EVALUATION OF UROCYTOGRAM AS A METHOD OF HORMONAL ASSESSMENT IN NORMAL SECOND TRIMESTER OF PREGNANCY AND ABORTION, A COMPARATIVE STUDY OF URINARY AND VAGINAL CYTOLOGY AND CYTOCHEMISTRY

by

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Assessment of hormonal function in pregnancy is one of the most important methods of diagnosis of pregnancy. Although uptil now vaginal cytology had an important place as a simple method for the assessment of hormonal function in pregnancy, this method has not proved to be of much reliability. The evaluation of urocytogram has thrown a new light to solve this problem, which has got an immense importance for obstetrician. It also avoids the possibility of error due to the presence of infection in the vagina, so common in pregnant women. For this reason, it seems interesting to explore the value of this method in pathological pregnancy.

The aims of the present study are:

1. To establish the normal pattern of urocytogram in second trimester of pregnancy, threatened and inevitable abortions and their comparative value with vaginal smear.

2. To establish the hormone related changes in lipids and glycogen of urinary cells in relation to the vaginal cytogram and urocytogram.

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Material and Method

Twenty cc. of first voided morning specimen of urine was centrifuged and 5 slides were prepared. Two slides were fixed in equal amount of absolute alcohol and ether and 3 slides were fixed in formaline vapour for 30 minutes.

Five slides were prepared from the lateral vaginal wall and fixed as above and following staining methods were adopted:

1. PAS for glycogen (PAS positive material)
2. Papanicolaou
3. Sudan black for mask lipids
4. Schmorls for lipofucsin
5. Oil red for neutral fat

Table I shows variation in indices and a comparison between urocytogram and vaginal smear of normal pregnancy, threatened and inevitable abortions.

Table II shows a comparison of mean percentage of mask lipids, lipofucsin, neutral fats and PAS material in urinary cells in normal pregnancy, threatened and inevitable abortions with urocytogram.

Discussion

The tissues developing from the mesonephric duct are known to show morpho-

TABLE I

Comparison Between Urocytogram and Vaginal Cytology

	Various normal pregnancy indices IInd trimester	Threatened abortion	Inevitable abortion
MI	V 0 : 90 : 10 SD ± 0.2 ± 5.1 ± 1.3 U 0 : 86 : 1.4* ± 11.2 ± 2.4	0 : 70 : 30* ± 0.1 ± 6.4 ± 1.8 4 : 73 : 23* ± 0.6 ± 8.9 ± 3.1	0 : 56 : 44* ± 0.3 ± 4.2 ± 3.2 0 : 56 : 44* ± 6.8 ± 5.8
EI	SD 14 ± 1.4 SD 17 ± 2.6	36* ± 3.2 34* ± 4.8	60* 56* ± 6.6
KI	SD 10 ± 1.1 SD 14 ± 2.7	30* ± 3.2 30* ± 5.2	45* ± 3.8 44* ± 4.9
FI	SD 86 ± 8.4 SD 82 ± 9.1	62* ± 5.8 56* ± 7.2	78* ± 6.2 49* ± 3.7
CCI	SD 74 ± 7.2 SD 67 ± 4.8	56* ± 5.2 45* ± 6.2	40* ± 3.7 28* ± 3.2
NC	SD 52 ± 4.7 SD 40 ± 3.2	30* ± 3.2 22* ± 4.2	22* ± 8.2 19* ± 4.2

*Difference significant at P = 1% from normal.
MI—Maturation index, EI—Eosinophilic index, KI—Karyopyknotic index, FI—Folded cell index, CCI—Crowded cell index, NC—Navicular cell count.

logical alterations in response to sex hormones and the urinary bladder mucosa is one such epithelium.

The urocytogram, that is the study of endocrine status by urinary cytology was first described by Biot and Beltran (1944). But it did not receive much attention and its utility in cilinical practice has yet to be popularised.

The present study of urocytogram in threatened abortion shows an increase in the mean value of superficial cells, 23% ± SD 3.1 and appearance of parabasal cells with a mean value of 4% ± SD 0.4 and EI with a mean value of 34% ±SD 4.8 and decrease in navicular cells with a mean value of 22% ± SD 4.2. These differences are significant from the normal second trimester pregnancy. The findings are same in vaginal cytology. The increase in the superficial cells is due to predominance of oestrogen.

TABLE II

	Normal pregnancy IInd trimester	Threatened abortion	Inevitable abortion
Mask lipids			
% of cells with coarse granules	52 ± 6.8	32* ± 4.9	31* ± 3.8
% of cells with fine granules	3 ± 0.5	3 ± 0.6	3 ± 0.3
Urocytogram	0 ; 86 : 14 ± 8.9 ± 2.1	4 : 73 ; 23 ± 0.6 ± 8.9 ± 3.1	0 : 56 : 44 ± 6.8 ± 5.8
Lipofucsin			
% of cells positive	30 ± 4.9	11* ± 2.0	10* ± 2.0
Urocytogram	0 : 86 : 14 ± 8.9 ± 2.1	4 ; 73 : 23 ± 0.6 ± 8.9 ± 3.1	0 : 56 : 44 ± 5.3
Neutral fat			
% of cells positive	Neg.	Neg.	Neg.
Urocytogram	0 : 86 : 14 ± 8.9 ± 2.1	4 : 73 : 23 ± 1.6 ± 8.9 ± 3.1	0 : 56 : 44 ± 6.8 ± 5.8
PAS Material			
% of cells positive	68 ± 7.8	55* ± 6.5	42* ± 5.8
Urocytogram	0 : 86 : 14 ± 8.9 ± 2.1	4 : 73 : 23 ± 0.6 ± 8.9 ± 3.1	0 : 56 : 44 ± 6.8 ± 5.8

* Difference significant from normal pregnancy at P = 1%.

Soule in 1964 has reported an increase in superficial eosinophilic cells, EI and KI in vaginal smear and also reported that more than 30% pyknosis is a sign of progesterone deficiency which results in threatened abortion. In present series this percentage of pyknosis is with a mean value of 30% ± SD 3.2 and 35% SD 5.2, respectively in vaginal and urocytogram. These findings are similar to that of Soule.

Kammitzer in 1965 has reported that navicular cells are decreased in vaginal cytology in threatened abortion, while in the present study the navicular cells are with a mean value of 30% ± SD 3.2 and 22% ± SD 4.2, respectively in vaginal cytology and urocytogram as compared to mean value of 52% ± SD 4.9 and 40% ± SD 3.2 normal second trimester pregnancy. The findings of the present study are similar to that of Kammitzer. All these differences are significant statistically from normal pregnancy.

Urocytogram in inevitable abortion shows a rise in the mean value of superficial cells 44% ± SD 5.8, EI 56% ±SD 6.6 KI 44% ±SD 4.9 and fall in the mean value of FI 49% ± 3.8, CCI 28% ± SD 3.2 and navicular cells of 19% ± SD 4.2. These differences are significantly different from normal pregnancy. The findings are again parallel to vaginal cytology. Cytology reports on this aspect could not be found in the literature.

Table II shows the finding of percentage

of coarse lipid granules, lipofucsin and PAS material in threatened and inevitable abortions when compared with values in normal second trimester pregnancy.

From this study it is evident that urocytogram shows cell patterns parallel to those reflected in the vaginal smear under the influence of estrogen and progesterone and that the results in various groups give the same information. This has the great advantage that in situation where the vaginal cytology may fail to give results due to inflammation or bleeding urocytogram may be used as an effective and reliable replacement.

The PAS positive material which is thought to be mainly glycogen also shows significant relation with hormonal status.

Conclusion

1. Presence of superficial cells with a mean value of 23% ± SD 3.1 and of parabasal cells with a mean value of 4% ± SD 0.4 in threatened abortion are found to be significant statistically in urocytogram.

2. The mean values of superficial cells 44% ± SD 5.8 E1 56% ± 66, K1 44% ± SD 4.9, F1 49% ± SD 3.8 CC1 28% ± SD 3.2 and navicular cells 19% ± SD 4.2 in inevitable abortion are found to differ statistically significantly from those in IInd trimester pregnancy. Urocytogram findings are parallel to vaginal cytology findings.

3. The study of Masks lipids, lipo fucsin, neutral fats and PAS material shows statistically significant difference in threatened abortion and inevitable abortion from IInd trimester pregnancy.

4. This study is of great help in diagnosis of normal intact pregnancy.

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