Pregnancy outcome following fresh vs frozen embryo transfer into gestational carriers using a simplified slow freeze protocol

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Summary

Purpose: To compare pregnancy rates following fresh vs frozen embryo transfer into gestational carriers. *Methods:* Choice of deferring fresh embryo transfer and cryopreserving the embryos vs fresh transfers was not randomized but based on circumstances. The cryopreservation protocol used a simplified slow cool technique avoiding the planar programmable freezer and using a one-step removal of the cryoprotectant. *Results:* The live delivered pregnancy rate was 51.0% (49/96) for fresh embryo transfer vs 34.3% for transfers of frozen thawed embryos in gestational carriers not having a fresh embryo first. *Conclusions:* Using the simplified slow cool cryopreservation protocol with a one-step removal of cryoprotectants pregnancy rates are comparable to what is found in women of similar ages undergoing controlled ovarian hyperstimulation followed by IVF-ET. However, when transferring to a gestational carrier the live delivered pregnancy rates are 50% higher with fresh embryo transfer.

Key words: Frozen embryo transfer; Fresh embryo transfer; Gestational carrier; Pregnancy rate.

Introduction

There are many IVF centers performing in vitro fertilization-embryo transfer (IVF-ET) that demonstrate very good pregnancy rates with fresh embryo transfer but do not fare as well with the transfer of frozen-thawed embryos. Some believe it is the type of slow freeze technique used that is the problem, especially the programmable freezer [1]. In fact there has been a revival of an old technique of vitrification which is showing promise as to providing comparable pregnancy rates to those with IVF-ET [2].

A slow cool technique has been described that avoids the planar programmable freezer and does provide similar pregnancy rates following transfer of frozen thawed embryos as with IVF-ET [3, 4]. Though indeed pregnancy rates were similar in women undergoing controlled ovarian hyperstimulation having fresh embryo transfer or those having fresh transfer deferred for subsequent frozen-thawed embryo transfer, the pregnancy rates were superior for recipients receiving fresh embryos [4].

Though based on the aforementioned study it would be ideal to synchronize a woman undergoing IVF-ET with a gestational carrier so that fresh embryo transfer could be achieved, sometimes the reason for the need for a gestational carrier is imminent surgical or medical therapy that could also damage ovarian oocyte supply and a gestational carrier cannot be arranged that quickly. Thus there is a need to cryopreserve the embryos for the future.

The present study aimed to determine how much of a sacrifice women are making by delaying fresh embryo transfers but cryopreserving the embryos using the simplified slow cool freezing technique.

Materials and Methods

A retrospective review of pregnancy outcome of all fresh and frozen embryo transfers in gestational carriers over a 6-year time period was performed. Only gestational carriers having previous full-term deliveries were used and with a history of no difficulty in achieving pregnancy.

Intentional freezing of embryos was performed at the pronuclear stage using a simplified freezing protocol and a one-step removal of the cryoprotectant 1,2 propanediol with thawing [3]. Some embryos were frozen on day 3. These were ones deselected from fresh transfer. In general twice as many embryos as intended for transfer were allowed to cleave to day 3 and the lesser quality ones were frozen. All fresh and frozen ETs were performed on day 3 and were preceded by assisted embryo hatching.

Most often the luteal phase leuprolide acetate regimen was used for COH especially when there was intention to transfer fresh embryos into the gestational carriers. Sometimes when intentional freezing was to be performed, an antagonist stimulation protocol using either ganirelix or cetrorelix was employed.

Results

There were 96 fresh and 113 frozen ET cycles evaluated. There were 67 gestational carriers having frozen ET who never had a previous fresh ET.

The average age of the woman having COH was 33.6; the average age for the subset of 67 having intentional

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freezing was 35.0. The mean number of embryos transferred for fresh ET was 3.1 ± .6 vs 3.1 ± .7 for frozen ET.

Clinical (ultrasound evidence of pregnancy) pregnancies were achieved in 56 of 96 (58.3%) gestational carriers having fresh ET vs 45 of 113 (39.8%) in gestational carriers having frozen ET ($p = 0.01$). To eliminate possible confounding effects of de-selection the fresh ET clinical PRs were also compared to gestational carriers having a frozen ET as their first transfer. Pregnancies were achieved in 28 (41.8%) ($p = 0.055$).

The live/delivered PRs were 51.0% (49/96) for fresh ET, 33.6% (38/113) for first frozen ETs including gestational carriers failing to conceive in their fresh ET, and 34.3% (23/67) for gestational carriers whose first transfer was with frozen/thawed embryos. The live/delivered PR was significantly higher for fresh ET than either frozen group ($p < 0.01$ and $p < 0.05$, respectively).

The implantation rates for fresh ETs was 28.0% (84/300) for fresh embryo transfer vs 20.4% (71/348) and 21.5% (45/209) for the two frozen ET groups ($p < 0.01$ comparing the fresh ET to either frozen ET group).

Discussion

These data confirm the conclusions of a previous study not using gestational carriers but using the simplified slow freeze protocol that pregnancy rates following frozen-thawed ETs are very respectable but inferior to fresh ET when COH is not used [4].

Thus whenever possible it would be ideal to wait to do oocyte retrieval until a gestational carrier is found. However, if circumstances require the IVF be performed right away it is important to use a cryopreservation technique that is effective.

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