



Use of urinary LH kit in predicting ovulation.

¹Dr Jyothi R Pillai, Senior consultant, Department of Reproductive medicine and surgery, Amrita Institute of Medical sciences, Kochi, Kerala, India

²Lissy Joseph, Embryologist, Janeen fertility and Genetic centre, Ibn Al Nafees Hospital, Manama, Baharin

Corresponding Author: Dr Jyothi R Pillai, Senior consultant, Department of Reproductive medicine and surgery, Amrita Institute of Medical sciences, Kochi, Kerala, India

Type of Publication: Original Research paper

Conflicts of Interest: Nil

Abstract

Objective: To assess the usefulness of monitoring urine LH at home for ovulation and timed intercourse using a rapid colorimetric LH kit once every morning.

Methods: 74 women were included in the study after ovulation induction with clomiphene citrate and urine LH test was done from day 10 onwards.

Results: Ovulation was documented in 91 % of patients by ultrasound within 24 hours.

Conclusion: Home urinary monitoring of LH is a reliable and convenient method of monitoring ovulation.

Key words: LH Kit, urine LH test, Ovulation, Ultrasound

Background: Traditionally various methods have been used in predicting ovulation. Relatively newer methods involve urinary LH kits which are now available in our country. Most kits can determine urinary LH levels as low as 20- 40 IU /L.A LH surge is detected if the urinary LH is above the threshold. However variations between different urinary kits are common. In our study we wanted to find the usefulness of these kits in selected group of patients in reducing the number of hospital visits in a treatment cycle.

Methods: A total of 74 women aged 20- 35 years were included in the study. These were cases of either primary or secondary infertility and had at least one year of regular unprotected sex .All of them had a basal FSH < 10 and LH value <10 ,were euthyroid and had normal prolactin levels. Tubal status was documented patent by either HSG or laparoscopy. Menstrual cycles were regular 26 - 34 days and the male factor normal. Ovulation induction was done using clomiphene citrate 100 mg from D2 to D6.All the subjects were asked to do the urine LH testing at home from day 10 of cycle.(CORTEX DIAGNOSTICS INC. ONE STEP TESTS.) Late morning urine samples were used for the purpose around 10 AM – 11 AM every day .The test results were read exactly at the specified time interval (5 minutes). We considered the urine LH kit to be positive if the colour intensity of the test line was similar to the control line or at least half as intense in colour. Once a positive ovulation prediction test was obtained subjects were asked to have sex that day and again about 24 hours later. The serum LH was measured on the same day and ovulation was confirmed by ultrasound on the next day. Serum β hcg was measured after 2 weeks.

Results

Table 1

Age	Mean duration of infertility (years)
20 –25 (n = 20)	1 year 3 months
25 - 30 (n = 26)	2 years
30 - 35 (n = 28)	2 years

Table 2

Age group(n = 74)	Serum LH >35	USG documented ovulation	Pregnancy rate
20- 25 (n= 20)	20	20	4
25 – 30 (n= 26)	26	22	2
30- 35 (n= 28)	28	26	4

All the 74 subjects who had a positive urine LH kit had serum LH >35 IU on the day of positive test.. Ultrasonographic criteria for ovulation like presence of fluid and follicular collapse were found in 68/74 patients (91%) within 24 hours. Serum β hCG was tested after 2 weeks and fetal cardiac activity was documented by ultrasound after another 2 weeks in 10/ 74 cases (13.5%).

Discussion

Ovulation is the release of mature ovum from the preovulatory follicle into the oviduct to be fertilized. Ovulation requires the collective actions of the preovulatory surges of LH and FSH and the maturation of the ovum also requires the LH surge. After a resting state, the oocyte in the preovulatory follicle resumes meiosis during the ovulation sequence. The oocyte nucleus or germinal vesicle undergoes a series of changes that involve germinal vesicle breakdown (GVBD), and the progression of meiosis to the second meiotic metaphase or first polar body stage. Meiosis is

arrested here and will proceed no further unless the ovulated egg is fertilized. Meiotic maturation is a vital event in ovulation because it is obligatory for normal fertilization. The LH/FSH surge in some way causes meiotic maturation by desensitization and down regulation of the LH and FSH receptors..

The LH surge is initiated by a dramatic rise of estradiol produced by the preovulatory follicle. The LH surge occurs 34 to 36 hours prior to ovulation and is a relatively precise predictor for timing ovulation. The LH surge stimulates luteinization and stimulates the synthesis of progesterone responsible for the mid cycle FSH surge. Also, the LH surge stimulates resumption of meiosis and release of ovum.

Estradiol levels fall dramatically immediately prior to the LH peak. Elevated FSH levels at this time are thought to free the ovum from the follicular attachments. Progesterone is responsible for stimulating the mid cycle rise in FSH. The mechanism causing the postovulatory fall in LH is unknown. The decline in LH may be due to the loss of the positive feedback effect of estrogen, due to the increasing inhibitory feedback effect of progesterone, or due to a depletion of LH content of the pituitary from downregulation of GnRH receptors.

Ovulation is related in time to the onset of the LH surge and occurs 40-45 hrs following the onset of this surge as detected in blood (Ahmad F. Khattab et al 2005) Repeated serum testing shows that 45% of the LH surges commence at around 5.00 AM to 9.00 AM .LH is secreted in pulses on an average 90 minutes and the half life is around 20 – 60 minutes. The serum levels fluctuate considerably .The accurate determination of the LH peak by serum testing requires repeated and frequent blood sampling which is not practical.

With the urinary assay of LH ,these fluctuations are practically overcome by allowing the urine to

accumulate for 3-4 hours in the bladder prior to testing. The LH surge as detected in the urine inevitably becomes apparent some hours after it can be detected by frequent blood tests. Urine kits can be used as frequently as necessary making it a convenient option. Khattas et al have reported that a urine test done at lunch time will detect >70 % of LH surges that will start that day. They used a single daily LH kit and additional two or three for testing in retrospect only on the day of positive urine result. Taylor et al have concluded that 11.00 - 15.00 hours is the best time of the day to check for LH surge using urine kits. Insemination at any time between 18 and 54 hours from first positive LH test will produce reasonable results.

Miller et al have reported that daily urine LH testing is a reliable method of predicting ovulation within the ensuing 48 hours. Positive predictive values for follicular collapse within 24 or 48 hours after positive urine LH testing were 73 and 92 % respectively. Ovulation was determined using sonographic criteria with confirmation by normal luteal phase progesterone levels.

Meta-analysis of studies comparing traditional methods and newer methods of predicting ovulation (Flierman et al. 1997) showed no benefit from using the LH kit in terms of pregnancy rates per cycle.

Robinson et al (1992) found a significant reduction in the number of patient visits per cycle. Urine LH kits Provide a convenient and reasonably reliable method for timing of ovulation. (Vermesh et al, 1992; Lashen et al 1999; Robinson et al 1992)

Urinary LH monitoring as its limitations and false negative results can occur if peak LH concentrations are < 40 IU / L. Some thing that may occur in upto 35 % of ovulatory cycles (Arici et al).

Eichner et al in a review of literature concerning ovulation prediction devices have reported that LH based ovulation tests have demonstrated accurate and superior ovulation detection when compared to BBT, calender calculation, salivary ferning or observation of vaginal or cervical discharge.

We believe that the benefits of home urine LH kit should not be dismissed lightly.

Apart from the invasive nature of serum LH testing there is the inconvenience and the cost of traveling to the clinic together with the need for trained personnel. Another obvious disadvantage of blood measurements arise in the case with estradiol and LH, where a single measurement may not be representative of the prevailing secretion rate.

Conclusion

Home urinary LH monitoring is a convenient and reliable method of monitoring ovulation in a selected group of patients.

Acknowledgement

We acknowledge Dr Shaikha Al Arrayed for providing the infrastructure and background for the present study

References

1. Khattab AF, Musthafa FA, Taylor PJ (2005) the use of urine LH detection kits to time intrauterine insemination with donor sperm. *Human Reprod* 20,2542-2545
2. Flierman PA, Hogerzeil HV and Hemrika DJ (1997) A Prospective, randomized. Cross- over comparison of two methods of artificial insemination by donor. *Human Reprod* 12,1945 – 1948.
3. Federman CA, Dumesic DA, Boone WR and Shapiro SS (1990) Relative efficiency of therapeutic donor insemination using a LH monitor. *Fertil Steril* 54,489-492.

4. Goldberg JM, Masch (1999) comparison of intrauterine and intracervical insemination with frozen donor sperm; a meta-analysis *Fertil Steril* 72,792-795.
5. Human fertilization, Embryology authority (2000) Ninth annual report and accounts. HFEA London.
6. Lashen H, Kennefik A (1999) Early resort to ovarian stimulation improves the cost effectiveness of a donor insemination programme. *Hum Reprod* 14,1983-1988.
7. Robinson JN, Lockwood GM, Dalton JD, Franklin PA, Farr MM and Barlow DH (1992) A randomized prospective study to assess the effect of the use of home urinary LH detection on the efficiency of donor insemination. *Hum reprod* 7,63-65.
8. Vermesh M, Kletzky OA, Davajan V et al, (1987) Monitoring technique to predict and detect ovulation. *Fertil Steril* 47,259-264.
9. Wilcox AJ, Weinberg CR and Biard DD (1995) Timing of sexual intercourse in relation to ovulation. *New Engl J Med* 23,15717-1521.
10. Miller PB, Soules MR Predictive value of monitoring urinary LH at home. *Obstet Gynecol.* 1996 Jan; 87(1): 13-17.
11. Velasco J.A, Arici A, Endogenous LH surge detection versus administration of HCG to correctly time intrauterine insemination. *Human Reprod* 15, 975-976.
12. Eichner SF, Timpe EM –ovulation prediction devices (2004) *Ann Pharmacother* 38 (2), 325 –331.