



# **Outcomes of Follicle-Stimulating Hormone Priming and Nonpriming in in vitro Maturation of Oocytes in Infertile Women with Polycystic Ovarian Syndrome: A Single-Blinded Randomized Study**

**Research of the month  
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Clinical research**





## Outcomes of Follicle-Stimulating Hormone Priming and Nonpriming in in vitro Maturation of Oocytes in Infertile Women with Polycystic Ovarian Syndrome: A Single-Blinded Randomized Study

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### Key Words

In vitro maturation · Polycystic ovarian syndrome · Follicle-stimulating hormone priming · Pregnancy · Maturation · Cleavage

### Abstract

**Background/Aims:** Follicle-stimulating hormone (FSH) priming has been studied in in vitro matured oocytes for oocyte maturation rate, embryo quality, and pregnancy rate with discouraging results. This study aimed to initiate FSH stimulation later, i.e. on day 6, to prolong natural endometrial priming and promote oocyte maturation. **Methods:** Forty polycystic ovarian syndrome (PCOS) patients were enrolled into a single, blinded (investigator), randomized, controlled study, and randomly allocated to group 1 (no FSH priming) or group 2 (day 6 recombinant FSH priming). Oocytes were retrieved after human chorionic gonadotropin injection on day 10. After 27 or 51 h of incubation, only mature oocytes were denuded and fertilized by intracytoplasmic sperm injection. Two day 3 embryos were transferred in most patients. Rates of oocyte maturation, cleavage, and pregnancy were compared. **Results:** The oocyte maturation

rates within 51 h were 62.6 and 72.7% in groups 1 and 2, respectively ( $p < 0.01$ ). The embryo cleavage rate was significantly higher in group 2 than in group 1 (77.3 vs. 63.6%,  $p < 0.05$ ). The pregnancy rate was higher in group 1 than in group 2 (50 vs. 30%,  $p > 0.05$ ). **Conclusion:** FSH priming is beneficial for promotion of the maturation and quality of oocytes, leading to a higher embryo cleavage rate and lower rate of pregnancy loss.

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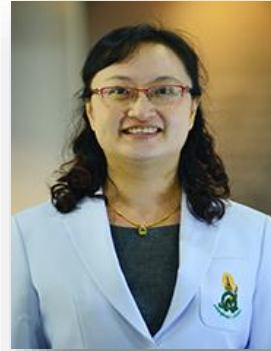
### Introduction

Polycystic ovarian syndrome (PCOS) is a common endocrine disorder that affects female fertility [1]. There is a significantly higher incidence of ovarian hyperstimulation syndrome in PCOS patients compared to women with normal ovaries [2, 3]. Therefore, in vitro maturation of oocytes (IVM) with limited or even no stimulation has become an alternative treatment to in vitro fertilization (IVF) for these patients [4].

Successful oocyte maturation includes the complete maturation of meiotic, cytoplasmic, and molecular com-



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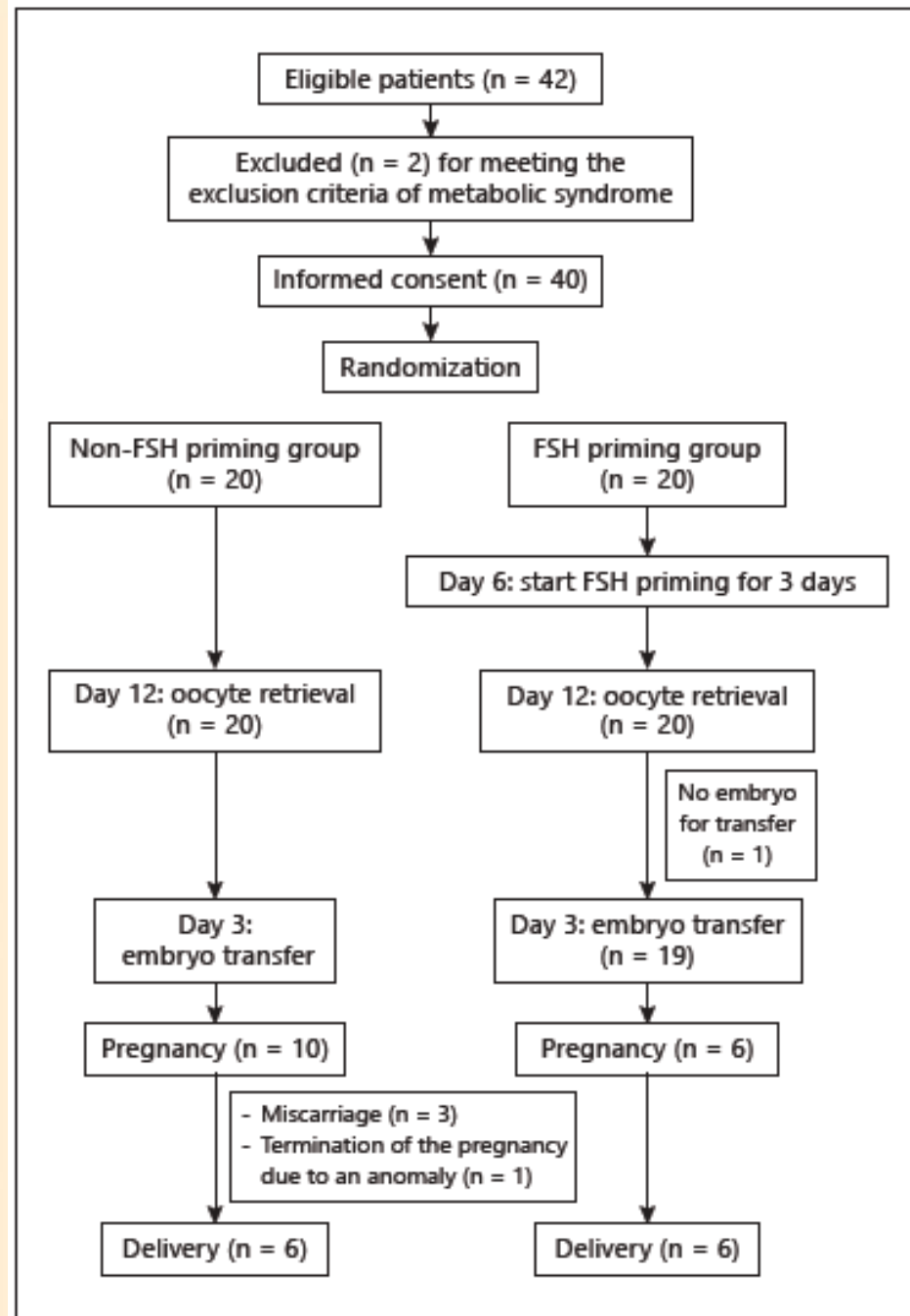
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**Table 1.** Basic characteristics of the patients

Parameters	Group 1 (n = 20)	Group 2 (n = 20)	p values
PCO, n	16	15	0.70
Age, years	30.2±3.5	31.9±2.8	0.1
BMI, kg/m <sup>2</sup>	26.5±5.3	23.3±4.5	0.051
Primary infertility, n	16	14	0.22
Infertility duration, years	3.9±2.1	4.8±2.8	0.26
Day 3 FSH, mIU/ml	5.8±1.1	6.3±1.2	0.22
Day 3 LH, mIU/ml	7.1±3.5	7.4±5.0	0.83 <sup>a</sup>
Day 3 estradiol, pg/ml	31.6±17.0	32.0±17.7	0.98 <sup>a</sup>
Day 3 inhibin B, pg/ml	113.0±79.1	122.2±71.2	0.82 <sup>a</sup>

Where appropriate, data were analyzed using the Mann-Whitney test, an independent sample t test, or a  $\chi^2$  test. Data are shown as numbers or means  $\pm$  SD unless otherwise stated.

<sup>a</sup> Data were analyzed using the Mann-Whitney test.

**Fig. 1.** Flow diagram of patients' enrollment and the process of the protocol



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**Table 2.** IVF laboratory parameters in the FSH priming and non-FSH priming groups

Parameters	Group 1	Group 2	p value
Immature oocytes retrieved, n	350	247	<0.001
Maturation rate at 27 h	157/348 (45.1)	124/245 (50.6)	0.19
Maturation rate at 51 h	61/191 (31.9)	54/121 (44.6)	0.02
Total maturation rate	218/348 (62.6)	178/245 (72.7)	0.01
Maturation rate in the PCO phenotype	187/297 (63.0)	151/211 (71.6)	<0.001
Maturation rate in the non-PCO phenotype	31/51 (47.2)	26/34 (72.2)	<0.001
Fertilization rate of oocytes matured in 27 h	134/157 (85.4)	98/124 (79.0)	0.17
Fertilization rate of oocytes matured in 51 h	42/61 (68.9)	43/54 (79.6)	0.19
Total fertilization rate	176/218 (80.7)	141/178 (79.2)	0.71
Cleavage rate of embryos developed from oocytes that were matured in 27 h	92/134 (68.7)	80/98 (81.6)	0.03
Cleavage rate of embryos developed from oocytes that were matured in 51 h	20/42 (47.6)	29/43 (67.4)	0.06
Total cleavage rate	112/176 (63.6)	109/141 (77.3)	0.01
Cleavage rate in the PCO phenotype	98/158 (62.0)	88/119 (74.0)	<0.001
Cleavage rate in the non-PCO phenotype	14/18 (77.8)	21/22 (95.5)	0.12
Mean transferred embryos, n	1.95	1.9	0.31
Total frozen embryos	69/137 (50.4)	46/103 (44.7)	0.41

Data are expressed as numbers/totals (%) unless otherwise stated.



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**Table 3.** Clinical outcomes in the FSH priming and non-FSH priming groups

Parameters	Group 1 (n = 20)	Group 2 (n = 20)	p value
Day 10 estradiol, pg/ml	62.3±95.9	466.9±477.3	<0.001 <sup>a</sup>
Day 10 inhibin B, pg/ml	272.6±248.5	316.0±273.6	0.80 <sup>a</sup>
Day 10 endometrial thickness, mm	6.46±0.44	8.12±0.56	0.03
Day 12 endometrial thickness, mm	9.94±0.51	9.72±0.70	0.81
Pregnancy rate per cycle, n (%)	10/20 (50)	6/20 (30)	0.20
Implantation rate/embryo transfer, n (%)	12/39 (30.8)	8/38 (21.1)	0.35
Delivery rate, n (%)	6/10 (60)	6/6 (100)	0.07
Miscarriage, n (%)	4/10 (40)	0/6 (0)	
Fetal anomaly, n	1	0	0.30

Data are shown as numbers/totals (%) or means ± SD. Where appropriate, data were analyzed using the Mann-Whitney test, an independent samples t test, or a  $\chi^2$  test.

<sup>a</sup> Data were analyzed using the Mann-Whitney test.