



TOTAL MOTILE SPERM COUNT IS NEGATIVELY CORRELATED WITH FERTILIZATION RATE BUT NOT BLASTULATION, EUPLOIDY, OR IMPLANTATION IN ICSI CYCLES

S. J. Morin, C. R. Juneau, S. A. Neal, R. T. Scott, Jr., J. M. Hotaling

OBJECTIVE: Total motile sperm count (TMSC) is the most reproducible of all parameters utilized for assessing semen quality. Furthermore, recent studies have suggested that TMSC count is superior to the WHO criteria in predicting the success of IVF cycles. However, less is known about whether any negative correlation between TMSC and IVF success is overcome by ICSI. Furthermore, it is unclear whether the quality of the specimen used for ICSI impacts the likelihood of success once a high-quality blastocyst is available for transfer.

DESIGN: Retrospective cohort

MATERIALS AND METHODS: All ICSI cases at a single center between 2012-2016 were evaluated for inclusion. Cases with surgical sperm retrieval, preimplantation genetic diagnosis for single gene or translocation disorders, and all third-party reproduction cases were excluded. Only the 1st retrieval and transfer cycles for each couple were considered to eliminate previous failure bias. Couples were divided into 4 groups according to TMSC: <1 million (M), 1-5M, 5-10M, and >10M. Fertilization rate (FR) and blastulation rate (BR) were compared for all patients. Among patients pursuing preimplantation genetic screening (PGS), euploidy rate and sustained implantation rate (SIR) of euploid blastocysts were compared. ANOVA tests were initially utilized. Then a linear regression analysis, adjusted for female age was performed.

RESULTS: A total of 8345 cycles were included in the analysis of fertilization and blastulation outcomes. PGS was performed in 3524 cycles. Female age was negatively correlated with the number of total motile sperm in the specimen. On linear regression analysis, FR was correlated with TMSC ($r^2 = 0.13$, regression coefficient: 3.63, $p=0.02$). However, BR and euploidy rates were not correlated. Sustained implantation rates of euploid blastocysts were also not different amongst the TMSC groups.

CONCLUSIONS: Total motile sperm count is correlated with fertilization rates in IVF/ICSI cycles. However, performance of the embryo as measured by blastulation, ploidy, and implantation rates is not affected by the TMSC of the specimen used for ICSI. Attempted improvement in semen parameters through medical or surgical intervention should be aimed at improving fertilization efficiency. However, downstream impact may be limited as ICSI appears to overcome any negative impact of reduced TMSC on a cohort's efficiency and a given embryo's reproductive potential. Additional means of predicting the impact of semen quality on IVF/ICSI outcomes are needed.

TMSC is associated with fertilization rate, but not blastulation, ploidy, or implantation					
	<1 Million TMSC	1-5 Million TMSC	5-10 Million TMSC	>10 Million TMSC	p-value
Female age (years)	33.9 (+/- 4.3)	34.9 (+/- 4.1)	35.3 (+/- 4.8)	35.8 (+/-3.8)	<0.05
Fertilization Rate	76.6% (6224/8125)	80.8% (6110/7559)	82.3% (5378/6533)	84.3% (61054/72445)	<0.01
Blastulation Rate	47.5% (2956/6224)	49.3% (3011/6110)	49.2% (2644/5378)	49.4% (30132/61054)	NS
Euploidy Rate	68.4% (1041/1521)	66.8% (1236/1850)	63.5% (976/1536)	65.7% (12244/18639)	NS
SIR of Euploid Blasts	62% (404/652)	62% (405/653)	61.5% (364/608)	60.3% (3865/6412)	NS

