

## The feasibility of embryo donation

Transfer of donated frozen embryos of various quality to recipients resulted in a delivered pregnancy rate of 36.8% per transfer. Hopefully these data will encourage other *in vitro* fertilization programs to set up similar programs. (Fertil Steril® 2004;81:452-3. ©2004 by American Society for Reproductive Medicine.)

Most IVF centers will freeze extra embryos so that if the transfer of embryos after oocyte retrieval fails, the woman can proceed with frozen ET without undergoing another controlled ovarian hyperstimulation attempt and oocyte retrieval. Thus, it is expedient to attempt to fertilize as many oocytes as possible and cryopreserve the embryos that are not transferred. Even if a successful pregnancy results, the frozen embryos can be used in the future for subsequent pregnancies.

Once a couple is sure that their family is complete, there are several options available to them regarding what to do with the remaining cryopreserved embryos. These options include discarding them, keeping them indefinitely cryopreserved, donating them to another woman so that she may have a baby, or donating them for research. The present study evaluated the outcome for the recipients who received cryopreserved embryos from anonymous donors.

There were several sources of these available frozen embryos. Sometimes all embryos were cryopreserved at the 2-pronuclear (2PN) stage because the woman was at risk for ovarian hyperstimulation syndrome, the endometrial thickness was too thin, or there was a homogeneous hyperechogenic pattern (1, 2). If a woman did have a fresh ET, twice as many embryos as intended to be transferred were allowed to cleave to the day 3 multicell stage. The ones not allowed to cleave were frozen at the 2PN stage, and the multicell embryos not chosen for fresh ET that reached at least a 4-cell stage with <50% fragmentation were also cryopreserved. When frozen ET was performed, the same formula was used as for fresh ETs, that is, twice as many frozen embryos were allowed to cleave to day 3 and the best half were transferred. The remaining embryos that met the same criteria for embryo morphology were refrozen. Thus, twice-frozen embryos were another source of donated frozen embryos (3). The final source was obtained from fertilization of *in vitro*-matured germinal vesicles or metaphase I stage oocytes followed by intracytoplasmic sperm injection, which were then cryopreserved at the 2PN stage.

Women donating embryos were never solicited. In the Cooper Center manual it is mentioned that one option for women or couples with frozen embryos that they no longer want is to donate them gratis to another anonymous woman or couple. The couple donating had to appear in person and sign consent forms. The policy of donating extra frozen embryos no longer wanted by the donor with the donor couple's permission was approved by the 12-member ethics panel for the Cooper Institute for Reproductive and Hormonal Studies. Since this study is merely descriptive and retrospective, the Medical School does not require Institutional Review Board approval.

The embryos were frozen using a simplified method in which a slow-cooling program is started at the seeding temperature of  $-6^{\circ}\text{C}$  in an alcohol bath controlled rate freezer. We used 1,2 propanediol as the cryoprotectant (4). The thawing procedure used a one-step dilution of the cryoprotectant as described elsewhere (4).

All frozen embryos available for donation were offered to each donor embryo recipient according to chronological registration. Recipients were allowed to select from more than one donor pool if there were an insufficient number or quality from one donor's remaining embryos. All transfers were performed on day 3. Assisted embryo hatching was performed before transfer (5).

Pelvic ultrasound was performed at 6, 8, and 12 weeks. A woman showing ultrasound evidence of pregnancy with appropriately rising serum beta hCG levels was considered as having a clinical pregnancy. Those delivering a live baby were considered delivered.

The outcome of ET of donated frozen-thawed embryos from January 1992 to July 2002 was evaluated. Embryo lots available varied from having embryos frozen at the 2PN stage (which were potentially the best embryos), those that had been deselected by the couple (multicell embryos not chosen from the fresh ET or those that had been twice frozen), or those derived from *in vitro* maturation of immature oocytes. Nevertheless, 212 (78.8%) of 269 embryo lots available for donation were selected. About half of the embryos used

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had been stored for  $\leq 2$  years (22.3% for  $\leq 1$  year, 27.9% for 1.1 to  $\leq 2$  years). Only 8.7% of the embryos had been stored over 6 years.

The clinical pregnancy rate per transfer was 40.0% (85/212), and the delivered pregnancy rate was 36.8% (79/212) per transfer. There was a mean of  $3.7 \pm 0.9$  embryos per transfer. The implantation rate was 15.7% (125/794).

Four hundred fifty-four (57.1%) of the embryos thawed and cultured were 2PN and 340 (42.9%) were deselected, twice frozen, or derived from immature oocytes. Further evaluation of the lower-quality group showed 181 deselected from a fresh transfer and thus frozen only once, 103 twice frozen and twice thawed, and 56 derived from immature oocytes. Since ETs frequently consisted of mixtures of embryos derived from all of these sources, pregnancy rates according to the type of embryo transferred could not be determined.

There are many couples opposed to destroying frozen embryos. Some are satisfied by keeping them indefinitely frozen. Others, for various reasons, prefer to donate these embryos without compensation to other couples to give these embryos a chance for life and to allow a woman desiring to have a baby to fulfill her desires. Oftentimes, the embryo recipients would be able to achieve a pregnancy through the use of donor gamete(s), but for personal, religious, or financial reasons they choose the donor embryo program.

Having a baby through the transfer of donated embryos has several advantages over adopting a baby, including satisfying the woman's desire to experience childbirth, providing a safer environment to prevent exposure of the fetus to drugs or disease, reducing the chance that the woman giving the child away for adoption may change her mind or interfere with the family unit at a later time, and providing a much less expensive method of having a baby.

A Medline search failed to show any other large studies of the use of donated cryopreserved embryos in this manner. This does not

mean that a similar program is not being performed at some other IVF center that has just not reported the data.

The purpose of this study is to show that the transfer of donated cryopreserved embryos, even though frequently of lower quality, can result in a delivered pregnancy rate of 36.8% per transfer, which would be acceptable to a lot of prospective candidates. Hopefully, these data will encourage other IVF centers to set up similar programs.

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