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TIME INTERVAL BETWEEN SPERM PROCESSING AND INTRACYTOPLASMIC SPERM INJECTION (ICSI) OUTCOMES IN PREIMPLANTATION GENETIC TESTING CYCLES (PGT-A): IMPLICATIONS FOR LABORATORY MANAGEMENT

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OBJECTIVE:

High complexity IVF labs often encounter large clinical volume, requiring meticulous scheduling and workflow management. Prior research has concentrated on the temporal aspects of oocyte preparation, including oocyte pickup (OPU) to denudation (DN), and subsequently to ICSI. These studies have primarily explored the correlation between timing intervals during oocyte preparation and the reproductive potential of the oocyte. However, a critical component of IVF involves the collection and processing of semen prior to ICSI, a phase that could exhibit time variability across IVF laboratories. Notably, there is a lack of literature regarding the relationship between the period of time after sperm preparation until ICSI, and IVF outcomes. Here, this study investigates whether varying time intervals between sperm processing and ICSI influence fertilization, blastulation, and euploidy rates.

MATERIALS AND METHODS:

The study included all IVF/PGT-a cases from 2016 to 2024. Only patients with fresh semen analysis with >10 million sperm concentration and total motility >42% were included. Only female patients with <35 years and AMH >0.7ng/dL were included in the analysis. Cohorts were divided based on quartiles of time distribution from density gradient centrifugation (DGC) to ICSI: Group A: <220 min; Group B: 220-290; Group C: >290 min). Baseline data, ovarian stimulation parameters, and laboratory times and results were recorded. Univariate analyses, Kruskal-Wallis test and an adjusted GEE multivariate regression analysis was performed. A sample size of 356 cases per group was calculated to have an 80% power to detect a 10% difference in fertilization rates (α=0.05).

RESULTS:

A total of 3810 cycles were included. In the univariate analysis significant differences were found among cohorts in oocyte age, AMH, estradiol at trigger, median number of eggs retrieved, and partners' age. Significant differences were found in fertilization rates (84.5% vs 85%, vs 86%, p=0.0009) and blastulation rates (75% vs 73.3%, vs 73.6%, p=0.007) among groups. Cryopreserved embryos (73.2% vs 72.2%, vs 71.8%, p=0.08) and euploidy rates were comparable (62.6% vs61.1%, vs 61.6%, p=0.16). In a multivariate analysis after adjusting for year of treatment, age, BMI, AMH, partners age, number of eggs retrieved and time from OPU and DN to ICSI. There was no significant association with different time categories from DGC to ICSI and lower fertilization (A vs B:aOR 1.02 CI95% 0.93-1.13; A vs C: aOR 1.09 CI95% 0.96-1.23), blastulation (A vs B: aOR 1.01CI95% 0.93-1.11; A vs C: aOR 1.11 CI95% 0.99-1.23), cryopreservation (A vs B: aOR 1.06 CI95%0.96-1.16; A vs C: aOR 1.05 CI95% 0.93-1.18), or euploidy rates (A vs B: aOR 0.99 CI95% 0.93-1.11; A vs C: aOR 0.99 CI95% 0.89-1.10) among cohorts.

CONCLUSIONS:

Different time durations of the period of time between sperm preparation and ICSI are not associated with suboptimal outcomes in PGT-A cases. This information is reassuring for embryologists, and lab directors responsible for managing and scheduling these complex and sensitive procedures.

IMPACT STATEMENT:

Variability in the duration between sperm preparation and ICSI does not appear to have an association with suboptimal ICSI outcomes.

REFERENCES:

N/A