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## Editorial

### OVULATION PREDICTION AND DETECTION

The only positive confirmation of ovulation is conception or identification of the ovum in the female reproductive tract. The development of a universal technique for the accurate prediction and detection of ovulation remains elusive. All methods biological, biophysical, biochemical and histological are indirect and based on the secretion of pituitary and ovarian hormones.

In the practice of reproductive medicine this information is of practical use, (1) to identify the day or time on which the oocyte was released, (2) to predict ovulation a few hours ahead, to aid the treatment of infertile couple (e.g. for timing artificial donor insemination or for the recovery of mature oocyte for *in vitro* fertilization), (3) to identify the probable limits of fertile period which for clinical purpose is the time from third day before ovulation to the second day after ovulation.

Most patients and clinical investigators use calendar day—midnight to midnight, whereas the results of test is obtained during the day and the test is often repeated after a 24 hour interval. Preliminary findings indicate that there is a day and night rhythm of ovulation (Edward. Nature. 293: 253, 1981) and this observation should help selection of proper time for the application of particular tests.

The likelihood of ovulation during a

regular menstrual cycle of 25 to 33 days is estimated clinically by endometrial biopsy during the luteal phase, aborization of cervical mucus or vaginal cytology by serial estimations during a cycle. Basal body temperature is also a simple and reliable test. Endometrial biopsy is a reliable test, hut the recent observation that luteinization of unruptured follicle can occur has diminished its value. Therefore, it is preferable to do simultaneously with endometrial biopsy other clinical tests as Basal Body Temperature or qualitative changes in the cervical mucus as supportive evidences.

The modification in the quality of cervical mucus correlate closely with the changing patterns of ovarian hormones during the follicular and luteal phases. The quality of cervical mucus can be taught to many women so that the women themselves assess the quality. This is a simple method applicable for family planning. An international trial by World Health Organization (Fertil. Steril. (36: 153, 591, 1981) revealed interesting variations between different countries widely separated from each other and of various socioeconomic classes. This study brought out that out of 5 centres, of which 3 were in developing countries, the method was relatively successful. By intelligent application of this simple observation the 'safe period' can be reduced by several days.

A reliable recent test of prediction of ovulation is the concentration of luteinizing hormone (LH) in serial samples of peripheral venous or capillary plasma. An increase in LH released from the pituitary gland is a prerequisite of ovulation. In a study by World Health Organization (Am. J. Obstet. Gynec. 138: 383, 1980) showed that ovulation occurred between 24 and 56 hours after a rise in the concentration of plasma LH.

Another test recently employed is analysis of LH in collection of early morning sample of urine. The results from a daily study of 23 women with ultrasound showed that ovulation occurred 20 to 44 hours after a defined rise in the concentration of urinary LH, with a mean time of 30 hours (Collins: Int. J. of Fertil. 26: 367, 1981).

Immediate prediction of ovulation within 3 to 4 hours is required for the recovery of mature oocytes and for this concentration of plasma or urinary LH, the measurement of plasma progesterone are done. Alternately, defined changes in the concentration of this hormone in saliva for frequent sampling is a convenient method and has been studied by Walker *et al* (Clinical Chemistry, 25: 2030, 1979).

Pelvic ultrasound allows the direct visualization of the presence, size and number of developing follicles. Follicular diameter ranging between 15 and 23 mm

are considered as mature follicles. This variation in follicular size indicates that there is no optimum size for fertilization. In all the studies carried out, fertilization did not occur in follicles less than 13 mm diameter. From the study of Seibel *et al* (Fertil, Steril. 36: 573, 1981) it appears that in early stages of a cycle multiple follicles below the size of 10 mm are present and as the cycle progresses 3 or 4 follicles increase in size, so that there is the possibility of multiple pregnancies should there be several follicles over 15 mm at the time of induction of ovulation by Clomid or HMG.

Ultrasound guides in two ways: (1) In determining whether the ovary responds to ovulation inducing drugs. (2) Whether follicles have attained a minimum size for administration of ovulation inducing drugs.

In conclusion, it can be stated that ultrasound plays an important role in the monitoring of ovulation induction, but does not replace the present methods.

In the present state of our knowledge there is no ideal method for prediction and detection of ovulation. For most purposes it is necessary that serial observations are made. It must be appreciated that all these tests are not available in all countries.

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