Over the past several decades, considerable effort has been expended toward the successful cryopreservation of various human cells. Oocyte cryopreservation certainly represents one of the most attractive developments in the field of assisted reproduction with the aim of extending fertility to women wishing to store their own young healthy eggs. Women diagnosed with cancer may preserve their fertility by egg freezing prior to start cancer treatment. An egg tank can be used by patients needing egg donation by eliminating cycle synchronization with egg donor. Finally patients who are opposed to embryos freezing can now freeze oocytes. Preliminary studies from our laboratory suggest it is possible to offer oocyte cryopreservation as a procedure that is able to compete with embryo freezing in efficiency.

Materials and Methods

Donated surplus frozen oocytes from successful IVF patients.

Case Report

A 30-year-old woman with polycystic ovarian syndrome (PCOS) underwent controlled ovarian hyperstimulation (COH) for in vitro fertilization. A limited number of oocytes were inseminated with Intracytoplasmic Sperm Injection (ICSI) due to oligoasthenoteratozoospermia. Surplus oocytes were cryopreserved by a slow freeze method because the patient declined to freeze a large number of embryos. In November of 2001, the patient delivered healthy twins. The couple decided to donate all unused cryopreserved oocytes and embryos. We decided to offer the donated oocytes to 42 years old matched primary infertility recipient.

Case Report

Seven out of 10 oocytes survived the thaw. Survival was defined as 1) the zona pellucida and cell membrane were observed to be intact, 2) the perivitelline space was of normal size, 3) there was no evidence of cytoplasmic leakage or oocyte shrinkage. Frozen sperm was used to insemination 6 oocytes (day 0) and fertilization check was done 16 hours later, documenting that 5 oocytes were normally fertilized. Twenty-four hours later 4 embryos had cleaved normally on day 2. The recipient’s endometrium had been prepared with oral administration of estradiol (E2) followed by intramuscular progesterone (P) supplementation. The recipient patient elected to receive all 4 embryos, which were transferred by transvaginally guided ultrasound technique. Fourteen days after embryo transfer, the recipient’s initial serum beta-hCG level was 342 mIU/ml. An initial ultrasound examination 28 days after embryo transfer showed two gestational sacs with cardiac activity observed in sac A. No embryo was observed in sac B. Thirty-four days after embryo transfer a repeat ultrasound demonstrated a singleton pregnancy with cardiac activity.

Discussion

There are several circumstances in which the ability to store oocytes would be advantageous. The potential benefits of long term storage of unfertilized oocytes apply especially to young female patients wishing to extend their oocyte viability and young cancer patients who are scheduled for chemotheraphy and / or radiation therapy. Oocytes storage is also a potential benefit to patients undergoing fertility treatment who have surplus oocytes, and are opposed to embryos freezing. Oocytes cryopreservation would facilitate banking of oocytes, not only for the patient’s own use, but also for possible donation to other infertile couples or research. Finally, oocyte cryopreservation would make donation more efficient by avoiding the need of synchronization donor and recipient treatment cycles. By lowering the previously high number of cryopreserved oocytes required for a successful implantation, our new freezing solution has overcome some of the previous challenges. Oktay et al., reports that from all slow-freeze thawed oocyte cases reported from 2002-2004, only 4.1% of 688 oocytes thawed resulted in a pregnancy with a 6.9% fertilization rate. These studies reveal that a high number of oocytes is required to produce a viable pregnancy to overcome poor thawing survival and low fertilization rate. Our results reveal that our new slow-freeze/fast-thaw protocol used with the case produces high survival rates (91%) and fertilization rates (70%) leading to a smaller number of oocytes needed for a pregnancy.