TIME TO LIVE BIRTH IN PATIENTS WHO UTILIZE PREIMPLANTATION GENETIC TESTING FOR STRUCTURAL REARRANGEMENTS

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Background
Structural chromosomal rearrangements, including inversions, reciprocal translocations, and Robertsonian translocations, affect at least 1% of the population. Balanced translocation carriers typically show no phenotypic abnormalities yet are more likely to produce gametes with partial aneuploidies, resulting in higher incidence of miscarriage. PGT-SR identifies chromosomal rearrangements in embryos, enhancing transfer selection and pregnancy outcomes for patients with balanced translocations (1,2). As PGT-SR becomes more accessible, further research is needed to better understand reproductive outcomes and how testing helps patients achieve their family-building goals.

Objective
The study assesses the time from initiation of the first IVF cycle to FET resulting in live birth in patients who utilize PGT-SR.

Materials and Methods
This retrospective cohort study evaluated time to live birth in patients who underwent at least one autologous IVF cycle with PGT-SR followed by FET at a single fertility clinic between January 2017 and December 2023. The study utilized the next generation sequencing (NGS) platform for PGT-SR. Patients were grouped by live birth outcomes. Patient demographics, cycle characteristics, embryology parameters, and cycle outcome data were collected. The primary outcome was time from the first IVF cycle to FET resulting in live birth. Secondary outcomes included the number of IVF and FET cycles to live birth. Baseline demographics were compared using Student t-test or Mann Whitney U for continuous variables and chi-square or Fisher exact tests for categorical variables. Time to live birth was modeled using Kaplan-Meier curves and adjusted survival analysis performed with Cox proportional hazards regression modeling.

Results
In total, 51 patients who utilized PGT-SR prior to FET of a single euploid-normal embryo were included for analysis. Baseline demographics were similar among patients, apart from age. Patients who achieved live birth (n=42, 82.4%) were younger at the start of treatment compared to those who did not achieve live birth (n=9, 17.6%) (mean age 33.7 vs 36.8, p=0.02). Euploid-normal embryo counts were more than double for patients who achieved live birth compared to those who did not achieve live birth (29.7% vs 13.1%, p=0.0009). Other embryologic parameters including oocytes retrieved, fertilization rate, and blastulation rate did not differ between the two cohorts. IVF and FET cycle counts did not differ between groups, however, patients who did not achieve live birth spent more time undergoing treatment (median 410 +/- 116.5 days vs 134 +/-

86.5 days, p=0.01). In a censored analysis, the median time to FET resulting in live birth was 184 days, equivalent to two IVF cycles and two frozen embryo transfers.

Conclusion

Among patients who utilized PGT-SR, more than half achieved live birth after fewer than 6 months of treatment. Younger age and higher euploid-normal embryo counts were key predictors of success. Notably, no other embryologic parameters were associated with live birth. The study highlights the importance of PGT-SR in detecting structural rearrangements that would have been missed by earlier genetic testing focused solely on aneuploidy. By integrating embryologic assessment with PGT-SR, clinicians can offer more tailored guidance, empowering balanced translocation carriers with clearer pathways to achieve successful family-building outcomes.

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References:

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