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DECREASED TOTAL MOTILE SPERM COUNT IS NOT ASSOCIATED WITH INCREASED FREQUENCY OF SEGMENTAL ANEUPLOIDIES

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OBJECTIVE:

Preimplantation genetic testing for aneuploidy (PGT-A) results can report segmental aneuploidies in the human embryo. It has been shown that segmental aneuploidies can be associated with parent-of-origin. Specifically, the paternal allele can be affected in up to 2/3 of complex segmental imbalances (which are characterized by the presence of two or more aberrations on the same chromosome). There are currently no studies investigating the link between abnormal semen parameters such as total motile count (TMC) and segmental aneuploidies. This study aims to assess the association between concentration of TMC and the frequency in segmental aneuploidies.

MATERIALS AND METHODS:

This study included in vitro fertilization (IVF) cycles with Intracytoplasmic sperm injection (ICSI) and PGT-A at a single academic center from September 2016-March 2021. All PGT-A testing was analyzed by a modified FAST-SeqS NGS-based PGT method and bioinformatics pipeline after trophectoderm biopsy. Cycles were grouped into percentiles based on total motile count (TMC) of the sperm specimen used for fertilization [(Group 1: <25th percentile TMC (<17.82 million); Group 2: 50-75th percentile TMC (between 17.82 million-133.2 million); Group 3 75th percentile TMC (>133.2 million)]. Demographic and embryonic characteristics were collected. The primary outcome was the percentage of embryos with segmental aneuploidy. Comparative statistics were performed with ANOVA, Kruskal-Wallis, and chi-square. Data was also analyzed using a multivariate regression analysis fitted with a general estimate equation (GEE) model. A sample size of 1471 cycles per group was calculated to have 80% power to detect a 5% difference in percentage of segmental aneuploidies (α=0.05).

RESULTS:

A total of 5, 902 IVF cycles were identified. The percentage of segmental aneuploidies was similar across all groups (p=0.31). A sub-analysis was performed analyzing cycles using testicular sperm vs ejaculate sperm, with no difference in percentage of segmental aneuploidies. In a multivariate logistic regression analysis adjusted for oocyte age, paternal age, maternal BMI, anti mullerian hormone, number of embryos biopsied, use of fresh vs frozen sperm specimen, and use of TESE vs ejaculate sperm, there was no difference in the frequency of segmental aneuploidies between the groups with <25th percentile TMC and >75th percentile TMC (aOR 0.93, 95% CI 0.66, 1.29).

Table 1.

	25th percentile TMC		50-75th percentile TMC		75th percentile TMC		
	Mean	SD	Mean	SD	Mean	SD	P value
Oocyte Age	36.81	4.88	36.94	4.42	36.76	4.32	0.18
Paternal Age	40.59	7.03	39.46	5.72	38.62	5.27	<0.0001
BMI	24.95	4.87	24.23	4.58	23.87	4.41	<0.0001
AMH	2.86	2.82	2.84	3.22	2.83	3.22	0.10
Eggs Retrieved	14.77	10.39	14.34	9.37	14.50	9.66	0.73
Mature Oocyte Rate	78.25%	16.02%	77.56%	16.79%	77.22%	17.09%	0.70
Fert Rate per M2	75.41%	21.77%	78.99%	19.17%	79.01%	19.42%	<0.0001
Blast rate per M2	73.78%	20.86%	74.25%	19.93%	73.95%	22.64%	0.90
% biopsied euploid	47.08%	34.41%	47.41%	34.11%	45.88%	35.40%	0.41
% biopsied aneuploid	46.55%	35.36%	46.87%	34.80%	47.43%	36.05%	0.85
% biopsied with any segmental aneuploidy	10.02%	18.73%	9.79%	18.97%	10.77%	20.90%	0.31
	Frequency	%	Frequency	%	Frequency	%	Chi sq
# Cycles with at least one segmental aneuploid embryo	512/1476	34.69%	943/2951	31.96%	497/1475	33.69%	0.16

CONCLUSIONS:

The paternal allele is often affected in complex segmental aneuploidies, suggesting that segmental aneuploidies could be associated with male factor and abnormal semen parameters. Our study shows that there are similar rates of segmental aneuploidies regardless of the TMC in couples who undergo IVF with PGT-A.

IMPACT STATEMENT:

Couples can be reassured that the risk of segmental aneuploidy is not increased with sub-optimal TMC.

REFERENCES:

N/A