



Original Research Article

A Comparative Morphological Study of Placenta in Normal Pregnancy and Placenta of Pregnancy Induced Hypertension

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ABSTRACT

Placenta begins to meet the demands of embryo as early as from 3rd week of Intra Uterine life even before the mother is aware of her pregnancy. Pregnancy Induced Hypertension affects the Pathophysiology of Placenta. It is one of the deadliest complications affecting the fetal and maternal health. With this view a comparative Morphological study was carried out on 100 placentae. 50 placentae of PIH group and 50 placentae of normal group (control group) were collected and examined grossly for number of cotyledons, umbilical cord attachment, presence of infarction, calcification, fibrosis or any other gross anomaly. It was found that presence of Infarction is significant in cases of PIH group. Presence of calcification and decreased number of cotyledons were also found in PIH group though not statistically significant. There was no association of a particular pattern of umbilical cord attachment to placenta in PIH group.

Key Words: Placenta, Pregnancy Induced Hypertension (PIH), Cotyledones. Infarction, Calcification.

INTRODUCTION

Placenta is a vital organ for maintaining pregnancy and promoting normal fetal development. It is the mirror which reflects the intrauterine status of the fetus. All the anabolites needed for fetal metabolism come from the mother's blood and fetal catabolites are carried back into the mothers' circulation through the placenta. [1]

Placenta grows till 37th week of pregnancy and its morphology varies considerably during this short period. [2]

Being the fetal organ it shows the same stress and strain to which the fetus is exposed. Thus any disease process affecting

the mother and fetus also has great impact on Placenta.

Maternal diseases like pregnancy induced hypertension attribute to the great degree of fetal and maternal morbidity and mortality. Study of placenta in such cases is very helpful to scrutinize the exact etiopathogenesis/effects of PIH. Placental examination in such cases gives valuable information and answers to the questions concerning pregnancy management of such cases.

Present study is carried out with the view to study the impact of PIH on the placental morphology and to decrease

morbidity and mortality of fetus and mother and to plan future pregnancies in such cases.

MATERIALS AND METHODS

This is a prospective study carried out in our institute. The study material consisted of placentae. These were obtained from the department of Obstetrics and Gynecology where the mothers were delivered normally or by caesarean section in the labour room or in the operation theatre. A total of 100 placentae were collected in two groups.

Group I (Control Group)

This group included 50 placentae. These were collected from the mothers who had normal full term pregnancy, not suffering from PIH (Blood pressure was <140/90 ml of Hg without edema or proteinuria), blood coagulopathies, respiratory or cardiac diseases or any other disease which can affect the blood pressure of mother or fetal outcome in any way. This group was labelled as control group/normal group.

Group II (PIH Group)

This group consisted of the cases with blood pressure of 140/90 or above with edema or proteinuria or both. Some cases also had eclamptic fits with symptoms like blurring of vision, headache, upper abdominal pain or oliguria. None of the cases had hypertension prior to pregnancy. A total of 50 placentae were collected in this group, and labelled as PIH group.

Collection of Placentae:

Placentae were collected immediately after the delivery. Blood was allowed to drain out by keeping it flat in a tray. Then it was washed under running tap water and dried with blotting paper. Umbilical cord was cut 5 cm away from its insertion.

1) A note was made regarding the site of insertion of umbilical cord. Fetal surface and the membranes were examined for their

glossiness, translucency and colour. The membranes were then trimmed.

2) Number of the cotyledons on maternal surface was counted.

3) Placenta was examined for the presence of infarction, calcification or fibrosis if any.

4) All Placentae were then kept in 10% formalin for 8-10 hours. Transverse cuts were made through the maternal surface at a distance of 1-2 cms. in bread loaf manner and examined grossly for infarction, calcification, necrosis, fibrosis or any other gross anomalies as they are better appreciated after fixation. ^[3]

OBSERVATION / RESULTS

A comparative morphological study of placenta in normal pregnancy and placenta of PIH showed following results.

Number of Cotyledons

Table No. 1 - Number Of Cotyledons.

Sr. No.	No. of Cotyledons	No. of cases			
		control group	%	PIH group	%
1.	11-15	NA	NA	NA	NA
2.	16-20	27	54%	29	58%
3.	21-25	20	40%	18	36%
4.	26-30	3	6%	3	6%

In present study 27 cases (54%) of control group and 29 cases (58%) of PIH group was showing number of cotyledons in the range of 16-20. While another 40 % and 36% of control and PIH group respectively were lying in the range of 21-25 cotyledons. 6% cases of the both the groups were lying in the range of 26-30 cotyledons. (As shown in Table 1) There was no significant difference in the number of cotyledons in both the groups.

ATTACHMENT OF UMBILICAL CORD

Table No. 2 - Distribution of cases as per attachment of Umbilical Cord.

Umbilical cord	Number of cases			
	Control Group	%	PIH Group	%
Central	19	38%	19	38%
Eccentric	18	36%	17	34%
Marginal	13	26%	14	28%

In present study 19 cases (38%) of control group and 19 cases (38%) of PIH group showed central attachment of cord. Eccentric attachment was seen in 36 % of control group and 34% in PIH group. While marginal insertion was seen in 26% of control group and 28% of PIH group. (As shown in Table 2) There was no preponderance of any one type of cord attachment in PIH group.

MORPHOLOGICAL CHANGES IN PLACENTA

Table No. 3 : Distribution of cases as per presence of Infarction & Calcification

	Number of cases					
	Control Group	%	PIH Group	%	P Value	Significance
Infarction	4	8%	20	40%	<0.05	Significant
Calcification	11	22%	17	34%	>0.05	Not Signif.

Present study showed that infarction was the commonest lesion found

macroscopically in PIH group. There were 20 cases of PIH showing infarction as compared to only 4 cases of control group. All the infarcts were fresh infarcts and presence of infarction in PIH is found to be more and statistically significant.

In Present study calcification was found in both the groups i.e. control and PIH group. In PIH group we found that 17 cases (34 %) were showing calcification where as in control group 11 cases (22%) showed calcification. Presence of calcification in PIH group was not significant. (Table 3)

Present study does not show any case of fibrosis or any other gross anomaly.

DISCUSSION

Placenta is made up of components from both the mother and the fetus. Maternal component is decidua basalis which is the part of endometrium where future placenta is to be formed. It lies deep to the developing blastocyst. It is also called as decidual plate. The fetal structure is chorion. It consists of trophoblast resting on extra embryonic mesoderm. This chorion gives rise to essential element of placenta "chorionic villi" which are primary, secondary and tertiary. [4]

Placenta shows two surfaces fetal and maternal. Fetal surface is smooth, covered by amnion with umbilical cord attachment. It is referred as Placental Roof or Shini-Schultze." [5]

Maternal surface is also referred as "Dirty Duncan." [5] It is rough and irregular showing 15-20 polygonal areas limited by fibrous tissue called as Maternal Cotyledons.

Crowford (1959), stated that total number of cotyledons remain same throughout the gestation once formed but individual cotyledon continues to grow till term.

Majumdar S. (2005), [6] studied placenta in cases of PIH and normal pregnancy and found that there is no

significant change in the number of cotyledons in PIH group. In present study there is no significant change found in the number of cotyledons in PIH group which is in conformity with above two studies. Nag U and co workers (2013), [7] mentioned in their study that the decrease in the number of cotyledons in PIH group was not statistically significant. However Gunpriya Raghunath (2011), [8] & Pradeep S.Londhe (2011), [9] noted paucity of cotyledons in PIH group. This may be due to variation in sample size.

Attachment of Umbilical cord

Attachment of umbilical cord to placenta can be studied by ultrasound or by dissection method. Studies have shown that central or eccentric umbilical cord attachment is most common and is considered normal.

Val A.(2011), [10] and Manikanta (2012), [11] studied variations in placental attachment in umbilical cord and concluded that abnormal attachment like marginal and velamentous are associated with IUGR, Pre term Labour or congenital anomalies. Jason H Collins (2010), [12] quoted the incidence of furcate insertion as 1% in the literature. Rath, Garg (2000), [13] Majumdar (2005), [6] Londhe (2011), [9] and Nag U (2013), [7] found marginal insertion of cord in PIH. Whereas present study shows no correlation of any type of cord attachment to PIH group which is in conformity with Nobis and Das (1991). [14]

Infarction

Placental Infarction is a zone of ischemic necrosis of a group of villi due to complete interference with their blood supply in the decidua or by thrombosis of a spiral arteriole. [15]

Further the extent and incidence of infarction increases with the increasing severity of toxemia. Fox H (1967), [16] Majumdar (2005), [6] and Gunpriya (2011), [8] in their respective studies mentioned that

the placental infarcts are significantly common in PIH which is in conformity with the present study. Pradeep Londhe (2011), [9] and Nag U (2013), [7] also confirms the same findings.

Calcifications

Microscopic calcification of placenta is by no means uncommon and may be quite extensive as it is a hallmark of placental degeneration. Present study shows presence of calcification in both the groups and its presence in PIH group is not statistically significant which is in conformity with Kailash Belkund (2014). [17]

CONCLUSION

Thus to conclude a detail gross examination of placenta can give an idea about the fetal status, its prenatal experience and future well being.

Presence of fresh Infarcts in the Placenta specially in mothers who have not attended ANC clinics, definitely suggests that mother was suffering from PIH and can help the Doctor to decrease the Fetal and Maternal morbidity and mortality and to plan for the future pregnancies in such cases.

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