

STUDY OF PLACENTA, MEMBRANES AND UMBILICAL CORD AFTER MIDTRIMESTER TERMINATION OF PREGNANCY WITH INTRA-AMNIOTIC HYPERTONIC SALINE

by

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The use of 20% Saline has been accepted for induction of abortion in the third trimester. Despite its wide use for MTP during this period with high success, it appears that there is much confusion regarding its site and mechanism of action. The study of placenta, membranes and umbilical cord thus obtained after IAHS is a convenient method to know the possible mechanism of its action. But surprisingly very few studies have been made in this regard till date.

This prospective study was carried out to throw light on the site and mechanism of action of hypertonic saline in initiation of uterine contraction and completion of abortion.

Material and Methods

The present study included 100 women who sought MTP in the midtrimester, during the period from September 1978 to February 1980. Ten cases of identical nature treated by hysterotomy served as control. After detailed history and exami-

nation to confirm the duration of pregnancy, routine examination of blood and urine was done. A sickling test was done in all cases and those with a positive test were excluded from study, as were those with systemic diseases. In all cases, 20% saline was injected into the amniotic cavity, the amount depending on the duration of pregnancy. The placenta, with membranes and the cord were preserved in formal saline for histological study.

Observations

Thirty per cent of the cases were below 20 years of age and 52% were married. The prevalence of younger age was due to the fact that 48% were unmarried. The average instillation-abortion interval was 30.68 hrs, 80% of the cases aborting within 36 hours. The rest 20% needed Syntocinon drip to help the process. The complications encountered are shown in Table I.

The major complications were retention of placenta (8%) and Post-abortal fever (4%).

Macroscopic Changes

The gross changes observed in the placenta and the membranes are outlined in Table II.

The cut sections of the placentae reveal-

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TABLE I
Complications After IAHS

Complications	No. of cases	Percent
1. Vomiting	2	2
2. Premature rupture of membrane	3	3
3. Prolonged latent period (36 hours)	8	8
4. Pre-intraabortal fever	0	0
5. Post abortal fever	4	4
6. Retained placenta	8	8
7. Cervical lacerations	2	2
8. Haemorrhage	0	0

Microscopic Changes

A. Membranes

On microscopic study, remarkable changes were found in the membranes. These changes are outlined in Table IV and Fig. 1. It will be found that oedema of the membranes was so extensive that the tissues failed to take up stains properly. The other major changes were found in the form of degeneration of the amniotic epithelium (54%), degeneration of the chorionic epithelium (23%) and thrombosis of the chorionic blood vessels (40%).

TABLE II
Gross Changes in Placenta and Membranes

Surface	Changes	No. of cases	Percent
Foetal	1. Oedema of the membranes	100	100
	2. Haemorrhage under the membranes	10	10
	3. Congestion of the blood vessels	10	10
	4. Thrombosis	Nil	Nil
	5. Infarction	Nil	Nil
Maternal	Appeared normal in all cases		

ed formation of red thrombus underneath the membranes in 34% of the cases. Scattered areas of haemorrhage were marked in 40%. These areas were found to be strictly restricted towards foetal surface.

Umbilical Cord

Gross changes in the cord are shown in Table III.

TABLE III
Gross Changes in Umbilical Cord

Gross changes	No. of cases	Percent
Oedema	50	50
Thrombosis	36	36
Congestion of blood vessels	20	20
Haemorrhage	1	1

TABLE IV
Microscopic Changes in the Membranes

Changes	No. of cases	Percent
1. Oedema of the membranes	100	100
2. Degeneration of cells of the amniotic epithelium in form of cytoplasmic vacuolation and nuclear pyknosis	54	54
3. Degeneration of cells of chorionic epithelium	23	23
4. Leucocytic infiltration of the membranes	15	15
5. Thrombosis of chorionic blood vessels	40	40

B. Chorionic Villi

The microscopic changes were very marked in the villi, Trophoblastic cells, stroma and blood vessels (Table V).

TABLE V
Microscopic Changes in Chorionic Villi

Structure	Changes	No. of cases	Percent
TROPHOBLAST	Degeneration	78	78
	Necrosis	60	60
STROMA	Oedema	85	85
	Necrosis	23	23
	Leucocytic infiltration	10	10
BLOOD VESSELS	Dilatation	32	32
	Congestion	48	48
	Red Thrombosis	2	2

C. Intervillous Space

Table VI shows the changes seen in the intervillous spaces.

TABLE VI
Changes in the Intervillous Space

Changes	No. of cases	Percent
1. Areas of red thrombosis	40	40
2. Leucocytic exudates	30	30
3. Haemorrhage	40	40
4. Fibrin deposition	22	22
5. Calcification	2	2

In the control group fibrin deposition was seen in only 1 case and it was within normal limits.

D. Decidua

Degeneration, leucocytic infiltration and haemorrhage were common in the decidua as can be seen in Table VII and Figs. 2, 3, 4 and 5.

The histopathologic changes noted above were not in any way related to the duration of gestation or to the instillation-abortion interval.

TABLE VII
Microscopic Changes in the Decidua

Changes	No. of cases	Percent
1. Degeneration and necrosis of cells with pyknosis or karyorrhexis and vacuolisation of the cytoplasm	100	100
2. Leucocytic infiltration	100	100
3. Haemorrhage	54	54
4. Thrombosis in decidual blood vessels	6	6

Discussion

Despite great achievement of hypertonic saline as a method for MTP in the mid-trimester the exact site of its action, nature and mode of changes in the tissues exposed and the mechanism by which it initiates uterine contraction all remain unresolved till date.

Oedema of the membranes (100%) in this study were similar to that found by Honore (1976) and Kundu *et al* (1978). Salhan (1979) reported a low incidence, Congestion of membranes was found in 100% of cases by Honore (1976) as compared to 10% in this series. Amniotic cell degeneration was reported to be 100% (Christie *et al* 1966; Honore, 1976); 60% by Blaustein and Shanker (1971) and

48% by Kundu *et al* (1978) whereas it was 54% in this study. The leucocytic infiltration (15%) was very conspicuously prominent wherever it was present.

Changes found on cut section of the placenta compare well with those found by Kundu *et al* (1978) and Christie *et al* (1966). The microscopic changes were not seen in diffuse pattern but patchy and focal and were found more towards foetal surface in a thin subchorionic zone only.

Study of decidual changes attracted attention following the observation of Gustavii (1973) who discussed basal decidual necrosis and its role in release of PGF₂-alpha, an uterine stimulant. Honore (1976) could observe changes only in the decidual perietalis and not in decidua basalis. The present study revealed remarkable changes in decidua basalis in the form of degeneration, necrosis, neutrophil leucocytic infiltration, haemorrhage and early red thrombus formation. The former two changes were extensive in all cases indicating a definite pathological process in the form of acute inflammatory reaction. Haemorrhage was also massive and significantly present in 54% of the cases.

Honore (1976) suggested that the primary source of PGF₂-Alpha is decidua in abplacental and myometrium in the subplacental region. This was in difference with Gustavii's study in 1973. In the present study, the basal decidua was found to be mostly affected. No parietal decidual tissue could be obtained from the detached membranes as obtained by Honore (Personal communication). Hence the result of the present work support the Lysosomal Hypothesis of Gustavii who proposed that acute decidual necrosis

produced by primary osmotic impact of Hypertonic Saline, as it diffuses out of the amniotic sac, causes local synthesis and release of PGF₂-alpha, which acts as the mediator of myometrial activation culminating in expulsion of the foetus.

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Summary

The histopathological changes in placenta, membranes and the umbilical cord following midtrimester abortion induced by 20% Saline in 100 cases have been studied in order to understand the site and mechanism of action of this agent. The membranes were oedematous in all cases. Gross haemorrhage and congestion of blood vessels were seen on the foetal surface of the placenta. Oedema and thrombosis were seen in the cord. The decidua basalis showed striking and remarkable changes in the form of degeneration and necrosis of its cells and intense leucocytic infiltration in all cases. Massive haemorrhage and thrombosis were also present. The extensive damage noted in the decidua basalis has been discussed in the light of Lysosomal Hypothesis propounded by Gustavii.

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See Figs. on Art Paper II & III