

HISTOPATHOLOGICAL STUDY OF PLACENTA AND DECIDUA IN MID TRIMESTER ABORTIONS

by

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Twenty per cent hypertonic saline administered intra-amniotically is believed to be one of the best procedures for the termination of pregnancy in second trimester and it has virtually replaced hysterotomy for this purpose. The mechanism of action of hypertonic saline induced abortion, however, still eludes us. During normal pregnancy placenta is responsible for the nourishment of foetus. It is, therefore, natural that placental lesions are suspected in the aetiology of spontaneous or induced abortions. As early as in 1878, Storch postulated that early cystic degeneration of chorionic villi accounted for a large percentage of cases of spontaneous abortions. Stamm and De Watteville (1954) noticed necrosis of amnion in placentae in cases of intra-amniotic hypertonic saline induced abortion. Other authors did not detect damage to villi or the amnion but found inter-villous thrombosis (Jaffin *et al*, 1962). Hydropic degeneration, necrosis, hyaline degeneration, fibrosis, fibrinoid degeneration and calcification have also

been described (Upadhyay *et al*, 1967).

Another group failed to find any change in placentae in hypertonic saline induced abortions (Wynn, 1967; Brunk and Gustavii, 1973). Myers *et al* (1974) laid stress on mild to moderate interstitial oedema of decidua in the pathogenesis of induced abortions; Vassilakos *et al*, (1974) upheld the observations of these authors.

It is, therefore, apparent that divergent views are expressed by competent workers on the mechanism of abortions. Hence it was decided to study this problem during 1974-76 at the postpartum unit in the University Hospital, Varanasi.

Material and Methods

The Clinical material consisted of 200 healthy young pregnant women (Pregnancy 15-20 weeks) whose pregnancies were terminated by intra-amniotic 20 per cent hypertonic saline solution during 1974 to 1976. Detailed macroscopic and microscopic examination of placenta and decidua was possible in only 90 cases. The present study details our findings in these cases. Each specimen was minutely examined macroscopically externally and on cut surface and was immediately fixed in 10 per cent neutral buffered formaline in saline. Four blocks were taken from each placenta and 4 from the membranes and the decidual material.

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Haematoxyline and eosin stained paraffin sections were cut at 4 micrometer thickness and were examined independently by 2 observers.

Observations and Results

The gross examination of placentae did not reveal any remarkable abnormality on the external surface, except in 3 cases in which membranes appeared oedematous and had irregularly scattered fluid filled small bullae between the layers of chorion and amnion. The cut surface, however, showed an irregular zone of red thrombus in most of the placentae. This observation was passed on as within normal limits.

Microscopic abnormalities of varying degree were observed in almost all the placentae. In all the cases the amniotic epithelium showed fibrinoid necrosis,

blastic cells which at places formed syncytial knots (Fig. 2). The histological changes were confined to a fairly narrow zone of necrotic villi just beneath the membranes. In this zone the villi were also infiltrated by inflammatory cells (Fig. 3). Damaged chorionic villi showed nuclear pyknosis and eosinophilic coagulative necrosis suggesting acute necrotising placentitis. The villi were more or less normal in the remaining major part of placenta.

The decidual cells showed degenerative alteration with pyknosis on Karyorrhexis and vacuolization of the cytoplasm. Amidst the degenerating decidual cells some inflammatory cell infiltrate was also noticed indicating deciduitis (Fig. 4). The decidua also showed foci of necrosis and haemorrhage.

The results are summarised in Table I.

TABLE I

Gross and Histological Findings in Placentae and Decidua in 90 Cases of Mid-Trimester Abortions

Placenta									Decidua								
Macroscopic				Macroscopic					Microscopic				Microscopic				
Normal	Abnormal	No.	%	Normal	Abnormal	No.	%	No.	%	Normal	Abnormal	No.	%	Normal	Abnormal	No.	%
87	96.7	3	3.3	0	0	90	100	1	1.1	89	98.9	0	0	90	100		

coagulative necrosis of the cytoplasm and pyknosis of the nuclei. The membrane itself had become thickened and relatively avascular (Fig. I). The intervillous spaces showed profuse haemorrhages although villi themselves were more or less normal. In 3 areas thrombosis was also noticed around damaged villi. Some of the fibrosed villi were encircled by areas of fibrinoid necrosis. At times, giant villi were observed which contained sclerosed vessels.

Chorionic villi also showed varying degree of proliferation of syncytiotropho-

Discussion

The histopathological study of the placenta and decidua in our series has revealed some relevant findings. Though normal on external appearance in the majority, microscopic abnormalities of varying degrees were found in almost all placentae and decidua. Our histological findings are consistent with those of Bengtsson and Stromby (1962) and Turnbull and Anderson (1965). However, Jaffin *et al* (1962) did not find any microscopic evidence of deciduitis but did describe intervillous thrombosis in subcho-

ronic zone. Klepper *et al* (1966) also found bulk of placenta normal but for superficial coagulative necrosis.

Christie *et al* (1966) observed oedematous membranes in all and thin irregular zone of red thrombus in 5 out of 7 placentae of hypertonic saline abortions on macroscopic examination, but in our study only 3 placentae showed gross abnormalities on naked eye examination. On microscopic examination Christie *et al* (1966) found that histopathological abnormalities were confined to thrombotic zone and in the amnion. Remaining part of placenta was normal. No abnormality was seen in the vessels. Our findings are in variance with those of the above authors because we found sclerosed vessels and fairly advanced changes in chorionic villi, besides lesions in amnion.

Kunders and Hemalatha (1972) on histological examination of placenta and membranes could only attribute mild inflammation with polymorphonuclear leucocytosis to intraamniotic saline injection. We agree with these findings.

The histopathological findings in the decidua in the present study are similar to those reported by Gustavii and Brunk (1971). They observed that decidual cells underneath Nitabuch membrane showed extensive degenerative alterations. Brunk and Gustavii (1973) came to the conclusion that the saline diffuses out through membranes and act on decidua which lies in the extra-amniotic space. It is, therefore, possible that the decidua is the target in the action of hypertonic saline. The damage to the decidua cause release of prostaglandin F_{2α} into amniotic fluid exerting its abortifacient activity (Gustavii and Brunk, 1971).

Vassilakos *et al* (1974) were also able to demonstrate a surprising vulnerability

of decidua during saline abortion by observing degenerative changes as early as 2 hours after saline instillation. Mayers *et al* (1974) upheld these findings. Llewellyn *et al* (1975) recorded a steady rise in prostaglandin F_{2α} levels after intraamniotic saline injection. Similar findings were reported by Gustavii and Green (1972).

These observations afford inferential evidence that hypertonic saline exerts its abortifacient activity through a prostaglandin mediated mechanism.

Our findings also demonstrate extensive damage to decidua.

Summary and conclusion

The histological study of the placenta and decidua revealed placentitis and deciduitis. It may be conjectured that the decidual damage was perhaps responsible for the release of prostaglandins leading to initiation of abortion.

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See Figs. on Art Paper X

Our findings are discussed in the following paragraphs.

The histological study of the placenta revealed the presence of syncytiotrophoblastic giant cells. It may be concluded that the histological changes are suggestive of a form of placental infarction.

The histological findings in the placenta are similar to those reported by Gostain and Hank (1971). They observed that decidual and chorionic trophoblastic membranes showed extensive degenerative changes. Hank and Gostain (1971) came to the conclusion that the saline dilution outgrowth technique and not an abortion which lies in the extra-embryonic space. It is therefore possible that the changes in the fetus in the case of placental infarction are the result of the damage to the decidua and chorion. The damage to the decidua may be of mechanical nature as suggested by Gostain and Hank (1971).

Yoshida et al (1971) were the first to describe a curvilinear infarction of the placenta. They reported that the infarction was confined to the decidua and chorion. The infarction was characterized by the presence of syncytiotrophoblastic giant cells and the absence of chorionic trophoblastic membranes. Our findings are similar to those reported by Yoshida et al (1971). They observed that the infarction was confined to the decidua and chorion. The infarction was characterized by the presence of syncytiotrophoblastic giant cells and the absence of chorionic trophoblastic membranes.