THE PLACE OF VAGINAL CYTOLOGY IN TOXAEMIA OF PREGNANCY

by

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The ever increasing endeavours of the obstetrician in further decreasing perinatal morbidity and mortality, especially in abnormal pregnancies associated with impaired placental function, has resulted in the development of many a placental function test based on alteration of hormonal excretion in these cases. There is general agreement amongst all those who have studied the endocrinology of toxaemic pregnancies that both progesterone and oestrogen levels are lower in toxaemic than in non-toxaemic pregnancies (Russel *et al*, 1957; Shearman, 1969; Smith and Smith, 1933, 1941; Taylor *et al*, 1958; Watts and Adair, 1943; Loraine & Matthews, 1953). In severe and moderate toxaemia, the progesterone level falls even below the normal range (Russel *et al*, 1957; Shearman, 1959), while the fall in oestrogen (oestriol excretion levels) depends more on the degree of foetal jeopardy. Vaginal cytology provides rapid, simple and reliable information about the hormonal status of the pregnant patient.

Few studies of vaginal smears in abnormal pregnancies have been made. Spira and Macrae (1960) and Macrae *et al* (1964) found vaginal cytology to be helpful in the management and prognosis of cases complicated with hypertension and toxaemia. Wood *et al* (1961) found vaginal cytology to be helpful in assessing foetal prognosis. The present study was undertaken to delineate just how useful vaginal cytology would be as a parameter of placental function in the management of complicated pregnancies.

Material

A total of 68 smears were studied in 38 cases of toxaemia of pregnancy. These included 21 cases of moderate toxaemia (B. P. below 160/100 mm of Hg.), 13 cases of severe toxaemia (B.P. above 160/100 mm of Hg.) and 4 cases of eclampsia. Of the 68 smears, 45 were taken within 10 days of labour, and in 23 the pregnancy continued over 10 days of taking the smears.

Methods

Smears were taken from the right vaginal vault under vision with a wooden spatula, spread on a micro-

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glass slide and immediately fixed in equal parts of 95% alcohol and ether. All the smears were taken in the 3rd trimester of pregnancy. Repeat smears were also taken when the interval between the first smear and delivery was more than 10 days.

Papanicolaou's stain was used. Desquamation and karyopyknotic index were used to evaluate the slides.

Desquamation:- Three types of smear patterns were noted, clumped, partly discrete, and discrete.

Karyopyknotic Index: Evaluated by counting 200 cells under oil immersion lens.

The Establishment of Normal Values

Normal values were established by studying 80 smears in normal pregnant women taken more than 10 days prior to delivery, since impending labour alters the pattern of vaginal cytology. The incidence of various cytological criteria in this group is shown in Table I. This shows that the normal pattern when labour is not imminent is characterised by clumps of intermediate cells with karyopyknotic index under 10. The appearance of discrete smear type with a karyopyknotic index over 10 was therefore considered to be abnormal for the purpose of this study. Table II shows a definite increase in the appearance of abnormal smears in toxaemic groups. When labour is not imminent the ratio of normal to abnormal smears is significantly lower in toxaemia (2.2:1) as compared with non-toxaemic cases (9:1). With impending labour there is an increase in abnormal smear pattern in both groups when the difference is not so marked, i.e. 1.2:1 (toxaemic) and 2.3:1 (non-toxaemic) cases).

Table III shows the comparison of smear types in relation to severity of toxaemia, both when labour is not imminent (i.e. over 10 days), and when it is imminent (i.e. within 10

TABLE I

Incidence of various cytological criteria in 80 normal pregnant patients

Total No. of smears	Clumped		Partly discrete		Discrete		Cytolytic		K.I. over 10	
	No.	%	No.	%	No.	%	No.	%	No.	%
80	35	43.75	15	18.75	11	13.75	19	23.75	7	10

TABLE II

Ratio of normal to abnormal smears in toxaemic & non-toxaemic cases in relation to labour

		Total No. of smears	Normal	Abnormal	Normal to abnormal ratio	Cytolytic
Labour not imminent	Toxaemic	23	9	4	2.2 : 1	10
	Non-toxaemic	80	55	6	9 : 1	19
Labour imminent	Toxaemic	45	18	15	1.2 : 1	12
	Non-toxaemic	56	27	12	2.3 : 1	17

TABLE III

Comparison of smear types according to severity of toxaemia in relation to labour

		Total No. of smears	Normal	Abnormal	Normal to abnormal ratio	Cytolytic
Labour not imminent	Mild	14	5	3	1.7 : 1	6
	Severe eclampsia	*9*	*5*	..	*5 : 00*	*4*
Labour imminent	Mild	28	12	6	2 : 1	10
	Severe	13	6	5	1.2 : 1	2
	eclampsia	4	1	3	1 : 3	—

TABLE IV

Relation of smear type to foetal death in toxaemic & non-toxaemic cases

Clinical condition	Total deaths	Normal smear	Abnormal smear	Cytolytic smear
Non-toxaemic	6	5	0	1
Toxamic	5	—	5	—

days). The increase in abnormal smear reflects the impending labour rather than the severity of toxaemia. When comparing the two groups, labour not imminent and imminent labour, it is observed that the appearance of abnormal smears is related more to impending labour than to the severity of the toxaemic process.

A correlation between foetal deaths in toxaemia and abnormal smears was then studied. Of the five foetal deaths in toxaemia all were associated with an abnormal smear, while in the six non-toxaemic foetal deaths, there were 5 normal and 1 cytolytic smears and no abnormal smear.

Discussion

Since impending labour is often associated with cytological changes reflecting a fall in oestrogen and progesterone levels, the cases were studied in 2 groups : (1) smears more than 10 days prior to delivery and (2) smears within 10 days of delivery. It was noted that there was a definite preponderance of abonrmal smears in the toxaemic group when labour was not imminent. Imminent labour by increasing the number of abnormal smears in both toxaemia and non-toxaemia vitiated this observation. Hence, significance can be attached to an abnormal smear only if it has been taken 10 or more days prior to the onset of labour.

In the toxaemic group, however, the severer forms were not necessarily associated with a higher proportion of abnormal smears when taken more than 10 days prior to delivery. Spira and Macrae (1960) found a higher cornification index in the severer toxaemia of long standing. Their finding was not corroborated in this series.

Foetal prognosis, however, was closely related to the smear pattern. While all the five foetal deaths in toxaemia were associated with abnormal smears, only one out of six

foetal deaths in non-toxaemic pregnancy showed abnormal smear. Spira and Macrae (1960) and Macrae *et al* (1964) found the same observation. Wood (1961), in non-toxaemic pregnancies, found that normal vaginal cytologic findings occurred irrespective of whether smears are taken just before or immediately after delivery of the dead foetus. Kamnitzer (1959), has shown that regressive changes in vaginal smear did not appear even when foetal death was diagnosed, but appeared later on follow-up in 11 of 18 cases. The discrepancy between the findings in non-toxaemic and toxaemic foetal deaths is due to the fact that in toxaemia the functional state of the placenta is already low at the time of foetal death, while in non-toxaemic cases, the appearance of abnormal smear depends on the functional state of the placenta and its subsequent rate of degeneration. Leeton (1967) and Wood (1961), have also found that abnormal smears correspond with ultimate foetal prognosis. Misra (1967), studying 9 cases of mild to moderate toxaemia, found high K. P. I. only in one case which ended in the delivery of a healthy baby.

The correlation of an abnormal smear pattern to the ultimate foetal prognosis rather than the severity of toxaemia is illustrated in the following cases:

Case 1

P. W., age 25 years, primigravida; blood pressure 140/90-150/100 mm of mercury; urine, albumin traces; no oedema; duration of toxaemic process, one week. Smear at 38th week of pregnancy showed a discrete type with a karyopyknotic index of 13. Delivered spontaneously; baby weighed 2100 gms. Placenta small and infarcted. Neonatal death; foetal placental ratio 6:1.

Conclusion — Mild case of toxaemia showing an abnormal smear and ending in foetal death.

Case 2

K. K., age 27 years, primigravida; blood pressure 170/110 mm. of mercury; urine albumin +; oedema feet +; vaginal smear at the 36th and 37th weeks of pregnancy showed partly discrete smear with a karyopyknotic index of 4 and 8 respectively Spontaneous delivery. Baby weighed 2500 grams.

Conclusion — Severe case of toxaemia showing a normal smear ending in a live baby.

Case 3

S., age 38 years, para 5; blood pressure 190/100 mm. of mercury; urine albumin +++; smear at 36th week showed discrete pregnancy pattern with a karyopyknotic index of 30. Delivered spontaneously; baby weighed 3000 grams; stillbirth; placental foetal ratio 1:5.

Conclusion — Severe case of toxaemia associated with an abnormal smear ending in foetal death.

Thus, the severity of toxaemia was not associated with an abnormal smear in the absence of clinical placental insufficiency, i.e. small baby, foetal distress or foetal loss.

Summary and Conclusion

A total of 38 cases of toxaemia of pregnancy were studied. The incidence of abnormal smears was found to be significantly higher in the toxaemic group. The imminence of labour caused an increase in the incidence of abnormal smears, both in toxaemic and non-toxaemic groups, making any correlation difficult at that stage. In toxaemia the abnormal smear was related to foetal prognosis and not to duration or severity of toxaemia. All cases with ultimate foetal loss showed an abnormal pat-

tern reflecting the severity of placental insufficiency.

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