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Effect of Vitrification on Embryos Euploidy Obtained from Thawed Oocytes

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Abstract : Introduction: It is known that cryopreservation of oocytes has peculiar features due to the complex structure of the oocyte. One of the most important features is that mature oocytes contain meiotic division spindle which is very sensitive even to the slightest variation in temperature. Thus, the main objective of this study is to analyse the resulting euploid embryos obtained from thawed oocytes in comparison with the data of preimplantation genetic screening (PGS) in fresh embryo cycles. Material and Methods: The study was conducted at 'Medical Centre IGR' from January to July 2016. Data were analysed for 908 donor oocytes obtained in 67 cycles of assisted reproductive technologies (ART), of which 693 oocytes were used in the 51 'fresh' cycles (group A), and 215 oocytes - 16 ART programs with vitrification female gametes (group B). The average age of donors in the groups match 27.3±2.9 and 27.8±6.6 years. Stimulation of superovulation was conducted the standard way. Vitrification was performed in 1-2 hours after transvaginal puncture and thawing of oocytes were carried out in accordance with the standard protocol of Cryotech (Japan). Manipulation ICSI was performed 4-5 hours after transvaginal follicle puncture for fresh oocytes, or after defrosting - for vitrified female gametes. For the PGS, an embryonic biopsy was done on the third or on the fifth day after fertilization. Diagnostic procedures were performed using fluorescence in situ hybridization with the study of such chromosomes as 13, 16, 18, 21, 22, X, Y. Only morphologically quality blastocysts were used for the transfer, the estimation of which corresponded to the Gardner criteria. The statistical hypotheses were done using the criteria t, x^2 at a significance levels $p<0.05$, $p<0.01$, $p<0.001$. Results: The mean number of mature oocytes per cycle in group A was 13.58±6.65 and in group B - 13.44±6.68 oocytes for patient. The survival of oocytes after thawing totaled 95.3% (n=205), which indicates a highly effective quality of performed vitrification. The proportion of zygotes in the group A corresponded to 91.1%(n=631), in the group B – 80.5%(n=165), which shows statistically significant difference between the groups ($p<0.001$) and explained by non-viable oocytes elimination after vitrification. This is confirmed by the fact that on the fifth day of embryos development a statistically significant difference in the number of blastocysts was absent ($p>0.05$), and constituted respectively 61.6%(n=389) and 63.0%(n=104) in the groups. For the PGS performing 250 embryos analyzed in the group A and 72 embryos - in the group B. The results showed that euploidy in the studied chromosomes were 40.0%(n=100) embryos in the group A and 41.7% (n=30) - in the group B, which shows no statistical significant difference ($p>0.05$). The indicators of clinical pregnancies in the groups amounted to 64.7% (22 pregnancies per 34 embryo transfers) and 61.5% (8 pregnancies per 13 embryo transfers) respectively, and also had no significant difference between the groups ($p>0.05$). Conclusions: The results showed that the vitrification does not affect the resulting euploid embryos in assisted reproductive technologies and are not reflected in their morphological characteristics in ART programs.

Keywords : euploid embryos, preimplantation genetic screening, thawing oocytes, vitrification
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