VAGINAL CYTOLOGY IN NEWBORN

by

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The hormonal correlation between the foetus and the mother poses a problem of interesting study to the Gynaecologist and the Endocrinologist alike. Estimation of vaginal smears provide an easy method to assess the hormonal status of the newborn and these would indirectly reflect on the variations in the hormonal states of the mother.

The much discussed 'genital crisis' of the newborn resulting in varying degrees of breast activity and the presence of increased vaginal secretions or even uterine bleeding is said to be influenced by hormones circulating in the newborn, the origin of which is not certain. Probably, they are derived from the maternal circulation and are mostly of placental origin. (Da Bormida, 1950, Boemi, 1959, Wachtel and Plaster, 1954) believe that this crisis is caused by a sudden depriviation of the circulating maternal oestrogen.

Material and Methods

The present study was carried out in the Department of Obstetrics and Gynaecology, S.N. Medical College, Agra. One hundred neonates whose maturity varied from 31 weeks to 43 weeks of gestation were investigated. After a complete general examination which included examination of the breasts, appearance of the vulva, its roundness and vascularity and macroscopic character of the vaginal secretions, vaginal smears were obtained daily for the first 7 days of life. Follow up smears were taken on the 15th day, 3rd week and the 6th week. The type and distribution of the cells, Cornification Index, Karyopyknotic Index, Maturation Index and the presence of leukocytes and erythrocytes were taken into account in the interpretation.

Observations

The vulva of all the newborns was swollen with copious vaginal secretions during the first fortnight. The breasts were enlarged in 87 per cent of the cases while secretions were present in 40 per cent of cases. The macroscopic genital findings were not related to the appearance of breast activity.

The cornification Index (Table 1) showed a gradual reduction from the first day onwards. Average Cornification Index on the first day was 4.11, gradually falling to 0.03 on the 42nd day. In most of the

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TABLE I

Mean Cornification Index, Karyopyknotic Index and Maturation Index of 100 New Born Infants From the First Day to the 6th Week of Life

S. No.	Day of life	Mean Cornification Index	Mean Karyopyknotic Index	Maturation Index
2.	I	4.11	17.30	0/82.87/17.33
1.	II	3.60	15.60	0/84.84/15.16
3.	III	2.54	12.79	0/87.21/12.79
4.	IV	1.55	10.78	0/89.22/10.78
5.	V	0.88	8.77	0.11/91.12/08.77
6.	VI	0.69	8.28	0.28/91.44/08.28
7.	VII	0.50	6.97	0.97/92.06/06.97
8.	XVI	0.10	3.76	5.55/90.69/03.76
9.	XXI	0.04	1.68	10.70/87.62/01.68
10.	6th week	0.03	0.79	20.40/78.81/00.79

cases, cornified cells disappeared from the smears after 4 to 5 days.

The Karyopyknotic Index on an average was 17.13 on the first day and thereafter gradually decreased upto the 42nd day.

The Maturation Index varied from 0/52/48 to 0/97/3 on the first day. Mean Maturation Index was 0/85/15. No parabasal cells were observed till the fifth day. In a few cases parabasal cells appeared on the 5th day, but in most of the cases parabasal cells were first seen on the 15th day. The cells gradually increased in number while the Superficial Cells decreased. A shift to the left occurred so that the Maturation Index on the 42nd day, on an average was 20.4/79.81/0.79.

Leukocytes were observed in 47 per cent of all the neonates. As can be seen from Table II in majority of the cases white blood Cells appeared on the third or fourth day and persisted till the 15th day. In 2 cases white blood cells were observed on the 42nd day also.

Relation of Vaginal Cytology to the Maturity of the Infants

Vaginal smears of the mature, premature and postmature infants was compared. On the first day of life the vaginal smear of the term and premature child did not show any great variation. In the subsequent smears, however, it was observed that the rapid transition to atrophy did not occur in the premature infant.

The Cornification Index was slightly higher in the premature infant being 5.2 as compared to 4.1 and 4.0 of postmature and mature on the first day. Cornification Index in all the three groups showed almost a similar fall so that on the 42nd day it was 0.02, 0.1 and 0.0 in mature postmature and premature infants respectively (Tables II and III).

No marked difference was noted in the K.P.I. in the three groups on the first day (Table III). On the subsequent days the rate of disappearance of Superficial Cells was not the same in the three groups. In premature Infants, the Superficial Cells deseased slowly. In the other two groups the Karyopyknotic Index was almost similar on each day.

The Maturation Index of Mature, postmature and premature infants were similar in the three groups on the first day, on an average was 0/82.65/17.35, 0/82.4/17.6 and 0/84.7/15.3 respectively.

TABLE II

Day of Appearance and Disappearance of Leucocytes in Vaginal Smears of the New Born

Day of appearance/ disappearance of W.B.Cs	Appearance of W.B.Cs Number of cases	Disappearance of W.B.Cs. Number of cases
3rd	10	1
4th	10	4
5th	14	5
6th	5	9
7th	6	7
15th	1	10
21st	1	9
42nd	0	2
	47	47

TABLE III

Comparison of Cornification Index and Karyopyknotic Index of Mature, Premature and Post-mature Infants

Day	CORNIFICATION INDEX			KARYOPYKNOTIC INDEX		
	Mature	Post-mature	Pre-mature	Mature	Post-mature	Pre-mature
1.	4.00	4.10	5.20	17.35	15.30	17.60
2.	3.55	4.09	5.20	15.00	14.60	17.30
3.	2.42	3.00	2.60	12.80	11.80	14.60
4.	1.54	1.50	1.10	10.80	8.80	11.70
5.	1.00	1.50	0.60	8.42	9.50	11.10
6.	0.85	0.72	0.60	7.90	8.09	11.30
7.	0.59	0.50	0.40	6.48	7.50	11.00
15.	0.06	0.30	0.20	3.41	3.10	7.70
21.	0.06	0.20	0.00	1.33	1.30	5.00
42.	0.02	0.10	0.00	0.73	0.50	1.50

In both term and postmature infants the shift to the left took place earlier than in the premature infants. On the 42nd day the Mean Maturation Index in mature and postmature infant was 24.6/74.73/0.67 and 18.6/80.9/0.5 respectively while in the premature it was 6/92.5/1.5 thus showing a slower transition to atrophy.

The vaginal smears of the 82 infants who were being breast fed and 8 who were being top fed were compared. The smears did not reveal any difference in the colpocytological count. (Table IV).

Discussion

Vaginal smears taken during the first few days of life appeared relatively cellular and crystal clear. The cells were present in large numbers and belonged to the superficial and middle layer of the vagina. These cells were mostly elongated and resembled the navicular cells, especially where they appeared in tight clusters. The cytoplasm was thin and transparent and was mostly cyanophilic. The edges were folded and pyknosis was rare. The smears were free from debris,

TABLE IV

Effect of Breast Feeding on Vaginal Cytology

Day	BREAST FED INFANTS			TOP FED INFANTS		
	P	I	S	P	I	S
1.	00.00	82.80	17.20	00.00	85.80	14.20
2.	00.00	94.30	15.70	00.00	89.70	12.30
3.	00.00	87.20	12.80	00.00	90.00	10.00
4.	00.00	89.20	10.80	00.00	91.67	8.22
5.	00.07	90.98	8.95	00.00	91.50	8.50
6.	0.03	91.02	8.95	00.03	92.23	7.40
7.	1.00	92.00	7.00	0.44	94.12	4.44
15.	5.20	92.00	3.80	5.50	91.84	2.66
21.	10.70	88.30	0.00	11.10	87.56	2.33
42.	15.00	84.30	0.70	21.66	77.79	0.55

bacteria, leukocytes and erythrocytes. Gradually, increasing numbers of leukocytes were seen during the first week when the smears lost their thin clear appearance with a rise in the intermediate cells. At the end of the first week, parabasal cells began to appear in addition to these typical intermediate cells. The number of superficial cells was markedly low. The intermediate cells also gradually decreased in number, the parabasal cells gradually increasing in number during the 2nd, 3rd and 6th week.

In the first few days the Karyopyknotic Index was slightly higher and superficial cells persisted for a longer time in the premature infants than in the mature and postmature children. The vaginal smears of the premature and full term infants in the first few days of birth showed the same findings, but in the smears taken on the subsequent days a discrepancy was found between the two groups. The rapid transition to atrophy noted in the full term infants did not take place in the premature infant. For several months the vaginal smears of the premature infants continued to show a distinct oestrogenic effect.

Colpocytograms of infants fed on breast milk and those who were given top feeds did not reveal any significant difference.

Summary and Conclusions

1. Shortly after birth the vaginal smears of the neonates resemble those found in the mother in late pregnancy.

2. A change from a highly cellular smear of early life to an atrophic smear pattern is very gradual suggesting the possible influence of maternal hormones on the vaginal epithelium of the newborn and then their gradual elimination.

3. Except for the slight variation in Cornification Index the vaginal smears of full term, premature and postmature infants showed uniformity during the first few days of life. The ensuing regression to atrophic pattern was much slower in the premature infant as compared to full term and postmature infants.

4. Vaginal bleeding commonly referred to as 'genital crisis' was observed in 8 per cent of the neonates.

5. No significant difference was noted between the artificially and breast fed infants regarding the vulval and vaginal changes, breast changes and vaginal cytology.

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