Original Articles

Reproductive Biology Section

A novel method to assess the effect of uterine senescence by comparing pregnancy outcome in younger donors vs older recipients who are sharing a common pool of oocytes

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Summary

Purpose: To evaluate uterine senescence by comparing pregnancy rates in older recipients vs their younger donors who were actually trying to conceive themselves. *Methods:* A retrospective analysis comparing clinical and delivered pregnancy rates in all infertile donors ≤ age 35 sharing their eggs with a recipient age ≥ 40 over a 6-year time span. These parameters were also evaluated in the first frozen embryo transfer from these couples (if they had one). *Results:* The clinical and delivered pregnancy rates were similar in younger donors vs older recipients following fresh embryo transfer. There was a non-significant trend for lower implantation rates in the younger donors. No differences were found when comparing frozen embryo transfers. *Conclusions:* These data support conclusions that the uterus of women ≥ 40 does not inhibit embryo implantation.

Key words: Uterine senescence; Donor oocytes; Frozen embryos.

Introduction

A study over ten years ago of donor egg recipients found comparable implantation and clinical pregnancy rates in recipients < 40 vs those ≥ 40 [1]. The data from Sauer *et al*. suggested that uterine senescence does not seem to be a big factor in human conception [1].

This concept was supported by a study of shared donor-oocytes in which despite a common oocyte pool the older recipients had higher clinical, ongoing/delivered, and implantation rates than the donors [2]. These data had been interpreted that there had to be some factor in the donors having an adverse effect on implantation. One of these factors may have been the more likely presence of hydrosalpinges in donors vs recipients. Hydrosalpinges are well known to adversely effect implantation [3-5].. Today most in vitro fertilization (IVF) centers surgically remove the infected tubes or ligate them [6-8].

There was always the chance that the conclusions reached by Sauer *et al*. could have been related to the fortuitous use of better eggs in the older recipients negating the adverse influence of an aging endometrium. The present study attempted to evaluate uterine senescence by using a common oocyte pool.

Materials and Methods

A retrospective review over a 6-year period was performed for shared-donor oocyte cycles where recipients were ≥ 40. Donors were ≤ 35 years old. In the shared oocyte program an infertile donor shares half of the oocytes collected with a recipient in exchange for the recipient paying for the IVF cycle [9].

To cover the possible confounding variable of an adverse effect of the controlled ovarian hyperstimulation regimen, outcome was also compared on the first frozen embryo transfer. Only cycles where both donors and recipients received an embryo transfer were evaluated.

Results

The mean age for recipients was 41.9 (SD 5.6) and for donors it was 31.4 (SD 3.1). There were no significant differences in clinical or ongoing/delivered pregnancy rates in the donors or the recipients nor any differences in fresh embryo implantation rates (Table 1).

There was also no difference in pregnancy or implantation rates when comparing the first frozen embryo transfer (Table 1). The mean number of embryos transferred (combining fresh and frozen) was 2.9 for donors and 3.2 for recipients.

Discussion

These data clearly show that the uterus from women in their 40s is as receptive as younger women. Though successful pregnancies with donor eggs have also been recorded in women > 50 this age group only represented a very small minority of the recipients [10]. Thus these data do not prove that the uterus is as effective in women ≥ age 50 but do not refute this possibility.

Uterine fibroids are known to increase in frequency in women in this age range and donors or recipients with

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Table 1. — *Outcome following fresh and frozen embryo transfers in donors and recipients sharing Eggs.*

	Donors	Recipients	Donors 1st frozen ET	Recipients 1st frozen ET
# transfers	118	118	32	61
# pregnancies	66	73	11	21
% pregnant/transfers	55.9	61.9	34.4	34.4
# clinical pregnancies	59	67	8	19
% clinical/transfers	60.0	56.8	25.0	31.1
# chemical	5	6	2	2
# ectopic	2	0	1	0
# live/delivered	54	60	7	16
% live/delivered	45.8	50.8	21.9	26.2
# miscarriages	7	8	3	4
% miscarriage/clin. pregnancies	11.9	11.9	37.5	21.1
# embryos transferred	348	374	94	194
Average # embryos transferred	2.9	3.2	2.9	3.2
# sacs implanted	95	122	13	28
Implantation rate	27.3	32.6	13.8	14.4

fibroids were not excluded. The percentage of fibroids in younger donors vs older recipients was not evaluated in this study but probably was higher in the recipients. Surgery was only performed for submucous fibroids. These data support but do not prove our previous conclusions that the presence of intramuscular or subserosal fibroids in donor egg recipients does not impair the implantation rates [11].

Besides the presence of hydrosalpinges in the donors the other explanation for the aforementioned study showing higher pregnancy and implantation rates in recipients vs donors in a shared program was the possibility that the controlled ovarian hyperstimulation regimen (COH) had an adverse effect on the uterine environment [2]. There are data supporting the concept that COH may adversely effect implantation [12]. In fact some anecdotal case reports support this concept, e.g., a woman who failed to conceive despite transferring 92 embryos over ten IVF cycles but was successful with her first frozen embryo transfer [13], and even conceived naturally at the age of 40 following her first cycle of luteal phase progesterone supplementation [14].

There are data suggesting that the risk that the controlled ovarian hyperstimulation regimen may adversely affect 20% of the women having IVF-ET in the era of salpingectomy for hydrosalpinx [15]. Though the present study showed no significant difference in pregnancy or implantation rates in the donor vs recipients there still was a 20% higher implantation rate in fresh embryo transfer cycles in the recipients which was not present with frozen embryo transfers. Thus the present data do not refute this concept.

These data thus confirm the study by Sauer *et al*. showing no evidence that women age ≥ 40 have any adverse uterine factor compared to younger women. In the way the present study was performed (in which eggs were shared between younger and older women) the present study ruled out a possible fortuitous better egg pool that could have been a confounding factor in the aforementioned study by Sauer *et al*. [1].

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