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O-255 Clinical and laboratory factors associated with pregnancy outcomes in patients undergoing frozen euploid blastocyst transfer

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Study question: Which variables do have an impact on the pregnancy and live birth rates (LBR) when euploid frozen embryo transfers (FET) are performed?

Summary answer: Day of trophectoderm biopsy, Body Mass Index (BMI) and endometrial preparation protocol have an impact on pregnancy rate (PR) and LBR in FET cycles.

What is known already: Preimplantation genetic testing for aneuploidy (PGT-A) and morphological grading of embryos are the two main criteria to select a blastocyst from a pool of embryos, having the highest implantation potential. However, other clinical and laboratory variables might play a crucial role for a successful outcome when top quality euploid embryos are transferred in a FET cycle. It has been described that higher BMI increases the odds for miscarriage when compared with non-obese women.

Study design, size, duration: This analysis includes 1660 FET cycles with data from of pregnancy rates, miscarriage rate and LBR. Embryos were obtained from 2564 IVF/ICSI cycles of couples with primary or secondary infertility at ART Fertility Clinics UAE, from November 2016 to December 2020.

Participants/materials, setting, methods: A total of 1660 FET cycles with 2439 euploid blastocysts were included. FET cycles with mosaic or segmental aneuploid embryos were excluded. PGT-A was performed on trophectoderm cells, using Next Generation Sequencing (NGS). Biopsy was performed on day 5, 6 or 7 blastocysts. Endometrial preparation included ovulatory natural cycles (NC) and hormone replacement therapy (HRT) cycles, chosen according to physician’s discretion. Ethical approval was obtained from the Research Ethics Committee (REFA023).

Main results and the role of chance: Patients’ characteristics are described as mean±SD (min-max): age; 33.5±4.43 (19-47), AMH: 3.30±3.05ng/ml (0.01-23.00), BMI: 27.1±4.87Kg/m2 (13.1-43.90), mean number of blastocysts transferred: 1.4±0.49 (1-3). Patients were categorized according to age (years) in 4 categories (<30; n=404; 30-34; n=487; 35-40; n=595; >40; n=174) and no association with pregnancy rate (PR, p=0.856), biochemical miscarriage rate (BMR, p=0.940), clinical miscarriage rate (CMR, p=0.06) nor LBR (p=0.154) was found. BMI (kg/m2) was divided into four groups according to World Health Organization: underweight (<18.5;n=32), normal weight (18.5-24.9;n=555), overweight (25-29.9;n=622), and obese (>30;n=426). Although no differences were seen for PR or BMR between groups (p=0.507 and p=0.343, respectively), CMR was significantly lower for normal BMI group (p<0.001) and LBR significantly higher when compared to the overweight and obese group (<18.5kg/m2=68.42%; 18.5-24.9kg/m2=68.35%; 25-29.9kg/m2=60.14%; ≥30kg/m2=53.29%; p<0.001). No differences were observed on the outcomes when AMH was sub-divided as per Bologna Criteria (<1.3ng/mL,n=327; ≥1.3ng/mL,n=1090). Regarding endometrial preparation, NC protocol showed significantly lower BMR and CMR (7.93% vs 12.27%, p=0.026; 8.44% vs 17.97%, p<0.001), and higher LBR (70.33% vs 55.06%, p<0.001) compared to HRT. Day of trophectoderm biopsy had a significant higher PR for day 5 (day 5=75.58% vs day 6=61.1% and day 7=23.81%, p<0.0001), yet no differences were observed for BMR, CMR nor LBR.

Limitations, reasons for caution: Although the large number of FET included, performed in the same centre with same methodology, the retrospective study design is a limitation. We could not discard other hypothetical variables contributing to miscarriage such as KIR-HLA discrepancies, or other obstetric factors affecting late miscarriage and live birth.

Wider implications of the findings: Evaluating the factors associated with pregnancy outcomes should be considered prior to euploid frozen embryo transfer for personalized treatment approach and adequate blastocyst selection. Women with higher BMI should be aware of higher risk of miscarriage and lower LBR although an euploid blastocyst is transferred.

Trial registration number: not applicable