

Donor Oocyte Cryopreservation Resulting In High Pregnancy And Implantation Rates

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BACKGROUND

Routine application of oocyte cryopreservation has been discouraging due to the low overall post thaw survival rate and subsequent pregnancy rates(1). Cryoinjury to the human metaphase II (MII) stage oocyte, such as meiotic spindle disassociation and/or chromosome instability caused by disassembly/reassembly of the microtubules, has been suggested to be the main reason for poor outcome results(2).

There are two primary groups of women who are likely to benefit from advances in oocyte freezing technology: 1) those desiring preservation of female fertility prior to compromise by medical treatment; 2) those who plan to delay childbearing until later in life with the hopes of retaining their reproductive potential. Oocyte donor programs could potentially benefit from egg freezing technology, through the creation of frozen oocyte banks which would allow couples to choose an appropriate donor immediately.

We present the outcome results of an Institutional Review Board approved study of donor oocyte cryopreservation involving four anonymous oocyte donors who produced 79 frozen/thawed oocytes, with the resulting embryos being transferred to 4 recipient couples.

OBJECTIVE

To determine the clinical potential of donor oocyte banking by cryopreservation and subsequent thaw technique for oocyte recipient patients.

DESIGN:

Institutional Review Board approved prospective study of donor oocyte cryopreservation

SETTING:

A large private infertility center

MATERIALS AND METHODS

Patients:

Four anonymous oocyte donors underwent ovarian hyperstimulation for the purpose of oocyte retrieval and cryopreservation. The oocytes were subsequently thawed, fertilized and transferred to 4 recipient patients.

Interventions:

Oocytes were obtained from young donor patients and were cryopreserved with a slow freeze/rapid thaw protocol in which 1,2-Propanediol (PrOH) and sucrose were used as cryoprotectants (Oocyte Freeze/Oocyte Thaw ; Medicult, Denmark). Oocytes that survived were inseminated using ICSI. Resulting embryos were transferred into recipient patients on the third day post-insemination.

Main Outcome Measures:

Post-thaw survival, fertilization, cleavage, implantation and clinical pregnancy rates.

RESULTS

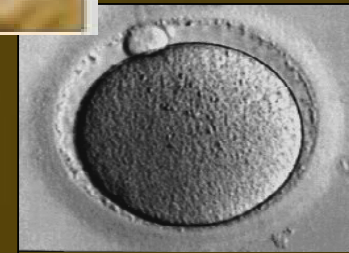
A total of 79 metaphase II oocytes were frozen, stored frozen overnight in liquid nitrogen and then thawed. The post thaw survival rate was 86.1% (68/79). Normal fertilization following ICSI occurred in 89.7% (61/68) of the surviving oocytes. Cleavage was observed in 91.8% (56/61) of normally fertilized oocytes. A total of 23 embryos were transferred to 4 recipient patients. Clinical pregnancy rate of 75% and an implantation rate of 26.1% were achieved.

	Number	Mean (SD)	%
Metaphase II frozen	79	19.75 (9.54)	100
Thawed and Survived	68	17 (6.98)	86.07%
Normal Fertilization (2PN)	61	15.25 (6.9)	89.71%
3PN	1	0.25 (0.5)	1.47%
1PN	0	0	0%
0PN	3	0.75 (1.5)	4.41%
Degenerate	3	0.75 (1.5)	4.41%
Cleaved embryos	56	14 (6.83)	91.8%

Number of embryos transferred	23	5.75 (2.06)	100%
Number of embryos implanted overall	6	1.5 (1.29)	26.08%
Clinical Pregnancy rate per transfer	3	0.75 (0.5)	75%

CONCLUSIONS:

Human donor oocyte cryopreservation using slow cooling and rapid thawing is an effective technique that can be applied in a clinical situation with high oocyte survival and clinical pregnancy rates. These results demonstrate that the formation of donor oocyte banks is possible without a detriment to pregnancy rates. Banks of cryopreserved donated oocytes would allow the 6 month quarantine of oocytes until appropriate infectious disease screening of the donor can be completed. This would grant couples the opportunity to choose a donor immediately, without having to delay the process due to searching, screening, scheduling and synchronization. The option to limit the number of oocytes thawed for each recipient cycle will also benefit patients by cutting down on the number of extra embryos created and cryopreserved that may never be used by couples after completing their families. The creation of oocyte donor banks may also allow a single donor to be used by many recipient couples, allowing the costs of these very expensive donor/recipient cycles to be reduced for the patients



References

- Fabbri R, Porcu E, Marsella T, Rocchetta G, Venturoli S, Flamigni C. Human oocyte cryopreservation: new perspectives regarding oocyte survival. *Hum Reprod* 2001;16:411-6.
- Wang W, Meng L, Hackett R, Odenburg R, Keele D. Limited recovery of meiotic spindle in living human oocytes after cooling-rewarming observed using polarized light microscopy. *Hum Rep* 2001;16:2374-8.