
FIRST-TRIMESTER MIRNA-210, ADMA, AND UTERINE ARTERY DOPPLER FOR PREECLAMPSIA PREDICTION AND PREVENTION IN IVF PREGNANCIES FOLLOWING PROGRAMMED FROZEN EMBRYO TRANSFER

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Abstract

Burning issue:

Programmed frozen embryo transfer (FET) without a corpus luteum may impair vascular adaptation and increase the risk of preeclampsia [1,2]. Recent evidence indicates that the absence of a corpus luteum in programmed FET may be associated with a higher risk of hypertensive disorders of pregnancy, while natural ovulation regimens appear to have a more favorable obstetric risk profile [1,2]. Reliable early predictors and targeted prevention remain limited. Circulating miRNA-210 has been proposed as a potential biomarker of placental hypoxia and preeclampsia [3], while asymmetric dimethylarginine (ADMA) reflects endothelial nitric oxide pathway dysfunction and has shown potential for early prediction of preeclampsia [4]. First-trimester uterine artery Doppler indices may additionally improve risk stratification when combined with biochemical biomarkers [5,6].

Keywords: Frozen embryo transfer, corpus luteum, miRNA-210, ADMA, preeclampsia, uterine artery Doppler

Objective:

To evaluate first-trimester miRNA-210, asymmetric dimethylarginine (ADMA), and mean uterine artery pulsatility index (PI) for preeclampsia prediction and compare aspirin alone with aspirin plus L-arginine.



Method:

This prospective controlled cohort included 178 singleton pregnancies: programmed FET without a corpus luteum receiving aspirin 150 mg/day (n=60), programmed FET without a corpus luteum receiving aspirin plus L-arginine 3 g/day (n=68), and spontaneous pregnancies receiving routine antenatal care (n=50). Treatment began before 16 weeks. Biomarkers and PI were assessed at 11–14, 20–24, and 28–32 weeks.

Results:

At 11–14 weeks, both FET groups had higher miRNA-210 (1.72 ± 0.48 and 1.69 ± 0.45 vs 1.12 ± 0.31), ADMA (0.66 ± 0.13 and 0.65 ± 0.12 vs 0.49 ± 0.10 $\mu\text{mol/L}$), and PI (1.78 ± 0.31 and 1.76 ± 0.29 vs 1.43 ± 0.24) than controls (all $P < 0.001$). Preeclampsia occurred in 17/60 (28.3%), 8/68 (11.8%), and 3/50 (6.0%) women, respectively ($P = 0.003$). Combination therapy was associated with a lower preeclampsia rate than aspirin alone (RR 0.42, 95% CI 0.19–0.89; $P = 0.025$). At 28–32 weeks, ADMA and PI were lower in the combination group (both $P < 0.001$). The combined model achieved an AUC of 0.87, with 80% sensitivity and 79% specificity.

Conclusion:

Programmed FET pregnancies without a corpus luteum demonstrated early endothelial and uteroplacental abnormalities, consistent with previously reported concerns regarding programmed FET and hypertensive pregnancy complications [1,2]. Aspirin plus L-arginine was associated with improved ADMA and Doppler profiles and lower preeclampsia frequency. The observed predictive value of a biomarker-Doppler combination is in agreement with recent studies demonstrating the potential utility of multimarker and uterine artery Doppler approaches for early preeclampsia risk stratification [5,6].

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