SERIAL HORMONAL COLPOCYTOLOGY IN INDUCED MIDTRIMESTER ABORTIONS

by

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SUMMARY

The serial hormonal colpocytological changes following induced mid trimester abortion has been studied. Serial colpocytological examination was performed at 12 hourly intervals after induction till onset of abortion. The Shorr's staining technique was used and in each smear karyopyknotic index, eosinophilic index, crowding of the cells was observed.

The colpocytological changes reflected disturbances in the hormonal balance, which is characterised by transition from "prior to term" to "at term" and "imminent labour" patterns. The appearance of "imminent labour" pattern has got definite predictive value as regards abortion. The pilot study of 200 otherwise uncomplicated threatened abortions also confirms the same.

Introduction

The vaginal epithelium is extremely sensitive to changes in the hormonal milieu especially oestrogens and progesterone. Throughout pregnancy there is predominance of progesterone as compared to oestrogens which is responsible for what is known as "prior to term" pattern in vaginal cytology. This particular pattern consists of predominant intermediate navicular cells, Doderlein's bacilli, and cell clumping with dirty smear background (Pundel, 1959).

As woman approaches labour the delicate oestrogens-progesterone balance is gradually disturbed in favour of the former (Csapo *et al*, 1974 & 1977). This results in "at term" pattern in vaginal cytology characterised by diminution of cell clumps, rise in karyopyknotic and eosinophilic indices. This transition from "prior to term" to "at term" pattern takes places in lost two weeks of pregnancy (Geudefroy, 1959).

Shortly before the onset of labour the cytological picture undergoes regressive changes with further rise in karyopyknotic and eosinophinic indices, appearance of blood cells and occasionally presence of basal cells. This pattern is described as "imminent labour" pattern by various workers (Pundel, 1959, Kamnitzer, 1959, Ghosh *et al*, 1985). The clinical labour usually starts within 24 hours of the appearance of the above pattern.

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In the light of these facts, it was decided to study the serial cytological changes in the vaginal smear after induction of second trimester abortion. The aims and objects of the study were two fold, firstly, to study the serial changes in the colpocytology till the onset of clinical abortion; effect of different methods of midtrimester abortion on serial colpocytology and secondly to apply the findings of the study to threatened spontaneous abortions to predict the outcome with reliable accuracy.

Material and Methods

Two hundred cases of 14-20 weeks of uncomplicated pregnancy were selected for induction of abortion using intra-amniotic hypertonic saline in 150 cases and extraamniotic emcredyl in 50 cases respectively.

Serial colpocytological examination was performed at 12 hourly intervals after induction till the onset of abortion. One smear was collected prior to induction to know the baseline eosinophilic and karyopyknotic indices in each case.

Each smear was collected from lateral vaginal wall using Ayre's spatula. The smear was fixed either by using fixative spray or ether-alcohol mixture. The Shorr's staining technique was used for staining the slides. In each smear at least 200 cells were screened and karyopyknotic index, eosinophilic index, crowding of cells, background of the smear etc. were observed.

In addition a pilot study of 200 cases of threatened abortion from 12-20 weeks of otherwise uncomplicated pregnancy was conducted to find out whether the results of the above study can be applied successfully to predict the outcome of the disturbed pregnancy.

Observations

A total number of 892 smears were examined in 200 cases.

Between induction of abortion and onset of the process of abortion the smear regressed from "prior to term" pattern to "imminent labour" pattern, over a period varying from 12-72 hours.

The smears just before induction and 12 hours after induction (except in 11 cases in whom 12 hours smear showed "at term" pattern) were typical of pregnancy "prior to term" pattern, with eosinophilic index below 5, karyopyknotic index below 10, with thick clusters of navicular eosinophilic cells and dirty smear background (Fig. 1).

In each case transition from "prior to term" to "at term" smear was observed,

TABLE I

Time Taken for Transition From "prior to term" to "at term" Smear and Method of Induction of Abortion

Time lapsed after induction	Method of Induction	
	I.A. saline No. of cases (%)	E.O. Ethacridine No. of cases (%)
12 hours	11 (7.3%)	—
24 hours	47 (31.3%)	19 (38%)
36 hours	62 (41.3%)	25 (50%)
48 hours	25 (16.6%)	6 (12%)
60 hours	5 (3.3%)	—
Total:	150 (100%)	50 (100%)

characterised by poor crowding of cells, rise of eosinophilic index upto 10, karyopyknotic index upto 15 and clearing of the background (Fig. 2).

The time taken for this change over was 12-60 hours as shown in Table I. In majority of cases (80% in I.A. Saline and 88% in E.O. Emcredyl) time taken was from 12-36 hours. There was no appreciable difference between saline and emcredyl. The transition from one pattern to another was sudden, Smears taken 12 hours before transition did not show any signs of regression i.e. they were strictly showing "prior to term" pattern.

The "at term" pattern regressed rapidly over a period of 12 hours, irrespective of the time taken for transition from "prior to term" to "at term" pattern. There was further rise in karyopyknotic index upto 30, eosinophilic index upto 15, and absence of any clusters of cells. Few smears also showed presence of blood cells and parabasal cells ("imminent labour pattern") (Fig. 3).

The uterine contractions and onset of process of abortion started invariably within 6-24 hours of the appearance of "imminent labour" pattern (Table II). Here again there was hardly any difference between saline and emcredyl induced cases.

In the pilot study of otherwise uncomplicated threatened abortions, the smears were collected from the lateral vaginal walls and were stained by Shorr's technique. The smears were classified into "prior to term", "at term" and "imminent labour" patterns, depending on the criteria described before.

Table III shows the correlation between the outcome of pregnancy and the smear pattern obtained. Out of 72 cases in whom smear showed "prior to term" pattern 38

TABLE II

Time Taken for the Onset of Spontaneous Abortion From the Appearance of "imminent labour" Pattern

Time taken for onset of abortion	No. of cases (%)	
	I.A. Saline	Emcredyl
6 hours	8 (5.3%)	2 (4%)
12 hours	30 (60%)	22 (44%)
18 hours	32 (21.3%)	13 (26%)
24 hours	18 (12%)	10 (20%)
30 hours	2 (1.3%)	3 (6%)
Total:	150 (100%)	50 (100%)

TABLE III

Outcome of Pregnancy in Otherwise Uncomplicated Theatened Abortions and Pattern of the Smear

Smear Pattern	No.	Abortion	Outcome Preterm Delivery	Term Delivery
Prior to term	72	22 (30.5%)	12 (16.6%)	38 (52.7%)
At term	63	18 (28.6%)	16 (25.4%)	(29 46%)
Immient labour	65	59 (90.7%)	6 (9.3%)	—
Cardiac pulse	200	99	34	67

(52.7%) continued pregnancy, 22 (30.5%) aborted. 63 showed "at term" pattern, in whom 29 (46%) continued pregnancy and 18 (28.6%) aborted. In 65 cases in whom smear showed "imminent labour" pattern 59 (90.7%) aborted and none continued pregnancy till term. Here appearance of "imminent labour pattern seems to have definite predictive value as regards continuation of pregnancy or not. One can postulate that the irreversible process of abortion sets in with the appearance of the "imminent labour" pattern.

Discussion

In our study of serial colpocytology following induction of midtrimester abortions, the smears taken before induction showed thick clusters of cells, eosinophilic and karyopyknotic indices varying within 5 and 10 respectively. The smear was typical of "prior to term" pattern. The change over from "prior to term" to "at term" pattern was sudden and took place within 36 hours of induction in most of the cases. There was no appreciable difference between saline and emcredyl induced cases as regards transition. One is tempted to postulate that the essential pathophysiology of induction of abortion in both saline and emcredyl induced cases is same viz. placental damage and decline of progesterone levels.

The further regression of the Smears resulting in "imminent labour" pattern occurred gradually over 12-24 hours of the appearance of "at term" pattern. Here again there was no difference in saline and emcredyl induced cases respectively. There was also no correlation between time taken for intial transition from "prior to term" to "at term" pattern and time taken for further regression from "at term" to "imminent labour" pattern. Probably once the trigger of hormonal change is set off, the pace of hormonal change is same irrespective of the method and initial time taken to set off the trigger.

The process of abortion invariably started within 12-24 hours of the appearance of "imminent labour" pattern.

In the second phase of the project we tried to apply the findings of the initial phase viz. serial colpocytology after induction of midtrimester abortions to cases of otherwise uncomplicated threatened abortions between 12-20 weeks of gestation. We attempted to classify the vaginal smears in these cases as "prior to term", "at term" and "imminent labour" patterns, and the correlated the outcome of pregnancy to the smear pattern. The whole exercise was to determine, in the light of the earlier findings whether any predictive value can be attached to a particular smear pattern in colpocytology.

In a pilot study of 200 threatened abortions we could successfully predict the outcome of pregnancy in cases showing "imminent labour" pattern in colpocytology (90.7% aborted). In cases showing "prior to term" and "at term" pattern the abortion rate was meagre (29.6% i.e. 40 out of 135 cases aborted). Probably transition of "prior to term" to "at term" smear indicates the onset of progesterone deficiency but the process of abortion is still reversible. One may take this as an indication of hormone therapy. But once "imminent labour" pattern appears in the colpocytology, the process of abortion has already set in irreversibly and the abortion is inevitable. Here hormone therapy may do more harm than good viz. missed abortion. Further studies

are required to substantiate these aspects, such as effects of hormone therapy in threatened abortions and its effect on colpocytology.

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See Figs. on Art Paper I