

SERIAL URINARY OESTROGEN AND PREGNANDIOL LEVELS IN WOMEN WITH OVULATORY CYCLES

by

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Introduction

Oestrogens and pregnanediol assays are essential for proper monitoring of patients on ovulation inducing agents, especially the gonadotrophin therapy. However, it is important to establish the levels of these hormones in normal ovulatory cycles. Then one can apply these assays in women with various menstrual abnormalities and also to monitor the therapy for induction of ovulation. Hence studying of serial urinary oestrogens and pregnanediol levels in women with ovulatory cycles was undertaken.

Material and Methods

We studied 18 cycles in 17 women for serial vaginal cytology, cervical mucus study, endometrial biopsy, serial urinary oestrogens and pregnanediol assays in women with history of primary infertility and apparently normal cycles. However, the study cycles were ovulatory and normal in 13, ovulatory but prolonged in 2, and anovulatory and prolonged in 1 and anovulatory but normal in 2 cycles.

Evaluation of cervical mucus, vaginal cytology and oestrogens and pregnanediol assays were done at every three days interval in most of the cases and daily in 2 cases. Endometrial biopsy was done either premenstrually or on the first day of the menstruation.

Twenty-four hours urinary oestrogen assays were done by Brown's (1955) semiautomatic spectrofluorometric method and 24 hours urinary pregnanediol assays were done by De'Wattville's (1948) method.

Results

Though we studied hormonal assays in 15 ovulatory cycles, to make the graph clear we have plotted serial oestrogen levels of 6 cycles in graph I and serial pregnanediol levels of the same 6 cycles in graph II.

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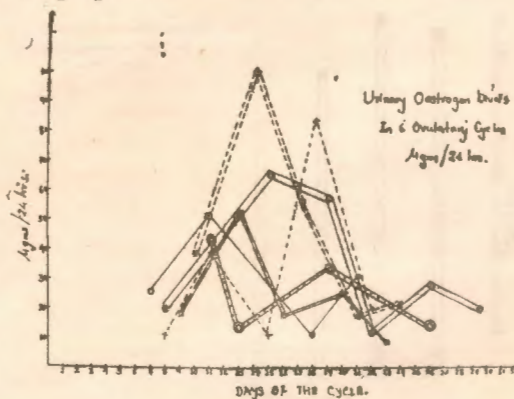


Fig. 1

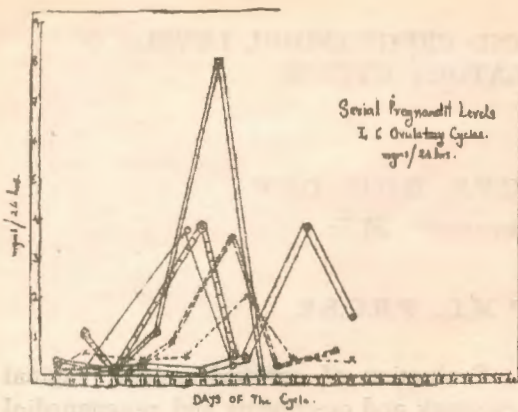


Fig. 2

In all these 6 cycles, the first 24 hours urinary oestrogen peak was varying from 45 μ gms to 100 μ gms and this peak occurred in the period of day 11 to day 18 of the cycle. The second oestrogen peak occurred from day 19 to day 26 and oestrogen level varied from 24 to 32 μ gms/24 hours.

The urinary pregnanediol peak was observed from day 18 to day 26 of the cycle and the peak levels were 3.5 to 3.8 mgms/24 hours, in 4 cycles, and 2 mgms and 8 mgms respectively in other 2 cycles. The cycles with pregnanediol peak on day 18 and day 20 were from 25 and 27 days cycle.

Graph III indicates the first oestrogen

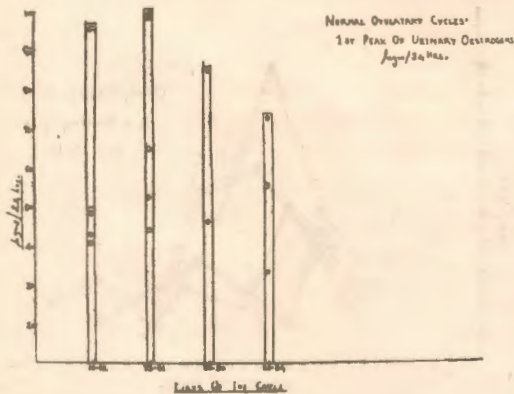


Fig. 3

peak of all the 14 ovulatory cycles studied. The first oestrogen peak varied from 33 μ gms/24 hours to 100 μ gms/24 hours. This peak occurred in the period varying from 10-18 days in 11 cycles and from 21 to 24 days in 3 cycles. However, 2 of these 3 cycles with late first oestrogen peak were prolonged cycles of 47 and 48 days and 1 patient was having a normal cycle with late oestrogen peak.

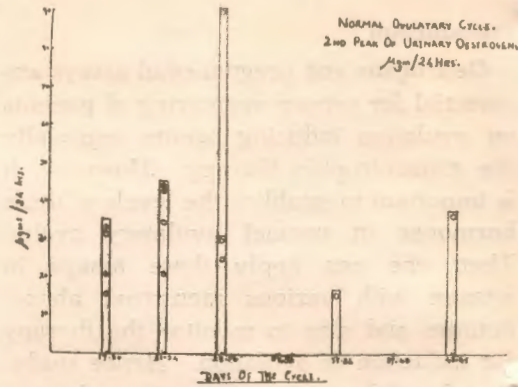


Fig. 4

The second oestrogen peak of all the cycles is shown in Graph IV. The peak varies from 15 μ gms to 40 μ gms/24 hours and it occurred in the period of day 18 to 28 in most of the cycles and from day 35 and 40 in the 2 other prolonged cycles.

Three patients with history of normal cycles had anovulation in the cycle studied. The cycle studied was shorter (22 days) in 1 case, longer (60 days) in the second and normal (30 days) in the third case. Their oestrogens and pregnanediol levels are plotted in Graph V. The oestrogen curves are fluctuating around 5 to 10 μ gms/24 hours in 1 case but the oestrogen levels showed a peak of 45 μ gms/24 hours in the other case and fluctuating around 6 μ gms to 16 μ gms in the third case. The pregnanediol levels showed fluctuation between 0.5 to 1 mgs

in 2 cases and one case did show a rise in pregnanediol upto 1.7 mgs/24 hours.

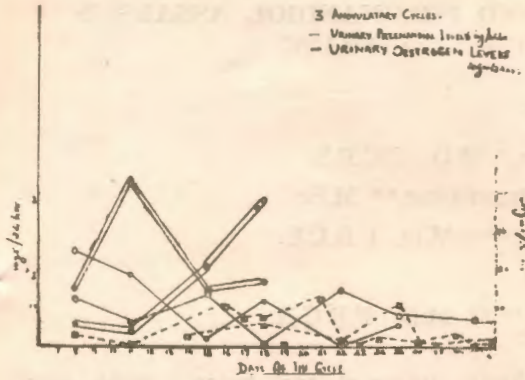


Fig. 5

Discussion

Loraine and Bell (1963) and Brown (1955) have studied urinary oestrogens and pregnanediol values in normal menstrual cycles. Loraine and Bell (1963) have given the mean oestrogen values as 11.6 μ gms, 15 μ gms, 35.6 μ gms and 28 μ gms/24 hours in menstrual, follicular, ovulatory and luteal phase respectively. The mean pregnanediol values in the same period were 1.43, 1.33, 1.54 and 3.16 mgs/24 hours. However they found considerable individual variations in the subjects studied.

Brown (1955) has emphasized that a peak of oestrogen levels indicate ovulation. This rise to the ovulation peak is gradual and serial measurement of the hormones in a cycle is essential. Brown (1955) has documented that at the time of ovulation, oestradiol excretion is $\frac{1}{2}$ of urinary oestrone levels and the peak of oestradiol lags behind the peak of oestrone by a day. However, fractionated oestrogens are time consuming and costly. Determination of total urinary oestrogens is sufficient in most clinical situations (Goebelsmann 1968).

Loraine and Bell (1963) have observed the pregnanediol peak around 3.5 mgs/24 hours occurring around days 8 in the luteal phase. Pregnanediol measurement has diagnostic value as an ancillary technique for determining ovulation, the values varying from 0-2 mgms/day in the proliferative phase and 2-10 mgms/day in the luteal phase of the cycle (Gold 1968).

Our results have shown the peak oestrogen value around ovulation between 30-100 μ gms/24 hours and the average value of oestrogen peak is around 45 μ gms/24 hours and the rise is gradual. This is in correlation with the result of Loraine and Bell (1963). Our second oestrogen peak (Luteal phase value) lies between 24-32 μ gms/24 hours, which corresponds to the lower limit of the other workers.

Our pregnanediol levels in ovulatory cycles vary from 2-8 gm/24 hours and this peak is always gradual. This pregnanediol peak occurs at 6-8 days after the onset of ovulation.

The pregnanediol peak and the second oestrogen peaks mostly correspond. There are wide individual variations and serial hormonal assays are essential for proper conclusion of the cycle.

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