

Effect of fertilization by intracytoplasmic sperm injection versus conventional insemination on embryo cleavage rates

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Summary

Purpose: To determine if fertilization by conventional oocyte insemination vs intracytoplasmic sperm injection (ICSI) causes any difference in the maximum number of blastomeres of fresh or frozen thawed embryos transferred. **Methods:** Retrospective evaluation of all in vitro fertilization (IVF) cycles over a 10-year period in cycles having ≥ 2 embryos transferred where the semen analysis was normal except for strict morphology which was allowed to be 2-5% normal. The percentage of the maximum number of blastomeres in any transfers was compared according to the method of insemination. **Results:** There were no differences in the maximum blastomere numbers in cycles where there was conventional insemination vs ICSI. **Conclusions:** Though higher pregnancy rates have been found following the transfer of embryos derived from conventional oocyte insemination vs ICSI, and higher pregnancy rates were found following single embryo day 3 transfers with embryos with more blastomeres, the beneficial effect of conventional insemination does not seem to be related to forming embryos with more rapid cleavage.

Key words: Blastomeres; Intracytoplasmic sperm injection; Oocyte insemination.

Introduction

A recent study of single embryo transfers found similar pregnancy rates with embryos with 6-8 blastomeres [1]. The pregnancy rate with 6-8 blastomeres was much higher than when embryos with 4-5 blastomeres were transferred [1].

Recent studies have demonstrated that at least in younger women the use of ICSI for fertilization of eggs results in embryos with less implantation potential than those fertilized by conventional insemination [2]. The present study evaluated whether ICSI leads to the generation of embryos with fewer blastomeres compared with conventional insemination.

Materials and Methods

A retrospective evaluation of all ICSI and conventional in vitro fertilization-embryo transfer (IVF-ET) cycles over a 10-year period in women ≤ 39 who had ≥ 2 embryos transferred was performed. A requirement for semen parameters was that the motile density was $\geq 8 \times 10^6/\text{ml}$, no antisperm antibodies were present, and the hypo-osmotic swelling test was $\geq 50\%$. A further requirement was that the normal morphology using strict criteria was 2-5%.

In vitro fertilization-embryo transfer cycles were evaluated according to the maximum number of blastomeres in any of the embryos transferred. The study would compare the relative frequency of 4, 5, 6, 7 and 8-cell embryos on day 3 immediately prior to transfer to the uterus according to whether fertilization was achieved by ICSI vs conventional oocyte insemination. Frozen embryo transfers were similarly evaluated.

Results

A comparison of the effect of the method of oocyte insemination (intracytoplasmic sperm injection vs conventional insemination) on the maximum number of blastomeres of any one embryo transferred in a given fresh embryo transfer is seen in Table 1.

Sixty-nine percent of the transfers of embryos derived from ICSI had at least one 8-cell embryos vs 71.3% of embryos derived from conventional insemination ($p = \text{NS}$). There were 90.7% of the transfers of embryos derived from ICSI had at least one good prognosis 6-8 cell embryo vs 91.9% of embryos derived from conventional insemination. More details are provided in Table 1. The percentage of fresh embryos transferred with better implantation potential, i.e., 6, 7 and 8-cell embryos were similar whether the eggs were fertilized by ICSI (6-cell 10%, 7-cell 11.9%, and 8-cell 69.0%) or conventional insemination (8.9%, 12.7%, 71.3%).

With frozen embryo transfers an 8-cell embryo was found in 48.6% of transfers with ICSI vs 52.3% with con-

Table 1. — Comparison of the effect of the method of oocyte insemination (intracytoplasmic sperm injection vs conventional insemination) on the maximum number of blastomeres of any embryo following fresh embryo transfers.

	ICSI		Conventional	
	No. of patients	% of cycles with	No. of patients	% of cycles with
Total # patients	1670		820	
No. cells				
4-cell	45	2.6%	21	2.5%
5-cell	71	4.1%	37	4.5%
6-cell	171	10.0%	72	8.9%
7-cell	201	11.7%	105	12.7%
≥ 8 -cell	1182	69.0%	585	71.3%

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Table 2. — Comparison of the effect of the method of oocyte insemination (intracytoplasmic sperm injection vs conventional insemination) on the maximum number of blastomeres of any given embryo following frozen-thawed embryo transfers.

Total # patients	ICSI		Conventional	
	1713 No. of patients	% of cycles with	1129 No. of patients	% of cycles with
4-cell	129	7.5%	84	7.4%
5-cell	180	10.5%	95	8.4%
6-cell	246	14.4%	151	13.4%
7-cell	292	17.0%	181	16.0%
> 8-cell	832	48.6%	590	52.3%
morula	23	1.3%	12	1.1%
blastocysts	11	0.6%	16	1.4%

ventional oocyte insemination. There was at least one frozen thawed 6-8 cell embryo transferred in 80.0% of the transfers of ICSI derived embryos vs 81.7% of frozen embryo transfers derived from conventional oocyte insemination. Table 2 shows similar findings for frozen embryo transfers.

Discussion

Though both a higher clinical and live delivery rate were found in previous studies with embryos derived from conventional insemination vs ICSI despite subnor-

mal sperm morphology using strict criteria, this does not seem to be reflected by embryo quality, at least as manifested by blastomere number. In the aforementioned study of single embryo transfer the degree of fragmentation did not seem to have a significant impact on pregnancy outcome following single embryo transfer so this parameter was not evaluated in this study [1].

References

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