PREIMPLANTATION GENETIC TESTING FOR ANEUPLOIDY AND DONOR EGG DERIVED EMBRYOS: A PARADIGM SHIFT

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Background: Despite an overall increase in the utilization of preimplantation genetic testing for aneuploidy (PGT-a) in in-vitro fertilization, the benefit in younger patients, and consequently donor egg derived embryos, has remained controversial (1, 2). With increasing rates of elective single embryo transfer (eSET), and the desire to make the arduous journey of infertility treatment as efficient as possible, there is a goal to maximize the chance of success of each frozen embryo transfer (FET).

Objective: To assess trends of PGT-a use in donor egg derived embryos and the effect on FET implantation and live birth rates.

Materials and Methods: Retrospective analysis of 2014-2021 SART data of thawed donor egg embryos (3). Statistics were performed with Chi-squared and Pearson correlation coefficient tests and a value of $p < 0.05$ was considered significant.

Results: Over the eight-year period, there were a total of 100,600 donor egg FETs with 41,276 undergoing PGT-a (41.0%). Both overall number of donor egg FETs and utilization of PGT-a steadily increased over time – with PGT-a use going from 15% in 2014 to 49% in 2021. The largest increase in PGT-a utilization occurred from 2016-2018 (16%), with subsequently stable rates ~50%. The rate of eSET in all donor egg embryo FETs increased from 43.0 to 87.0% and PGT-a eSET from 56.1% to 91.2%. There was a decrease in the average number of embryos transferred from 1.5 to 1.1 which corresponded to a decrease in multiple pregnancy rate from 19.2 to 5.6%. Even as fewer embryos were transferred, implantation rates were not impacted and positively correlated with PGT-a utilization (Table 1; $R = 0.99$). Total live birth rates ranged from 40.5 to 48.5%, while PGT-a live birth rates ranged from 48.6 to 54.6% with an average difference of 6.2% favoring PGT-a each year. PGT-a demonstrated a statistically significant improvement in implantation ($p<0.01$) and live birth ($p<0.01$) rates in each of the years analyzed.

Conclusions: PGT-a utilization has increased over the past decade to over half of all donor egg derived embryos in 2021. Implantation and live birth rate improvements correlate with PGT-a use and are significantly higher in FETs that underwent PGT-a. While PGT-a may not increase the overall chance of live birth in a full cohort of donor egg embryos, per transfer improved implantation rate shortens time to pregnancy and may decrease financial burden as PGT-a costs decline.

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References:

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Year	Total FET (n)	Cycles with PGT-a	Avg # Embryos Tx	Implantation Rate (Total)	Implantation Rate (no PGT-a)	Implantation Rate (PGT-a)
2014	8220	15.3%	1.5	37.4%	35.5%	48.0%
2015	9754	21.3%	1.4	40.1%	37.2%	51.0%
2016	11,076	32.2%	1.4	43.6%	39.3%	52.6%
2017	12,421	40.9%	1.3	47.1%	40.7%	56.4%
2018	14,164	47.8%	1.2	49.2%	42.3%	56.8%
2019	15,245	51.9%	1.2	50.9%	43.6%	57.7%
2020	13,485	48.9%	1.1	50.6%	43.3%	58.2%
2021	16,235	49.4%	1.1	50.6%	44.6%	56.7%

Table 1: Data derived from SART depicting rates of PGT-a and implantation of thawed donor egg embryos.

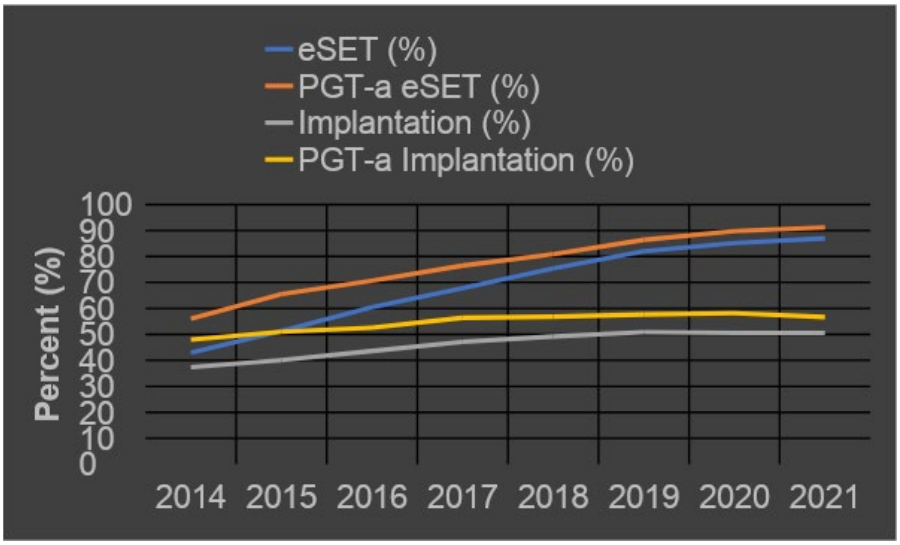

Figure 1: Rates of eSET with and without PGT-a and subsequent implantation rates with and without PGT-a.