OPTIMISED CLINICAL OUTCOMES WITH BLASTOCYST CULTURE AND CRYOPRESERVATION USING VITROLIFE G-SERIES CULTURE MEDIA

Background

Independent from legal restrictions, decisions on the day of embryo transfer in an egg collection cycle as well as the day of embryo cryopreservation differ between clinics. Among several reasons this may be related to the lack of evidence that one policy is superior to the other. Nevertheless, cryopreservation contributes significantly to the overall success of ART. In an attempt to answer the question if cryopreservation of blastocysts is superior to cryopreservation at the cleavage stage, Zhu et al.[1] compared the results of vitrification on day 3 with those from vitrification at the blastocyst stage in a prospective observational study.

Material and methods

Out of 2531 treatment cycles, 1190 fulfilled the inclusion criteria and had at least one warming cycle. For 565 patients embryos were cryopreserved on day 3 (control) while 625 patients were assigned to the blastocyst cryopreservation group. For fertilisation and culture, G-Series media from Vitrolife were used. For warmed embryos survival was defined as at least 50% intact blastomeres for cleavage-stage embryos and re-expansion for blastocysts. Criteria for vitrification were good to fair quality for day 3 embryos and blastocysts of type 3 or more advanced with a type A or B ICM or trophectoderm according to the scoring system suggested by D. Gardner[2].

Results

Among the patients that opted for blastocyst cryopreservation, 73.8% had at least one good-quality blastocyst available for vitrification. After warming, embryo survival was similar in both groups (96.8% and 97.4% in blastocyst vs. control group). Because of the lower number of patients with cryopreservation in the blastocyst group, per patient included, fewer embryo transfers occurred in this group after warming, 454/624 (72.6%) compared to 556/565 (98.4%) in the control group. Despite this difference in cryopreservation rate, the overall pregnancy rate per patient included was significantly higher for blastocysts compared to day 3 embryos, see Figure 1 for clinical outcomes of the first warming cycle. Logically, the pregnancy rate per transfer was also in favor of the blastocyst group.

After warming the implantation rate was also higher for blastocysts compared to day 3 embryos and fewer pregnancies tended to result in a miscarriage (14.4% vs. 18.3% for blastocysts and control respectively, NS).

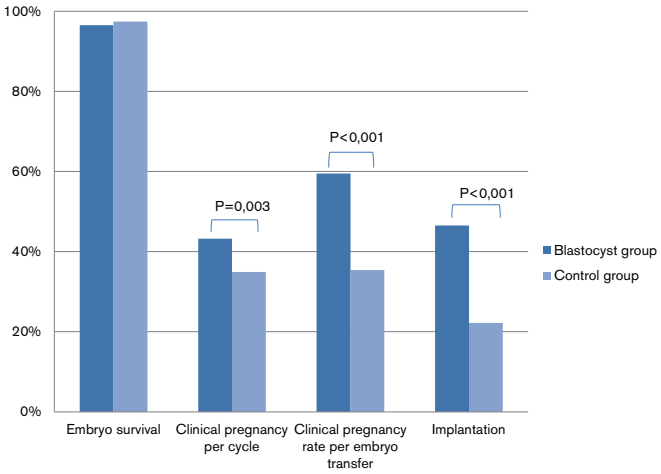

Figure 1. Embryo survival, clinical pregnancy and implantation rate for blastocyst culture compared to day 3 culture (control).

Outcome after cryopreservation was also analyzed in relation to the number of embryos available for cryopreservation (1-3, 4-6, 7-9 or ≥10). Significantly higher pregnancy rates were observed in the blastocyst group after the first warming cycle when 7 or more embryos were cryopreserved. Pregnancy rates were also numerically higher when 4-6 embryos were available. Although no differences were found in the cumulative pregnancy rates, significantly more warming cycles were necessary to achieve a pregnancy in the control group.

Conclusion

This study demonstrates that extended culture before cryopreservation allows for selection of viable embryos with a high chance of implantation after warming. Although fewer patients had embryos cryopreserved, the pregnancy rate per patient included was still higher after blastocyst vitrification. Although the overall pregnancy rate per patient was not different between the 2 groups, patients obtained a pregnancy faster after blastocyst culture before cryopreservation. The high blastocyst formation rate (73.8%) using Vitrolife culture media, together with an efficient cryopreservation program resulting in survival rates of >96% should eliminate any earlier concerns about blastocyst culture and cryopreservation.

1. Zhu et al., Blastocyst culture and cryopreservation to optimize clinical outcomes of warming cycles, RBM Online (2013), 27 (2), 154-60. 2. Gardner DK, Schoolcraft WB. In vitro culture of human blastocysts. In Jansen R, Mortimer D (eds). Toward Reproductive Certainty: Fertility and Genetics Beyond 1999. London: Parthenon Publishing 1999a, 378-388.

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