A cost-effectiveness comparison of embryo donation with oocyte donation

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Objective: To compare the cost-effectiveness of embryo donation (ED) to that of oocyte donation (OD).
Design: Calculation of cost-effectiveness ratios (costs per outcome achieved) using data derived from clinical practices.
Setting: In vitro fertilization centers and embryo donation programs.
Patient(s): Infertile couples undergoing oocyte donation or embryo donation.
Intervention(s): Oocyte donation or embryo donation cycles.
Main Outcome Measure(s): Cost-effectiveness ratios.
Result(s): For a single cycle, ED is approximately twice as cost-effective as OD, with a cost-effectiveness ratio of $21,990 per live delivery compared to $40,600. When strategies of up to three cycles (to achieve one live delivery) are used, ED costs $13,505 per live delivery compared to $31,349 for OD.
Conclusion(s): Cost-effectiveness is a compelling reason for infertile couples to consider embryo donation. (Fertil Steril® 2010;93:379–81. ©2010 by American Society for Reproductive Medicine.)

Key Words: Cost-effectiveness, embryo donation, oocyte donation

Embryo donation (ED), or embryo adoption, has become an increasingly attractive method to achieve pregnancy for infertile couples who have either failed to conceive or not chosen to pursue IVF using their own gametes (1–3). Because embryo donation does not require the recipient woman to undergo oocyte retrieval, the procedure is medically less complex and less expensive than either autologous IVF or oocyte donation (OD) (4). However, the pregnancy and live delivery rates from an infertility procedure need to be considered in light of their success rates. An effective measure for doing this is the cost-effectiveness ratio (CER)—the cost of the procedure divided by the live delivery rate (dollars per live delivery achieved) (5). Comparison of the CERs of oocyte and embryo donation can help determine whether the higher success rate of oocyte donation is enough to justify its higher cost.

MATERIALS AND METHODS

For the first phase of the study, the cost of a single cycle of OD in the United States was estimated by averaging the charges of 15 geographically representative IVF centers calculated from information furnished by their staff members or published on their Web sites (6–20). These costs included donor and recipient medications, fees paid to the egg donor, administrative costs, short-term donor medical insurance, and charges for clinical services. This cost figure was divided by the delivery rate for OD cycles without prior assisted reproductive technique (ART) derived from the National ART Surveillance System (NASS) administered by the Centers for Disease Control and Prevention (G. Jeng, personal communication, January 2009) to obtain a single-cycle CER for OD.

Seven ED programs (four IVF centers and three programs that match embryo donors) supplied ED costs. These costs included clinical fees, counseling and family studies, medications, and shipping charges. In four of the seven programs, a clinical entity works with a social services entity to serve the patient; in these cases, costs from both entities were included. The other three programs offer all the services "under one roof." An average of the costs, weighted by the number of embryo transfers done by each program, was divided by the previously published aggregate delivery rate for the programs (3) to obtain a single-cycle CER for ED.

For the second phase, five IVF centers that perform both OD and ED supplied average costs for first (fresh) and second and third (cryopreserved) cycles for OD, and the numbers of patients participating in and delivering in each cycle. Centers reported numbers of patients seen during the last 12 years, for a total of 20 clinic-years for OD and 19 clinic-years for ED. A given patient remained in the model only up through her first live delivery. The IVF centers supplied the same information

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TABLE 1

Calculation of cost-effectiveness ratios for oocyte and embryo donation.

	Oocyte donation	Embryo donation
No. of patients participating, cycle 1	525	186
Total cost of cycle 1	$10,439,894	$1,019,760
No. of patients delivering, cycle 1	280	77
No. of patients participating, cycle 2	164	67
Total cost of cycle 2	$667,980	$314,236
No. of patients delivering, cycle 2	63	22
No. of patients participating, cycle 3	52	24
Total cost of cycle 3	$209,000	$124,568
No. of patients delivering, cycle 3	18	9
Total cost of all cycles	$11,316,874	$1,458,564
Total deliveries in all cycles	361	108
Overall CER	$31,349	$13,505

CER = Cost-effectiveness ratio.

Finger. Cost-effectiveness of embryo donation. Fertil Steril 2010.

for the first three cycles (all cryopreserved) of ED. These data enabled the calculation of three-cycle CERs for OD and ED for couples pursuing pregnancy by either of these routes.

RESULTS

In the first phase, the average cost of a single cycle of OD was $22,127. When divided by the live delivery rate reported by SART for first-cycle OD participants (no previous IVF; 54.5%), the CER for OD is $40,600 per live delivery. The average cost of ED from the seven programs was $7,806. When divided by the previously published live delivery rate (35.5%) the CER for ED is $21,990 per live delivery.

In the second phase, the five participating IVF centers experienced a single-cycle CER for OD of $37,285, which is approximately $3,000 less than the national average. Couples experiencing up to three cycles of OD in these centers paid $31,349 per live delivery, compared with $13,505 for ED. Cost-effectiveness ratios are lower when calculated for three cycles than for just one cycle, because subsequent OD cycles do not require additional oocyte retrievals, and subsequent ED cycles do not require additional home studies and counseling, yet produce additional live births. Table 1 shows the numbers of patients participating in and delivering in each stage of the model, and the total cost of each stage, summed across all five centers.

DISCUSSION

This study found that a single cycle embryo transfer with a donated embryo is approximately half as expensive per live delivery than one with a donated oocyte. If a couple embarks on a strategy of up to three cycles with donated oocytes until one live delivery is achieved, they can expect a cost per live delivery well less than half of that experienced by a couple who begins with a fresh embryo made from a donated oocyte and if unsuccessful, follows with up to two frozen cycles with embryos made from oocytes from the same donation. Thus, accepting a donated embryo is an attractive option for a couple for whom finances are a limiting factor. For comparison, we attempted a rough estimate of a CER for traditional adoption. The Child Welfare Information Gateway (21) estimates an average cost for a domestic independent adoption at $10,000 to $15,000. Using the midpoint of this range ($12,500) and a figure from the National Survey of Family Growth (22) that for every woman age 15–44 years who has actually adopted a child, 2.07 women "took steps to adopt" and estimating that a couple might spend $2,000 on an unsuccessful adoption attempt, the estimated CER would be $16,640—slightly higher than our three-cycle CER for embryo donation. Thus, embryo donation is likely to be cost-effective by this comparison as well.

Factors other than finances influence reproductive choices. Autologous IVF is not possible for some couples because the female partner may not be able to produce viable oocytes. A couple whose male partner produces no viable sperm cannot do autologous IVF or oocyte donation except with donor sperm. An advantage of embryo donation for some couples is that they may prefer to have a child genetically unrelated to either of them rather than to just one parent (23). In addition, some couples who hold that individual human life begins at conception may see acceptance of a donated embryo as a "rescue" of that life, whereas oocyte donation may be seen as the creation of a life outside the marriage bond (24). On the other hand, the pregnancy rate from a donated embryo is not as high as that with oocyte donation, and for some couples, oocyte donation may offer what they consider to be more favorable characteristics in the offspring.

Any pregnancy from a donated embryo or a donated oocyte will be 100% antigenically foreign to the mother, compared with 50% for a natural pregnancy. Some studies have suggested that pregnancy-induced hypertension or preeclampsia

may be more common because of a more robust immunologic response to pregnancies where none of the antigens on the trophoblast are the same as the mother's (25–27). However, miscarriage rates for embryo donation pregnancies are similar to those for natural pregnancies (CDC, unpublished data).

The cost-effectiveness results presented in this paper illustrate one compelling reason for couples to choose embryo donation. This option should be offered by IVF centers to couples whose financial resources are limited, especially if medical factors have foreclosed other strategies.

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