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ASSISTED REPRODUCTION

Should a patient's own IVF physician perform the embryo transfer?

Stephanie J. Estes · Stacey A. Missmer · Elizabeth S. Ginsburg

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Abstract *Purpose:* To compare pregnancy rates of embryo transfers performed by a patient's own IVF physician to pregnancy rates of embryo transfers performed by other physicians on the IVF team.

Methods: Retrospective cohort study; University hospital.

Results: A total of 3029 embryo transfers were included. 434 patients (14%) had an embryo transfer by their own IVF physician. There was no difference in pregnancy rates comparing patients who had embryos transferred by a different physician than their own IVF physician when all cycle attempts were analyzed [Odds ratio (OR) 1.1; Confidence interval (CI) 0.9–1.4]. There was no significant difference between the groups' population characteristics. A subset analysis of 1st cycle only embryo transfers ($n = 1416$) also revealed no difference in pregnancy rates [OR 1.1; CI 0.8–1.5].

Conclusions: Patients can be reassured that their chances of pregnancy are the same whether their embryo transfer is performed by their own physician or another physician in the practice.

Keywords Embryo transfer · Infertility · IVF · Physician-patient relationship · Pregnancy rates

Introduction

The physician-patient relationship is a paramount part of patient care. Additionally, patients often view their involvement with the physician at the time of key procedures to be a marker of success or "good luck" for that procedure. As in vitro fertilization (IVF) gains increased utilization [1], efficiency of a busy IVF unit requires a team physician approach that involves multiple physicians being involved in the course of a patient's cycle and procedures. This process may seem daunting to patients who are familiar with a specific physician's care. Unlike other types of surgical interventions where an individual patient chooses a physician who will be performing the procedure, the retrieval and transfer procedures at many centers may be performed by another physician on the IVF team.

Therefore, we ask our patients to transfer their trust/relationship at the time of key procedures to another member of the physician team. For embryo transfer, patients often informally question the process of who will perform the procedure but appear to be accepting of having different physicians involved in their care when not given a choice. However, even though patients are accepting of this process, many still have doubts as to whether or not the success of their cycle is affected, especially if pregnancy does not occur.

Our hypothesis is that pregnancy rates are not different when the embryo transfer is performed by a physician other than the patient's own IVF physician.

Materials and methods

Study population

We conducted a retrospective cohort study of data collected from patients who underwent an embryo transfer by an attending physician from January 2000 to October 2004 at a tertiary care hospital. Institutional Review Board approval was obtained for this study.

S. J. Estes · S. A. Missmer · E. S. Ginsburg (✉)
Brigham and Women's Hospital, Department of Obstetrics and Gynecology, Division of Reproductive Endocrinology and Infertility, 75 Francis Street, Boston, MA, 02115
e-mail: eginsburg@partners.org

IVF protocol

All patients initially were under the care of an attending IVF physician who assumed the responsibility of managing the cycle prior to and during a stimulation cycle. New patients were assigned a stimulation regimen based on their history; patients with previous failed cycles underwent cycle review with multiple attending physicians and an embryologist at our weekly team meeting, discussing the recommended stimulation protocol for the following cycle that was documented in the chart. Gonadotropins administered were follicle stimulation hormone (FSH) (Gonal-F, Follistim, Fertinex or Metrodin) with the addition of human menopausal gonadoptropin (hMG) (Repronex, Pergonal) in some patients. The dosage of medication was divided between the morning and the evening when more than 225 IU (3 amps) of medication was used. The majority of cycles utilized GnRH agonists (Lupron), but GnRH antagonists (Cetrotide, Antagon) were used is embryo quality in a prior cycle was suboptimal. Patients underwent controlled ovarian stimulation with monitored estradiol levels and pelvic ultrasounds, and gonadotropin doses were adjusted accordingly. Estradiol assays were analyzed using the Bayer Immuno-1 random access analyzer (Interassay CV $<$ 50 pg/ml = 6%, Interassay CV $>$ 100 pg/ml = 2.2%). Monitoring was continued until two follicles with mean diameter of 18 mm were achieved at which point patients received 10,000 IU of human chorionic gonadotropin (HCG) intramuscularly. An estradiol of $>$500 pg/mL and at least 4 total follicles $>$12 mm were needed to meet criteria to proceed with hCG administration. Oocyte retrieval was performed 36 h after hCG. Intracytoplasmic sperm injection was performed as indicated. Assisted hatching was routinely performed in women $>$40 years old at the time of transfer, or in women of any age if the prior two cycles did not result in an implantation. Transfer of embryos occurred 3 or 5 days after retrieval according to the age of the patient, the number of embryos retrieved, and the embryo quality. The number of embryos selected for transfer were based on an algorithm from internal data analyses including patient age, cycle number, total number of embryos, number of embryos $\geq$8 cells and the quality of embryos.

Embryo transfer

The majority of embryo transfers were performed by attending physicians with a Wallace catheter (Irvine Scientific, CA) from 2000–2003. In 2004, Efficere (Cooper Surgical, CT) catheters were alternated with Wallace catheters for every other case. Embryo(s) were transferred to a depth of 1.25 to 1.5 cm less than the mock embryo transfer (uterine sounding) that had been performed in the office during a cycle prior to the stimulation cycle. If no mock transfer had been performed, ultrasound guidance was used to estimate approximately 1.5 cm below the fundus of the uterus at which point the embryos were transferred. Ultrasound guidance was also performed in cases where a difficult transfer was anticipated. The catheter was left in place for 60 s and then examined by embryology for retained embryos. If retained embryos were found, they were replaced into the uterus using the same measurements as above and the catheter was reexamined. Donor/recipient cycles, gamete intrafallopian transfers/zygote intrafallopian transfer cycles, and cycles that did not result in an embryo transfer were excluded.

Exposure and outcome

Clinical pregnancy was defined as a positive fetal heart on ultrasound. Ectopic pregnancies were not included in this analysis. The IVF physician (IVF MD) was defined as the physician who clinically managed the patient's treatment. Embryo transfer physician (ET MD) was defined as the physician who performed the embryo transfer.

Covariates

A complete list of covariates is included in Table 1.

Statistical analysis

Using SAS version 8.2, logistic regression analysis was performed to compare the pregnancy rates of embryo transfers performed by a patient's own IVF MD to those performed by another physician of the IVF team. Odds ratio and 95% confidence intervals were calculated [2]. Student's *t*-test and Mantel-Haenszel Chi-Square were used to compare group variables with P-values [2]. All *p*-values are two-sided. A covariate was considered to be a potential confounder if it was associated with either the ET performing doctor or the likelihood of pregnancy. No factor was found to change the effect estimate by $\geq$10% [2], and therefore, our primary results are presented as univariate models. Analyses were also restricted to first cycle attempts.

Results

In total, 3029 embryo transfers were included in these analyses, 434 transfers (14%) were performed by the patient's own IVF physician. The IVF team included nine attending physicians. Among all IVF cycles, 1392/3029 (46.0%) of the transfers resulted in pregnancy. Among the first IVF cycles only, 691/725 (48.8%) of the patients became pregnant. Comparison of the groups where the IVF MD and ET MD was the same physician to the group where the IVF MD was different from the ET MD did not reveal any significant

Table 1 Comparison of population characteristics by patient's own physician versus a different physician performing the embryo transfer among all IVF cycles $n = 3029$)

Variables	N (%) or mean IVF MD = ET MD	N (%) or mean IVF MD ≠ ET MD	*P*-value
Number of transfers analyzed	434 (14%)	2595 (86%)	
Primary infertility diagnosis[c]			0.16[b]
Woman's age (years)	36.1	36.0	0.65[a]
Day 3 FSH (mIU/ml)	8.0	8.0	0.72[a]
Type of cycle			0.50[b]
IVF	167 (38%)	1018 (39%)	
IVF/assisted hatching (AH)	90 (21%)	544 (21%)	
ICSI (exclusive)	62 (14%)	505 (19%)	
ICSI (mixed)	11 (3%)	42 (2%)	
ICSI/AH	104 (24%)	486 (19%)	
Attempt number	2.1	2.0	0.57[a]
Ampules of FSH	55.5	55.7	0.56[a]
Days of stimulation	11.2	11.2	0.94[a]
Estradiol on day of HCG (pg/mL)	1976.2	2036.2	0.21[a]
Follicles on day of HCG	13.0	13.0	0.96[a]
Number of oocytes retrieved	14.0	14.1	0.85[a]
Total mature oocytes	7.7	7.9	0.69[a]
Number of 2 pn embryos	4.9	4.9	0.88[a]
Average fragmentation	1.9	1.9	0.21[a]
Average symmetry	2.0	1.9	0.70[c]
Number of embryos transferred	3.6	3.4	0.05[a]
Cell number of embryos transferred	7.2	7.3	0.08[a]
Number of embryos frozen	1.1	1.1	0.70[a]
Transfer catheter depth (cm)	6.1	6.0	0.26[a]
Type of transfer catheter[d]			0.88[a]
Ease of transfer			0.32[a]
Easy	298 (69%)	1819 (70%)	
Some difficulty	58 (13%)	359 (14%)	
Major problems	9 (2%)	60 (2%)	
Not recorded	69 (16%)	357 (14%)	

Note. IVF MD: the physician who clinically managed the patient's infertility evaluation and treatment plan; ET MD: the physician who performed the embryo transfer; FSH: follicle stimulating hormone; HCG: human chorionic gonadotropin; 2 pn: 2 pronuclear; cm: centimeter; fragmentation: 0 none; 1: <10%, 2: 10–25%, 3: >25%<50%, 4: >50%; symmetry: 1 symmetrical, 2 slight asymmetry, 3 asymmetrical.

[a] *T*-test.

[b] Mantel-Haenszel Chi-Square, 2-sided p-values.

[c] Primary infertility diagnoses included adhesions, anovulatory, cervical factor, diethylstilbesterol (DES), endometriosis, luteal phase defect, male factor, polycystic ovarian syndrome/oligoovulation, tubal factor, uterine factor, unexplained, combined/other, or not available.

[d] Wallace or Efficere.

differences in patient diagnosis, age, day 3 FSH, stimulation protocol, amount of FSH used during the cycle, days of stimulation, estradiol on the day of hCG, number of follicles on the day of hCG injection, number of oocytes retrieved, number of total mature oocytes, number of 2 pn embryos, cell number of the embryos transferred, average fragmentation, average symmetry, number of embryos transferred, number of embryos frozen, transfer catheter depth, type of catheter used for the embryo transfer, or ease of transfer (Table 1).

Primary infertility diagnoses (own IVF MD %, other IVF MD %) consisted of adhesions (1.3%, 0.7%), anovulatory (0.6%, 0.8%), cervical factor (0, 0.08%), diethylstilbesterol (DES) (0.5%, 0.7%), endometriosis (7.8%, 8.6%), luteal phase defect (0.5%, 0.08%), male factor (22.1%, 24.3%), polycystic ovarian syndrome/oligoovulation (6.5%, 5.6%), tubal factor (14.1%, 13.3%), uterine factor (0.5%, 1.3%), unexplained (23.7%, 23.0%), combined/other (11.1%, 8.4%), or not available (11.3%, 12.0%) "data not shown." Among all patients, cycle attempts included 1st attempt ($n = 1416$), 2nd attempt ($n = 799$), 3rd attempt ($n = 424$), 4th attempt ($n = 217$), 5th attempt ($n = 97$), 6th attempt ($n = 42$), 7th attempt ($n = 17$), 8th attempt ($n = 8$), 9th attempt ($n = 4$), 10th

Table 2 The likelihood of pregnancy by relationship with physician performing embryo transfer

	Pregnant (%)	Not pregnant (%)	Odds ratio* (95% confidence interval)
All cycles ($n = 3029$)			
IVF MD = ET MD ($n = 434$)	190 (43.8)	244 (56.2)	10. (referent)
IVF MD ≠ ET MD ($n = 2595$)	1202 (46.3)	1393 (53.7)	1.1 (0.9–1.4)
1st cycles only ($n = 1416$)			
IVF MD = ET MD ($n = 210$)	98 (46.7)	112 (53.3)	1.0 (referent)
IVF MD ≠ ET MD ($n = 1206$)	593 (49.2)	613 (50.8)	1.1 (0.8–1.5)

Note. IVF MD: the physician who clinically managed the patient's infertility evaluation and treatment plan; ET MD: the physician who performed the embryo transfer.

*Unconditional univariate logistic regression.

attempt ($n = 3$), and 11th attempt ($n = 1$) "data not shown." The median number of cycles attempted was 2.0. The number of embryos transferred (3.6 vs. 3.4 by the patient's own IVF physician and a different physician, respectively) was not statistically significant (p-value = 0.05). Individual physician pregnancy rates per embryo transfer were similar ($p = 0.34$).

In our program, the likelihood of pregnancy was not greater among those cycles where the patient's own IVF MD performed the ET compared to those where a different IVF MD performed the ET (OR 1.1; CI 0.9–1.4). (Table 2) An additional subset analysis restricted to 1st cycle only embryo transfers was performed. Of these 1416 1st cycle embryo transfers, 210 (15%) were performed by the patient's own IVF physician. There was no significant difference between the two groups. The likelihood of pregnancy was nearly identical to the "all cycle" analysis (OR 1.1; CI 0.8–1.5).

Discussion

In this retrospective cohort study conducted in a university hospital-based IVF center, we observed no significant difference in pregnancy rates from embryo transfers performed by a patient's own IVF physician compared to another physician in the practice for our IVF program. Many women consider infertility to be the most stressful experience in their lives [3], and stress may affect IVF outcomes [3–6]. In our experience, patients feel that they may experience less stress if their own physician performs the embryo transfer, and wonder if pregnancy would be more likely to occur. We did not find any difference in pregnancy rates if a patient's own IVF physician performed the embryo transfer in either all cycle or 1st cycle analyses.

Addressing the emotional aspects of fertility is an essential part of care for our patients [7] as infertile women have been shown to have increased anxiety and depression when compared to fertile controls [8]. Patients also tend to feel a loss of control as they progress through their fertility treatment [9], and not having their own IVF physician with whom they originally formed a relationship at the beginning of their care present at the time of embryo transfer can be disconcerting. The couple may find it less than optimal to discuss the specific findings of the embryos and the number of embryos to transfer with someone other than their own IVF physician. It is critical to document for patients an analysis that can reassure them that a team approach to IVF does not cause any decrease in the likelihood of success of their IVF cycle. We believe that both staff and patients can feel reassured that the need for a team approach to IVF is not detrimental to pregnancy rates. Of course, it is critical that ongoing assessments of individual physicians' pregnancy rates per transfer should always be part of an IVF programs' quality assessment program.

To our knowledge, this is the largest study addressing whether the performance of an embryo transfer by the patient's own physician impacts pregnancy rates. Karande et al. conducted a comparison of embryo transfers performed by a patient's own physician versus another physician in the group; however, six out of 11 physicians had less than 10 transfers in each of the comparison groups. In addition, potential confounding by patient population characteristics was not evaluated [10].

Other studies have focused on the individual pregnancy rates for physicians performing embryo transfers. Van Weering examined 977 embryo transfers in a prospective observational study and concluded that experienced physicians who perform transfers by a standardized method have similar ongoing pregnancy rates [11]. Van de Pas suggests that homogeneity can be achieved between physicians with an embryo transfer at a fixed distance [12], and Bjuresten identified similar pregnancy rates (31% vs. 29%) between midwives and gynecologists who performed embryo transfers [13]. On the other hand, Hearns-Stokes reported that rates may continue to differ despite attempts to standardize the embryo transfer technique [14]. Some have suggested, however, that it is the patient demographics that can be the cause of differences in

physician pregnancy rates in IVF programs [15]. But, none of these studies address the pregnancy rates for an individual physician in regard to their "own" patients.

Our study had a specific goal of investigating the relationship between the patient and the physician. Although we acknowledge that the pregnancy rate is influenced by the individual physician success rate, we did not observe a significant difference when individual physician rates were evaluated. We conclude from our findings that, in our IVF program, performing an embryo transfer on one's own IVF patient does not factor into an increase or decrease in pregnancy rate.

We achieve uniformity in our practice by several means. First, there is a written protocol for performing embryo transfer adhered to by all physicians. Second, only flexible internal sheath catheters have ever been used, i.e. Wallace catheter, and then only after rigorous QA is performed on each lot. Thirdly, the pregnancy rate per transfer of each physician and embryologist is performed routinely taking into account the age and embryo quality and other parameters of the IVF cycles involved. Pregnancy rate differences have never reached statistical significance between practitioners. If possible trends are seen, then the individual is observed to ensure that no deviation from the transfer technique has occurred.

In a program with ongoing quality assurance, patients can be confident that their "team" of IVF physicians is equally serving their best interests. We present this evidence to assuage patients' concerns. Patients may be reassured that the team approach to IVF treatment is not detrimental and suggest that other practices replicate these findings.

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