A case report: successful pregnancy after controlled ovarian hyperstimulation by using short-acting gonadotropin releasing hormone agonist only

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Controlled ovarian hyperstimulation (COH) is widely used in in vitro fertilization and embryo transfer (IVF-ET) to achieve multiple follicle development during one treatment cycle. COH is usually initiated by gonadotropin releasing hormone agonist (GnRHa) to down-regulate pituitary secretion of gonadotropins, suppress endogenous LH surge and synchronize multiple follicles development, which is followed by stepwise exogenous gonadotropins stimulation [1, 2]. Here we report a case of successful pregnancy after inducing multiple follicles development by using short-acting GnRHa only.

A 31-year-old woman, 50 kg weight, was administrated in our unit for four-year primary infertility. Her menstrual cycle was 28 days, lasting 6–7 days. The basal serum follicle-stimulating hormone (FSH), luteinizing hormone (LH) and estradiol (E2) level was 5.1 mIU/mL, 3.56 mIU/mL, and 38.81 pg/mL, respectively. The numbers of antral follicles were eight per ovary.

In the mid-luteal phase, the patient was administrated of short-acting GnRHa (Decapeptyl, Ferring, Germany) 0.1 mg/day for pituitary down-regulation] to initiate an IVF treatment cycle. After 14 days administration, the serum FSH was 4.58 mIU/mL, LH was 29.23 mIU/mL, and E2 was 26.79 pg/mL. Transvaginal ultrasound examination showed

that there were five follicles with average diameter more than 10 mm, and the largest one was 14 mm. 0.1 mg Decapeptyl was continuously given for one more day and the LH level maintained 29.96 mIU/mL. Then, we decreased the dose of GnRHa to 0.05 mg/day and continuously given for four more days. Ultrasound examination showed five follicles with average diameter more than 20 mm, the largest one was 28 mm. The patients' serum E2 increased to 1,270 pg/mL, LH was 13.51 mIU/mL. 0.05 mg Decapeptyl was continuously given in the morning and 10,000 IU human chorionic gonadotropin (hCG) was administered to trigger egg maturation in the evening. The patient was scheduled for oocyte retrieval 34 h after the hCG injection. Five oocytes were obtained and three fertilized successfully. Two grade I embryos at the 8-cell stage were transferred at d3, and a surplus grade I embryos at the 7-cell stage were frozen. Routine luteum support (UTROGESTAN 200 mg, Bid, Laboratoires Besins-Iscovesco, France) was given after embryo transfer (ET). Serum β -hCG level examined 14 days after ET was 613.9 mIU/mL, indicating a successful biochemical pregnancy. A transvaginal ultrasound examination 4 months after ET confirmed an ongoing intrauterine twin pregnancy.

Discussion

It is widely accepted that high serum LH level in follicular phase will affect the quality of oocytes and ultimately compromise the IVF outcome [3, 4], therefore Porter in 1984 [1] firstly introduced the GnRHa into COH to suppress endogenous LH surge. Usually GnRHa firstly induces an augmented pituitary response (flare up effect) followed by

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gradually pituitary down regulation [5, 6]. There was successful report in animal study that taking advantage of the initial flare-up effect and using ultra-low dose of short-acting GnRHa to achieve multiple follicles development without exogenous gonadotropines, it suggested that GnRHa alone could generate enough FSH level and duration for multiple follicles recruitment [7]. But recent study in human [8] demonstrated that microdose GnRHa alone is not sufficient to induce multiple follicles development.

In our case, after 14 days administration of Decapeptyl (GnRHa), FSH of the patient decreased to an ideal level (less than 5 mIU/ml), which will not induce follicle development under usual circumstances or sometimes stimulate 1~2 follicles developed due to “flare up” effect. But we observed multiple follicles development under this ideal FSH suppression level. We considered it to be a low FSH threshold for this patient. Brown in 1978 [9] first introduced the concept of FSH threshold, which is the lowest dose of FSH to trigger follicle development. Follicles will not develop even though prolongation of the stimulation time, unless the FSH level is 10~30% higher than the threshold [10]. After 14 days down regulation by Decapeptyl, the patient’s serum FSH was 4.58 mIU/ml, almost two fold higher than a previously reported lowest FSH threshold (2.5 mIU/mL) [11], which in this case may provide enough FSH and do initiate multiple follicles development.

Considering the LH level was not controlled well and maintained in a high level after 14 days down regulation, we did not stop using Decapeptyl but decreased the dose of GnRHa to 0.05 mg/day and expected to maintain a necessary FSH level and to further decrease the high LH level. It proved that this regimen was effective. The follicles grown up and matured finally, and patient obtained successful pregnancy ultimately.

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