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Sequential hormone measurements after menstrual regulation in normal Nigerian women

*B. OSOTIMEHIN, †E. O. OTOLORIN, †O. A. LADIPO AND †T. FATINIKUN

**Endocrine-Metabolic Research Unit, Department of Chemical Pathology and †Department of Obstetrics and Gynaecology, College of Medicine, University College Hospital, University of Ibadan, Nigeria*

Summary

The objective of this study was to examine the dynamics of the pituitary hormones (LH, FSH and Prolactin) and Progesterone in normal adult Nigerian women during the first cycle after a menstrual regulation for delayed periods. Hence, eleven healthy volunteers aged between 19 and 35 years were recruited. All the subjects had consulted the Family Planning Clinic for menstrual regulation. Venepuncture was performed immediately before and every other day after the procedure until the onset of the first menstrual period. Serum from the samples were stored at -20°C and later assayed for LH, FSH, Prolactin and Progesterone. The results showed that nine patients (82%) had a demonstrable LH peak whilst seven patients (64%) had a luteal phase serum progesterone in excess of 6 nmol/l. These criteria were used for the diagnosis of ovulation. The combination of two or three indices i.e. LH + FSH peak (64%) LH + Progesterone (64%) LH + FSH + Progesterone (55%) did not seem to confer any special advantages in terms of the diagnosis of ovulation. These results are considered as further evidence for the need to provide contraception in the first cycle after an abortion in women who do not wish to get pregnant immediately.

Résumé

Cette étude visait à examiner les dynamiques des hormones pituitaires (LH, FSH, et Prolactin) aussi bien que de la progestérone chez les Nigériennes adultes au cours du premier cycle suivant la régulation menstruelle nécessitée par le retard des règles. Nous choisismes donc onze femmes âgées de 19 à 35 ans qui consentirent à

participer, et qui avaient toutes visité la clinique du planning familial pour régulation menstruelle. Avant chaque application, et ensuite deux jours plus tard la vénepuncture fut pratiquée, jusqu'à la parution des prochaines règles. Le sérum obtenu des échantillons fut congelé à -20°C pour être ensuite titré pour les LH, FSH, Prolactine et Progesterone. D'après les résultats, neuf patientes (donc 82%) firent preuve d'un taux maximal LH tandis que sept patientes (donc 64%) témoignèrent du sérum de la progestérone en phase lutéale supérieure à 6 nmol/l. Ces critères servirent de base pour diagnostiquer l'ovulation. En ce qui concerne la diagnostique d'ovulation aucun avantage ne fut apporté par la combinaison de deux ou trois indices, à savoir LH + FSH maximum (64%) de LH + Progesterone (64%) LH + FSH + Progesterone (55%). On dut déduire de ces résultats qu'il est nécessaire d'appliquer un procédé contraceptif au cours du premier cycle suivant un avortement provoqué chez les femmes qui ne désirent pas être en grossesse aussitôt.

Introduction

Even though there exists information about the recovery of the pituitary-ovarian axis after a full-term pregnancy in both nursing (Parlow, Danne & Dignan, 1970) and non-nursing (Le Maire *et al.*, 1971) mothers, similar information following a first trimester abortion is very scanty. This kind of data we consider very essential since menstrual regulation has become a popular therapeutic for secondary amenorrhoea and most of our patients are unprotected in the immediate post abortal period. Boyd and Holmstrom (1972) using measure-

ments of basal temperatures and histology of endometrial biopsies showed that 85% of their patients ovulated within 22 days after therapeutic abortion. More recently Lahteemaki and Luukkaiven (1978) reported the return of ovulation in 83% of their subjects within the first cycle. This was determined by the measurement of serum LH, oestradiol, and progesterone concentrations. They observed the first LH peak as early as 16 days post abortion.

This present effort was designed to study in a sequential manner the dynamics of the pituitary hormones (LH, FSH, Prolactin) and progesterone in normal adult Nigerian females during their first post abortal cycle. It is hoped that the data thus generated will provide further information about this rarely studied period and consequently draw more attention to the need for contraceptive advice in this vulnerable phase.

Materials and methods

Patients

Eleven healthy volunteers aged between 19 and 35 years of age who consulted the Family Planning Clinic of the University College Hospital for menstrual regulation were recruited into the study. All the subjects were shown to have a positive pregnancy test on urine examination. The period of amenorrhoea varied between 41 to 55 days before menstrual regulation. None of the subjects was exposed to any form of contraception during the period of study.

Sample collection

The first blood samples were obtained immediately before menstrual regulation and the subjects were required to present themselves for subsequent venepunctures on alternate days until the onset of the first day of the next menstrual period. The samples obtained were immediately centrifuged and the plasma stored at -20°C until analysis. The initial enthusiasm about the study was unfortunately not sustained thus sampling in the second half of the study was not as regular as during the first half.

Hormone assays

Serum levels of LH, FSH and Prolactin were measured by specific radio immunoassays optimized by the Radiochemical Centre, Amersham U.K. Serum progesterone levels were estimated by a radioimmunoassay method optimized for the World Health Organisation for the Matched Reagents Programme. The inter-assay and intraassay variability were 10.7% and 5.6% respectively.

Results

Serum prolactin

The mean serum prolactin concentration before menstrual regulation was 874 ± 310 mu/l (s.d. of mean). This was the highest during the period of study. Subsequently there were day to day variations in the mean serum prolactin values (Fig. 1) which are consistent with published data (Dada *et al.*, 1981). The values obtained are also within the reference range for our laboratories (190–750 mu/l).

Serum LH

The mean serum LH levels on the first day of the study was 115.3 ± 9.15 mu/l (s.d. of mean) which would be compatible with cyesis especially as there is a 19% cross-reactivity with human chorionic gonadotrophin in the assay system. The high mean values however rapidly declined reaching a trough of 13.7 ± 3.6 mu/l (s.d. of mean) at about ten days after menstrual

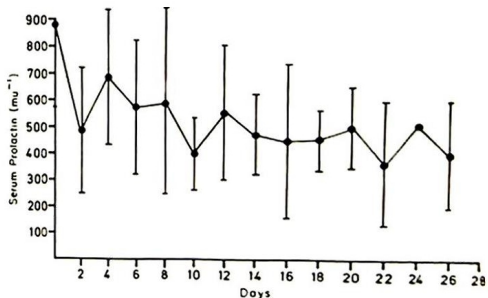


Fig. 1. The mean (\pm s.d.) values of serum prolactin throughout the study period.

regulation. Subsequently there was a gradual increase over the next 4–6 days with a peak value of 76.25 ± 30.2 mu/l (s.d. of mean) being achieved on the 16th day. Beyond this peak there was a fall off (Fig. 2).

Serum FSH

The mean serum concentrations of FSH was 1.9 ± 0.5 mu/l (s.d. mean) at the start of the study. This value gradually increased achieving a peak of 6.30 ± 2.4 mu/l (s.d. of mean) on day 10. This peak was sustained for about two days and then there was a decline in the mean serum values (Fig. 3).

Serum progesterone

Similar to serum LH values the initial serum progesterone concentration were universally high with a mean value of 43.3 ± 7.6 nmol/l (s.d. of mean). This fell sharply within two days of the procedure to 14.7 ± 3.7 nmol/l (s.d. of mean). There was a continual fall in levels subsequently, with the values ranging between

4.6 and 8.5 nmol/l (Fig. 4). This trend was sustained till the twentieth day when the mean values increased to 13.2 ± 2.7 nmol/l (s.d. of mean). This upward trend was maintained culminating in a peak value of 25.2 ± 1.2 nmol/l (s.d. of mean) at 24 days post operation.

Determination of ovulation

Ovulation was deemed to have occurred by the attainment in a particular subject of:

- (i) a discernible LH peak
- (ii) Serum progesterone values greater than 6 nmol/l in the second phase of the study.

The Fig. 6 nmol/l was selected because of our previous work in this area (Otolorin *et al.*, 1983).

Table 1 shows the characteristics of each subject. Nine (82%) of the eleven subjects had demonstrable LH peaks while eight had FSH peaks. Only seven of our subjects had a luteal phase progesterone of 6 nmol/l and above. This lower figure with respect to progesterone as a criterion we believe is a reflection of the default rate of our volunteers during the latter half of the study. This is exemplified by the data obtained from subject Nos 9 and 10 (Table 1) who had discernible LH peaks but who stopped coming for bleeding at 24 and 20 days post-abortion respectively. It is conceivable that given time the serum progesterone will have increased beyond the 6 nmol/l level.

The combination of two or three indices i.e. LH + FSH, LH + Progesterone, LH + FSH + Progesterone does not seem to confer any special advantages in terms of diagnosis of ovulation. It would appear that serial serum LH levels constitute the most important factor in the evaluation of pituitary-ovarian recovery in our subjects.

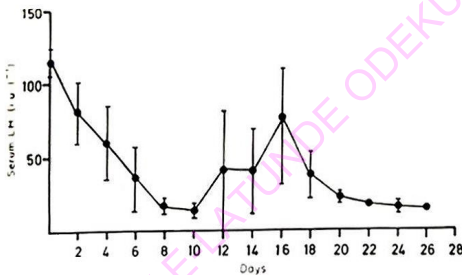


Fig. 2. The mean (\pm s.d.) values of serum LH in the study period.

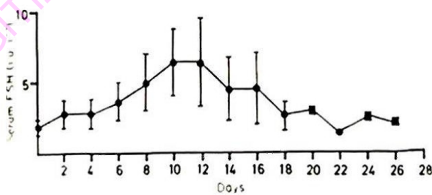


Fig. 3. The mean (\pm s.d.) values of serum FSH during the study period

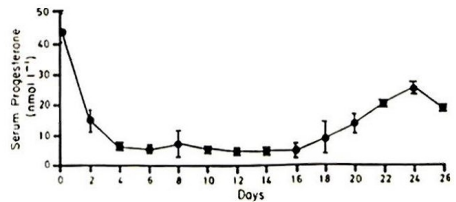


Fig. 4. The mean (\pm s.d.) values of serum Progesterone during the study period.

Table 1. Summary of ovulation criteria

Stage in cycle	Subject No.										
	1	2	3	4	5	6	7	8	9	10	11
LH peak	+	+	+	+	+	-	+	+	+	+	-
FSH peak	+	+	+	+	+	-	-	+	-	+	+
Luteal phase											
Progesterone 6nmol/l	+	+	+	+	+	-	+	+	-	-	-
Day of last venepuncture — post MR	28	26	26	20	22	20	24	26	24	20	26
LH peak alone	9 (82%)										
Serum Progesterone alone	7 (64%)										
FSH alone	7 (64%)										
LH + FSH	7 (64%)										
LH + Progesterone	7 (64%)										
LH + FSH + Progesterone	6 (55%)										

Discussion

The state of the pituitary-ovarian axis in the immediate post abortal period is under investigation. Most of the studies that exist are short term being limited to the first few days after abortion (Holmdall, Johansson & Wide, 1971; Saunders & Kalso, 1974; Manganiello *et al.*, 1981). These studies provide information about the dynamics of some hormones in the immediate post abortal period and lack the necessary information about recovery of the pituitary-ovarian axis and reproductive performance.

The present effort therefore was designed to study some of the endocrinological indices during the first post abortal cycle especially as it relates to ovulation. This we believe will provide the hard data required for rational family planning strategies for this group of women in our environment.

The result of our study will also further enrich the existing body of information about the endocrinology of early pregnancy and the immediate post abortal period.

Enthusiasm in the study in the early phase was sustained, thus most of the information relating to ovulation is derived essentially from the serial LH and FSH estimations. Nine out of our eleven subjects had demonstrable LH peaks while eight of those nine had FSH peaks.

The pre-abortal LH values were high probably because of the cross reactivity between LH

and HCG. The cross reactivity in the assay system was 19%. These initial high LH values dropped significantly within the first 8 days of the study. However from the twelfth day of the study there was a gradual increase in the mean LH values with a peak on the sixteenth day. Individually all our observed LH peaks were within the first 20 days of the study. Taking this as presumptive evidence of ovulation and going by the knowledge that the LH peak antedates the ovulatory process by about 24 hours (Lundy *et al.*, 1974) we could infer that 80% of our patients ovulated within the first 22 days after abortion in the first trimester. The serial FSH and Progesterone values only complemented the LH values in our subjects since all the subjects but one with FSH peaks had demonstrable LH peaks and all the seven subjects with luteal phase progesterone of 6 nmol/l and above are also included in the LH peak positive list.

However as a side observation the information that the early phase progesterone provided could be useful in the understanding of the endocrinology of missed abortions. It could be inferred from our results that serum progesterone declines rapidly i.e. within the first 48 h after the events. Certainly by the end of the fourth day the levels are very low and inconsistent with early pregnancy. This is in conformity with earlier reports (Holmdall *et al.*, 1971).

The serum prolactin profiles do not possess

any consistent pattern which could be said to be of any diagnostic significance. The preabortal levels are high which is in accordance with earlier reports in pregnancy (Manganiello *et al.*, 1981; Rigg, Lein & Yen, 1977). The values obtained during the first post-abortal cycle are similar to those obtained during the menstrual cycle in normally menstruating Nigerian women (Dada *et al.*, 1981).

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