

## THE HISTOLOGICAL STUDY OF PLACENTAE IN NORMAL AND ABNORMAL PREGNANCY

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The normal aging process of the placenta consists of reduction in the size of the chorionic villi, loss of cytotrophoblastic layer of Langhan cells, development of the clusters of syncytial nuclei (syncytial knot) and mature dilated capillaries occupying 2/3 of the stroma. Premature aging of the placenta is marked in toxæmia of pregnancy (Wislocki and Dampsy, 1946) and in essential hypertension (Paine 1957). Accelerated aging of the placenta is found in Rh-ve mothers with Rh + ve foetus (Shanklin, 1958) and in postmaturity (Fox, 1964).

Paine (1957) found that the syncytium was thinned out over a large proportion of villi in the presence of toxæmia. Vascular changes and their sequelae found in toxæmia were identical to those seen in hypertension. Such changes were absent in cases of acute fulminating toxæmia. In essential hypertension the changes were more marked in the vessels and in the stroma, while in toxæmia of pregnancy the syncytial atrophy was the marked feature.

Syncytial knot may be present occasionally in premature placenta (Wigglesworth, 1962), upto 30% in mature placenta (Benirschke, 1961) and in excessive number in postmaturity and toxæmia of pregnancy (Merril, 1963; Kubli and Budliger, 1963; Fox, 1964; and Malkani and Bhasin, 1968) Presence of excessive number of syncytial knots in toxæmia of pregnancy is called as "Tenney change".

Fox (1964) found that in the normal placenta, the villous Langhan cells show greater degree of proliferation in women above the age of 30 years, in case of prolonged pregnancy and in grandmultipara.

The proliferation of Langhan cells is related with placental ischaemia and diastolic blood pressure. It is marked in conditions where foetal anoxia develops slowly as in toxæmia of pregnancy and hypertension. This finding is not seen in acute and fulminating cases as there is no time for these changes to develop, (Paine, 1957; Fox, 1964). Boyd and Hamilton (1967) found diminution in number of Langhan cells in postmaturity.

Stromal collagen gradually increases throughout pregnancy and at term the stroma usually shows delicate network of fibrous tissue, (Paine 1957; Vokaer 1957; Fox, 1964). Increase of stromal fibrosis was noted in toxæmia of pregnancy

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Received for publication on 3-8-1971.

(Sauromo, 1961), post maturity (Kubli and Budliger, 1963) and in stillbirth (Nesbitt, 1967). Boyd and Hamilton (1967) discussed that thickened basement membrane of the placenta was a feature of toxæmia, postmaturity and diabetes (Lister, 1965; Okudaira *et al.*, 1966).

Fujikura and Benson (1964) studied the changes in the foetal vessels in the placenta of stillborn infants and disclosed partial or complete fibrous occlusion of the foetal vessel in 38% of placenta. The vascular changes were commonly associated with moderate to marked foetal maceration. Foetal obliterative endarteritis was also noted occasionally in pre-eclamptic toxæmia (Riviere, 1930; Hunt *et al.*, 1940) and in syphilis (Fox, 1967).

The purpose of this paper is to study the correlation between the clinical diagnosis and the histological pattern.

#### Material and Methods

The histological study of 140 placenta from normal full term and abnormal pregnancies was carried out. The placenta were obtained from the labour room of Kamala Nehru Memorial Hospital, Allahabad. The cases were classified according to Table 1.

The tissue was fixed in 10% formal saline, processed and sections were prepared and stained with haematoxylin and eosin.

The study was done from the aspect of changes in the trophoblast, blood vessels and stroma of the chorionic villi. No stress was given on the shape of the villi, fibrinoid necrosis and calcification.

#### Results

The histological findings are summarized in Table II. *Normal Placenta:* Twenty full term normal placenta were studied. The chorionic villi were small in

TABLE I  
Showing Distribution of Different Types of Placenta

Type of Placenta	Total No.	Percentage
Normal	20	14.4
Twin & triplets	18	12.8
Stillbirth	20	14.4
Toxaemia of pregnancy	18	12.8
Postmaturity	10	7.1
Prematurity	12	8.6
Hydramnios	10	7.1
Rh-ve group	7	5.0
Anaemia	10	7.1
Miscellaneous (Heart case)	7	5.0
Hepatitis	3	2.1
Congenital anomalies	5	3.6
<b>TOTAL</b>	<b>140</b>	<b>100.0</b>

all the cases with Langhan cell proliferation in 3(15%), reduction in syncytial knots in 4(20%), reduced vascularity in 5(15%) and stromal fibrosis in 3(15%).

#### Twin and Triplet

Eighteen placenta were studied. The chorionic villi were small and flattened with thin walled foetal blood vessels. Three cases (16.6%) showed Langhan cell proliferation, reduced syncytial knots in 6 (33.3%), reduced vascularity was observed in 5 (27.7%) with fairly marked degree of stromal fibrosis and hyalinization in 2(11%) of cases.

#### Stillbirth

Out of 20, four were macerated and 16 were fresh stillbirths. Langhan cell proliferation, reduced syncytial knots and stromal fibrosis were seen in 3(75%) and reduced vascularity with partial or complete occlusion of blood vessel by fibrosis was seen in 4(100%) in macerated foetal placenta (Fig. 1). In the remaining 16 cases of fresh stillbirth, 6 (37.5%) had Langhan cell proliferation, reduced syn-



TABLE II

*Showing Histological Findings in Different Types of Placenta*

Placenta	No.	Langhan cell Proliferation		Syncytial Knots		Increased		Reduced vascularity		Stromal fibrosis	
		No.	%	No.	%	No.	%	No.	%	No.	%
Normal	20	3	15	4	20	—	—	5	25	3	15
Twin & triplet	18	3	16.6	6	33.3	—	—	5	27.7	2	11.1
Stillbirth—fresh	16	6	37.5	7	43.75	—	—	9	56.2	2	12.5
macerated	4	3	75	3	75	—	—	4	100	3	75.0
Toxaemia of pregnancy	18	8	44.4	—	—	8	44.4	11	61.1	9	50.0
Postmaturity	10	—	—	—	—	—	20.0	1	10.0	2	20.0
Prematurity	12	2	16.6	8	66.6	—	—	4	33.3	4	33.3
Hydramnios	10	2	20.0	2	20	—	—	2	20	1	10.0
Rh-ve group	7	1	14.2	—	—	—	—	—	—	—	—
Anaemia	10	3	30.0	4	40	—	—	2	20	2	20
Miscellaneous; heart cases	7	—	—	—	—	2	28.4	1	14.2	—	—
Hepatitis	3	2	66.6	2	66.6	—	—	2	66.6	1	33.3
Congenital anomalies	5	1	20.0	1	20	—	—	1	20.0	—	—

cytial knots in 7 (43.7%), reduced vascularity in 9 (56.2%) and stromal fibrosis in 2 (12.5%) cases.

#### *Toxaemia of Pregnancy*

The blood pressure varied from 130/96 to 160/120 mm of Hg. in 18 cases of toxæmia of pregnancy. Tanney changes (Fig. 2) and Langhan cell proliferation were present in 8 (44.4%) cases. Eleven cases (61.1%) showed reduced vascularity and stromal fibrosis in 9 (50%) cases (Fig. 3).

#### *Postmaturity*

One out of 10 cases (10%) of postmaturity showed reduced vascularity of villi, Langhan cell proliferation, reduced syncytial knots and stromal fibrosis were not significant features in postmaturity group of cases. Calcification was found in almost all the cases.

#### *Prematurity*

The syncytial knots were present in 8 out of 12 cases (66.6%); reduced vascularity and stromal fibrosis were also present in 4 cases (33.3%).

In hydramnios, Rh-ve-group anaemia and miscellaneous group (heart cases, hepatitis and congenital anomalies) there was no significant histological finding except a few cases showed Langham cell proliferation, reduction of syncytial knots, reduced vascularity and presence of stromal fibrosis (Table II).

#### *Discussion*

No significant histological finding was found in placentae of twin and triplets except Langhan cell proliferation. Signs of placental ischaemia in a few cases and reduced vascularity were seen in 3 (16.6%) cases. Two cases (11%) having reduced vascularity also showed stromal fibrosis.

Fujikura and Benson (1964) reported

foetal obliterative endarteritis in 38% of placentae of stillbirth, while in this study it was 65%. Marked degree of Langhan cell proliferation was noted in all the 4 macerated stillbirths while Langhan cell proliferation in 37.5%, reduced vascularity in 56.2% and stromal fibrosis in 12.5% were noted in fresh stillbirths in the present study. Langhan cell proliferation (Fix, 1964) and stromal fibrosis (Nesbitt, 1967) were also demonstrated in stillbirth.

Tanney changes and Langhan cell proliferation were present in 8 cases (44.4%). Tanney changes were also demonstrated by others (Riviere, 1930; Sauromo, 1953; Becker and Bleyl, 1961; Merrill, 1963). Langhan cell proliferation was related to the level of diastolic blood pressure which varied from 96 to 120 mm of Hg. Nine cases (50.0%) showed mild to moderate degree of stromal fibrosis as reported by Sauromo (1961) and Salvatore (1968). Eleven cases (61.1%) showed foetal obliterative endarterities. Similar lesion was noted by others (Riviere, 1930; Hunt *et al*, 1940; Fox, 1967; and Salvatore, 1968). Trophoblastic, stromal and vascular changes may be absent in cases of acute and fulminating toxæmia (Paine, 1957).

Langhan cell proliferation was not a significant feature in postmaturity group in this study. This finding was consistent with others (Schroder, 1930; Ortman, 1955; Stohr, 1959). Normal vascularity of the chorionic villi was revealed in 90% cases of postmaturity. Dilated sinusoidal form occupying nearly all the cross sectional area of villi being supplied by small centrally placed capillaries was probably of little significant value. An excessive number of such villi had been correlated with low birth weight and foetal anoxia (toxæmia) (Gruenwald, 1961; 1963).



Rh negative group of cases had no significant histological finding as there was no sign of foeto-maternal incompatibility.

Premature aging was noted in the premature group as indicated by the lack of syncytial knots. Cases of anaemia, hydramnios and miscellaneous group (Heart cases, hepatitis and congenital anomalies cases) had no significant findings except a few cases showed placental ischaemia as indicated by Langhan cell proliferation, reduced vascularity and stromal fibrosis.

Calcification and fibrinoid necrosis had no significant relationship in placentae of different group of cases.

#### Summary

No significant histological findings were found in placentae of twin and triplets, Rh-ve group, anaemia, hydramnios and miscellaneous group except in a few cases as sign of placental ischaemia revealed by Langhan cell proliferation and reduced vascularity.

65% of placentae of stillbirth showed foetal obliterative endarteritis. Langhan cell proliferation was noted in 9 out of 20 (45%) of cases of stillbirths. 44% of placentae of toxemia of pregnancy showed "Tanney changes" and Langhan cell proliferation, reduced vascularity in 61.1% and stromal fibrosis in 50% were also noted. 90% of placentae of postmaturity showed normal vascularity and no Langhan cell proliferation in all the cases. Sign of premature aging in the placentae of premature delivery was noted. Calcification and fibrinoid necrosis had no significant relationship in placentae of different groups.

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*See Figs. on Art Paper I*