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Preimplantation Genetic Testing (PGT) and Frozen Embryo Transfer (FET) Synergistically Decrease Pre-Term Delivery in Patients Undergoing In Vitro Fertilization (IVF)

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PREIMPLANTATION GENETIC TESTING (PGT) AND FROZEN EMBRYO TRANSFER (FET) SYNERGISTICALLY DECREASE PRE-TERM DELIVERY IN PATIENTS UNDERGOING IN VITRO FERTILIZATION (IVF)



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Abstract

OBJECTIVE: To study the effects of FET and FET post PGT (FET/PGT) on pre-term and very pre-term deliveries in patients undergoing IVF with elective single embryo transfer (eSET).

DESIGN: Retrospective cohort Society for Assisted Reproductive Technology (SART) data study.

MATERIALS AND METHODS: A retrospective cohort study was conducted using the publicly available data in the SART National Summary Report from 2014 to 2017. Cycle inclusion criteria were eSET, fresh embryo transfers (ET), and frozen embryo transfers (FET) with or without PGT (FET/PGT). Exclusion criteria were use of gestational carriers and donor eggs. Pregnancy outcomes included live births and gestational age at delivery (term: ≥ 37 weeks, pre-term: ≥ 32 to < 37 weeks, and very pre-term: < 32 weeks). Chi-squared test was used to compare variables between groups. A P value of < 0.05 was considered statistically significant.

RESULTS: A total of 161,550 eSETs were analyzed for the effect of FET and PGT on IVF outcome and pre-term deliveries including 43,618 ETs, 58,812 FETs and 59,120 frozen embryo transfers post PGT (FET/PGT). Live birth rates in patients with FET/PGT were significantly higher than those in ET (52.9% vs 46.4%, $P < 0.0001$) and FET (52.9% vs 43.1%, $P < 0.0001$). Patients with FET had significantly lower live birth rate compared with that of ET (43.1% vs 46.4%, $P < 0.0001$). Both FET and FET/PGT significantly increased term deliveries compared with ET (89.1% and 89.5% vs 88.6%, $P < 0.05$ and < 0.001). There were no statistical differences among ET, FET and FET/PGT in terms of pre-term delivery, however, FET/PGT significantly reduced very pre-term deliveries when compared with ET and FET (1.5% vs 2.0%, $P < 0.0001$ and 1.5% vs 1.9%, $P = 0.0002$).

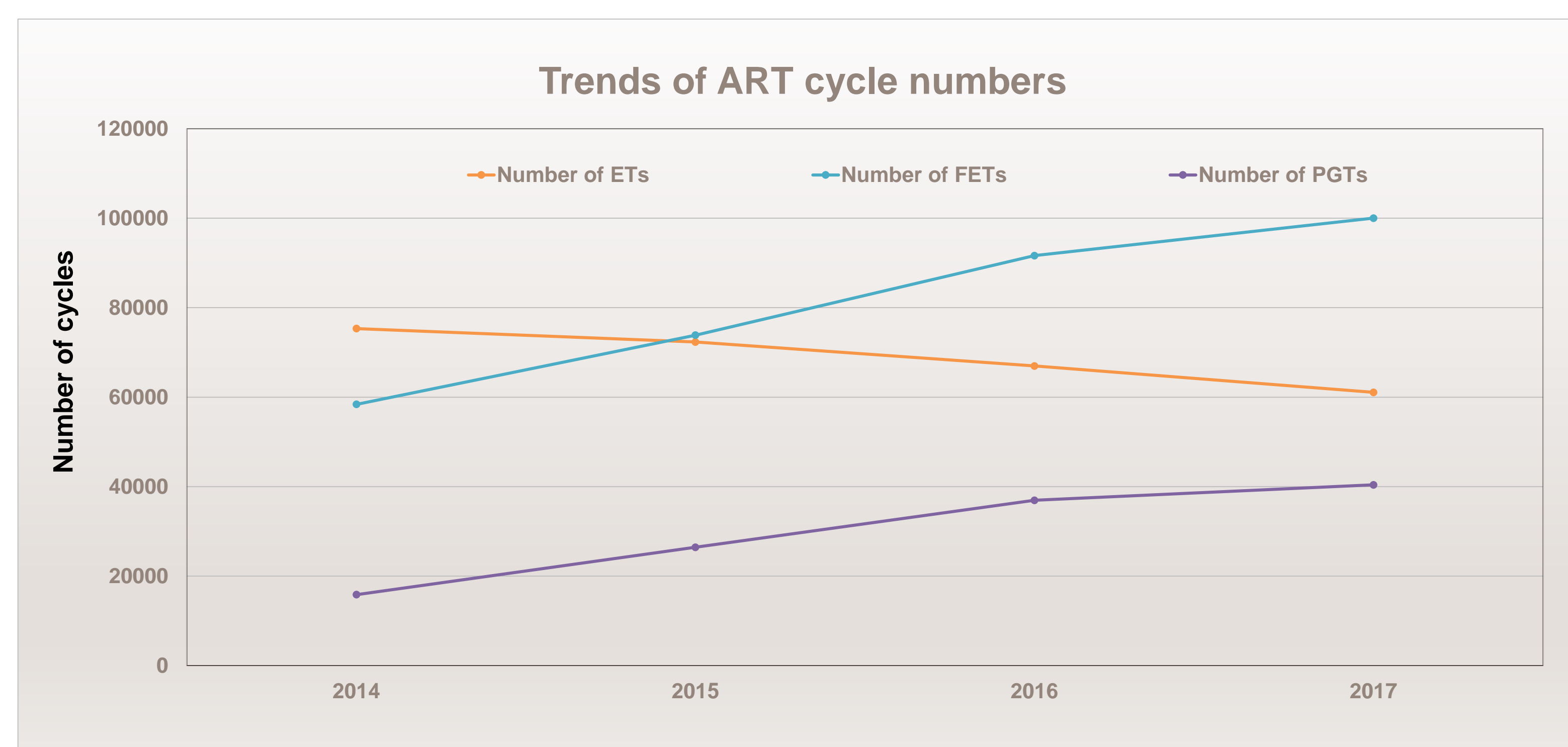
Conclusion: PGT has been integrated into one of the most important roles in IVF treatment. This study using large cohort SART data demonstrates that PGT significantly improves IVF outcome. Moreover, this study shows that patients undergoing PGT accompanied with subsequent FET had significantly increased term deliveries. More important, patients with FET/PGT had significantly lower very preterm deliveries compared with patients with ET and FET. Higher term deliveries and Lower incidence of very pre-term delivery associated with PGT should be taken into account when counseling patients seeking infertility treatment.

Objective

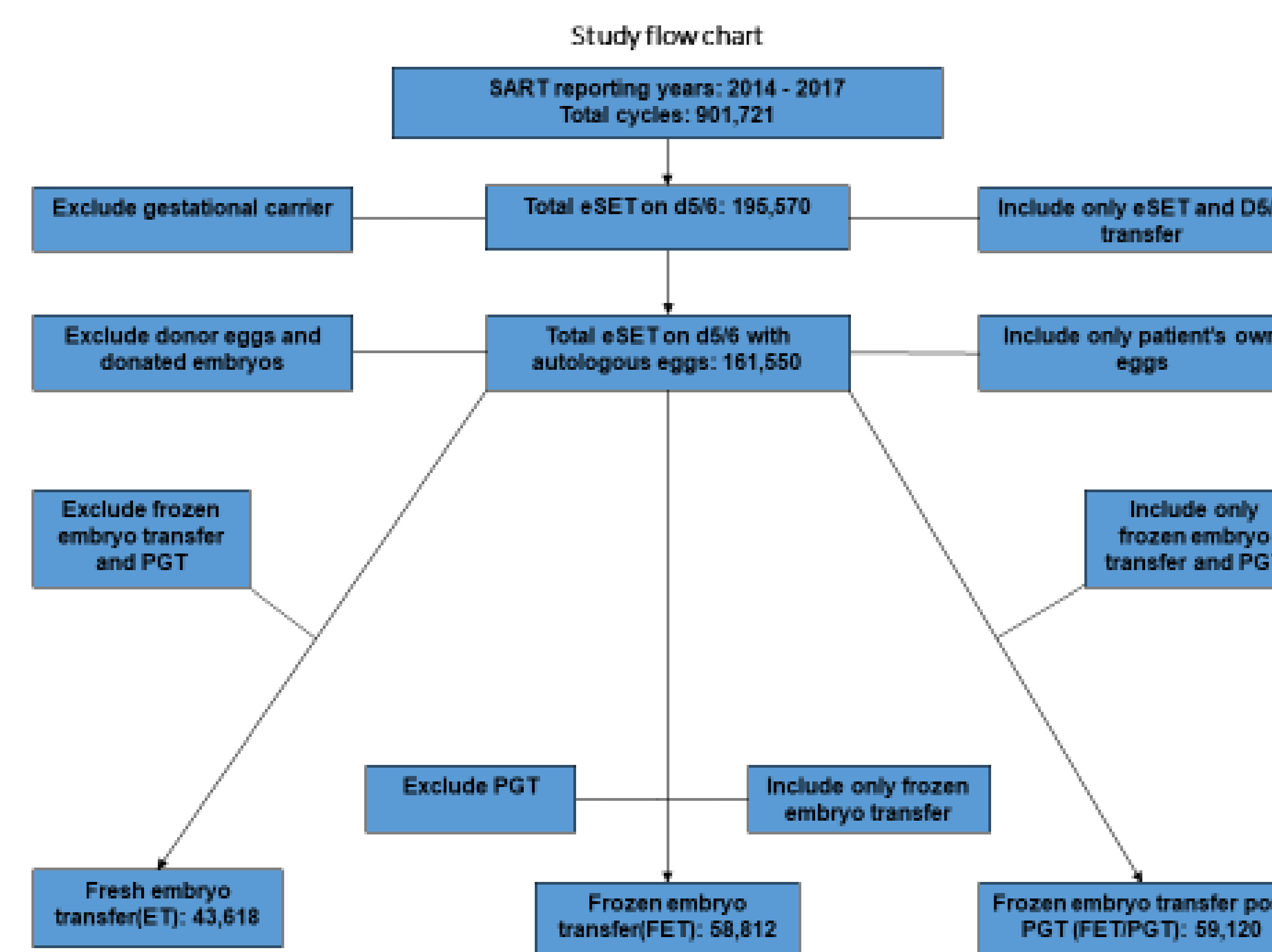
To study the effects of FET and FET post PGT (FET/PGT) on pre-term and very pre-term deliveries in patients undergoing IVF with elective single embryo transfer (eSET).

Background

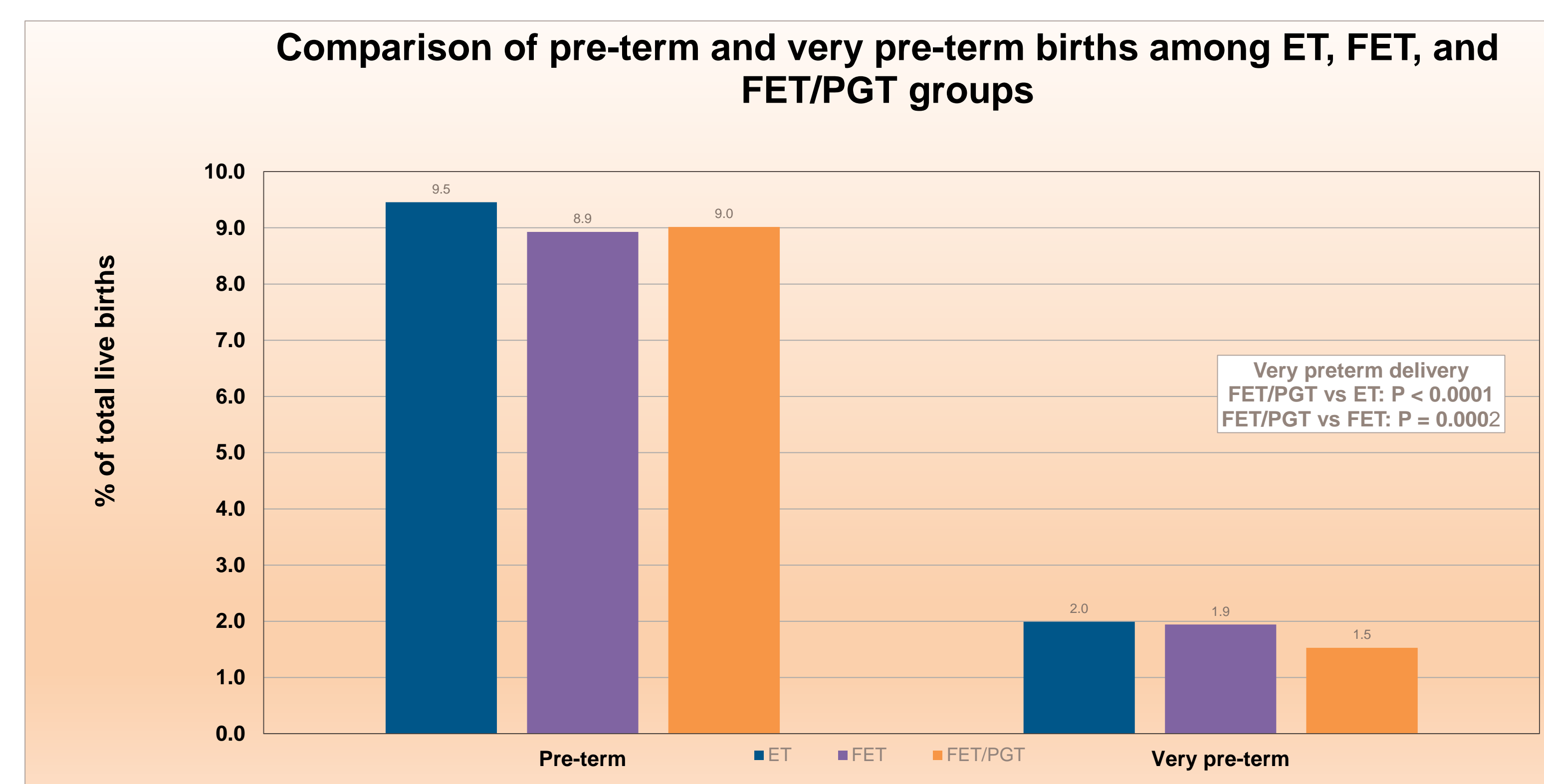
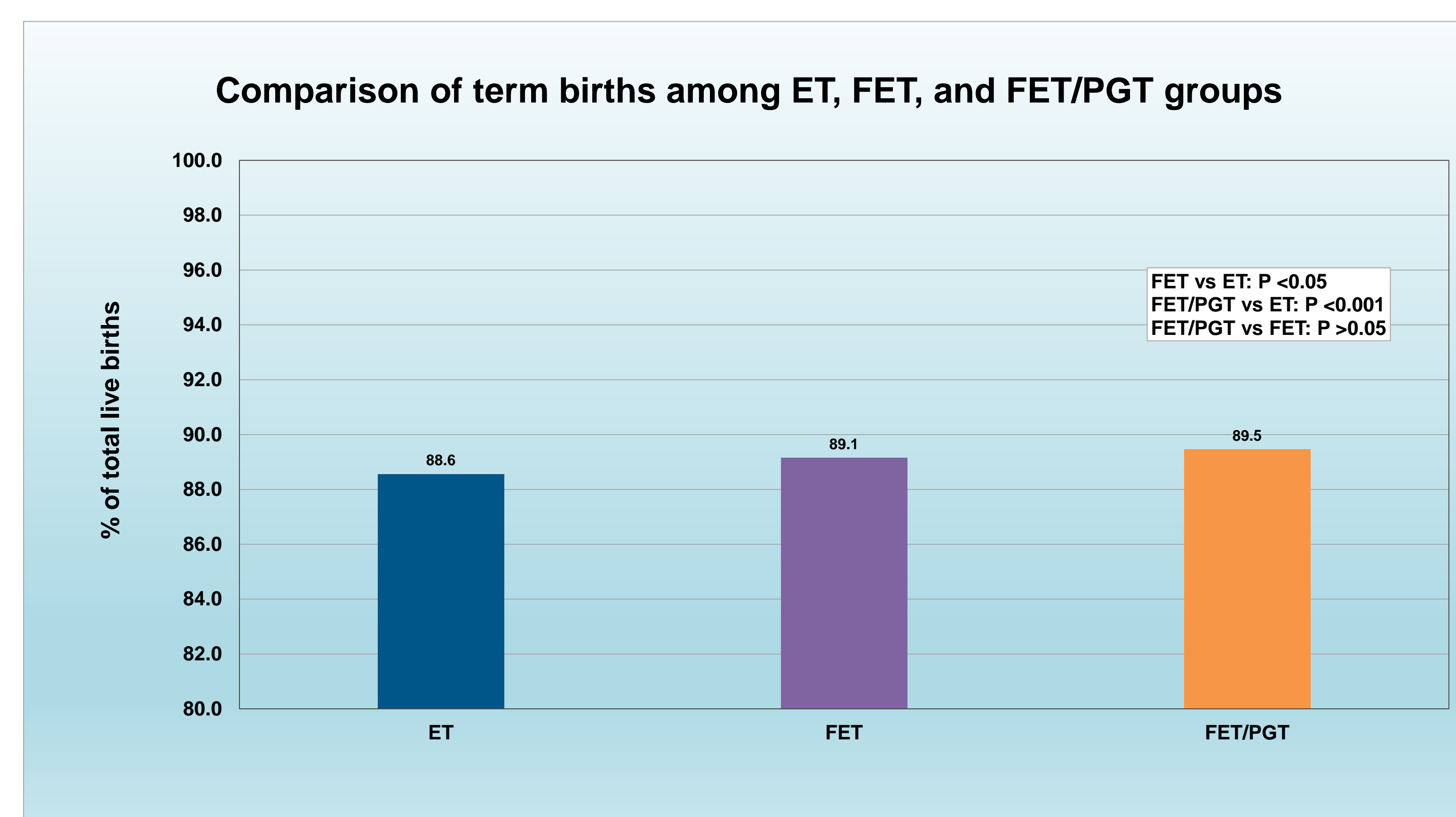
- Pre-term delivery is associated with significant perinatal morbidity and mortality
- Multiple risk factors including age, ethnicity, and socioeconomic status.
- Associated causes including pre-term pre-labor rupture of membranes (PPROM), maternal or fetal infections such as chorioamnionitis, diabetes, and preeclampsia.
- IVF is associated with higher prevalence of pre-term birth.
- FET has become increasingly more common in IVF treatment.
- PGT for aneuploidy screening significantly increases implantation and live birth rates, as well as decreasing miscarriage rates.
- Studies of effect of PGT on neonatal outcomes are relatively rare.



Design



Results



Results

	ET	FET	FET/PGT
# of transfers	43618	58812	59120
Singletons (%)	98.2	98.6	98.6
Twins (%)	1.7	1.4	1.4
Triplets or more (%)	0.01	0.02	0.01
Live Births (%)	46.4	43.1	52.9
Term (> 37 weeks, %)	88.6	89.1	89.5
Pre-term (32-37 weeks, %)	9.5	8.9	9.0
Very pre-term (< 32 weeks, %)	2.0	1.9	1.5
Clinical pregnancies (%)	54.8	53.6	61.9
Miscarriage rate (%)	13.5	18.0	13.0
Implantation rate (%)	52.8	50.1	58.9

- Live birth rates in patients with FET/PGT were significantly higher than those in ET (52.9% vs 46.4%, $P < 0.0001$) and FET (52.9% vs 43.1%, $P < 0.0001$).
- Patients with FET had significantly lower live birth rate compared with that of ET (43.1% vs 46.4%, $P < 0.0001$).
- Both FET and FET/PGT significantly increased term deliveries compared with ET (89.1% and 89.5% vs 88.6%, $P < 0.05$ and < 0.001).
- No statistical difference in pre-term birth rate between ET, FET and FET/PGT
- FET/PGT significantly reduced very pre-term deliveries compared to ET and FET (1.5% vs 2.0%, $P < 0.0001$ and 1.5% vs 1.9%, $P = 0.0002$), respectively.

Discussion

- Compared to fresh embryo transfer, FET with or without PGT was associated with increased term births.
- Patients undergoing PGT with subsequent FET also had significantly lower rates of very pre-term births compared to the ET and FET groups.
- Preterm-birth is associated with significant short- and long-term neonatal morbidity/mortality, as well as significant financial, psychological, and emotion to the families involved.
- The synergistic effect of PGT with FET in decreasing very pre-term births should be taken into account when counseling patients about to undergo infertility treatment.
- With decreasing associated costs over time, adoption of PGT with FET as the standard of care in IVF should be considered.

References

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