Comparative Study between Measuring (FSH, LH and E2) on Day two and on any Day of the Cycle

Thesis

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By

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List of Abbreviations

Abbr.	Full-term
AFC	: Antral follicle count
AMH	: Anti-Mullerian Hormone
ART	: Assisted reproductive technique
BMI	: Body mass index
COH	: Controlled ovarian hyperstimulation
CP	: Clinical pregnancy
DHEA	: Dehydroepiandrosterone
DOR	: Diminished ovarian reserve
FGAs	: Functioning gonadotroph adenomas
FSH	: Follicle-stimulating hormone
GnRHa	: Gonadotropin releasing hormone
HIV	: Human immune deficiency virus
ICSI	: Intra cytoplasmic sperm injection
IHH	: Isolated Hypogonadotroiic Hypogonadism
IQR	: Interquartile range
IVF	: In vitro fertilization
LB	: Live birth
LH	: Luteinising hormone
ORT	: Ovarian reserve tests
PCOS	: Polycystic ovary syndrome
POI	: Primary ovarian insufficiency

RIA : Radioimmunoassay

SD : Standard deviation

SPSS : Statistical package for social science

TSH : Thyroid-stimulating hormone

TVUS : Transvaginal ultrasonography

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ABSTRACT

Background: Evaluation of ovarian reserve has become an essential part of the treatment assessment of woman about to undergo assisted reproductive technique. **Aim of the Work:** To evaluate measuring (FSH, LH and E2) at any day of the whole (menstrual cycle) compared to mandatory day2 measurement and establishing an actual negative correlation between FSH & E2. **Patients and Methods:** Observational analytical prospective study on 50 women attending the Gynecology outpatient clinics of Maternity hospital Ain-Shams University in 2016. **Results:** There was a significant negative correlation between (E2/FSH) on the 3rd, 5th and 10th days of the cycle. Also there was insignificant negative correlation on day 21. **Conclusion:** there negative correlation between basal (day2)(E2/FSH) which is equivalent or similar to that ratio on days (5,10,21) so there is no need to wait for hormonal analysis to the next cycle (day 2 or 3) to save time specially in patients >35years for them there is importance of cycle day3 for evaluation of ovarian reserve and prior ovulation induction and subsequent pregnancy potential during the infertility work up. **Recommendations:** During the infertility work up , rigid adherence to cycle day3 collection ,no longer seems necessary ,no need to wait for hormonal analysis to Estradiol and FSH to the next cycle as there is equivalent negative correlation between (E2/FSH) on menstrual cycle days (3,5,10,21) aiming for saving time.

Key words: FSH, LH, E2, menstrual cycle

Introduction

The concept of ovarian reserve as assessed by follicle stimulating hormone (FSH) measurement has proven useful in predicting pregnancy outcome ***(Scott and Hoffman, 1995).*** Determination of cycle day 3 FSH has evolved as the standard for predicting oocyte quality and the likelihood of conception in assisted reproductive technology programmes. The information obtained from cycle day 3 FSH testing is invaluable in counselling patients as to their chances of achieving a pregnancy and deciding on options for stimulation protocols ***(Scott et al., 1989).***

Muasher *et al.* (1988) demonstrated that basal cycle day 3 concentrations of FSH reflected the reproductive potential of that menstrual cycle. This could be applied further to discriminate between patients who would be more likely to respond to ovarian stimulation and those who would not ***(Toner et al., 1991).*** Cycle day 3 testing has emerged as a dictum from these studies because most stimulation protocols were initiated on cycle day 3, 4 or 5 ***(Jones et al., 1984; Marrs et al., 1984).*** The validity of testing on other days has not yet been explored. Early follicular phase oestradiol concentrations may reflect die stage of follicular development, with higher concentrations associated with asynchrony of follicular development An abrupt early rise of

oestradiol may be a subtle sign of the shortened follicular phase often seen prior to menopause. The purpose of this study was to evaluate the intra- and inter-cycle variability of serum values of FSH and oestradiol in the early follicular phase (cycle days 2-5) ***(Hansen et al., 1996).***

The importance of cycle day 3 FSH for evaluation of ovarian reserve and subsequent pregnancy potential has recently been emphasized in women >35 years during the infertility workup ***(Scott and Hofmann, 1995).*** Basal FSH values have been utilized to decide on treatment protocols and to counsel patients as to their potential pregnancy success ***(Toner et al., 1991).*** Many authors attest to the importance of cycle day 3 testing ***(Fenichel et al., 1989; Pearlstone et al., 1992; Tanbo et al., 1992).*** The emphasis on cycle day 3 testing seems to have evolved in part from convenience, based on the cycle day 3 start of most stimulation protocols ***(Jones et al., 1984; Marres et al., 1984).*** According to ***Hodgen's work (1989),*** early follicular growth and recruitment occur in the beginning of the cycle prior to cycle days 5-7. By day 7 the one follicle destined to ovulate has been selected. Since the objective in ovarian hyperstimulation for assisted reproductive technology is to recruit more than one dominant follicle, stimulation must be initiated prior to the loss of this multipotentiality of the follicles. Before the widespread use of (GnRHa), stimulation

protocols traditionally began on cycle day 3 or 4. Thus, basal testing had to be performed by cycle day 3. According to our data, testing for FSH on any of cycle days 2-5 will give equivalent results, regardless of patient age ***(Hansen et al., 1996).***

Ovarian reserve tests (ORT) help to predict the response to exogenous gonadotrophin stimulation and the likelihood of success with IVF and are widely accepted as an essential element of the evaluation of IVF ***(Speroff & Fritz, 2005). .***

ORT can roughly be divided into three groups: ***(Haadsma et al., 2007).***

These tests measure early follicular phase hormones level and they include: Female age; Cycle day 3 serum FSH concentration; Cycle day 3 serum estradiol (E2) concentration; Cycle day 10 serum progesterone(P) concentration; Cycle day 3 serum Inhibin B concentration; Serum Anti-Mullerian Hormone (AMH) concentration and Ovarian biopsies.

Basal FSH has been reported to be better predictor of ovarian response in IVF cycles stimulated with gonadotrophins than age ***(Akira et al., 2005).***

As women ages, FSH becomes elevated in an attempt to force the aging ovary to respond. It starts to increase

because of reduced inhibin-B and E2 production by the diminished cohort of growing follicles. This event takes place a few years before the actual menopause ***(Annemarie de vet et al., 2002).***

The cycle day 3 FSH level is one of the most commonly used tests for predicting success in IVF treatment. This was first described by ***Muasher et al. (1988),*** and ***Lenton et al. (1988)*** demonstrated that women with an elevated cycle day 3 FSH had reduced ovarian reserve. Since then, several studies have shown that women with an elevated FSH level, independent of age, have a poor response to ovarian stimulation, leading to a lower pregnancy rate with assisted reproductive technique (ART) ***(Abdalla and Thum, 2004).***

The basal level of serum FSH is used as a screening test for patients undergoing IVF. It is well documented that a high day 3 basal level of FSH is associated with a lower pregnancy rate. Indeed, some Units have been using this test to screen patients with a lower chance of a pregnancy in view of maintaining high clinic success rates ***(Abdalla and Thum, 2006).***

In reproductive endocrinology, basal FSH is measured in order to detect women with ovarian failure. FSH measured in serum on day 3 of the menstrual cycle is probably the most