Evaluation of placental weight and placental attachment of umbilical cord and its clinical correlations

Manju Sree KN[1], Sanna Nazir[2], Satyavathi Devi[3]

[1]Postgraduate student, Department of Anatomy, [2]Postgraduate student, Department of Pathology, [3]Ex Professor and Head, Department of Anatomy, Prathima Institute of Medical Sciences, Karimnagar, Telangana, India.

Address for correspondence: Dr. Manju Sree, Postgraduate Student, Department of Anatomy, Prathima Institute of Medical Sciences, Karimnagar, Telangana, India.

Email: manjukalluri@gmail.com

ABSTRACT

Introduction: Placenta is a foeto-maternal organ which connects the developing foetus to the uterine wall of the mother. It allows the transfer of nutrients, elimination of wastes, and exchange of gases via mother's blood supply. The birth weight and placental insufficiency are significant risk factors for the development of the metabolic syndrome in later life.

Aims and Objectives: The purpose of this study is to analyze the weight of the placenta and site of attachment of umbilical cord to the placenta by dissection method and to correlate them with any abnormalities of the mother as well as foetus.

Materials and Methods: A total of 50 specimens were collected from Prathima Institute of Medical Sciences during the period of February 2013 to May 2014 and subjected to thorough examination. Details were recorded and analyzed.

Results: Study showed a mean weight of 450.40g. Central attachment of umbilical cord in 27(54%), battledore 15 (30%), velamentous 7(14%) and double umbilical cord 1 (2 %) was observed.

Conclusion: Variations in the placenta are also associated with abnormalities in the foetus as well as the mother. Therefore, it is essential that the delivering physician performs a thorough, accurate examination of the placenta which in case of abnormality will be helpful for immediate and later management of mother and infant.

Key words: Placental weight, Battledore, Velamentous, Anencephaly.

Please cite this article as: Manju Sree KN, Sanna Nazir, Satyavathi Devi. Evaluation of placental weight and placental attachment of umbilical cord and its clinical correlations. Perspectives in medical research 2014;2:18-20

Source of Support: Nil, Conflict of interest: None Declared

INTRODUCTION

Placenta is a foeto-maternal organ which connects the developing foetus to the uterine wall of mother and is expelled from the womb by natural maternal forces after the delivery of the foetus. It is the only organ that belongs to two people at the same time. It allows the nutrition, elimination of wastes, and exchange of gases via mother's blood supply. All the anabolites required for foetal metabolism comes from the mother's blood and foetal catabolites are transported back into the mother's circulation through placenta. This extraordinary organ is dedicated to the survival of the baby, even to the extent of putting the mother at risk in some cases like postpartum hemorrhage. The birth weight and placental insufficiency are significant risk factors for the development of the metabolic syndrome in later life including hypertension, diabetes, and coronary heart disease. If the placenta is very small or sometimes extremely infracted, placental size may become the most important single factor in limiting foetal group.[1]

Hence, the examination of placenta gives a clear idea of what happened within it when it was in the mother's womb and to the foetus too, in the future.

MATERIALS AND METHODS

The materials for the study comprise of collections of placentae from the department of obstetrics and gynecology of Prathima Institute of Medical Sciences, Karimnagar. The placental specimens were studied in the department of anatomy. After

delivery, the placenta is mopped to remove any clotted blood and then weighed with 10 cm of umbilical cord. The specimen is fixed in 10% formalin immediately over 24-48 hours and then subjected to thorough gross examination. Net weight and site of attachment of umbilical cord, and gross variations are noted in all the specimens. Details of the mother and foetus were taken from clinical case sheets.

RESULTS

In all 50 specimens, mean weight of the placenta and the site of attachment of umbilical cord, were studied. The mean weight of the placenta was found to be 450.40±65.86grams In the majority of specimen, 30 (60%) the weight of the placenta was between 401-500 grams followed by ≤ 400 grams in 13 (26%) specimen. Central attachment of the umbilical cord was seen in 27 (54%) of specimen whereas battledore placenta in 15 (30%) specimen. Velamentous cord insertion was seen in 7 (14%) and double umbilical cord in 1 (2 %) of the specimen. Battledore placentae were associated with the anomalies of placenta as well as related to abnormal conditions of the mother and foetus/newborn.

Table 1: Mean weight of the placenta

Weight of the placenta	Frequency	Percentage
< 400 grams	13	26%
401-500 grams	30	60%
501-600 grams	5	10%
>600 grams	2	4%
Total	50	100%

Table 2: Site of attachment of umbilical cord to the placenta

Site of attachment	Frequency	Percentage
Center	27	54%
Battledore	15	30%
Velamentous	7	14%
Double umbilical cord	1	2%
Total	50	100%

Table 3: Fetal weight, fetal abnormalities and placental weight in normal and abnormal placenta

Variables	Mean fetal weight (grams)	Mean placental weight	Abnormalities in fetus
Normal placentae	3388.75±600.82	469±70.91	1
Placentae with abnormalities	2611.00±489.91	376±59.23	3

The mean fetal weight was less in placenta with abnormalities [battledore/ Velamentous placentae and placentae with hematoma/ decreased number of cotyledons] compared with normal placenta (3388.75±600.82grams and 2611.00±489.91 grams respectively). Similarly mean placental weight was less in placenta with abnormalities compared with normal placenta (469±70.91 grams and 376±59.23 grams respectively). More number of abnormalities 3 ((Anencephaly, Mitral/Cerebellar hypoplasia, Macrostomia each) in fetus was seen in placenta with abnormalities compared with normal placenta, 1 (Holoprosencephaly).

DISCUSSION

In the present study the mean placental weight is 450.40 grams with lowest being 320grams and highest being 630grams. In a study conducted by Williams et al recorded weight of placenta as 500grams whereas in a study conducted by Nayak et al, the mean placental weight was 518.21grams and mean fetal-placental weight ratio was 5.71. The average feto placental ratio is 7.17:1 and the average placental coefficient is 0.13. Placentae which are found to have hematoma are 100% associated with placentae weighing less than 400g. Hematoma or blood clots in membranes were seen in 4 specimens and 9 neonates were found to have a birth weight <3kg.

In the majority of specimen central attachment of umbilical cord is seen followed by battledore and velamentous cord insertion. Several theories have been postulated to explain this condition.[4]

(1) The yolk sac gets attached to the chorion at a place different from the original placental site; 2) the body stalk gets shifted towards a region other than decidua basalis; 3) Abnormal implantation theory: oblique orientation of the embryo may result in abnormal implantation of the cord; and 4) Trophotropism: the umbilical cord is normally implanted but becomes abnormal because of central atrophy and lateral growth of the chorion frondosum in one direction.

Among 15 battledore placenta, there is history of abortion in 2, type 2 diabetes mellitus in 1, pre

eclampsia in 1, oligohydramnios in 1, anencephaly in 1 specimen, holoprosencephaly in 1 specimen. Among 7 velamentous placentae, type 2 diabetes mellitus is associated in 1 case. Battledore placentae and placentae with <400g weight were associated with the anomalies of placentae as well as related to abnormal conditions of the mother and foetus, comparatively.

CONCLUSION

Variations in the placenta are also associated with abnormalities in the foetus as well as the mother. Therefore, it is essential that the delivering physician performs a thorough, accurate examination of the placenta and in case of doubt, pathologist or anatomist should be consulted to confirm the diagnosis. Such early examination of the placenta can yield information that may be important in the immediate and later management of mother and infant.

REFERENCES

1. Dawes G.S. Foetal and neonatal physiology. Chap 4. Year Book Medical Publishers. Chicago;1968.Pp 42-46.
2. Williams PL, Bannister LH, Berry M, Collins Pet al. Gray's Anatomy In: Early human Development, 38th Edn; Churchill Livingstone Edinburgh.1995; London.P.166.
3. Ashwini Nayak U, Sundari N. Placental weight and its ratio to birth weight in normal pregnancy. Indian J. Prev. Soc. Med 2009;40:147-50
4. Kurt Benirschke, Peter Kaufmann "Pathology of human placenta", fourth edition 2000.