

The influence of insemination/injection time on fertilization rate, embryo quality, pregnant outcome after IVF and ICSI

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INTRODUCTION: In IVF and ICSI procedures, insemination/injection time influences the fertilization rate, embryo quality and pregnancy rate had been reported with or without statistically significant difference. To clarify the influence of insemination/injection time on results of IVF and ICSI, we analyzed the fertilization rate, embryo quality and pregnant outcome of IVF and ICSI under different time interval between oocyte retrieval and insemination/injection.

METHODS: Total of 176 IVF and 64 ICSI cycles performed between 1999 and 2001 were included in this analysis. Some cases with inadequate data or mixed IVF/ICSI procedures were excluded in the analysis. Uniform ovarian stimulating with GnRHa/FSH/HMG protocol was applied; 10,000 IU HCG was administrated when two leading follicles reached a mean diameter of 18mm. Oocyte retrieval was arranged 34 h after HCG injection. Fertilization rate, embryo quality and pregnant outcome were analyzed within 5 groups in each IVF and ICSI arm. Group I, II, III, IV and V represented time lapse between oocyte retrieval and insemination/injection <2.5 h, 2.5-<3.5 h, 3.5-<4.5 h, 4.5-<5.5 h and ≥ 5.5 h, respectively. Embryo quality was evaluated according to the average cumulative embryo score.

RESULTS: Totals of 1883 and 802 oocytes were retrieved from IVF and ICSI cycles, respectively. The metaphase II percentage of ICSI arm were 80, 91.1, 89.3, 88.6, and 86.8% observed in Group I, II, III, IV and V, respectively ($P < 0.05$ using the χ^2 test). The fertilization rates were 67.9, 80.5, 82.0, 84.5 and 73.0% observed in Group I Group I, II, III, IV and V, respectively ($P < 0.001$ using the χ^2 test), whereas no statistically significant differences were detected in Groups of ICSI with fertilization rate 56.3, 54.7, 53.0, 50.0 and 56.2%, respectively. No statistical significance was observed in the average accumulative embryo scores, pregnancy rate and ongoing pregnancy rate in each group.

CONCLUSIONS: The results suggest the time lapse between oocyte retrieval and sperm injection in ICSI increases the percentage of metaphase II oocytes when the period is longer than 2.5 hours. The time interval between insemination and oocyte retrieval may influence the fertilization rate in IVF and the best fertilization rate are obtained if the oocytes are inseminated between 2.5 and 5.5 h after retrieval. This finding is relevant to the distribution of metaphase II oocytes in the retrieval since the pre-insemination incubation for 2.5 h may be able to increase the nuclear maturity of the oocytes when they are retrieved with HCG administration 34 h before. We may also concluded that oocyte retrieval performed 36 h after HCG injection may be better than those retrieved 34 h after HCG injection due to better oocyte nuclear maturation.