

Morphological Study of the Placenta; A Reflection of Intrauterine Life of the Foetus.

Hina Nafees¹, Dilshad Ahmed²,
Satyam Khare³, Shilpi Jain³

¹Assistant Professor, Department of Anatomy, TMMC & RC, TMU, Moradabad, India.

²Demonstrator, Department of Anatomy, TMMC & RC, TMU, Moradabad, India.

³Professor, Dept of Anatomy, SMC, Meerut, India.

Date of Submission: 11-09-2015

Date of Acceptance: 23-11-2015

Date of Publishing: 26-12-2015

ABSTRACT

Background: Placenta is a vigorous, energetic, resourceful organ which in most cases of placental insufficiency is showing compensatory changes in response to an unfavourable maternal milieu, (H Fox 1975). The present study is an attempt to find out the morphological and histopathological changes in the placentas of hypertensive patients. **Methods:** The study was conducted on 60 cases of pregnant women admitted and delivered in the department of Obstetrics & Gynaecology, Subharti Medical College Meerut. The patients were divided into two groups. Control group included cases with normal blood pressure and study group included cases having blood pressure more than 140/90 mmHg. Placentas of each group were kept in separate container filled with 10% formalin solution for at least one week. At the onset of examination, placental size, thickness & weight is recorded. **Results:** The result reveals the mean placental area \pm SD in placenta of control group was $240.5 \pm 51.7\%$ and in study groups was $206.3 \pm 67.4\%$ ($p < 0.05$). The mean placental thickness \pm SD in the control group was $2.3 \pm 0.4\%$ and in the study group was $2.8 \pm 0.6\%$ ($p < 0.001$). The mean placental weight \pm SD in the control group was $390.3 \pm 49.0\%$ and in the study group was $346.7 \pm 97.4\%$ ($p < 0.05$). **Conclusion:** Placenta is a mirror which reflects the intrauterine status of the fetus. The examination of the placenta gives a clear idea of what had happened with it, when it was in the mother's womb and what is going to happen with the fetus in the future.

Keywords: Hypertension, Morphometry, Placenta, Pregnancy.

INTRODUCTION

The term 'placenta' is believed to have been introduced in 1559 by Realdus Columbus, who used the Latin word for a circular cake.^[1,2] In 1937, Mossman defined placenta as that portion of the foetal membranes that was in opposition with or fused to the uterine mucosa.

Name & Address of Corresponding Author

Dr Hina Nafees
Assistant Professor,
Department of Anatomy,
TMMC & RC,
Moradabad, India.
E mail: 786drhinanafees@gmail.com

As a major cause of both maternal and foetal morbidity and mortality, hypertensive disorder is the

most important underlying maternal condition to complicate pregnancy. Pregnancy complications like hypertension or gestational diabetes are reflected in the placenta in a significant way (both macroscopically and microscopically).

Pregnancy induced hypertension is the development of new hypertension in a pregnant woman after 20 weeks of gestation without the presence of protein in the urine. Hypertension is blood pressure greater than 140/90 mmHg.^[3]

Reduced maternal utero-placental blood flow leads indirectly to constriction of foetal stem arteries and finally results in changes seen in the placenta of pre-eclamptic women, (Fox H. 1975).^[4] Maternal vasospasm leads to fetal hypoxia, which is responsible for fetal jeopardy. Several studies have been done on the placentas of hypertensive patients. A study of the placenta of hypertensive pregnancies was done by Majumdar S, Dasgupta H, Bhattacharya K,

Bhattacharya A (2005).^[5]They have noted significant morphological and histopathological changes in placentas of hypertensive patients. Soma H, Yoshida K, Mukarda T, Tabuchi (1982)^[6]have studied morphological changes in hypertensive placentas. Udaina A and Jain M.L. (2001)^[7]have noted low birth weight and low placental weight as the severity of hypertension increases..

The present study focuses on the morphological changes of placentas of PIH patients and compare them with that of normotensive patient.

MATERIALS ANDMETHODS

The study was conducted on 60 cases of pregnant women admitted and delivered in the department of Obstetrics & Gynaecology, Subharti Medical College, Meerut, in which 30 cases were of uncomplicated pregnancy & 30 cases of PIH.

Control group, included cases with normal blood pressure without edema or proteinuria. Study group included cases having blood pressure ranging 140/90 mmHg and above, with or without edema and /or proteinuria. All those PIH cases having any other associated diseases like Diabetes Mellitus, jaundice were excluded from the study.

All placentas were collected immediately after delivery from labour room and Gynaecology operation theatre, Department of Obstetrics and Gynaecology, SMC Meerut. Placentas of each group were kept in separate container filled with 10% formalin solution for at least one week.

At the onset of examination, placental size, thickness & weight is recorded. [Figure 1-3].



Figure 1: Photograph of placenta showing measurement of diameter.

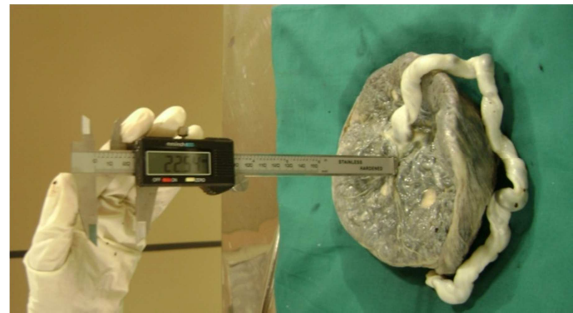


Figure2: Photograph of placenta showing measurement of thickness by digital verniercaliper.



Figure3: Photograph of placenta showing measurement of weight.

RESULTS

Table 1:Gross study of placenta.

Placental Parameters	Control Group n=30 mean \pm S.D.	Study group n=30 mean \pm S.D.	P value
Placental area (in cm ²)	240.5 \pm 51.7	206.3 \pm 67.4	t=2.2 p<0.05
Placental thickness (in cm)	2.3 \pm 0.4	2.8 \pm 0.6	t=3.8 p<0.001
Placental weight (in gms)	390.3 \pm 49.0	346.7 \pm 97.4	t=2.2 p<0.05

The result reveals the mean placental area \pm SD in placenta of control group was 240.5 \pm 51.7% and in the study group was 206.3 \pm 67.4% [Figure 4]. The unpaired t - test was done and the p value was <0.05. The mean placental thickness \pm SD in the control group was 2.3 \pm 0.4% and in the study group was 2.8 \pm 0.6% [Figure 5] p value as calculated by unpaired *t-test* was <0.001. The mean placental weight \pm SD in the control group was 390.3 \pm 49.0% and in the study group was 346.7 \pm 97.4% [Figure 6] p value as calculated by unpaired *t-test* was <0.05 [Table 1].

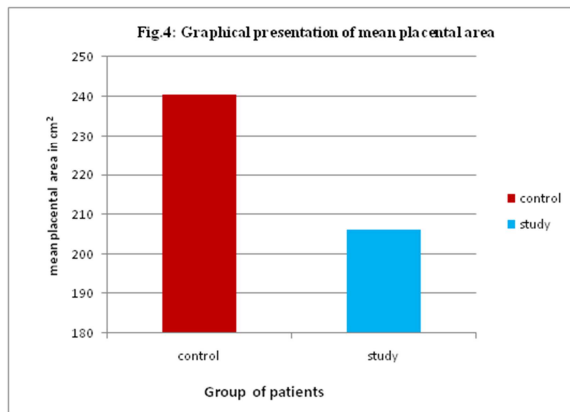


Figure 4: Graphical presentation of mean placental area.

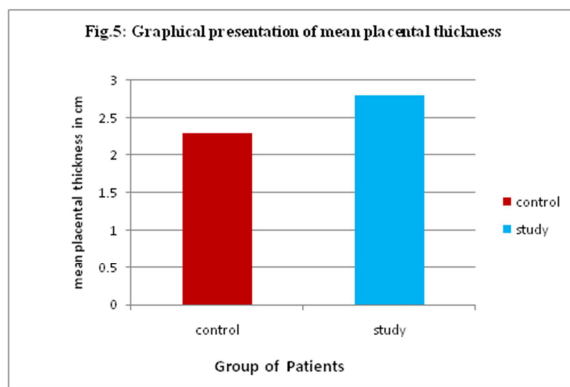


Figure 5: Graphical presentation of mean placental thickness.

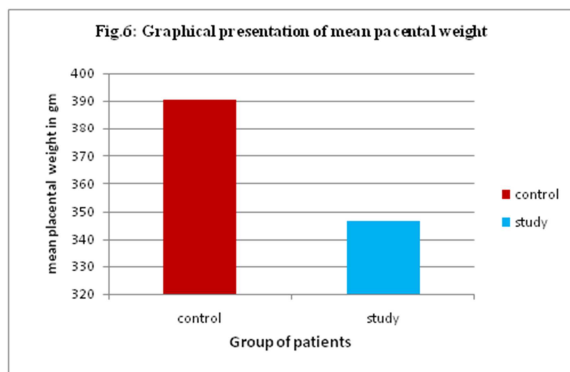


Figure 6: Graphical presentation of mean placental weight.

DISCUSSION

The results of our study show that PIH has an adverse effect on the surface area of the placenta and thereof on foetal growth and development. This was in conformity with the findings of Browne and Veall (1953)^[8] and Garg, Rath and Sharma (1996)^[9] who found that placental surface area is significantly less in PIH. Teasdale^[10] found significant reduction of the

transverse diameter in pre-eclampsia group, this reduction seems to be due to the small size of a placenta in pre-eclampsia groups. Cibils^[11] reported that the placentas from hypertensive patients were significantly smaller than the normal, suggesting that the pathologic process interferes with the normal placental growth.

The present study shows that hypertension was not associated with reduced placental thickness. This finding was very much in accordance with the study done by David J.P. Barker (2010).^[12] Michael Yampolsky (2009)^[13] hypothesize that placentas with deformed chorionic surface vascular trees and reduced functional efficiency also have irregular vascular arborization that will be reflected in the increased variability of placental thickness and a lower mean thickness.

According to our study, hypertension is associated with reduced placental weight. It was also observed by Damania et al (1989)^[14] that hypertension causes low birth weight, low placental weight and other abnormalities. According to Fox (1967)^[15] placentas from women with pre-eclampsia tend to be smaller than those of uncomplicated pregnancy.

Shah et al. (1985)^[16] concluded that the weight of placenta is more in pre-eclampsia with edema than without edema, but in severe pre-eclampsia weight will decrease probably due to marked proteinuria.

CONCLUSION

The placenta interfacing between the maternal and foetal circulation is a highly vascularized multifunctional organ, which develops and differentiates in the course of pregnancy. The placenta is a mirror, which reflects the intrauterine status of the foetus. The examination of the placenta gives a clear idea of what had happened with it, when it was in the mother's womb and what is going to happen with the fetus in the future. So special precaution implemented during the antenatal period and labor in subsequent pregnancies can reduce foetal morbidity & mortality.

REFERENCES

1. Fox H. The morphological basis of placental insufficiency. J. Obstet. Gynaec. India. 1975; 25 (4): 441-50.
2. Boyd JD and Hamilton W.J. The Human Placenta. Cambridge, England, Heffer, 1970; pp 451-9.
3. Williams obstetrics (24th edition). McGraw- Hill Professional . 2014; p 34-46.
4. Fox H. The morphological basis of placental insufficiency. J. Obstet. Gynaec. India. 1975; 25(4): 441-50.

5. Majumdar S, Dasgupta H., Bhattacharya K., Bhattacharya A. A study of placenta in normal and hypertensive pregnancies. *J. Anat. Soc. India.* 2005;54(2):34-8.
6. Soma H, Yoshida K, Mukaida T, Tabuchi Y. Morphological changes in the hypertensive placenta. *Contrib Gynecol Obstet* 1982;9:58-75.
7. Udania A, Jain ML. Morphological study of placenta in pregnancy induced hypertension with its clinical relevance. *J Anat. Soc. India.* 2001;50(1):24-7.
8. Browne JC, Veall N. The maternal placental blood flow in normotensive and hypertensive women. *J. Obstet. Gynaecol. Br. Emp.* 1953;60:141-7.
9. Garg K, Rath G, Sharma S. Association of birth weight, placental weight and the site of umbilical cord insertion in hypertensive mothers. *J Anat Soc India.* 1996;44:4-9.
10. Teasdale F. Gestational changes in functional structure of the human placenta in relation to foetal growth. *Am. J. Obst.* 1980; 137:560-2.
11. Cibils LA. The placenta and new born infant in hypertensive conditions. *Am J Obstet Gynaecol.* 1974;118(2):256-70.
12. Barker DJP, Thornburg KL, Osmond C. The surface area of the placenta and hypertension in the offspring in later life. *Int. J. Dev. Biol.* 2010;54:525-30.
13. Yampolsky M, Salafia C, Shlakter O, Haas D, Euker B, Thorp J. Centrality of the umbilical cord insertion in a human placenta, influences the placental efficiency. *Placenta* 2009;30:1058-964.
14. Damania KR, Salvi VS, Ratnaparkhi SK, Daftary SN. The placenta in hypertensivedisorders of pregnancy. *J Obst Gynaecol India.* 1989;39:28-31.
15. Fox H. Significance of placental in perinatal morbidity and mortality. *Biologia Neonatorum* 1967;11:87-91.
16. Shah RK, Jaguvala KS, Vyas PK. Placental morphology and fetal growth in normal and abnormal pregnancies. *J. Obst. Gynaecol India.* 1985; 35: 1089.

Copyright: © the author(s), publisher. Academia Anatomica International is an Official Publication of "Society for Health Care & Research Development". It is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

How to cite this article: Nafees H, Ahmed D, Khare S, Jain S. Morphological Study of the Placenta; A Reflection of Intrauterine Life of the Foetus. *Acad. Anat. Int.* 2015;1(1):26-9.

Source of Support: Nil, **Conflict of Interest:** None declared.