PLASMA DEOXYRIBONUCLEIC ACID CONCENTRATION OF WOMEN IN LABOUR AND IN UMBILICAL CORD

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The plasma concentration of ribonucleic acid (RNA) of women was found to be significantly lower in the last trimester of pregnancy than during the second trimester (Nordion *et al* 1966). Tey have also reported that the RNA Concentration in the serum from the umbilical cord was about one half the RNA concentration of the serum drawn from the mother at the same time. In the present study the concentration of DNA in the plasma of women in labour and in the umbilical cord was measured to acquire a more complete information of pregnancy and birth because prior to the present study very little work has been made on plasma DNA in mothers and in newborn infants.

Material and Method

Fifty-five non-pregnant and 25 women in the first stage of labour were included in the present study and were admitted to S.V.B.P. Hospital, Meerut. None of the patients had history of any illness prior to or during pregnancy. Approximately 7 ml. of whole blood was collected by venipuncture using ethylene diamine tetraacetic acid (EDTA) as an anticoagulant and stored at 4°C until the second sample was obtained from the umbilical cord by free flow during the third stage of labour. Those patients who had dystocia during labour or who required cesarean section or midforceps delivery were not included in our study.

Plasma DNA concentration was estimated by Schmidt and Tannhauser (1945) method. In our course of study the DNA concentration remained unchanged at least for 5 days, so the difference in time between the collection of the specimen from the mother and from the umbilical cord did not affect the results obtained.

Results

The plasma DNA concentration in 55 non-pregnant women, 25 mothers and their infants are shown in Table I. The mean plasma DNA concentration in women in labour was significantly lower ($P < 0.1$) than the mean plasma DNA concentration of non-pregnant women. It has been also demonstrated that the mean

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TABLE I

Plasma DNA Concentrations in Non-pregnant Women, Women in Labour and From Umbilical Cord

	No.	Range	Mean	S.D	P. value	
Non-Pregnant women	55	10.3–16.5	13.4	2.1	0.1	0.001
Women in labour	25	8.4–13.6	11.9	1.3	0.1	
Umbilical cord	25	5.8– 9.9	7.8	1.5		

Ratio of Plasma DNA concentration of women in labour to plasma D.N.A. concentration of umbilical cord. = 1.53 ± 0.26.

plasma DNA concentration of the umbilical cord during the third stage of labour was significantly lower ($P < 0.01$) than the mean plasma DNA concentration of women in labour.

Discussion

The plasma DNA concentration of women in labour was found to be significantly lower than the plasma DNA concentration in non-pregnant women. These results are in agreement with Kamm and Smith (1972) who found a significant fall in plasma DNA concentration in 30 women in labour, using a simple flormetric method for its determination. Nordion *et al* (1966) have previously reported that RNA concentration in the sera of 32 pregnant women was found to be lower in the last trimester of pregnancy than during the second trimester. They were of the opinion that just prior to parturition there is a decline in nucleic acid concentration due to associated cellular destruction during parturition. However, this is not a valid statement; if the nucleic acid is originating from cellular destruction, then parturition with its associated cellular destruction would be expected to produced a rise in nucleic acid concentration. Therefore, simple cellular destruction cannot be presumed to be the source of changes observed.

The concentration of extracellular DNA in the plasma of the umbilical cord was found to be significantly lower as compared to the concentration in plasma from mother. Nordion and associates (1966) studying the serum, and Zaprudskaya *et al* (1969), studying the whole blood, have reported that the RNA, concentrations were likewise lower in umbilical cord blood than in mother's blood. If the plasma concentration of DNA from the umbilical cord can be taken as an accurate indicator of the general plasma concentration in the fetus, then the fetal and maternal blood streams are not in equilibrium, atleast in this regard. The cause of this disequilibrium is not known. It may be that the placenta, or atleast some component of the "fetal-maternal barrier", is selectively preventing the free exchange of these molecules. This may just be a consequence of the physical size of configuration of the nucleic acid molecules, or the molecules may be selectively excluded via other means.

The ratio of the DNA concentration in the plasma from the mother to the DNA concentration in the plasma from the umbilical cord of the infant is also of

Fig. 1
Implant use—7 months
Day of biopsy—27th
Dating—23rd day
Predecidual reaction around the arterioles seen despite marked stromal oedema (H.E. x 100).

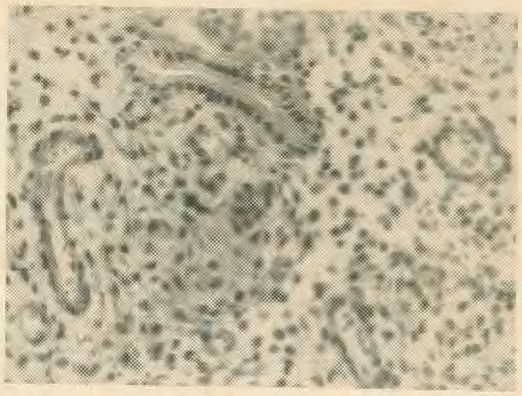

Fig. 2
Implant use—7 months
Day of biopsy—26th
Dating—26th day
Disparity in stromal, glandular and vasculai component; though glands less tortuous for this stage (H.E. x 100).

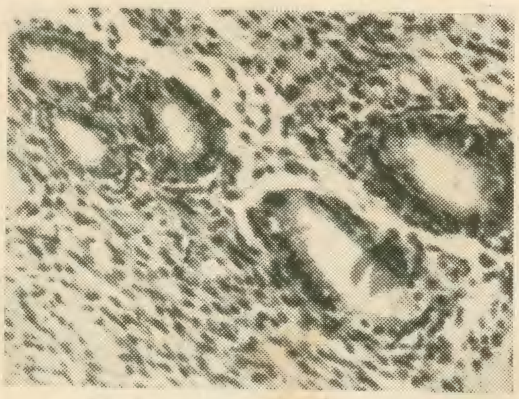

Fig. 3
Implant use—8 months
Day of biopsy—20th
Even though glandular secretion has appeared, yet occasional subnuclear vacuoles are still persisting (H.E. x 200).

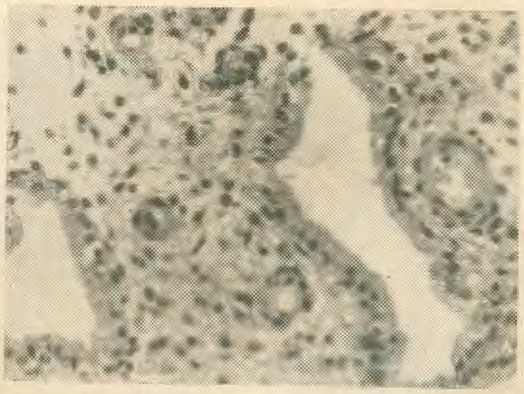

Fig. 4
Implant use—8 months
Day of biopsy—22nd
Predecidual reaction around arterioles beginning. Practically no secretion seen in the glands (H.E. x 200).

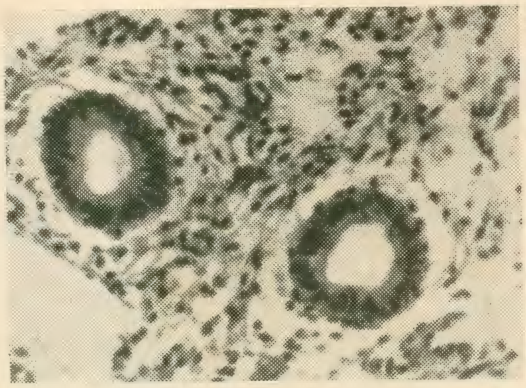

Fig. 5
Implant use—8 months
Day of biopsy—26th
Proliferative Endometrium (H.E. x 200).

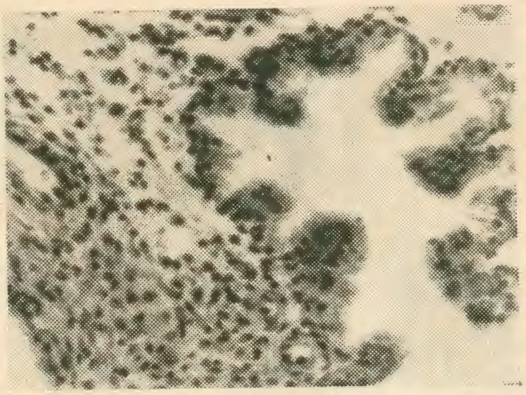

Fig. 6
Implant use—9 months
Day of biopsy—16th
Dating—25th day
(H.E. x 200).

Fig. 7
Implant use—10 months
Day of biospy—25th
Dating—25th day
(H.E. x 200).

Cytological Assessment of Host and Tumour Factors—Prema and Reddy pp. 853-857

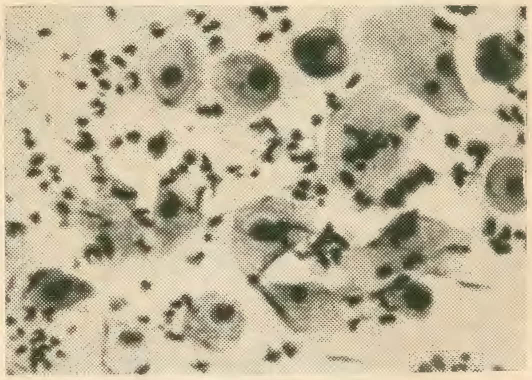

Fig. 1
"Sensitisation response"—vacuolated parabasal cells in vaginal smear.

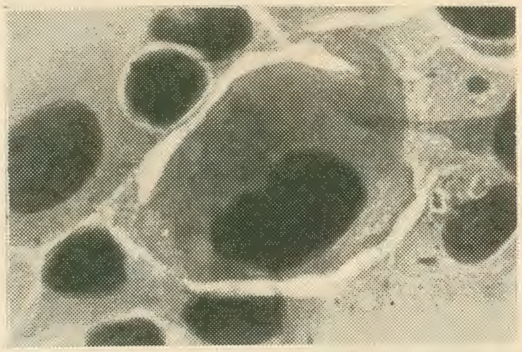

Fig. 2
Group of malignant cells including a 'tad pole' cell.

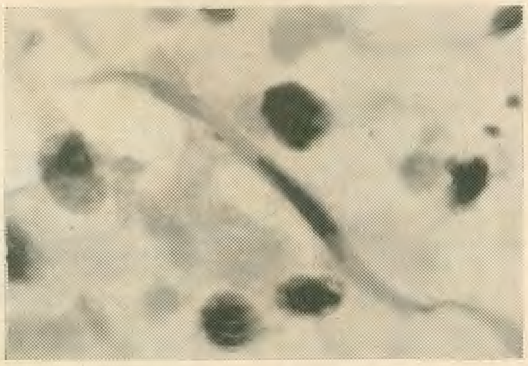

Fig. 3
Group of anaplastic malignant cell with a 'Fiber' cell.

Fig. 1
Hysterogram (Lat view) showing minor degree of deformity in post caesarean case.

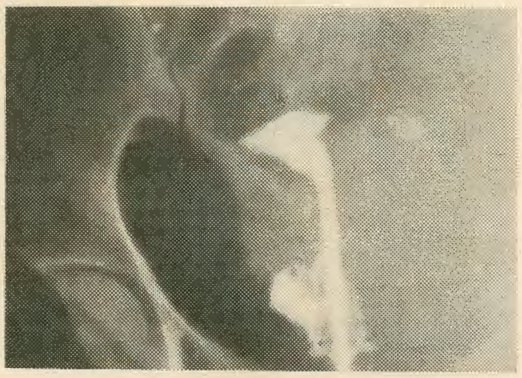

Fig. 2
Hysterogram showing minor degree of deformity in post hysterotomy case.

Fig. 3
Hysterogram (A P view) showing moderate deformity with leaking of dye from one corner of scar area in a case following caesarean section (X-ray taken 6 months after operation).

Fig. 4
Hysterogram (A P view) showing moderate deformity in scar area in post hysterotomy case (X-ray was taken 10 months after operation).

Fig. 5
Hysterogram (A P view) showing Major deformity of scar area following caesarean section (X-ray taken 3 months after operation).

Fig. 6
Hysterogram (A P view) showing major deformity of scar area with varying depth at different places following myomectomy (X-ray taken 7 months after operation).

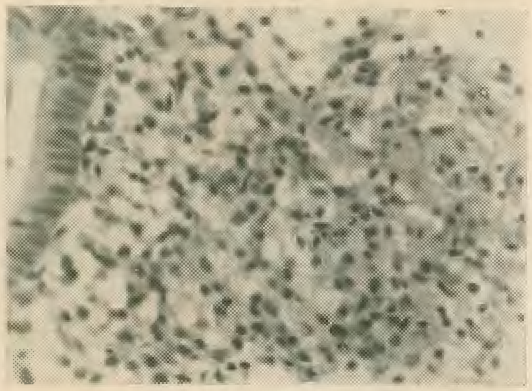

Fig. 1
Showing the earliest picture of granuloma formation. H. & E. x 270.

Fig. 2
Granulomatous lesion formed by giant cells replacing the glandular epithelium H. & E. x 200.

Fig. 3
Granulomatous lesion comprising of neutrophils and nuclear dust in the centre, palisading histiocytes and lymphocytes. H. & E. x 100.

Fig. 1
Showing normal uterine cavity with fine irregularity of fundus and clear bilateral venous reflux.

Fig. 2
Showing saw tooth appearance of uterine cavity with bilateral cornual block.

Fig. 3
Showing distorted uterine cavity with bilateral cornual block. Calcified lymph node seen on left side.

Fig. 4
Showing irregular saw tooth appearance of uterine cavity with sacculation of tube on left side.

Fig. 5
Showing normal uterine cavity with left sided hydrosalpinx and beaded appearance of tubes.

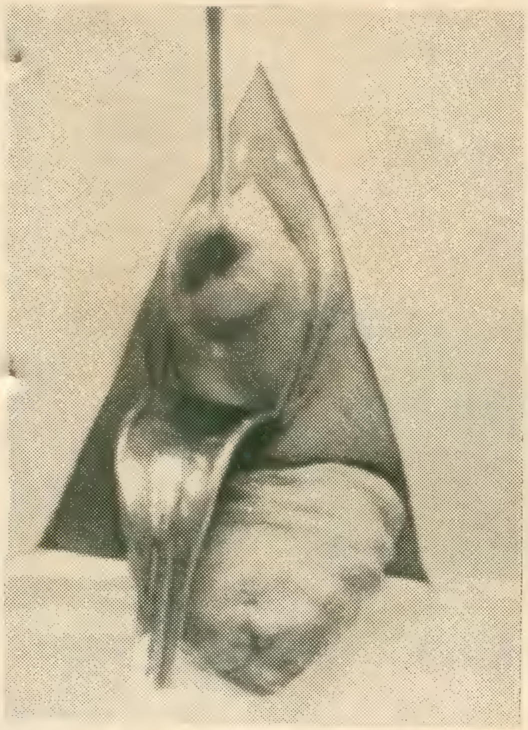

Fig. 1
Showing combined uterine and rectal prolapse.

Fig. 2
Showing laxity of ligaments and deep pouch of Douglas.

Fig. 3
Showing silk sutures in puborectalis.

Fig. 4
Showing extraperitonised bowel.

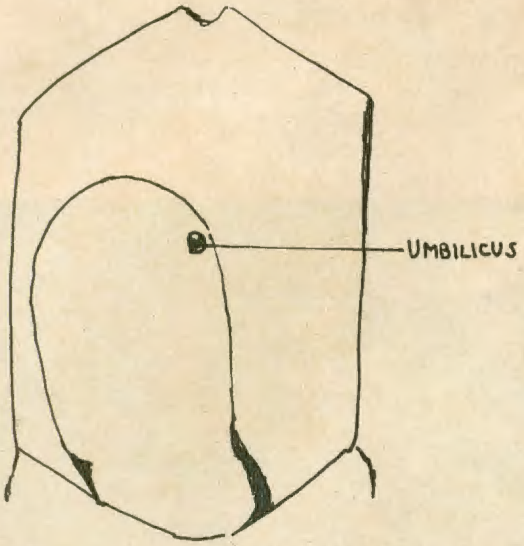

FIGURE 1.

Fig. 2

Fig. 1
Hysterosalpingogram showing bicornuate uterus.

special interest. The mean ratio was found to be 1.53, with a standard deviation of 0.26. Zaprudskaya *et al* (1969) found that RNA phosphorous in whole blood from the umbilical cord compared to RNA phosphorous in the mother's whole blood always exceeds the amount in healthy children. They found the highest concentration of RNA in healthy children. They also observed that the RNA concentration rose in babies as they grew.

Summary

The plasma concentration of deoxyribonucleic acid (DNA) was determined in 25 women in labour and from the umbilical cord of the newborn. These concentrations of DNA were compared to the plasma DNA concentrations of non-pregnant women. The mean plasma DNA concentration of women in labour was significantly lower ($p < 0.1$) than the mean plasma DNA concentration of non-pregnant women. The mean plasma DNA concentration of umbilical cord during the third stage of labour was significantly lower ($p < 0.01$) than that of women in labour and that of non-pregnant women ($p < 0.001$).

References

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