Pregnancy rates in donors / recipients using the same pool of oocytes

JH Check, K Nowroozi, JS Chase, G Goldsmith

Division of Reproductive Endocrinology & Infertility, Department of Obstetrics / Gynecology, The University of Medicine / Dentistry of New Jersey, Robert Wood Johnson Medical School at Camden, Cooper Hospital / University Medical Center, Camden, New Jersey, 08103, USA

Correspondence and reprints requests to: Jerome H. Check, M.D., 8002 E. Greentree Commons, Marlton, NJ 08053

abstract

Most centers performing donor oocyte fertilization and embryo transfer have found a higher pregnancy rate in donor oocyte recipients than in the woman undergoing IVF. The higher pregnancy rates have been attributed to better quality oocytes provided for the recipient, or to a negative effect of the hyperstimulation regimen used for IVF. Our donor oocyte program is somewhat unique in that the source of oocytes for the recipients are other infertile patients who are also undergoing IVF. Pregnancy rates were evaluated in donors versus recipients who equally shared a common pool of oocytes. Although the same number of embryos were transferred in both donors / recipients, there was a higher pregnancy rate found in the recipients. The recipients also had a higher multiple birth rate and a lower abortion rate, leading to a much greater number of births. Oocyte quality did not appear to be a factor in the high pregnancy rates in recipients.

Introduction

Pregnancy rates are higher following the transfer of embryos to functionally agonadal women. This is achieved by fertilization of donor oocytes by sperm from the recipient's male partner (Lutjen et al, 1984; Rosenwaks, 1987; Asch et al, 1988: Meldrum et al, 1989b). The oocytes were donated by pre-designated donors, relatives / friends of patients, and co-participants in GIFT or IVF programs (Formigli et al, 1989; Sauer et al, 1989b). Most assisted reproductive technology programs have the availability of cryopreservation of embryos formed from fertilization of "extra" oocytes. It is therefore much more difficult to find women who are undergoing IVF or GIFT and willing to share extra oocytes because they may prefer to have their oocytes preserved for a future attempt at achieving a pregnancy.

A large number of recipient volunteers were enlisted to share oocytes with the donors by the recipients. The present study was conducted to evaluate and compare the outcome of donors and the recipients who shared equally in the donors' oocytes.

Materials / Methods

Patients undergoing IVF-ET were given the option of sharing half of their oocytes retrieved with a recipient in premature ovarian failure in exchange for assistance with the cost of the IVF procedure. All retrieved eggs were equally distributed between the donor / recipient based on morphological criteria. The long leuprolide acetate - hMG regimen was used for controlled ovarian hyperstimulation of the donor (Meldrum et al, 1989a). Recipients received a gradually increasing dose of estradiol (Estrace-2 tablets), which was initiated on the donor's 6th day of leuprolide acetate, and 50 mg progesterone IM starting with the hCG injection of the donor.

There were generally more recipients at any given time than there were donors. Rarely was a patient rejected as a donor unless she was over 40 years of age. Each recipient was selected according to the time of registration. After having received details of the donor's physical characteristics, education and medical history if a given recipient chose to reject the donor, the next recipient chronologically, was offered the next available donor. If a donor's oocytes were used in more than one cycle, the recipient was presented the details of the previous IVF cycles.

All donor-recipient cycles from January 1, 1989 to December 31, 1990 were included in the study. The results of the donor-recipient cycles for both donors and recipients were compared; chi-square analysis and Fisher's exact tests were used to analyze all the data.

Table 1 Summary of comparison of 92 cycles of *in vitro* fertilization using shared oocytes with donors and recipients

Patients	Number of patients	Aver. no oocytes transferred	No. of[a] pregnancies	Rate of implantation	No. of spontaneous abortions	No. with multiple births[b]	Tot. no. births[d]
Donors	65	3	9(10%)[c]	4%	55%	0	5
Recipients	50	3	17(18%)[c]	9%	35%	4[c]	17

[a]chi-square analysis, $p<0.01$
[b]Fisher's exact test $p<0.02$
[c]3 sets of twins; 1 set of triplets
[d]chi-square analysis $p<0.01$
[c]pregnancy rate/cycle

Results / Discussion

There were 92 cycles of IVF performed in which the donor and the recipient shared oocytes (Table 1). Despite the transfer of approximately the same number of embryos, the recipients were found to have a higher pregnancy rate (18%) than the donors (10%). The recipients also had fewer spontaneous abortions; the spontaneous abortion rate was 55% in the recipients compared to 35% in donors. Multiple births occurred in the recipients but not the

donors and the difference between the two groups was even greater when the total number of births was considered. Although there were no apparent differences in the quality of embryos transferred in donors or recipients, the implantation rate per embryo was 8.5% for recipients and only 3.6% for the donors.

Although the recipients were infertile women who received only half of the available pool of oocytes, they have a good chance of conception following transfer of embryos developed from fertilized donor oocytes. Unfortunately, the donor's chances of conception fell significantly below the level of a non-donor. Nevertheless, some patients would rather undergo the IVF procedure by sharing oocytes even with the reduced probability of pregnancies because otherwise they could not afford IVF at all. If one has an anonymous pre-designated donor available, dividing the oocytes between two recipients to lower the cost to each and decrease the risk of multiple gestations is a reasonable clinical option (Sauer et al, 1989a).

de Ziegler / Frydman (1990) reported higher pregnancy rates from the transfer of cryopreserved-thawed embryos originating from prior donor oocyte cycles versus those originating from regular IVF cycles. Their data suggested that either the source of oocytes is from more fertile donors, the uterus of women with ovarian failure may be more sensitive to implantation, or perhaps there is reduced chance of implantation in the donors possibly related to endometritis (Check, 1991). Their data refutes the concept that the hyperstimulation regimen used in IVF reduces the chances of a negative effect on pregnancy rates from IVF-ET. Using a shared common pool of oocytes, our data clearly demonstrated that the explanation for higher pregnancy rates in the recipients was not related to the quality of the oocytes at retrieval or at transfer. Combining our data with that of de Ziegler's, it would appear that the most likely mechanism for the improved pregnancy rate in the recipients is related to either a better milieu for implantation in the recipients or decreased receptivity in the donors.

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