

The Effect of Various Ovulation Induction Protocols on Pregnancy Rates Following Intracytoplasmic Sperm Injection

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In the last two years intracytoplasmic sperm injection (ICSI) has become frequently employed as an assisted reproductive technique primarily to treat male factor infertility.¹ In order to achieve high pregnancy rates, all assisted reproductive technologies including ICSI require sufficient number and quality oocytes. In our practice we use three different ovulation induction regimens (CC/hMG, GnRH-a/hMG, and GnRH-a/FSH) to maximize the number of oocytes available for fertilization. In this present report, we retrospectively compared pregnancy rates with ICSI following the use of these protocols.

MATERIALS AND METHODS

A total of 244 ICSI cycles were initiated in our center between May 1, 1994, and June 1, 1995. The patients were randomly assigned to receive three different ovulation induction protocols, consisting of the following: in group A, an introductory low-dose combined contraceptive pill (Marvelon, ORGANON) followed by clomiphene citrate (CC, Clostilbegyt, EGIS) and human

menopausal gonadotrophin (hMg, Pergonal SERONO); GnRH-a (Suprafact, HOECHST) and Pergonal in group B; and Suprafact and FSH (Metrodin, SERONO) in group C. All regimens were administered as a fixed stimulation protocol.² Eighteen of the patients were canceled during ovulation induction; 8 from group A, 6 from group B, and 4 from group C. The indication in all cases was severe male factor infertility.

Oocyte retrieval was performed by

ultrasound-guided puncture of the ovarian follicles 35 hours following hCG administration. The preparation of the oocyte and the ICSI procedure was carried out as previously described using Narishige and Leitz equipment.⁴ Figures 1 through 4 show the step-by-step injection of a single spermatozoa into a mature oocyte by micromanipulation technique. The state of fertilization of the oocytes was assessed 16 hours after the sperm injection by looking for the presence of pronuclei. Fertilization

Figures 1-4. Injection of a single spermatozoa into a mature oocyte by micromanipulation technique.

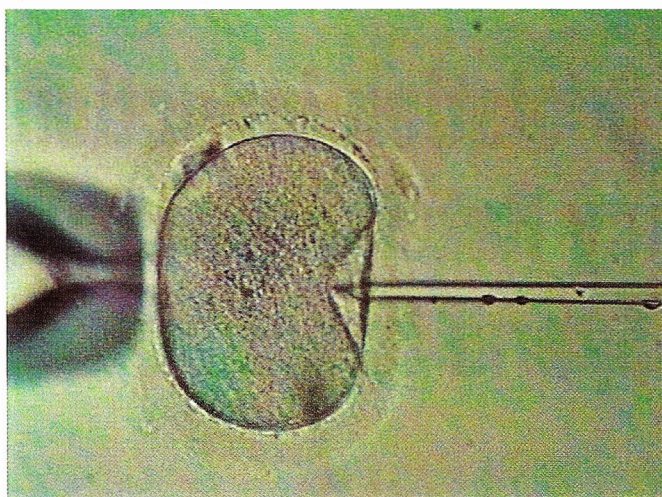


Figure 1

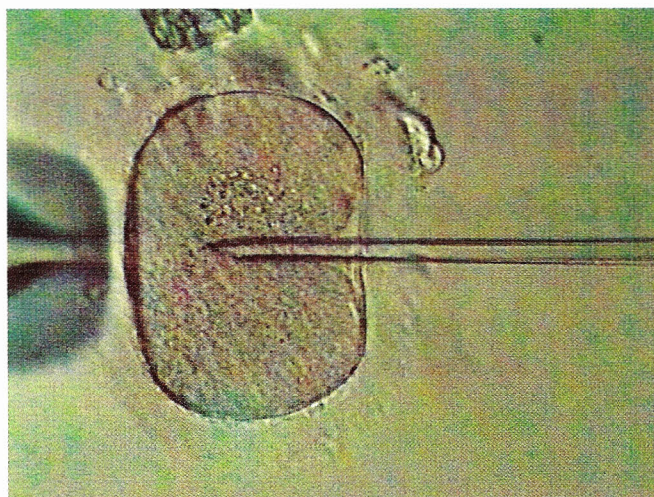


Figure 2



Figure 3

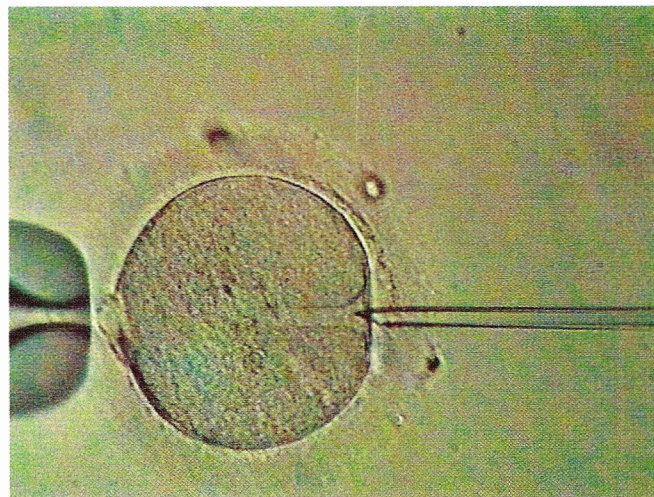


Figure 4

Table 1. Results of ICSI in the three study groups

	Group A (CC/hMG) n=90	Group B (GnRH-a/hMG) n=76	Group C (GnRH-a/FSH) n=60
Oocytes retrieved	7.3 ± 3.3	6.5 ± 3.4	6.7 ± 4.1
Fertilization rate	76.4%	73.8%	82.3%
Embryos replaced	3.2 ± 0.9	3.6 ± 1.2	3.8 ± 0.9

was considered when two pronuclei were present. Up to four embryos were transferred in each cycle usually 48 hours after the ICSI.

All results are reported as mean ± standard deviation. Comparisons were made by Chi-Square analysis. $P < 0.05$ was considered as significant.

RESULTS

There was no significant difference in the mean age of women: 31.4 ± 5.1 years in group A, 34.1 ± 4.1 years in group B, and 34.4 ± 4.5 years in group C. The semen characteristics were as follows: sperm density was on average 6.7 ± 8.1

million/mL, progressive motility 11.35 ± 16.7 , and the percentage of normal spermatozoa (WHO) was $<15\%$. The semen was prepared by Percoll method.³ Group A took significantly fewer ampules of gonadotrophins (12.3 ± 4.1) than group B (21.6 ± 5.9) and group C (20.5 ± 5.4). The days required for ovulation induction

Table 2. Pregnancy outcome in the three groups

	Group A (CC/hMG)	Group B (GnRH-a/hMG)	Group C (GnRH-a/FSH)
Initiated cycles	98	82	64
Canceled cycles	8	6	4
Oocytes retrieval	90	76	60
Pregnancies	30	26	19
Ongoing pregnancies	28	23	17
Abortions	2	3	2
Ectopic pregnancies	0	0	0
Ongoing PRs per oocyte retrieval	31.10%	30.30%	28.40%
Ongoing PRs per initiated cycles	28.60%	28.00%	26.60%

were significantly fewer in group A (9.2 ± 1.5) than in group B (12.3 ± 2.1) and group C (11.2 ± 1.4). The number of retrieved oocytes, fertilization rates, and replaced embryos are presented in Table 1.

The ongoing pregnancy rates per oocyte retrieval were 31.10% in group A, 30.30% in group B, and 28.40% in group C. There is no statistical difference in the pregnancy rates among the three groups. The distribution of all pregnancy outcomes is shown in Table 2.

DISCUSSION

Intracytoplasmic sperm injection is gaining worldwide popularity because of the high number of male infertility cases. In

order to achieve acceptable pregnancy rates, it is rational to use an ovulation induction protocol which would provide the most quality oocytes for micromanipulation. It is generally accepted that the use of down-regulation protocols yields more retrievable oocytes and reduces cycle cancellation rate, but specific complications may be associated with the use of GnRH-a including treatment time and cost. Therefore, as cost containment becomes increasingly more important, it is vital for healthcare providers to prescribe ovulation induction protocols which maximize pregnancy rates at reasonable cost. Our findings suggest that the more affordable CC/hMG protocol for intracytoplasmic sperm injection provides comparable pregnancy rates

with the down-regulation regimens. **STI**

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