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FET may be more vulnerable to a suboptimal environment

"Can outdoor air pollution affect the FET and fresh ET outcome in IVF cycles?"

Introduction: Ambient air pollution has been associated with human infertility and IVF outcomes. Choe et al[1] study indicated lower pregnancy rates in IVF cycles may be linked to ambient air pollution during controlled ovarian stimulation and the post-transfer period. Does outdoor air pollution differentially affect the outcomes of frozen–thawed embryo transfer (FET) and fresh transfer?

Summary: Wang et al[2] studied the affect of air pollution on IVF treatment cycles in 11148 patients contributing to 16290 transfer cycles between January 2013 and December 2016. The average age of the cohort was 31.5 years. Inverse distance weighting interpolation was used to estimate the daily ambient exposures to six pollutants ($PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, O_3) at an IVF clinical site, according to the data from fixed air quality monitoring stations in the city. The exposures of each cycle were presented as average daily concentrations of pollutants from oocyte retrieval to embryo transfer/cryopreservation. Exposures were analyzed in quartiles. A generalized estimating equation was used to evaluate the association between pollutants and IVF outcomes. The clinical pregnancy rate and live birth rate of the cycles was 55.1% and 47.1% respectively. Among the included cycles, 4013 patients received 5299 FET cycles, resulting in 42.7% live birth per ET, whereas 9553 patients received 10991 fresh transfer cycles, resulting in 49.2% live birth per ET. Increased SO_2 and O_3 levels were significantly associated with lower live birth rates in FET cycles, whereas none of the pollutants were significantly associated with lowering of IVF outcomes in fresh transfer cycles. The FET cycles in the highest quartile of SO_2 and O_3 exposure had significantly lower live birth rates (adjusted OR) in comparison with those in the lowest quartile. Models involving all transfer cycles and interaction terms (FET exposures) suggested that FET significantly enhanced the effects of SO_2 and O_3 exposure on IVF outcomes ($P < 0.001$). Accounting for all six pollutants, women in the highest quartile of SO_2 still had the lowest live birth rates (OR 0.61, 95%CI 0.47–0.80).

Conclusion: This study implied that embryos undergoing FET may be more vulnerable to a suboptimal environment than those undergoing fresh transfer. Increased SO_2 and O_3 levels at the site of IVF unit were significantly associated with lower live birth rates following FET but did not affect the contemporary fresh transfer outcomes. In heavily polluted sites or seasons, fluctuation in FET outcomes may be partially explained by the dynamic changes of ambient gaseous air pollutant.

References:

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