

Frozen embryo transfer outcome according to reason for freezing the embryos

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Summary

Purpose: To determine if cryopreservation influences pregnancy outcome following transfer.

Methods: Retrospective cohort analyses of frozen embryo transfer (ET) cycles divided into five different categories according to reason for freezing.

Results: Frozen embryos remaining as a result of failing to conceive with the previous fresh transfer or those remaining because of cancellation of fresh ET related to inadequate endometrial thickness, result in lower pregnancy rates (PRs).

Conclusions: The fact that embryos never deselected in a group whose fresh ET was canceled because of risk of ovarian hyperstimulation did not have the best results suggests that these oocytes may not be of equal quality to those attained with a more modest response.

Key words: Frozen embryo transfer; Endometrial thickness; Ovarian hyperstimulation.

Introduction

An embryo cryopreservation program is an essential feature for any in vitro fertilization (IVF) center as it maximizes the chance of implantation from one oocyte harvest. Cryopreservation allows the opportunity to conceive again by the less expensive and invasive fresh frozen embryo transfer (ET) rather than through the more expensive and difficult in vitro fertilization (IVF) cycle. The latter also carries the added risk of controlled ovarian hyperstimulation (COH). Embryo freezing without the transfer of fresh embryos allows a woman the chance to reduce the risk of ovarian hyperstimulation syndrome (OHSS) without canceling the cycle. It also allows a woman the opportunity to proceed with oocyte retrieval if there is a lower chance of conception resulting from inadequate endometrial thickness on the day of the human chorionic gonadotropin (hCG) injection. Cryopreservation allows the treating physician the time and chance to improve the endometrial thickness using exogenous estrogen or other means necessary to improve endometrial blood flow. The present study explored the outcome following frozen ET according to the reason for cryopreservation.

Materials and Methods

Women aged 43 and younger at the time of oocyte retrieval during the time period from 1/1/97 to 12/31/02 were studied. These women were separated into five groups according to the reason for cryopreservation. The groups were as follows: Group 1 were women who had embryos remaining after failing to conceive with fresh ET. Group 2 were women having supernumer-

ary embryos remaining after conceiving with fresh ET but miscarried. Group 3 were women having supernumerary embryos remaining after successfully delivering a baby following fresh ET. Group 4 were women who had their fresh ET cancelled due to inadequate endometrial thickness (< 9 mm) at the time of the hCG injection or had the presence of a homogeneous hyperchogenic endometrial pattern [1, 2]. Lastly, group 5 had their fresh ET postponed because of risk of OHSS.

The outcome following frozen ET was studied, with only the first frozen ET of each woman evaluated. Only transfers using day-3 embryos were included. All the women in the study were treated with a graduated oral and/or vaginal estradiol regimen followed by progesterone (P). The frozen ET was performed on the fourth day of P supplementation and the embryos were then cryopreserved both at the 2 pronuclear cell and the multi-cell stage. A simplified freezing protocol using 2 propanediol as the cryoprotectant was used [3]. Assisted embryo hatching was performed prior to transfer [3].

Results

The clinical and delivered pregnancy rates (PRs) and implantation rates were similar in groups 2, 3, and 5 as seen in Table 1. The clinical and delivered PRs and implantation rates were significantly lower ($p < .0001$) in groups 1 and 4 as compared to groups 2, 3, and 5 (Table 1). The mean ages for the five groups during the time of retrieval were 35.1, 36.6, 35.2, 39.6, and 32.7, respectively. The mean ages for the five groups at the time of frozen ET were 35.6, 37.2, 36.1, 39.9, and 32.9, respectively.

Discussion

The data suggests that the failure to conceive after a fresh ET is predictive of lower PRs and implantation rates following a subsequent frozen ET. However, conception

Table 1. — *Clinical and delivered pregnancy rate (PR) and implantation rate according to reason for cryopreservation.*

Group	Number	Clinical PR	Delivered PR	Implantation Rate
1	323	31.9%	26.5%	14.6%
2	98	40.8%	34.7%	18.4%
3	74	41.9%	35.1%	20.5%
4	98	26.5%	26.5%	14.6%
5	430	42.6%	38.8%	19.0%

with a miscarriage does not lower the chance of a live pregnancy following frozen ET. It is difficult to say if the lower clinical and viable PRs and implantation rates in group 4 were related to the decreased endometrial thickness factor or the older mean age for the group. The older mean age may merely be fortuitous or it may be related to a greater chance for less endometrial thickness with advancing age.

Embryo deselection occurred in groups 1, 2, and 3 but not 4 or 5. Previous studies have found a better survival rate for 2 pronuclear embryos than for multi-cell embryos. Thus, it is surprising that the youngest group (no. 5) who cryopreserved all 2 pronuclear embryos,

none of which were deselected, did not have higher PRs and implantation rates than the other groups. These data may thus suggest that women who tend to hyperstimulate may have an increased chance to make somewhat less quality embryos which negates to some degree the aforementioned advantages of this group.

References

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