

# Effect of serum progesterone level on the day of human chorionic gonadotropin injection on outcome following in vitro fertilization-embryo transfer in women using gonadotropin releasing hormone antagonists

**B. Katsoff, J.H. Check, C. Wilson, J.K. Choe**

*The University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School at Camden  
Cooper Hospital/University Medical Center, Department of Obstetrics and Gynecology  
Division of Reproductive Endocrinology & Infertility, Camden, NJ (USA)*

## Summary

**Purpose:** To determine if there is any association of serum progesterone (P) level at the time of human chorionic gonadotropin (hCG) injection and pregnancy outcome in in vitro fertilization (IVF) cycles using gonadotropin releasing hormone (GnRH) antagonists for controlled ovarian hyperstimulation (COH). **Methods:** A retrospective analysis of IVF cycles over a six and a half-year period where either cetrorelix or ganirelix was used with COH and at least two embryos were transferred. Female partners were  $\leq 35$ . Four different serum progesterone (P) ranges were evaluated from  $\leq .5$  ng/ml to 1.9 ng/ml; P was measured by ELISA. **Results:** There was no significant difference in pregnancy rates or even a trend in that direction with increasing serum P levels with either GnRH antagonist. **Conclusions:** At least with COH cycles using GnRH antagonists and where serum P is measured by ELISA there does not seem to be any disadvantage of higher serum P levels up to 2 ng/ml at the time of hCG in IVF-ET cycles.

**Key words:** Progesterone; Cetrorelix; Ganirelix; Pregnancy outcome.

## Introduction

There have been several previous studies attempting to determine if a higher level of serum progesterone (P) on the day of taking human chorionic gonadotropin (hCG) in in vitro fertilization-embryo transfer (IVF-ET) is associated with a lower pregnancy rate per ET [1-4].

Various conclusions as to the negative influence of a higher serum P were reached. Most of these studies involved the use of luteal phase gonadotropin releasing hormone (GnRH) agonists [1-3].

The purpose of this study was to determine the pregnancy outcome according to various serum P ranges under 2 ng/ml on the day of hCG in women taking GnRH antagonists in a controlled ovarian hyperstimulation (COH) regimen.

## Materials and Methods

A retrospective review was performed for all couples undergoing IVF-ET over a six-year time period in which either cetrorelix or ganirelix was used following COH where at least two embryos were transferred. The maximum age for the female partner was 35.

The serum P levels were measured on the day of hCG injection by ELISA assay. Embryos were not transferred but instead cryopreserved if the serum p was  $\geq 2$  ng/ml. Pregnancy and implantation rates were calculated according to the serum P.

## Results

The clinical (ultrasound evidence of pregnancy) and ongoing/delivered pregnancy rates (PRs), and implantation rates are presented in Table 1. The data were evaluated according to ranges of P, and according to whether the GnRH antagonist was cetrorelix or ganirelix.

Even though some of the groups were small, there was no trend for lower PRs as the serum P increased at least  $< 2$  ng/ml for either GnRH antagonist.

## Conclusions

There does not appear to be any association of lower pregnancy rates following IVF-ET and higher levels of serum P (up to 2 ng/ml) on the day of hCG in women

Table 1. — Pregnancy rates according to the serum progesterone level on the day of hCG injection in women undergoing in vitro fertilization using antagonist controlled ovarian hyperstimulation protocols.

	Ganirelix					Cetrotide			
Serum P day of hCG (ng/ml)	$\leq .5$	.6-.9	1.0-1.3	1.4-1.9	$\leq .5$	.6-.9	1.0-1.3	1.4-1.9	
# transfers $\geq$ ET	18	29	15	4	7	18	15	7	
% clinical pregnancies/transfers	55.6	44.8	33.3	50.0	71.4	33.3	60.0	57.1	
% ongoing/delivered/transfers	44.4	44.8	33.3	25.0	57.1	33.3	53.3	57.1	
% embryos implanted	25.0	29.8	19.6	25.6	28.6	18.8	26.2	38.9	
Mean no. embryos transferred	3.1	2.9	3.1	2.3	3.0	2.7	2.8	2.6	

Revised manuscript accepted for publication June 22, 2010

using GnRH antagonists in their controlled ovarian hyperstimulation regimen.

If one favors the previous data showing higher PRs with lower serum P levels when using GnRH agonist protocols, then this study suggests that when using antagonist protocols the association is no longer found.

Of course, if one favors the previous studies showing no association of serum P at the time of hCG and pregnancy outcome then these data corroborate these studies only now using COH protocols with antagonists. The lack of association of serum P and outcome was found whether ganirelix or cetrorelix were used.

### Acknowledgement

We would like to thank Ascend Specialty Rx for providing partial grant support.

### References

- [1] Schoolcraft W., Sinton E., Schlenker T., Huynh D., Hamilton F., Meldrum D.R.: "Lower pregnancy rates with premature luteinization during pituitary suppression with leuprolide acetate". *Fertil. Steril.*, 1991, 55, 563.
- [2] Silverberg K.M., Burns W.N., Olive D.L., Richl R.M., Schenken R.S.: "Serum progesterone levels predict success of in vitro fertilization/embryo transfer in patients stimulated with leuprolide acetate and human menopausal gonadotropins". *J. Clin. Endocrinol. Metab.*, 1991, 73, 797.
- [3] Check J.H., Lurie D., Askari H.A., Hoover L., Lauer C.: "The range of subtle rise in serum progesterone levels following controlled ovarian hyperstimulation associated with lower in vitro fertilization pregnancy rates is determined by the source of manufacturer". *Eur. J. Obstet. Gynecol. Reprod. Biol.*, 1993, 52, 205.
- [4] Check J.H., Hourani C., Choe J.K., Callan C., Adelson H.G.: "Pregnancy rates in donors versus recipients according to the serum progesterone level at time of human chorionic gonadotropin in a shared oocyte program". *Fertil. Steril.*, 1994, 61, 262.

Address reprint requests to:  
J.H. CHECK, M.D., Ph.D.  
7447 Old York Road  
Melrose Park, PA 19027 (USA)  
e-mail: laurie@ccivf.com