Placental coefficient
Normal	20	5.90	0.17
PIH	18	5.40	0.18
GDM	24	5.72	0.19
Anaemia	25	5.25	0.17

DISCUSSION

Gestational diabetes is multitude metabolic derangement which has profound effects on both mother and baby. Prevalence of GDM is about 2-5% of all pregnancies [7]. People with GDM have more mobidity than normal pregnancies [8]. Uncontrolled GDM causes several pathological structural and functional changes leading to decreased exchange capacity between mother and foetus, foetal anoxia [9-10]. The placental weight, baby weight is increased in our study which is in accordance with Jauniaux, and G.J. Burton [11]. The foeto placental ratio is 5.72 almost equal to the normal ratio of 6:1 in western population, may be due to good control of diabetes during antenatal period.In PIH thickening of the villous basement membranes, villous stromal fibrosis fibrinoid necrosis, endarteritis obliterans depending on the severity leading to poor placental function and its sequelae[12]. Nobis and Das [13] in their study have shown that the placental weight in PIH varies from 279 to 407 gm. According to Udainia [14] mean placental weight in severe PIH is 371 gm and in our study its about 503 gm. For normal pregnancy it's about 484 gm. Paradoxically its higher in our study as all were under strict medications for PIH. Foeto placental ratio in PIH is 5.40 in our study which is almost equal to Maimhoona et al s study [15] with ratio of 5.6:1 in moderate PIH. Anaemia is a very prevalent condition, when present with pregnancy its effects are escalate affecting the foetus with hypoxia of variable degree and mother adding morbidity and mortality. The placental diameter (19.7 cm) and placental thickness (2.35 cm) are increased than the normal conterparts which is in accordance with Mahamuda Begum et al study [16] whose mean values for placental diameter and thickness being 18.04 cm and 2.1 cm . Godfrey et al [17] , in their study found that Anaemia in pregnancy is associated with increased placental weight and a high ratio of placental coefficient. In this study we have increased placental weight but a normal placental coefficient.

REFERENCE

[1] Teasdale F, et al. American J Obstetr Gynaecol 1978;130(7): 773-781.
[2] DeMayer EM, Tegman A. World Health Organ Qlty 1998; 38 : 302-16.
[3] Aleschenko IE, Milovanov AP, Vialtsea IU. Arkh Patol 2001;63(3): 26-30.
[4] Yin L, Liu Y, Matt, Zhonghia Fu Chan. Ke Za Shi 1998;33 (7): 415-8.
[5] Stoz F, S Chuhmann, Schultz R. J Perinatal Med 1988:16(3) 211-6.
[6] Las Heras J, Basker Ville JC, Harding PG, Haust MD. Placenta 1985;6(3): 217-27.
[7] Crowther CA, et al. New England J Med 2005;352(24):2477-2486.
[8] Platt MJ, et al. Diabet Med 2002;19:216-220.
[9] Hanson U and Persson B. Am J Perinatol 1993; 10:330-333.
[10] Evers IM, et al. Placenta 2003;24: 819-825.
[11] Jauniaux E and Burton GJ. Placenta 2006;27(3):468- 471.
[12] Aparna Narasimha, DS Vasudeva. Indian J Pathol Microbiol 2011;54(1):15 -20.
[13] Nobis P, Das U. J Obstet Gynecol 1990;40:166-9.
[14] Udainia A and Jain ML. J Anat Soc India 2001;50(1) 24-27.
[15] Maimoona Ahmed, Rekha G. Daver. Int J Reprod Contracept Obstet Gynecol 2013; 2(4): 524-527.
[16] Mahamuda Begum, Shamim Ara, Shahnaz Begum, Segupta Kishwara, Khondaker Abu Rayhan. J Shaheed Suhrawardy Med Coll 2009;1:21-23.
[17] Godfrey KM, Redman CW, Barker DJ, Osmond C. Br J Obstet Gynaecol 1991;98(9):886-91.