EFFICIENCY IN INTRACYTOPLASMIC SPERM INJECTION METHOD IMPROVES FERTILIZATION AND BLASTOCYST FORMATION RATES

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Background:
Intracytoplasmic sperm injection (ICSI) is a commonly used assisted reproductive technique that involves direct injection of a single sperm into the oocyte cytoplasm. Depending on sperm quality and number of oocytes, ICSI can lead to various degrees of oocyte damage due to extended exposure and microenvironment change during the sperm selection process.
The objective of this study is to compare the fertilization outcomes of the conventional ICSI approach to the pre-catching sperm (PCS) technique, where the oocyte exposure under the microscope is reduced.

Methods:
A retrospective cohort study was conducted to compare conventional ICSI with a PCS technique. Cases with at least 0.5 million total motile sperm and at least 5 mature oocytes were included. In the conventional ICSI technique, sperm and oocytes were simultaneously loaded onto the ICSI dish and up to four spermatozoa were identified, immobilized, and loaded into the pipette to be injected sequentially into the waiting oocytes. In the PCS ICSI technique, the sperm first loaded onto the ICSI dish and suitable spermatozoa were identified and immobilized. Oocytes were then loaded onto the dish and pre-caught spermatozoa were injected one by one. The following outcome measures were assessed: fertilization rate, oocyte degeneration rate, abnormal fertilization, high quality blastocyst rate, number of frozen blastocysts, and pregnancy outcomes. Student's t-test and Fisher Exact Test were used for statistical analysis.

Results:
Our study included 287 conventional and 177 PCS cases. Female age (35.1 vs. 35.4), BMI (26 vs. 27), AMH (3.0 vs. 2.6), and baseline estradiol (15 vs. 26) were similar between the groups; there was no difference in the total number of collected oocytes or rate of abnormal fertilization. The PCS ICSI group demonstrated a higher rate of oocyte fertilization, lower rate of oocyte degeneration, an increase in the rate of high-quality blastocysts. Although positive pregnancy rate was higher in PCS group, clinical pregnancy and ongoing/livebirth rate (LB) were similar among the groups.

Conclusion:
PCS ICSI technique, with reduced oocyte microscope exposure, is associated with higher fertilization rate, decrease in oocyte degradation and increase of high-quality blastocyst formation. With similar LB rates between the groups, larger number of frozen embryos may result in higher cumulative livebirth rate per autologous retrieval using this technique.

Impact Statement:
Our findings suggest that PCS ICSI technique use is warranted in couples undergoing ICSI with mild male factor infertility as well as no male factor infertility. Further studies are warranted to evaluate the effectiveness of this technique in various patient populations.

	PCS N=177	CONVENTIONAL N=287	P VALUE
N OF RETRIEVED OOCYTES	1913	3387	ns
FERTILIZATION RATE %	84.9	79.3	<0.001
OOCYTE DEGENERATION RATE %	1.7	3.6	<0.001
ABNORMAL FERTILIZATION RATE %	1.6	1.8	ns
HIGH-QUALITY BLASTOCYST RATE %	55.6	48.0	<0.001
POSITIVE PREGNANCY RATE %	77.7	69.5	0.032
CLINICAL PREGNANCY RATE %	67.0	60.4	ns
ONGOING / LIVEBIRTH RATE %	51.8	50.4	ns