

A STUDY TO FIND OUT ASSOCIATION BETWEEN MORPHOMETRY OF PLACENTA AND NEONATES PROFILE AT TERTIARY CARE TEACHING HOSPITAL, BIKANER

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ABSTRACT

Background: Morphometry of placenta reflects the development of fetus and disease pattern in later in life. Therefore a study was conducted to find out the association between morphometry of placenta and neonates profile at the tertiary care teaching hospital, Bikaner. **Materials and Method:** One hundred routine delivery cases in the Department of Gynecology & Obstetrics were interviewed, and the placentas required for measurements were collected from respective mothers. **Results:** Out of the 100 pregnant women 74 were uniparous, 21 were biparous, and five were multiparous. Out of hundred cases recorded the maximum pregnant women weight groups were 56 to 60 kilograms found. The mean value for the neonate weight was calculated as 2832.94 grams. Seventy-seven and twenty-three subjects had the round and oval shape of placenta respectively. No other shape was found in the present study. **Conclusion:** Placental morphology like weight, surface area, gender, and volume reflects the birth weight effectively for the planning of better maternal care.

Keywords: Placental Morphometry, Newborn, Pregnant Women

INTRODUCTION

The placenta is the first organ of the body, which after the egg is fertilized develop and give selfness services. Human placenta is a discoid, chorio-decidual organ, serves as a structure where mother and fetal tissue contacted directly due to acceptance of the fetal graft by the mother. (1) Human placenta is round in shape with the insertion of umbilical cord nearly at the center. The chorionic disk is rarely circular. Its shape varies from round to oval or regularly irregular. There is a linear relationship between the weight of placenta and diameter. The placental weight increases due to the increase of placental diameter in an early stage of life. In later stages the placental weight increases because of the

increase of placental thickness. (2)

The placental mass maintains a relationship with the weight of developing fetus in pregnancy. Thomson et al. conducted a study in women with normal blood pressure, and it was observed that there is a relation among birth weight, placental surface area, and placental volume and concluded that the placental size and weight are directly proportional to the birth weight. (3)

Hypertension and gestational diabetes have an impact on placenta significantly as pregnancy complications. Therefore examination of placenta gives a clear

picture of what had happened with it during any complication associated with pregnancy. (4)

Researchers have stressed upon the fact of the benefits related to anatomical examination of the placenta. By improving the nutrition of mother and anti-natal care quality, postnatal complications in mother and the newborn baby can be reduced. Therefore the present study was undertaken to analyze the morphometry of placenta and its effect on neonates regarding birth weight and umbilical cord measurements.

MATERIAL AND METHODS

The present study was conducted in the Department of Anatomy and the Department of Gynecology & Obstetrics of the tertiary care teaching Hospital, Bikaner. Subjects age of 21 to 25 year, had normal delivery were included in the study and subjects who had cesarean delivery, and incomplete placenta were excluded from the study. After obtaining informed consent, individuals were asked questions, and examination was done. One hundred routine delivery cases in the Department of Gynecology & Obstetrics during 2016-17 were interviewed, and the placentas required for measurements were collected from respective mothers. A pre-tested, predesigned, questionnaire was administered to selected subjects, which include maternal age, parity, mother weight, food preference, maternal height, race, past disease history.

The examination of placenta was conducted as soon as after the delivery. The measurement of placenta includes shape, diameter, the thickness at the center, volume, weight, maternal surface area, the attachment site of the umbilical cord, umbilical cord length. The birth weight of the baby was recorded immediately after birth as soon as possible on the balance machine. The observer recorded three continuous reading and mean of these was used for statistical analysis. Data thus collected were subjected to statistical analysis using Frequency, Proportion, Mean, Chi-square test, ANOVA, and the p-value of significance with the help of SPSS software 20.0.

RESULTS

Out of hundred cases, the maximum cases found age between 21 to 25 years and the minimum cases were found age less than 20 years. Out of the 100 pregnant women 74 were uniparous, 21 were biparous, and five were multiparous. Out of a hundred cases, the maximum pregnant women weight groups were 56 to 60 kilograms found, and the minimum was found from 71 to 75 kilograms. Fifteen women were vegetarian, and 85 women were non-vegetarian.

Seven women were suffering from diabetic, and 93 women were free of disease. Similarly, according to the clinical history, eight women had hypertension, and 92 women were normotensive. The pregnant women maximum height group was 161-170 cm, and minimum height group was 140 to 150 cm. Twenty-seven pregnant women were reported to be Hindu, and 73 were reported to be Muslim. About the infant gender, 43 were male infants, and 57 were female infants were recorded. Neonate weight was recorded in grams, and minimum neonate weight was found to be 1992 grams, and maximum weight was found to be 3791 grams. The mean value for the neonate weight was calculated as 2832.94 grams.

The neonates under the group of 1500 -2000 gm have listed only one neonate and in the weight group of 2501-3000 gm. of neonate's maximum number of counts were recorded as 43. Gestational age was recorded in weeks, and minimum gestational age was found to be 34 weeks, and maximum gestational age was found to be 38 weeks. The mean value for the gestational age was calculated as 35.30 weeks. When placental samples were divided for umbilical cord insertion site, the minimum recorded type was marginal in 5 cases, and maximum recorded type was found to be eccentric insertion with 88 counts. Seventy-seven numbers of placentas were of round shape, and 23 numbers of placentas were recorded as the oval shape. No other shape was observed in the study.

Minimum numbers of cotyledons were found as 8, and maximum numbers of cotyledons were found like 20. The mean number of cotyledon was analyzed

as 13. The weight of placenta was recorded in grams, and minimum placental weight was found to be 350 grams, and maximum placental weight was found to be 710 grams. The mean value for the placental weight was calculated as 475.37 grams. Mean values for the larger and smaller diameters of the placentas were calculated as 19.60 cm and 13.81cm. For the placental thickness minimum, the placental thickness was found to be 1.7 cm, and maximum placental thickness was found to be 3.1cm. Placental thickness was observed 2.324 cm.

Association between neonate weight and umbilical cord insertion site was observed, and the maximum count was observed for eccentric umbilical cord insertion (38%) under the 2501 to 3000 gm neonates weight groups whereas a minimum was marginal and central insertion under the 1500 to 2000 gm neonates weight groups. From the p-value, it is evident that no significant association between neonates' weight and umbilical cord insertion site. (Table: 1)

The association between neonate weight and Placental Shape was observed, and the maximum count was observed for oval placental Shape (34.0%) under the 2501 to 3000 gm neonates weight groups whereas a minimum were round placental shape under the 1500 to 2000 gm neonates weight groups. The association was expressed as chi-square values as $X^2= 0.014$, $df=1$, $P = 0.906$. From the p-value, it is evident that there is no significant association between neonates weight and the shape of the placenta. (Table: 2)

The cotyledon numbers and neonate weight groups association was analyzed using ANOVA test ($p = 0.000$), which is indicative of a highly significant association between cotyledon numbers and neonate weight. (Table: 3)

DISCUSSION

The mean gestational age in the study was (35.30 weeks). In another study of small for gestational age group babies, placenta findings were less in small for gestational age group babies than that of the normal group. (5, 6) Clappe et al. (7) conducted a study and

observed that the association between placental volume of Second trimester and birth weight. The mean birth weight of the neonate in the present study 2832.94 gram was lower than 3425 gram, 3382 gram & 3400 gram observed in Ukraine, Western Europe, and Eastern Nigeria respectively. (2) Mean birth weight might be due to altitude, maternal nutrition, and maternal diseases. (8,9,10,11) It was observed that Gestational diabetes mellitus (GDM) was 7% lower than other studies; perhaps because we had younger subjects than other investigators (with 75% in less than 29 years), as GDM is very common after 30 years (12) and also because of inadequate screening test, and early detections. (13)

One of the characteristic features of a placenta in maternal diabetes mellitus is its increase in weight. (14) The Raghunath et al. showed an almost normal foeto-placental ratio of 5.22:1, in cases of diabetes mellitus, due to good control of blood sugar in the mothers who were incorporated in the study. (15) In the present study, we found placental shapes as (round in 23%), (oval 77%) and (irregular 0%) of cases. Kishwara et al. found placenta of oval, round and irregular shape in 38.3%, 36.6%, and 25% of cases, respectively. (16) In Gupta et al. (17) study they found these shapes in 7%, 89%, and 1% of cases. Raghunath et al. found that out of the 101 placentas, 94 were circular in shape, and seven were oval in shape, and Kulandaivelu et al. found that out of the 51 placentas, 48 were circular and three were oval. (10, 15) Irregularly shaped placentas are mostly seen in premature deliveries that occur due to toxemia.

In the present study, we have found the insertion of the umbilical cord as marginal 5% central 7% eccentric 88%. Chhetri et al. (8) reported that in normal birth weight, in 84 .2% cases the mode of umbilical cord insertion was central, 72.7% of cases it was marginal and 90% cases eccentric. In low birth weight, in 15.8% cases the mode of umbilical cord insertion was central, 27.3% of cases it was marginal and 10% of cases it was eccentric. The Senapati et al. (18) study of 103 placentas in 81 placentas (78.6%) the umbilical cord insertion is central and in 22

placentas (21.4%) it was marginal.

According to Yetter (19), about 7% of umbilical cord insertions occur at the placental margin, but in Gupta et al. (16) study they found the marginal insertion of cord in 22% of cases. Londhe and Mane et al. (20) found that in 93% of the cases, there was the central attachment of the cord while the remaining 7% had the marginal attachment. Panuganti and Boddeti observed in their study that among 50 placentas, 60% attachment were central, 20% were eccentric attachment, and 20% were marginal attachment, while no velamentous attachment was found in the study. (21) Placental weight was strongly correlated with newborn birth weight. Hence placental parameters serve as a good and easily comparable measurement for placental size and as a proxy measurement for the quality and efficiency of the placenta and thereby birth weight of newborn babies.

CONCLUSION

It was found that placenta and umbilical cord morphometry significantly correlates with the fetal weight which means that if there is any abnormality in the placenta, it will be strongly reflected in the fetus. This indicates towards the fact that since the subjects under study in present work mostly belonged to the rural background where advanced modalities like ultrasound were not available, due to which, neglected antenatal care of the mother and fetus resulted in the low birth weight of the newborn and other complications in mother and the newborn both. This knowledge of measurements on the placenta and the umbilical cord will be helpful to the pediatrician and obstetrician in clinical practice for better antenatal and postnatal care of mother and the newborn.

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TABLES:

Table: 1 Cross-tabulation of neonates weight groups and umbilical cord insertion site groups

The umbilical cord insertion site	Neonates weight (grams)					Total
	1500 to 2000	2001 to 2500	2501 to 3000	3001 to 3500	3501 to 4000	
Marginal	0	1	2	1	1	5
	0.00%	1.00%	2.00%	1.00%	1.00%	5.00%
Central	0	2	3	2	0	7
	0.00%	2.00%	3.00%	2.00%	0.00%	7.00%
Eccentric	1	19	38	15	15	88
	1.00%	19.00%	38.00%	15.00%	15.00%	88.00%
Total	1	22	43	18	16	100
	1.00%	22.00%	43.00%	18.00%	16.00%	100.00%

($\chi^2 = 0.152$, $df=2$, $P = 0.927$)

Table: 2 Cross-tabulation of neonates weight groups and placental shape group

Placental shape	Neonates weight (grams)					Total
	1500 to 2000	2001 to 2500	2501 to 3000	3001 to 3500	3501 to 4000	
Round	0 0.00%	6 6.00%	9 9.00%	5.00% 3	3 3.00%	23 23.00%
Oval	1 1.00%	16 16.00%	34 34.00%	13 13.00%	13 13.00%	77 77.00%
Total	1 1.00%	22 22.00%	43 43.00%	18 18.00%	16 16.00%	100 100.00%

($X^2 = 0.014$, $df=1$, $P = 0.906$)

Table: 3 Mean values of the number of cotyledons among different neonate weight groups

Neonates weight groups (Grams)	Number of cotyledons Mean value	N	Std. Deviation
1500 to 2000	10	1	0
2001 to 2500	11.18	22	2.462
2501 to 3000	12.53	43	1.956
3001 to 3500	13.44	18	2.036
3501 to 4000	16.63	16	3.16
Total	13.03	100	2.866

($F=14.86$, $df=96$ (Within groups), $p = 0.000$)