



A STUDY OF THE MORPHOLOGY OF PLACENTA IN TERTIARY CARE HOSPITAL OF CENTRAL KARNATAKA, INDIA

Anatomy

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ABSTRACT

Introduction: Placenta is a temporary structure, developed during Pregnancy and discarded at Parturition. Human Placenta is of Discoid and Haemo-Chorial type. It connects the foetus with the mother's womb. It is formed by the contribution of two Individuals - both Mother and Baby. At term four- fifth of Placenta is of foetal origin and one- fifth is of maternal.¹ Along with Amnion, Chorion, Allantois and Yolk sac, Placenta can also be considered as one of the foetal membranes, which acts as Nutritive and Protective to the developing Embryo.

Method: - The present study was done on morphology and morphometry of 150 placentae carried at the Department of Anatomy, Basaveshwara Medical College & Hospital (BMCH), Chitradurga. The placentae were collected with prior ethical clearance and proper consent. Soon after the delivery the placental surface was washed thoroughly under running tap water which were then weighed, tagged and brought to the department of Anatomy, BMCH. The parameters like size, shape and attachment of umbilical cord were noted down. Gross examination was carried out according to the proforma.

Result: - The maximum number of placentae belong to the range of 501-600 gms (38.7%). Least placental weight is recorded as 205 gms, showing dispersal pattern. The maximum recorded weight is 835 gms and the average being 491.4 gms. The majority of the placentae are discoid (63.3%). The minimum length recorded is 8.9 cms, maximum as 23.80 cms and the average being 18.3 cms.

Conclusion: - Careful examination of Placenta can help in explaining adverse outcomes, their management in subsequent pregnancies and assessment of new born risk.

KEYWORDS

Placenta, Foetus, Umbilical cord

INTRODUCTION:-

Human Placenta is formed by the contribution of two Individuals- both Mother and Baby. At term four- fifth of Placenta is of foetal origin and one- fifth is of maternal.¹ There is an interesting Symbiosis between the foetal and maternal tissues. Placenta is an unique example for the intimate and efficient functional union between the tissues of two separate individuals.

Paradoxically there is no rejection (the foetal graft with paternally derived antigens, should act as foreign body in the uterus but, the tolerance of mother to the antigen of developing embryo suggests immunological acceptance of the foetal graft by the mother) of the placental tissue by the mother's immunological system.¹

In the Embryonic period of development till the third month; Pregnancy continues with the help of Corpus Leutum of Pregnancy; after that Placenta plays the most vital role without which there will be inevitable termination of the pregnancy as it acts as a Respiratory, Nutritional, Digestive, Excretory, Endocrine system and providing Immunity to the developing foetus.

Along with Amnion, Chorion, Allantois and Yolk sac, Placenta can also be considered as one of the foetal membranes, which acts as Nutritive and Protective to the developing Embryo. Placenta is analogous to organs like Lung, Liver and Kidney in function, but not homologous with them in structure.²

Examination of Placenta soon after delivery is very vital as it gives information of foetal development. It forms the morphological records of anatomical conditions, intrauterine events and intrapartum events of gestation.²

The handy information may be useful to the Medical faculty for the management of foetus and mother, also it can help them in handling the Medico-Legal issues in the event of maternal and foetal outcome, hence the study has been done here.

Placenta gives valuable information about the development and intrauterine events of the baby, so the present study was undertaken to analyse the morphological parameters like shape, size, weight, attachment of umbilical cord and dimensions.

AIM AND OBJECTIVE:

1. To study the morphology of placenta (shape, size, weight).
2. To study the effect of distribution of the placental vessels over morphology of placenta.

MATERIALS AND METHODS:-

The present study was done on morphology and morphometry of 150 placentae (**Figure No. 1**) carried at the Department of Anatomy, Basaveshwara Medical College & Hospital (BMCH) Chitradurga. Among these placentae, the vascular pattern was studied in 50 Resibond Secured placentae by dissection method and 50 by dye injection method. The placentae were collected with prior ethical clearance and proper consent from Obstetrics & gynaecology department of Basaveshwara Medical college Hospital, and District Hospital, Chitradurga, Karnataka state.

INCLUSION CRITERIA:

The placenta from full term normal deliveries and caesarean sections were taken for the study.

EXCLUSION CRITERIA:

Placenta from pre-term deliveries, still birth and macerated placenta were excluded.

Materials of our study include the following:

- Digital weighing machine, Dissection instrument set: Gloves, Apron, Mackintosh sheets, Dissection trays, 20 cc plastic syringes, 18- or 20-22-Gauge intravascular needle,
- 10% strength formalin solution, Resibond-SL acetic cure silicon resin (Resinova chemical. Ltd), Silicon injector gun, Methylene blue and Eosin dyes, Scalp vein set (size – 0.70 x 19 mm, A5), Infant feeding tube (size – 1.70 x 520 mm, FG-05), Tag number plates, Thread, Measuring tape, Needle probe, Plastic micro pipettes attachment cap

Methods employed in our study were as follows:

Morphological & Morphometric Study:

Soon after the delivery the placental surface was washed thoroughly under running tap water which were then weighed, tagged and brought to the Department of Anatomy, BMCH. The parameters like size, shape, attachment of umbilical cord and number of maternal cotyledons were noted down. Gross examination was carried out according to the proforma. Then the placentae were considered for the study of vascular pattern.

Diameter of the umbilical vessels was measured using a Vernier calliper both at the periphery (P) and at site of attachment of umbilical cord (C).

P/C ratio was measured

- P/C ratio $\leq$ half = Dispersal type
- P/C ratio $>$ half = Magistral type³

RESULT AND DISCUSSION:-

The present study included **150 placenta**e obtained from the department of Obstetrics & Gynaecology of BMCH, Chitradurga. The following parameters were studied for gross features-

1.Weight of The Placenta

It is seen from the Table 1-A and Figure 1 Bar diagram that; the maximum number of placenta belong to the range of 501-600 gms (38.7%). Least placental weight is recorded as 205 gms (placenta no: 5 and 97), showing dispersal pattern. The maximum recorded weight is 835 gms and the average being 491.4 gms. Placenta no: 35 is the heaviest (835 gms) and shows **Magistral** type of vascular pattern. The mean weight of placenta in magistral group is 520.25 gms whereas in **Disperse** it is 492.66 gms.

Usman Raies Ahemed (2006)⁴ in his study of 100 placenta (50 from control group and 50 from study group) observed that placenta from normal pregnancies weighed more than 500 gms, the heaviest being 700 gms. Susan Standing (**Gray's Anatomy**, 2008)⁵ mentioned mean placental weight to be 470 gms. Virupaxi et al (2011)⁶ in their study found the mean weight of placenta obtained from full term normal pregnancy to be 488.1 gms and compared the value with placenta of small for date babies. He concluded that the placental weight and volume were significantly lower in small for gestational age group babies as compared to full term normal group babies. Gunapriya et al (2011)⁷ studied 101 freshly delivered placenta, and found the average weight of the placenta to be 528.55 gms. Praveen Kumar et al (2012)² in their study of 50 specimen found that maximum number of placenta showed the weight as 453 gms. G. Priya et al (2012)⁸ studied 100 normal and 80 placenta from preeclampsia women. In the control group the mean weight of placenta was observed to be 451.25 $\pm$ 42.80 gms.

In the present work we recorded the least placental weight as 205 gms, maximum as 835 gms and the average being 491.4 gms. The maximum number of placenta belonged to the range of 501-600 gms (38.7%). Placenta no: 35 which was heaviest (835 gms) showed magistral type of vascular pattern. Earlier studies have shown that magistral pattern is associated with better blood supply, hence heavier placenta and heavier weight babies. Accordingly in our study we found that the mean weight of placenta and the baby in magistral group was 520.25 gms and 2.915 kgs whereas in disperse it was 492.66 gms and 2.75 kgs respectively.

2. Shape of The Placenta

As seen in the Table 1-B the majority of the placenta are discoid (63.3%) followed by, oval (17%), triangular (5.3%), irregular (4.7%), circumvallate (3.3%), tongue-shaped (3.3%), bifid (2%) and bilobed (1%).

Nobis and Das (1980)⁹ found 46% round, 17% oval and 5% bilobed placenta. Usman Raies Ahemed (2006)⁴ in his study of 100 placenta found that majority of them were oval (58%) in shape followed by round (41%) and bilobed placenta (1%). Virupaxi et al (2011)⁶ in their study got 65% discoid and rest irregular placenta. Gunapriya et al (2011)⁷ studied 101 placenta and observed majority were of circular shape (93.1%) and only 6.9% oval shaped. Whereas Praveen Kumar et al (2012)² studied 50 placenta and observed all of them with discoid shape.

In our study (Figure no. 2) we noticed placenta with 8 different shapes, namely: discoid (63.3%), oval (17%), circumvallate (3.3%), bilobed (1%), bifid (2%), tongue-shaped (3.3%), Triangular (5.3%) And Irregular (4.7%).

3. Dimensions of the Placenta

From table 1-C we can make the inference that the maximum number of placenta (74.6%) have the length in the range of 15-19.9 cms. The minimum length recorded is 8.9 cms (P. No: 5), maximum as 23.80 cms (P. No: 70) and the average being 18.3 cms.

The table 1-D shows that, majority of the placenta (70%) similar to

length have width ranging from 15-19.9 cms. The least recorded width is 8.0 cms maximum is 21.60 cms (P. No: 53) and the mean value being 15.9 cms.

The table 1-E reflects that 63.3% (majority) of placenta show their thickness at the centre lying in the range of 2-2.9 cms, with minimum being 1.1 cm and maximum is 3.50 cms. So, the mean width can be calculated as 2.25 cms.

Mallik et al (1979)¹⁰ reported the average diameter of normal placenta to be 17.54 cms. Usman Raies Ahemed (2006)⁴ in his study of 100 placenta, calculated the average dimension of normal placenta as $17 \times 15 \times 2.5$ cms. Susan Standing (**Gray's Anatomy**, 2008)⁵ observed that at term, the placental diameter varies from 200 to 220 mm (20-22 cms) and mean thickness being 25 mm (2.5 cms). Praveen Kumar et al (2012)² observed that the value 15.2 cms showed the highest incidence for diameter and majority of the placenta had the thickness at center as 3 cms.

CONCLUSION:-

A total of 150 placenta procured from BMCH were studied – 100 for vascular pattern by dissection and dye-injecting method and all 150 for morphology.

The average placental weight was 491.4 gms. The mean weight of placenta in magistral group was 520.25 gms whereas in disperse and mixed the mean were 492.66 gms and 493.2 gms respectively. In our study we noticed placenta of 8 different shapes. Majority of the placenta were discoid (95), oval (25), triangular (8), irregular (7), circumvallate (5), tongue-shaped (5), bifid (3) and bilobed (2).

We found the average dimensions of placenta to be $18.3 \times 15.9 \times 2.3$ cms. In majority (131) number of placenta the maternal cotyledons ranged between 15 to 30, an average being 24.14.

Conflict of interest:- None

Table 1

A. WEIGHT OF PLACENTAE (in gms)			
S.N.	Weight (in gms) range	Total Number of placenta	Percentage (%)
1	200-300	4	2.7
2	301-400	18	12.0
3	401-500	55	36.7
4	501-600	58	38.7
5	601-700	11	7.3
6	701-800	3	2.0
7	801-900	1	0.7
B. SHAPE OF PLACENTA			
S.N.	Shape	Total Number of placenta	Percentage (%)
1	Discoid	95	63.33
2	Oval	25	16.67
3	Triangular	8	5.33
4	Irregular	7	4.67
5	Circumvallate	5	3.33
6	Tongue shaped	5	3.33
7	Bifid	3	2.00
8	Bilobed	2	1.33
C. DIMENSIONS (LENGTH) OF THE PLACENTAE			
S.N.	Length Range (in cm)	Total Number of placenta	Percentage (%)
1	≤ 9.9	1	0.7
2	10-14.9	7	4.7
3	15-19.9	112	74.6
4	≥ 20	30	20.0
D. DIMENSIONS (WIDTH) OF THE PLACENTAE			
S.N.	Width Range (in cm)	Total Number of placenta	Percentage (%)
1	≤ 9.9	3	2.0
2	10-14.9	41	27.3
3	15-19.9	105	70.0
4	≥ 20	1	0.7
E. DIMENSIONS (THICKNESS, AT CENTRE) OF THE PLACENTAE			

S.N	Thickness Range(in cm)	Total Number of placentae	Percentage (%)
1	1-1.9	44	29.3
2	2-2.9	95	63.3
3	≥3	11	7.3

Bar Diagram 1

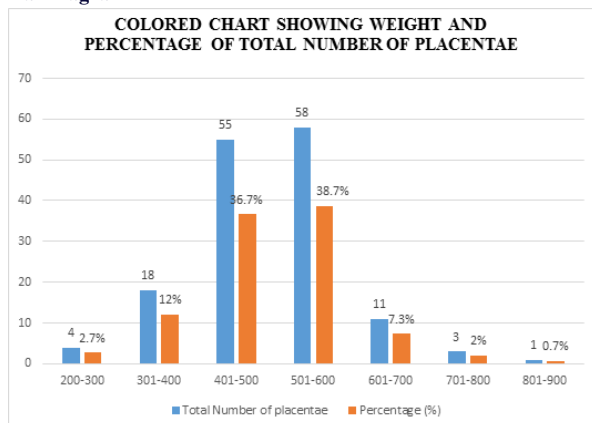


Figure 1

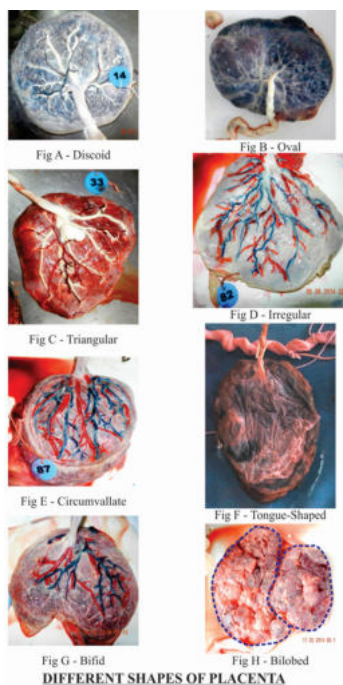


Figure No. 2

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