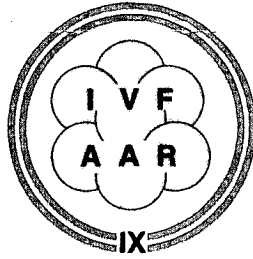


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IXth

The use of donor sperm vs oocytes to evaluate the course of failed fertilization (1)

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SUMMARY

In vitro fertilization-embryo transfer (IVF-ET) may be used to evaluate whether the inability of the sperm to fertilize the oocyte may be the cause of infertility. We evaluated patients in our practice who had at least one cycle with zero fertilization to determine which gamete was at fault. 35 couples used their own gametes. 30 (85.7%) had at least 1 cycle with positive fertilization; 42.5% of those failing to fertilize on cycle 1 and 35% failed on cycle 2 had subnormal motile density, morphology, or hypo-osmotic swelling test scores. The pregnancy rate/cycle was only 2.3% (3/130). It was 8.3% for those using donor sperm (3/36) and 18.2% (2/11) for donor oocytes. Thus, failure to fertilize does not necessarily forebode failure to fertilize in a subsequent cycle, but does predict poor outcome unless donor gametes are used.

INTRODUCTION

In vitro fertilization-embryo transfer (IVF-ET) offers a method for evaluating the cause of infertility in any given couple. In this study we evaluated patients in our IVF program who had multiple cycles where at least one had zero fertilization to determine which gamete was at fault.

MATERIAL AND METHODS

Three protocols were used: The first protocol (standard) requires the use of the couples own gametes. The long leuprolide acetate (LA)-human menopausal gonadotropin (hMG) regimen is used for controlled ovarian hyperstimulation (COH) (2).

The second protocol offered allows the couple to use donor sperm and/or oocytes for their first IVF cycle if either semen parameters showed poor chance of fertilization, or the wife was in premature ovarian failure.

The third protocol is designed for couples who wish to participate in our donor/recipient program. Patients are given the option of sharing half of their oocytes retrieved, with a recipient in premature ovarian failure, in exchange for assistance in paying for the donor's IVF cycle. All oocytes retrieved are then distributed equally by morphologic criteria to the donor and recipient.

RESULTS AND CONCLUSIONS

Sixty-three couples were examined. Although eight of the couples failed to achieve fertilization in all their IVF cycles, 87.3% attained fertilization in at least one of their IVF cycles.

Most common was failure to fertilize on the first cycle. Subnormal parameters were found in 42.5% of the males. On the failed cycle, 31/35 used their own gametes, 4 used some donor gametes. On subsequent cycles, 27 (77.1%) of these couples were able to achieve fertilization, 14 using their own gametes and 13 using donor. Six pregnancies were achieved.

Thirty-two percent achieved fertilization on their first cycle but failed on their second. Thirty-five percent of the males had at least one subnormal semen parameter. On the failed cycle, 15 couples used their own gametes, 5 used donor gametes. Seven couples tried a third cycle, 3 failed again (2 using their own gametes, 1 with donor), 4 achieved fertilization (3 with donor gametes, 1 with their own). Two pregnancies were achieved in this group.

Zero fertilization first occurred on the third cycle for 8 couples. At least one abnormal semen parameter was found in 12.5% of the males. On the failed cycle, 7 couples used their own gametes, 1 used donor gametes. Four couples underwent subsequent IVF cycles. All achieved fertilization, 2 with their own gametes, 2 with donor gametes. However, no pregnancies were achieved in this group.

23/63 (36.5%) couples had subnormal semen, while 40 (63.5%) failed to fertilize with normal semen parameters. Low oocyte yield was observed in 13 failed cycles. However, 6/13 had another IVF cycle in which they achieved fertilization with a low oocyte yield. Thus, these parameters seem to be inconsistent in their ability to predict poor outcome.

Overall, 35 couples continued to use their own gametes in all cycles, 28 couples tried donor. Of the couples who used their own gametes, 30 (85.7%) had at least one cycle with fertilization. Eight of the couples used donor gametes exclusively, with only one failing. Of the 20 couples who combined their own gametes with donor, 14 had fertilization with donor after failing with their own, 2 failed with both, 4 fertilized using their own gametes but failed with donor, and one attained fertilization with both.

Eighteen patients tried donor sperm. Twelve achieved fertilization

using donor sperm after failing with their own. Seven of the 18 men had at least 1 subnormal semen parameter. They all achieved fertilization using donor sperm after failing with their own sperm. Thus, the semen parameters correctly identified the male factor in these cases. Of the 11 men with normal sperm, 5 failed to achieve fertilization with their own sperm whereas donor sperm worked. It appears that semen parameters falsely identified 5 men as normal.

Eight of the 63 women (12.7%) became pregnant even though they experienced a cycle with zero fertilization. The pregnancy rates (PRs)/cycle were 2.3% (3/130) using own gametes; 8.3% (3/36) using donor sperm with female's partner's oocytes; 18.2% (2/11) using male partner's sperm with donor oocytes; and 0% using donor sperm and donor oocyte. Seven of the eight pregnancies had successful deliveries. One conceiving with couple's own gametes had an empty sac.

IVF-ET may be used to evaluate unexplained infertility. If zero percent fertilization occurs, it would suggest that there is a problem with one or both of the gametes. If in a subsequent cycle the husband's sperm fails to fertilize again but a portion of the oocytes are found to fertilize by donor sperm, the conclusion may be made that there is a problem with defective sperm whether semen parameters are normal or not. In contrast, failure to fertilize with either husband's or donor sperm, the conclusion may be drawn that a defective oocyte is probably responsible.

However, in 35 couples who used their own gametes exclusively, 85.7% subsequently had a cycle with good fertilization. These data cast doubt on the simple explanation considered above. It is possible that these defects will not persist in subsequent cycles.

There were 18 couples who used donor sperm. These were from a group where semen parameters were obviously poor and/or repeat failure to fertilize with their own sperm occurred. 10 of the 18 (58.5%) achieved fertilization using donor sperm, whereas they failed using their own sperm, thus indicating possible defective sperm as the cause of zero percent fertilization. However, since some couples continued to fail to fertilize using donor sperm and some had mixed fertilization results using donor sperm, the oocyte would seem to be defective in these cases despite the assumption of normal oocyte and spermatozoa.

Although fertilization was achieved with donor sperm in all 7 men who failed with their own abnormal sperm, the low PR of 7.7% still raises concern about some concomitant oocyte factor.

Though a cycle with zero percent fertilization does not forebode the likelihood of invariable subsequent failure, there were only 3 pregnancies in 130 cycles (2.3%/cycle) with the couples own gametes as compared to 3/36 cycles with donor sperm (8.3%/cycle). The best pregnancy results were accomplished with donor oocytes but this does not necessarily indicate that oocyte factor is more common than male factor since we achieve higher PRs in oocyte donation cycles than regular IVF-ET cycles (3,4).

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