

Day-5 inhibin B serum concentrations and antral follicle count as predictors of ovarian response and live birth in assisted reproduction cycles stimulated with gonadotropin after pituitary suppression

Joana Peñarrubia, M.D.,^a Sara Peralta, M.D.,^a Francisco Fábregues, M.D.,^a Francisco Carmona, M.D.,^a Roser Casamitjana, M.D.,^b and Juan Balasch, M.D.^a

^a Institut Clínic de Gynecology, Obstetrics, and Neonatology, and ^b Hormonal Laboratory Hospital Clínic-Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), Faculty of Medicine, University of Barcelona, Barcelona, Spain

Objective: To investigate the usefulness of day-5 inhibin B and antral follicle count (AFC) in predicting ovarian response and live birth in the first cycle of assisted reproduction.

Design: Prospective cohort study.

Setting: University hospital.

Patient(s): Ninety-eight infertile women treated with in vitro fertilization–intracytoplasmic sperm injection (IVF–ICSI) comprising 72 normal responders and 26 poor responders.

Intervention(s): Ovarian stimulation with gonadotropin-releasing hormone agonist–gonadotropin treatment.

Main Outcome Measure(s): Basal ultrasonographic (AFC, total ovarian volume) and basal (follicle-stimulating hormone, estradiol, and inhibin B) and stimulation day-5 (estradiol, inhibin B) hormone parameters.

Result(s): The AFC had the best predictive value among the basal variables for outcome of ovarian stimulation. Among the dynamic hormone measurements, day-5 inhibin serum measurement emerged as the best predictive variable of poor response in IVF–ICSI cycles, but it was not statistically significantly better than basal AFC. The association of day-5 inhibin B with live-birth rate was statistically significant and stronger than the effect of any other variable investigated.

Conclusion(s): Basal AFC and day-5 inhibin B have similar predictive properties for ovarian response in assisted reproduction cycles stimulated with gonadotropin after pituitary suppression, but day-5 inhibin B is a superior predictor of live birth. (*Fertil Steril*® 2010;94:2590–5. ©2010 by American Society for Reproductive Medicine.)

Key Words: AFC, inhibin B, IVF, poor responders

Basal follicle-stimulating hormone (FSH) and estradiol (E₂) were the first widely used markers of ovarian reserve that showed a better potential than age for predicting decreased ovarian function and lowered success rates after assisted reproductive technologies (ART) (1). However, both ultrasound and endocrine novel markers of ovarian reserve, mainly antral follicle count (AFC), levels of inhibin B, and levels of antimüllerian hormone (AMH), have been advocated over the last decade (2, 3). Antimüllerian hormone is a product of the granulosa cells that envelop the oocyte, and it continues to be expressed until the antral stage. Inhibin B is produced by the cohort of developing preantral and early antral follicles, and its circulating concentrations are maximal during the early to midfollicular phases. Early follicular inhibin B levels decrease during reproductive aging, leading to increased FSH concentrations. Similarly, AFC decreases during reproductive aging in line with the contention that the number of visible antral

follicles reflects the size of the primordial follicle pool; thus, it has been considered the test of first choice by some (2, 4).

Although the basal assays preferentially reflect the size of the ovarian follicle pool at rest, it has been stressed that consideration of the glandular response to stimulation may provide a more useful assessment of the reserve of the endocrine organ in question than a basal hormone measurement (5). Thus, we previously reported that AMH concentrations obtained on the fifth day of gonadotropin therapy in down-regulated women undergoing ART had a higher predictive value for ovarian response than basal AMH measurements. However, the predictive capacity of day-5 AMH was not better than that provided by day-5 E₂ (6). In contrast, we also reported that day-5 inhibin B concentrations were correlated directly with parameters of ovarian response, ovum retrieval, and oocyte and fertilization outcome. In addition, day-5 inhibin B was a better predictor of ovarian response than basal FSH and inhibin B, day-5 inhibin A, and basal and day-5 E₂ (7). Therefore, our prospective study investigated the usefulness of day-5 inhibin B and AFC for predicting ovarian response and live birth in a cohort of patients undergoing their first cycle of ART.

MATERIALS AND METHODS

Between January 2008 and April 2008, we prospectively included in our study 104 successive women (age range: 25 to 41 years) undergoing their first ART cycle and fulfilling our inclusion criteria. All patients were infertile but otherwise healthy women, had both ovaries with no previous ovarian surgery,

Received December 18, 2009; revised February 14, 2010; accepted March 5, 2010; published online April 18, 2010.

J.P. has nothing to disclose. S.P. has nothing to disclose. F.F. has nothing to disclose. F.C. has nothing to disclose. R.C. has nothing to disclose.

J.B. has nothing to disclose.

Supported in part by a grant from the Agència de Gestió d'Ajuts Universitaris i de Recerca, Generalitat de Catalunya (2009SGR 1099).

Reprint requests: Juan Balasch, M.D., Institut Clínic de Gynecology and Obstetrics, Hospital Clínic, C/Casanova 143, 08036-Barcelona, Spain (FAX: 34-93-2275454; E-mail: jbalasch@ub.edu).

TABLE 1
Patient characteristics, ultrasonographic and hormone measurements, gonadotropin treatment, ovarian response, ovum retrieval, and in vitro fertilization–intracytoplasmic sperm injection outcome in normal and poor responders.

Variable	Normal responders (n = 72)	Poor responders (n = 26)	P value
Age (y)	34.08 ± 3.5	37.12 ± 2.4	< .05
BMI (kg/m ²)	24.5 ± 4.3	22.6 ± 3.6	NS
Duration of infertility (y)	4.9 ± 1.5	5.0 ± 1.6	NS
Infertility factor			NS
Male factor	36 (50)	12 (46)	
Tubal factor	14 (20)	5 (19)	
Endometriosis	11 (15)	6 (23)	
Unexplained	11 (15)	3 (12)	
Basal AFC (n), mean ± SD	12.96 ± 6.1	5.54 ± 2.7	< .001
Total ovarian volume (mL)	9.42 ± 3.7	5.47 ± 2	< .001
Basal FSH (IU/L)	6.9 ± 2.2	9.1 ± 4.9	< .05
Basal E ₂ (pg/mL)	34.2 ± 19	40.8 ± 28.4	NS
Basal inhibin B (pg/mL)	72.02 ± 37.7	54.8 ± 29.7	< .05
Day-5 E ₂ (pg/mL)	169.94 ± 111	134.6 ± 174.6	< .05
Day-5 inhibin B (pg/mL)	359.8 ± 202.5	115 ± 76.7	< .001
Days to ovarian arrest	15.92 ± 1.7	16.53 ± 2.6	NS
Days of ovarian stimulation	10.97 ± 1.5	11.07 ± 2.08	NS
Total IU of FSH	2761 ± 1197	3817 ± 1521	< .005
Patients with hCG and ovum retrieval	72 (100)	14 (53.8)	< .001
No. of follicles (mm) ^a			
10–14	3.46 ± 2.6	1.5 ± 1.2	< .005
>14 to <18	3.65 ± 2.9	1.21 ± 1.2	< .005
≥ 18	5.92 ± 2.1	3.79 ± 1.31	< .001
Peak E ₂ concentration (pg/mL), mean ± SD ^a	2239 ± 495	995 ± 585.6	< .001
No. of oocytes retrieved, mean ± SD (range) ^b	11.6 ± 5 (4–25)	2.6 ± 0.7 (1–3)	< .001
No. of metaphase II oocytes ^b	10.04 ± 4.9	2.1 ± 1.05	< .001
No. of patients with ICSI	63 (87.5)	13 (92.8)	NS
No. of 2PN oocytes on day 1 ^b	6.97 ± 1.7	1.4 ± 0.8	< .001
No. of patients with embryo transfer	67 (93)	11 (42)	< .001
Day of embryo transfer ^b	2.1 ± 0.4	2.2 ± 0.4	NS
No. of embryos per replacement ^b	2.3 ± 0.7	1.6 ± 0.7	< .001
High quality embryos replaced ^b	1.6 ± 0.6	0.6 ± 0.5	< .001
Implantation rate (%) ^b	21.4	15	NS
Clinical pregnancies			
Number	30	3	
Per started cycle (%)	41.7	11.5	< .05
Per oocyte retrieval (%)	41.7	21.4	NS
Per embryo transfer (%)	44.8	27.3	NS
Miscarriages	4 (13.3)	0	NS
Live birth	26 (86.6)	3 (100)	NS

Note: Values are mean ± standard deviation or n (%), unless otherwise stated. 2PN = two pronuclei; AFC = antral follicle count; BMI = body mass index; E₂ = estradiol; FSH = follicle-stimulating hormone; hCG = human chorionic gonadotropin; ICSI = intracytoplasmic sperm injection; NS = not statistically significant.

^a Day of hCG administration or cancellation day.

^b Values are relative to the number of patients with oocyte retrieval.

Peñarrubia. Day-5 inhibin B and AFC in IVF cycles. *Fertil Steril* 2010.

and had normal ovulatory function. None of the patients had received any hormone therapy for ≥ 6 months before the study.

For the specific purpose of this study all participants had blood samples drawn on days 3 to 4 of their cycle, within 3 months of the in vitro fertilization–intracytoplasmic sperm injection (IVF–ICSI) attempt, for assay of basal concentrations of FSH, E₂, and inhibin B in addition to the E₂ and inhibin B determinations on the fifth day of gonadotropin therapy during the IVF–ICSI index cycle. On the same day as basal hormone analyses, all patients underwent a transvaginal ultrasound examination to assess the number of antral follicles and the volume of the ovaries. Each woman gave informed consent to participate in this study, which was approved by our internal ethics committee.

Ovarian stimulation was performed with recombinant human FSH under pituitary suppression with a gonadotropin-releasing hormone (GnRH) agonist according to a routinely used protocol (6). The criteria for human chorionic gonadotropin (hCG) administration were the presence of ≥ 2 follicles that were ≥ 18 mm in diameter with ≥ 4 follicles measuring ≥ 14 mm in association with a consistent rise in serum E₂ concentration. The cycle was canceled when there were < 3 follicles with diameter ≥ 14 mm after 8 to 9 days of gonadotropin therapy or after 4 to 5 additional treatment days without attaining or without the imminent prospect of attaining the criteria for hCG administration. The cancellation of the cycle due to insufficient follicular growth or collection of ≤ 3 oocytes at retrieval defined the poor responder patient.

Download English Version:

<https://daneshyari.com/en/article/6181226>

Download Persian Version:

<https://daneshyari.com/article/6181226>

[Daneshyari.com](https://daneshyari.com)