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ASSISTED REPRODUCTION TECHNOLOGIES

Single thawed euploid embryo transfer improves IVF pregnancy, miscarriage, and multiple gestation outcomes and has similar implantation rates as egg donation

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Abstract

Purpose The objective of our study was to determine if trophectoderm biopsy, vitrification, array-comparative genomic hybridization and single thawed euploid embryo transfer (STEET) can reduce multiple gestations and yield high pregnancy and low miscarriage rates.

Methods We performed a retrospective observational study comparing single thawed euploid embryo to routine age matched in vitro fertilization (IVF) patients that underwent blastocyst transfer from 2008 to 2011 and to our best prognosis group donor oocyte recipients (Donor). Our main outcome measures were implantation rate, clinical pregnancy rate, spontaneous abortion rate and multiple gestation rate.

Results The STEET group had a significantly higher implantation rate (58 %, 53/91) than the routine IVF group (39 %, 237/613) while the Donor group (57 %, 387/684) had a similar implantation rate. The clinical pregnancy rates were not statistically different between the STEET and IVF groups. However, the multiple gestation rate was significantly lower in the STEET group (STEET 2 % versus IVF 34 %, Donor 47 %).

Conclusions STEET results in a high pregnancy rate, low multiple gestation rate and miscarriage rates. Despite the older age of STEET patients and transfer of twice as many embryos, the implantation rate for STEET was indistinguishable from that for egg donation. STEET offers an improvement to IVF, lowering risks without compromising pregnancy rate.

Keywords Trophectoderm biopsy · Single embryo transfer · Array-comparative genomic hybridization · Aneuploidy · Embryo biopsy · Donor egg · IVF · Embryo transfer

Capsule Single thawed euploid embryo transfer results in a high pregnancy rate, low multiple gestation rate and miscarriage rates.

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Introduction

While in vitro fertilization (IVF) has provided thousands of people with success, IVF outcomes are still not ideal. The ultimate goal is to provide patients with one healthy child in a cost effective manner while avoiding the heartache of pregnancy loss. This is quite a tremendous and difficult goal for all age groups. Firstly, despite many advances in IVF in the past thirty years such as intracytoplasmic injection (ICSI) [26], extended embryo culture [8, 9], embryo biopsy and preimplantation genetic diagnosis (PGD) [10, 12], the pregnancy rate in fresh IVF cycles nationally in 2010 was only 42 % in those under 35 years of age (often referred to as a good prognosis group). In addition, while a miscarriage is devastating for all women, having a loss after IVF is even more upsetting and time consuming. On the other end of the spectrum is the complication of multiple gestations. Multiple gestations are associated with costs to society [4] and

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Reprogenetics for PGS analysis once all of the biopsies were performed. This analysis was performed using the method described in Gutierrez, Mateo et al. without modification. [11] Embryos were then cryopreserved using vitrification. Embryos were then cryopreserved using vitrification. Embryos were first equilibrated in media containing the lowest concentration of cryoprotectants (7.5 % ethylene glycol [EG] and 7.5 % dimethyl sulfoxide [DMSO]) to achieve the first level of dehydration. They were then placed in vitrification solution with cryoprotectants (15 % EG and 15 % DMSO). Embryos were then loaded onto Cryolock (Cummingel

groups. In addition, the range of oocytes retrieved and 2pns in the STEET group (6–42 oocytes, 3–34 2 pns) was similar to the IVF group (4–49 oocytes, 3–29 2 pns). Also of note, significantly more embryos were transferred in the routine IVF group (range 1–6). The IR per transfer is significantly higher in STEET than routine IVF while the SABR and MGR were significantly lower. There was one monozygotic twin pregnancy in the STEET group, 43 twin pregnancies and 3 triplet pregnancies in the IVF group.

in this age group in an effort to make sure a euploid embryo is replaced as aneuploidy is known to increase with age. [3, 19] However, without a biopsy before transfer how many euploid embryos are actually transferred is not known thus increasing chances of more than one implantation. There is no compromise in LBR by transferring one euploid embryo in this population not typically characterized as good prognosis patients. When comparing STEET to all IVF cycles at our center with a mean age of 37 from 2003 to 2009, STEET has a statistically significant CPR (50/91 vs. 641/1520, $p = 0.03$, unpublished data).

STEET is not for all patients. Patients that are eligible for STEET need to have embryos for biopsy and at least one euploid embryo for transfer. During the same time period we had 22 cycles where there was no euploid embryos available for transfer. While this may seem disappointing at first, it does save time, cost, patient progesterone injections, and heartache that would otherwise be involved if no biopsy had been done and the patient ended up with a negative pregnancy test or pregnancy loss. A more frustrating situation involves cancellation as we