

Live Delivery and Implantation Rates of Donor Oocyte Recipients in Their Late Forties are Similar to Younger Recipients

Jerome H. Check, M.D., Ph.D., Theresa Jamison, R.N., Diane Check, B.S., Jung K. Choe, M.D., Deanna Brasile, D.O., and Rachael Cohen, D.O.

OBJECTIVE: To determine if there is a certain age when the uterus is somewhat less receptive to successful pregnancy despite the transfer of embryos from donated oocytes.

STUDY DESIGN: We conducted a retrospective evaluation of donor oocyte recipient cycles according to specific ages. The recipients used an oral/vaginal graduated estradiol regimen followed by intramuscular and vaginal progesterone. Only recipients sharing oocytes with either the donor or another recipient were included.

RESULTS: Evaluating the pregnancy rate by each year of age from 40–49 following transfer of embryos derived from donor oocytes showed no trend for lower pregnancy rates up to age 49. In fact the highest live delivery pregnancy rates (though not significant) were found at ages 47 (64.3%) and 49 (63.6%). The live delivered pregnancy rates for recipients ≤ 39 was 52.5% vs. 55.6% for women ≥ 46 . The live delivered pregnancy rate was 34.6% for women ≥ 50 . The pregnancy and implantation rates were similar whether the source was infertile women sharing half their oocytes or compensated donors.

CONCLUSION: The uterus does not seem to have a diminished capacity for implantation up to the age of 49, but it may be slightly less receptive after age 50. (J Reprod Med 2011;56:149–152)

Age of the recipient did not seem to matter, whether the source of oocytes was infertile or compensated donors.

Keywords: donor oocytes, embryo implantation, embryo transfer, ovum donors, uterine senescence.

It is well known that in humans, in contrast to some other mammalian species, the ovaries rather than the uterus are first to become senescent. Using younger donor oocytes, it became clear in the early '90s that even women over age 50 can conceive easily.¹

Advancement of age could be associated with less uterine blood flow. Uterine leiomyomata are more common in women of advanced reproductive age. Some studies suggest that successful embryo implantation rates may be reduced in the presence of intramural leiomyomata.^{2,3} However not all studies agree.⁴ Thus though successful conception in women with advanced reproductive age is much

From the Division of Reproductive Endocrinology and Infertility, Department of Obstetrics and Gynecology, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School at Camden, Cooper Hospital/University Medical Center, Camden, New Jersey.

Address correspondence to: Jerome H. Check, M.D., Ph.D., 7447 Old York Road, Melrose Park, PA 19027 (laurie@ccivf.com).

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Table I Effect of Age on Pregnancy Outcome of Oocyte Recipients

Age of recipients	≤39.9	40.0–40.9	41.0–41.9	42.0–42.9	43.0–43.9	44.0–44.9	45.0–45.9	46.0–46.9	47.0–47.9	48.0–48.9	49.0–49.9	≥50
No. of transfers (minimum 2 embryos)	223	39	48	74	59	74	53	42	42	19	22	26
No. of clinical pregnancies (viable at 8 wks)	128	20	28	38	33	38	31	28	28	10	14	11
Clinical pregnancy per transfer (%)	57.4	51.3	58.3	51.4	55.9	51.4	58.5	66.7	66.7	52.6	63.6	42.3
No. delivered	117	16	26	32	27	32	28	25	27	9	14	9
Delivered per transfer (%)	52.5	41.0	54.2	43.2	45.8	43.2	52.8	59.5	64.3	47.4	63.6	34.6
No. of fetal losses	11	4	2	6	6	6	3	3	1	1	0	2
Fetal losses/clinical pregnancy (%)	8.6	20.0	7.1	15.8	18.2	15.8	9.7	10.7	3.6	10.0	0.0	18.2
Average no. of embryos transferred	3.1	3.0	2.9	3.0	3.0	2.9	2.9	3.1	3.0	2.8	3.0	3.2
No. of sacs implanted	204	33	45	64	54	52	52	49	50	18	23	22
Implantation rate (%)	29.8	28.4	31.9	29.0	30.5	24.0	34.0	38.0	39.1	33.3	34.3	26.2

more likely to occur with younger donor oocytes than with oocytes from their own ovaries, there may be an age at which transfer of embryos derived from donor oocytes may result in lower implantation and live-delivered pregnancy rates.

The present retrospective study was designed to determine if there is a certain age when women may expect a somewhat reduced pregnancy rate following embryo transfer even with the source of oocytes coming from younger oocyte donors.

Materials and Methods

A retrospective review was performed of outcomes following transfer of embryos derived from donor oocytes over a 10-year period. Approval for this original research was obtained by the Institutional Review Board of the Cooper Health System.

The data were originally stratified according to age: age ≤39 versus each yearly age up to 49, and

then ≥ age 50. The data were then further stratified according to 3 age groups: ≤39, 40–45, and ≥46. Only recipients whose oocytes were shared with another person were used in this study. This included compensated donor cycles in which there was sharing of oocytes with two recipients or infertile donors using their half of the oocyte pool for themselves in an effort to become pregnant by in vitro fertilization–embryo transfer (IVF-ET).^{5,6}

Only cycles in which there were ≥2 embryos transferred were included. All transfers were on day 3. Recipients were coordinated with the donor by first suppressing their own follicular development with oral contraceptives and then beginning a graduated course of oral and sometimes oral plus vaginal estradiol beginning on day 6 of the oocyte donor's subcutaneous injection of leuprolide acetate (all donors used a luteal phase leuprolide acetate regimen of 10 units for 10 days starting in mid-

Table II Effect of Age on Pregnancy Outcome Oocyte Recipients Using SART Age Groups

Age of recipients	≤35	35–37	38–40	41–42	≥43
No. of transfers (minimum 2 embryos)	89	71	102	122	337
No. of clinical pregnancies	50	43	55	66	193
Clinical pregnancy per transfer (%)	56.2	60.6	53.9	54.1	57.3
No. delivered	47	36	50	58	171
Delivered per transfer (%)	52.8	50.7	49.0	47.5	50.7
No. of fetal losses	3	7	5	8	22
Fetal losses per clinical pregnancy (%)	6.0	16.3	9.1	12.1	11.4
Average no. of embryos transferred	3.0	3.2	3.0	3.0	3.0
No. of sacs implanted	75	63	99	109	320
Implantation rate	28.2	28.0	32.0	30.1	31.7

luteal phase then 5 units). Gonadotropin injections were started on cycle day 3. The recipient started vaginal and intramuscular progesterone the day after the injection of human chorionic gonadotropin by the donor. Day 3 embryos were transferred on the fourth day of progesterone supplementation. Data were analyzed by chi-square analysis and Fisher's exact test.

Results

Table I shows the pregnancy rates at each age from ≤ 39 vs. 40–49 vs. \geq age 50. There was not even a trend for lower pregnancy rates at age 48 and 49. In fact, ages 47 and 49 had the highest pregnancy rates (though not significantly higher).

Table II presents the pregnancy outcome of oocyte recipients broken down into the age groups suggested by the Society for Assisted Reproductive Technologies (SART). No differences or trends are seen with advancing age of the recipients. Similarly there was no significant difference or trends for lower pregnancy or implantation rates in women aged ≤ 39.9 vs. ≥ 40.0 , as seen in Table III ($p =$ not significant, chi-square analysis).

At age ≥ 50 there may have been a nonsignificant trend for lower live-delivered pregnancy rates ($p = 0.13$, Fisher's exact test) versus women aged ≤ 39.9 and for women aged 40–49 ($p = 0.18$), but a live rate of 34.6% per transfer was still quite adequate. There were only 26 women in this group.

Table IV showed that not only did age not seem to matter, but these data confirmed previous conclusions that donor oocytes from infertile donors are as effective as from compensated donors irrespective of the age of the recipient.⁶ These data were stratified somewhat differently to determine if there was any trend for lower pregnancy rates in

Table III Effect of Age on Pregnancy Outcome of Oocyte Recipients Under Age 40 vs. Age 40 and Over

Age of recipients	≤ 39.9	≥ 40.0
No. of transfers (minimum 2 embryos)	223	498
No. of clinical pregnancies	128	279
Clinical pregnancy per transfer (%)	57.4	56.0
No. delivered	117	245
Delivered per transfer (%)	52.5	49.2
No. of fetal losses	11	34
Fetal losses per clinical pregnancy (%)	8.6	12.2
Average no. of embryos transferred	3.1	3.0
No. of sacs implanted	204	462
No. of embryos	684	1487
Implantation rate	29.8	31.1

women in their early versus late 40s. Age of the recipient did not seem to matter, whether the source of oocytes was infertile or compensated donors.

There was no trend for higher miscarriage rates with increasing age of recipients. There were 46 miscarriages in 327 clinical pregnancies (14.0%) in which compensated donors were used versus 33 in 739 clinical pregnancies (13.8%) in which infertile donors were used as the source of oocytes ($p =$ not significant).

Discussion

This is not the first large series evaluating the efficacy of donor oocyte programs for women \geq age 45. In 1996 a study evaluated 212 embryo transfers in women aged ≥ 45 using donor oocytes and found high live-delivered pregnancy rates (34.9%).⁷ The purpose of the present study was merely to use the donor oocyte model to determine at what age a decline in uterine receptivity begins.

These data clearly indicate that at least to age 49 the uterus loses none of its fecundity potential.

Table IV Comparison of Pregnancy Outcome According to Age of Donor Oocyte Recipients and Source of Oocytes (Compensated Versus Infertile Donor)

	Recipients with compensated donors			Recipients with infertile donors		
	≤ 39	40–45	≥ 46	≤ 39	40–45	≥ 46
No. of transfers (minimum 2 embryos)	147	246	88	76	101	63
Mean age of recipients	35.51	43.13	48.79	35.26	43.08	48.55
No. of clinical pregnancies	87	129	51	41	59	40
Clinical pregnancy per transfer (%)	59.2	52.4	58.0	53.9	58.4	63.5
No. delivered	83	113	46	34	48	38
Delivered per transfer (%)	56.5	45.9	52.3	44.7	47.5	60.3
No. of miscarriages	4	16	5	7	11	2
Miscarriage per clinical pregnancy (%)	4.5	12.4	9.8	17.1	18.6	5.0
Average no. of embryos transferred	3.0	2.9	2.9	3.2	3.0	3.3
Implantation rate (%)	29.4	29.3	34.5	30.6	29.2	35.7

There is a suggestion that despite a reasonable delivered pregnancy rate per transfer of embryos derived from donor eggs, women \geq age 50 may have a somewhat reduced fecundity despite the use of younger eggs.

Only 3.6% of donor egg cycles involved recipients \geq age 50 at the Cooper Center for IVF. A larger number of women aged \geq 50 are needed to corroborate or refute the suggestion that a mild degree of uterine senescence may exist in women \geq age 50.

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