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THE STUDY OF MORPHOLOGY AND VASCULAR PATTERN OF PLACENTA AND UMBILICAL CORD WITH CLINICAL CORRELATION IN ANDHRA POPULATION

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ABSTRACT

Abstract: Placenta plays a role exactly similar to that of bridge between the mother and child. Placenta is responsible for protective, nutritional, respiratory, and an excretory organ for the growing foetus. Examination of placenta immediately after delivery, gives much idea of prenatal health of baby and the mother. Umbilical cord embedded in the jelly of warton and consists of two Umbilical arteries and one Umbilical vein. **Objectives:** To compare and contrast the finding of the study with those previous literatures, with a view to analyze the morphology and vascular pattern of placenta and umbilical cord in 100 placentae and to clinically correlate this analysis with the foetal parameters. **Materials and Methods:** A total of 100 placentae were collected for this study (46 from uncomplicated deliveries and 54 from various factors which complicated pregnancy). The placenta parameters were collected, analyzed and clinically correlated. **Results and Conclusion:** Out of 100 placentae which were collected, 81 were circular, 15 were oval and 4 were triangular in shape. In the preset study the average diameter of placenta was 15.84 cm, the average thickness was 3.2 cm and the average weight of placenta was in male baby 506.30 gm and female baby 390.27 gm. The average diameter of umbilical cord for male 1.5 cm and female 1.3 cm. The average length of umbilical cord for male baby was 26 cm and female baby was 22 cm. This study shows eccentric insertion of umbilical cord in 70 %, central 7%, battledore 22%, and velamentous was 1%.

INTRODUCTION

The placenta is a unique organ in its development and function. The placenta begins to meet the demands of embryo at an early part of intrauterine life. This is the only organ in the body which is derived from two separate individuals the mother and foetus. Placenta is a flattened discoid mass with circular or oval in shape. It has an average volume of 500 ml, a weight of 470 gm, a diameter of 185 mm, a thickness of 23 mm and a surface area of 30000mm. The umbilical cord is attached near the center of foetal surface ^[1]. The

examination of the placenta in utero and postpartum gives idea about the state of foetal well being ^[2]. The umbilical cord is about 50 cm long and 1.5 to 2 cm in diameter, embedded in the jelly of warton is two umbilical arteries and one umbilical vein. The placenta is main characteristic feature of mammals which connects between uterus and foetus by the umbilical cord.

MATERIALS AND METHODS

A total of 100 placentae (FIGURE: 01) were collected (90 full term babies and 10 premature

babies) for this study from DR. PSIMS & Research Foundation Hospital, Chinoutapalli, Vijayawada, Krishna district, Andhra Pradesh. The placentae were collected both from normal deliveries and caesarean sections. The collected placentae were washed under tap water. The specimens were kept in 10 % of formalin.

In all collected placentae, the following parameters were studied

1. Weight – Rerecorded by weighing scale
2. Shape – By observation
3. Thickness – Measured by divider
4. Number of cotyledons - Counted visually
5. Diameter - By measuring tape

Also examined for abnormal placental characters

1. Accessory placental lobes
2. Placental calcification

Placentae were collected from

1. Normal un complicated prima gravid and multi gravid
2. Full term and pre maturity
3. Normal and caesarean delivery
4. Pathological factors which complicated pregnancy includes
 - a. Pregnancy induced hypertension (PIH)
 - b. Diabetes mellitus
 - c. Anaemia

- d. Intra uterine death (IUD)
- e. Abnormal presentation: Breech delivery

The babies whose placenta were obtained were also examined for the following factors

1. Sex of the baby
2. Weight of the baby
3. Any visible anomalies of the baby

In each case a preliminary history was elicited from the mother regarding

1. Age
2. Parity
3. Period of amenorrhea
4. Previous obstetric history
5. History of hypertension, diabetes mellitus, and toxemia of pregnancy

Techniques done in the present study are as follows

1. Study of placental vasculature by eosin and haematoxylin staining (FIGURE: 02)
2. Contrast study of placental vasculature by injecting barium sulphate dye
3. Study of placental vasculature by dissection

Umbilical cords were examined by:

Length and Diameter of umbilical cords were measured by measuring tape

All the parameters which were studied were tabulated and analyzed in (TABLE – 01)

Table: 01: Shows the number of placenta collected based on various categories of pregnancy

Parity		Maturity		Mode of Labor		Factors complicating pregnancy	
Type	cases	Type	cases	Type	Cases	Type	cases
Primi	65	Full term	90	Vaginal	58	PIH	13
Multi	35	Preterm	10	Caesarean	40	Diabetes mellitus	6
				Intra uterine death	02	Anaemia	21
						Pre maturity	10
						IUD	02
						Breach	01
						Delivery	

RESULTS

Shape

In the present study out of 100 cases 81 were circular (FIGURE: 03), 15 were oval in shape and 4 were triangular in shape placentae were seen.

Diameter and thickness of placentae

In the present study the average diameter of placenta was 15.84 cm (Range 10 – 12 cm), and average thickness was 3.2 cm (Range 2.2 – 3.3 cm).

Weight of Placentae

This study shows the placental weight ranged from 225 to 725 gm and average being 469.35 gm

Table: 02: Shows the range and average weight of placenta in normal pregnancies

Sex of the Baby	Range of weight of placenta)	Average weight of placenta
Both sexes together	225 – 725 gm	469.35 gm
Male baby	225 – 640 gm	506.30 gm
Female baby	270 – 725 gm	390.27 gm

The correlation of weight of placenta with foetal weight of the baby

The ratio between the foetal weight and placental weight (Foeto–placental ratio, which is normally

6:1) of Andhra population as shown by the present study is

Both sexes considered is – 5.89:1

In Males – 6.20:1, In Females – 5.78:1

Table: 03: Shows the placental characteristics in the factors which complicate pregnancy

Factors complicating pregnancy	Average weight of the baby	Average weight of the placenta	Foeto-placental ratio
PIH(13 cases)	2.4 kg	453 gm	5.2:1
Diabetes mellitus(6 cases)	3.1 kg	622 gm	4.9:1
Anaemia (21 cases)			
Prematurity (10 cases)	2.8 kg	370 gm	7.5:1
	2 kg	350 gm	5.7:1

Placenta succenturiata (Figure: 04) is seen in one case and a case of omphalocele with short umbilical cord (Figure: 05) also seen in present study. The amniotic membrane was translucent in

98 % of the cases and 2% of cases were opaque membranes. The average number of cotyledons in maternal surface was 18 in number.

Morphological Parameters of Umbilical Cord

Table: 04: shows the range and average length and the diameter of umbilical cord

LENGTH	Range (cm)	Average (cm)
Male	8 - 48	26
Female	8 - 35	22
DIAMETER	Range (cm)	Average (cm)
Male	1.1 – 1.9	1.5
Female	1 - 2	1.3

The present study shows eccentric insertion of umbilical cord in 70 %, central insertion 7%, battledore insertion 22%, and velamentous insertion was 1% (FIGURE: 06). True knots were

observed in 4 cases. The types of insertion of umbilical cord to the placenta in various cases were reported in TABLE: 05.

Table: 05: shows the type of insertion of umbilical cord

Type of insertion	Number of cases	Percentage
Central	7	7 %
Eccentric	70	70 %
Marginal	22	22 %
Velamentous	1	1 %

DISCUSSION

A total number of 100 cases were studied and their morphological observations have been summarized and discussed with special references to the diagnosis. The data obtained in this present study were correlated with the data of previous workers in the field. In the shape of placenta, According to Kurt Benirschke (2000) ^[3] studies shows 94 placentae were normal circular in shape and 7 were oval in shape. In the weight of placenta Armthage (1967) ^[4] reported the average weight of placenta was 508 gm. According to Younsouzai and Haworth (1969) ^[5] placental weight and size were directly proportional to birth weight of babies. Thomson AM (1969) ^[6] and Saigal (1970) ^[7] reported that placental weight and birth weight were below average, but their ratio was slightly

increased in case of pregnancy induced hypertension. According to previous studies there are some Factors which complicate the pregnancy, were reported by many authors, Naeye RL and Friedman EA (1979) ^[8] observed that 70 % of foetal deaths in women with hypertension are large due to large placental infarcts. According to Zeek PM and Assali NS (1950) ^[9] placental infarction as an ischaemic necrosis of a group of villi, due to complete interference with their blood supply in the deciduas or by the thrombosis of a spiral arteriole. Fox H (1967) ^[10] and Udania A (2004) ^[11] observed placental infarcts in cases of pregnancy induced hypertension. Gernot Desoye (2007) ^[12] reported that one of the characteristic feature of placenta in maternal diabetes mellitus is its increase in weight. Nordenvall M (1988) ^[13]

reported paucity of cotyledons seen in cases of PIH, prematurity and low birth weight babies. According to Siegler SL and sacks JJ (1941) ^[14] placenta succenturiata were associated with ante partum hemorrhage. Pretorius DH (1966) ^[15] observed 42% of cases of marginal insertion of placenta in pregnancy induced hypertension.

CONCLUSION

The study of morphology and vascular pattern of placenta and umbilical cord with clinical correlation in Andhra population Give a lot of information about the early assessment of the foetal well being. The observations of normal and abnormal placentae and umbilical cord gain greater importance in the specialties of obstetrics and neonatology, where this information are of great significance in the early diagnosis of condition is also useful in the congenital fetal malformations. Accurate study of fetal anomalies is possible with ultrasonography.

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REFERENCES

1. Standring S. Gray's Anatomy. The Anatomical basis of clinical practice. 40th ed. Edinburg. Elsevier Churchill Livingstone. 2008; 77: Pg.1302.
2. Kouvalainen K, Pynnonen AL, Makarainen M, Peltonen T, Weights of placental membranes and umbilical cord. Duodecim. 1971; 87: 1210-1214.
3. Kurt Benirschke, Peter Kaufmman. Pathology of human placenta. Springer-verlag, New York Inc. 2000; 4th Ed: pg.31.
4. Armitage P, Boyd JD, Hamilton WJ, Rowe BC. A statistical analysis of a series of birth-weights and placental weight. Human Biol. 1967; 39: 430.
5. Yousonsai & Haworth. Placental dimensions and relations in pre term and growth retarded infants. Am J Obst Gynaecol. 1969; 103: 265-271.
6. Thomson AM, Billewicz WZ, Hytten FE. The weight of the placenta in relation to birth weight. Jr Obst and Gynaecol Br commonwealth. 1969; 767(10): 865-72.
7. Saigal saroj and Shrivatsav JR. Foeto placental weight relationship in normal pregnancy and pre- eclampsia- eclampsia-A comparative study. Indian Pediatrics. 1970; 7 (2): 68-77.
8. Naeye RL and friedman EA. Causes of prenatal death associated with gestational hypertension and proteinuria. Am J Obst & Gynaecol .1979; 133: 8-11.
9. Zeek PM, Assali NS. Vascular changes in the deciduas associated with eclamptogenic toxemia of pregnancy. Am J Clin Pathol. 1950; 20: 1099-1109.
10. Fox H. Abnormities of foetal stem arteries in human placenta. Jr Obst and gynaecol Br commonwealth. 1967; 74: 734-738.
11. Udainia A, Bhagwat SS, Mehata CD. Relation between placental surface area, infarction and foetal distress in pregnancy induced hypertension with its clinical relevance. J. Anat. Soc. India. 2004; 53 (1); 27-30.
12. Gernot Desoye and Sylvie Hauguel-de Mouzon. The human placenta in gestational diabetes care. 2007; 30 (2): 120-126.
13. Nordenvall M, sandstedt B, Ulmsten U. Relationship between placenta shape, cord insertion , Lobes and gestational outcome.

- Acta obstet gynaecol scand. 1988; 67(7):611-6.
14. Siegler SL and sacks JJ. Placenta succenturiata as a cause of Ante partum haemorrhage. Amer J Obstet Gynae. 1941; 42: 38.
15. Pretorius DH, Chau C, Poeltler DM, Mendoza a, Catanzarite VA, Hollenbach KA. Placental cord insertion, Visualization with prenatal ultrasonography. J ultrasound Med. 1966; 15: 585-593.



Figure: 01: Shows a total number of 100 placental specimens



Figure: 02: Shows the circular Type of placenta



Figure: 03: shows a case of Placenta succenturiata



Figure: 04: shows a case of case of Omphalocele with short umbilical cord

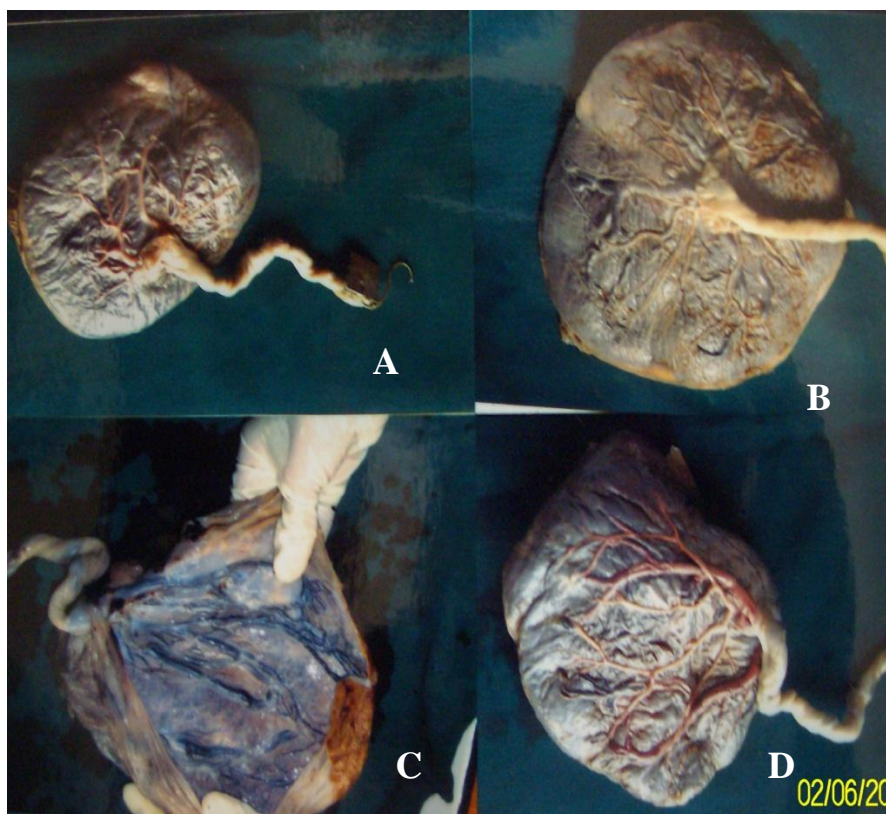


Figure: 05: shows types of insertions of umbilical cord to the placenta, (A: Eccentric insertion, B: central insertion, C: Battle Dore insertion, D: velamentous insertion)



Figure: 06: shows the vascular pattern of placenta after H & E stain