Preferences for intracytoplasmic sperm injection versus donor insemination in severe male factor infertility: a preliminary report

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With the advent of intracytoplasmic sperm injection (ICSI), our programme noted a drop in the number of couples using donor insemination (DI) for severe male factor infertility. Over the first 8 months in which our infertility programme offered both treatments, 27 consecutive couples scheduled for ICSI and 15 consecutive couples scheduled for DI were evaluated. Since all patients in our infertility programme beginning in-vitro fertilization (IVF) with planned ICSI or starting DI undergo a semi-structured psychological interview, the psychologist’s clinical notes as well as the medical chart were reviewed and coded retrospectively to determine factors related to a couple’s treatment choice. Couples who chose IVF-ICSI over DI had a higher occupational status and included husbands with higher educational levels. Their most common motivation was to have the husband’s biological child (93% of couples in the ICSI group). The most common motivation for choosing DI (60% of DI couples) was that IVF was not financially affordable. Choice of treatment was not related to psychological adjustment, the husband having prior biological children, or his risk of passing on a genetic defect to offspring. These preliminary data raise the concern that, with the success of ICSI, DI may change in the USA from being an option dictated by semen quality to a second choice treatment utilized for economic reasons.

Key words: donor insemination/intracytoplasmic sperm injection/treatment/motivation/psychological

Introduction

Since the first pregnancies from in-vitro fertilization (IVF) augmented with intracytoplasmic sperm injection (ICSI) were reported (Palermo et al., 1992), the use of ICSI has revolutionized the treatment of severe male factor infertility (Oehninger et al., 1995; Palermo et al., 1995; Sherins et al., 1995; Silber, 1995). Fertilization rates with ICSI are so high that female age, with its attendant impact on the quality and number of eggs retrieved, has become the limiting factor in pregnancy rates for couples. Parameters of semen quality, in contrast, appear irrelevant as long as viable spermatozoa are available (Oehninger et al., 1995; Sherins et al., 1995). IVF-ICSI therefore provides a new option to couples who previously were restricted to donor insemination (DI) or adoption to obtain a child. DI is often regarded unfavourably in Western society. A recent American survey of men in infertile couples found that only 43% would consider using DI and, in a matched sample without infertility, only 15% of men would contemplate it (Braverman and Corson, 1995). In a Spanish cohort of couples choosing DI, results of a word association test suggested men saw their role as more passive and were more apprehensive about pregnancy than their wives (Rojo-Moreno et al., 1996). Couples who use DI also must confront difficult decisions about whether to tell their child about his or her genetic origins (Broderick and Walker, 1995; Cook et al., 1995). For the minority who choose to be open (Schover et al., 1994; Cook et al., 1995), information about the donor remains quite limited in most countries. Moreover, the impact of the availability of ICSI on infertile men’s acceptance of DI has not been studied.

Our programme had noted a decline in the number of active couples in our DI programme (including both new and ongoing cases) from an average of ~150 couples from 1983 through 1988, to 135 in 1989, 112 in 1990, 109 in 1991, 105 in 1992, 88 in 1993 and 78 in 1994. We believed that much of the decline was related to the gradually increasing success of assisted reproductive technology for severe male infertility. Beginning in 1995, our Reproductive Centre has offered an effective programme of IVF-ICSI (including microsurgical sperm aspiration and electroejaculation to obtain spermatozoa).

We wanted to identify factors related to couples’ preferences for IVF-ICSI versus DI. Each couple entering either our IVF programme or our DI programme is required to have a semi-structured interview by a clinical psychologist (L.R.S.). To compare the reasons for choosing one type of treatment over the other, data from these interviews, as well as from medical chart reviews, were categorized and compared.

Materials and methods

A total of 42 consecutive married couples with severe male infertility underwent an hour-long semi-structured interview with an experienced, clinical psychologist (L.R.S.) in preparation for beginning infertility therapy either with IVF-ICSI or insemination of the wife with semen from an anonymous donor (DI). Only couples for whom ICSI was planned in advance of their IVF cycle were included. Couples were told that the purpose of the interview was to assess their current abilities to cope emotionally with their infertility treatment, to make sure both partners were comfortable with their choice of treatment, and to familiarize them with the psychological support services available in our programme.

Each partner’s highest level of education was recorded (high school degree, some college, 4-year college degree, postgraduate degree).
Table I. Reasons for male infertility in our study

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No (%) of patients undergoing procedure</th>
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<tbody>
<tr>
<td></td>
<td>IVF-ICSI</td>
</tr>
<tr>
<td>Vasectomy or failed reversal</td>
<td>4 (15)</td>
</tr>
<tr>
<td>Congenital absence of vas deferens</td>
<td>4 (15)</td>
</tr>
<tr>
<td>Past treatment for testicular cancer</td>
<td>1 (3)</td>
</tr>
<tr>
<td>Other severe male infertility</td>
<td>18 (67)</td>
</tr>
<tr>
<td>Total</td>
<td>27 (100)</td>
</tr>
</tbody>
</table>

IVF-ICSI = in-vitro fertilization with planned intracytoplasmic sperm injection, DI = donor insemination.

The psychologist rated the family's occupational status taking into account the occupations of both spouses as professional (physicians, doctoral level scientists, business executives, attorneys, etc.), white collar (engineers, teachers, small business owners, sales representatives, etc.), or blue collar (clerks, secretaries, factory workers, construction workers, etc.).

Standardized psychological questionnaires were not administered, but the interview included a series of open-ended questions about motivations for infertility treatment, psychological adjustment of each spouse (including a lifetime history and current assessment of substance abuse, affective and anxiety disorders by DSM-IV criteria), and the degree of conflict and intimacy in the marital relationship. Each couple was asked the following questions: In your situation, you have the options of IVF-ICSI, DI, or adoption. What made you choose this particular treatment? What thoughts have you had about the treatments you have not chosen (i.e. ICSI-IVF, DI, or adoption)? If the current treatment is not successful, what would you be likely to do next? The psychologist reviewed her extensive written notes for each interview and coded answers to questions of interest. No external check of reliability was attempted.

During the year 1995, we performed 48 IVF-ICSI cycles. Fresh embryo transfer was accomplished in 39 cycles. Embryos were cryopreserved in the nine remaining cycles to avoid the risk of ovarian hyperstimulation. Of the 39 transfers, 17 resulted in chemical pregnancies (44%) and 14 in currently ongoing or completed pregnancies (36%). Our pregnancy rate per cycle with DI using cryopreserved semen is ~15%, albeit with far less expense and medical risk. The approximate total cost for a cycle of IVF-ICSI in our programme was US $7000 per stimulation cycle and US $1000 per replacement of cryopreserved embryos, compared to US $400 for a cycle of DI.

Statistical analyses were performed using Stats+ (StatSoft Inc., Tulsa, OK, USA). Procedures included t-tests, \( \chi^2 \) tests, Fisher's exact test and Pearson's product-moment correlations.

Results

Background Information

In all, 27 couples chose IVF-ICSI and 15 couples chose DI. At the time data were reviewed, the interviews had taken place a mean of 4 ± 2.04 months (range 1–8) previously. The mean age of husbands was 37 ± 7.9 years and that of wives 33 ± 4.7 years. Seven couples in the sample had an age difference of ≥10 years between spouses. The mean years of marriage was 6 ± 3.9 (range 1–14 years).

Using t-tests for independent samples, the two treatment groups did not differ significantly in time since interview, age of husbands or wives, age gap between spouses, or years married. Table I lists the reasons for the husband’s infertility.

The numbers of men in each category are too few to allow valid statistical analysis, but in general the type of diagnosis appears similar within the two treatment groups.

Occupational status of the couple was, however, related to treatment choice. Couples of blue collar status were more likely to choose DI (five out of seven couples), while those of white collar or professional status were more likely to choose IVF-ICSI (25 out of 35 couples) (Fisher's exact test, \( P = 0.044 \)). The husband's level of education was also related to treatment choice, with husbands in the IVF-ICSI group having more education (\( \chi^2(3) = 8.97, P = 0.030 \)). Of men who had postgraduate degrees (\( n = 15 \)), 73% chose IVF-ICSI (and one had no choice except DI), compared to 25% of men with high school educations (\( n = 8 \)). The wife's educational level was not, however, significantly related to treatment choice.

Four women and 12 men already had at least one genetic child. Childless status was not related to choice of infertility treatment for husbands or wives (Fisher's exact tests).

Emotional factors and treatment choice

The psychologist rated 14 (33%) couples as having mild to moderate marital tension, based on observations of their interaction and on direct questions about expression of affection and anger and sources of conflict in their relationship. Eight (19%) of the women were assessed from the interview to have some current emotional distress (including both adjustment disorders and more major mood or anxiety disorders), as were 11 (26%) of the men. The prevalence of marital tension or individual distress was not significantly related to choice of infertility treatment (Fisher's exact tests). No couple was judged to be too distressed to proceed with infertility treatment.

Motivation to choose IVF-ICSI versus DI

The most common motivation stated by men for choosing IVF-ICSI (93% or 25 out of 27) was to have a biologically related child. For wives in the IVF-ICSI group, 93% stated that they wanted to bear their husband's biological child and 70% mentioned they wanted their own genetic child.

The most common motivation for choosing DI (60%, or nine out of 15, of both men and women) was the expense of IVF-ICSI. Most couples in this category simply could not afford IVF-ICSI, but a few (two DI couples or 13%) mentioned the limited success rates of IVF (particularly given the cost) as a factor in their treatment choice. The increased medical risk to the wife with IVF was a factor for five women (33%) and two men (13%). In the DI group, 12 women (80%) were motivated in their choice (compared to adoption) by their wish to give birth to their own genetic child.

Two couples (13%) were forced to choose DI because the husband had no sperm cells for IVF-ICSI (one man with bilateral orchiectomy and one with absence of any germ cells on testicular biopsy). We included these couples because they could have chosen adoption, but instead were part of the consecutive group participating in DI for severe male factor infertility. In fact, their inclusion attenuated the occupational and educational differences between treatment groups, since both fell into the 'professional' category.
Men frequently expressed a wish that the wife have the experience of pregnancy and biological parenthood (30% of IVF–ICSI husbands, i.e. eight men, and 27% of DI husbands, i.e. four men). This was a common motivation for men who had already had children in earlier relationships and were now infertile because of a vasectomy or other intervening factors. Sixty percent of men who chose DI (nine out of 15), but only 11% of those who chose IVF (three out of 27 men) mentioned that they believed genetic factors to be unimportant in the parent–child relationship (Fisher’s exact test, $P = 0.002$). Men of lower occupational status were more likely to discount the importance of biological parenthood ($\chi^2(2) = 5.25$, $P = 0.071$; 8% of professional men, $n = 12$; 30% of white collar men, $n = 23$; 57% of blue collar men, $n = 7$). Statements about the importance of genetic factors in parenthood were not significantly correlated with men’s educational attainment.

**Influence of genetic risk**

The use of ICSI entails some genetic risk (Meschede *et al.*, 1995; Persson *et al.*, 1996). Couples were informed about this issue and asked if a concern about passing on a genetic disease or condition to their offspring influenced their choice of infertility treatment. Within this group of couples, 10 men and two women had family histories or other diagnostic findings apart from oligospermia suggesting their offspring might be at risk for a genetic disorder. The choice of infertility treatment did not differ significantly with presence versus absence of genetic risk factors in the male partner (Fisher’s exact test). Congenital absence or obstruction of the vas deferens has been associated with carrier status for mutations of the CF gene that causes cystic fibrosis (Chillon *et al.*, 1995). Four men had congenital absence of the vas deferens and another had obstructive pathology but a sister with cystic fibrosis. These couples all had genetic counselling, including testing of the wife for CF carrier status. The wife’s test was negative for common CF mutations in all cases, so that the risk was mainly that a child would have CF carrier status and, if male, the attendant fertility problems. One man had a father and brother who were schizophrenic. Another had a brother with severe psoriasis (whom the couple had used as a semen donor prior to entering our programme). One husband had type I diabetes and one had Hirschsprung’s disease. One wife had Crohn’s disease and another had a sister with cri-du-chat syndrome.

Neither of the two women with a possible genetic carrier status was concerned about risk to a child. Concern about risks to their children did not influence choice of infertility treatment in any of the 10 men who could be genetic carriers. Of the 10 couples with a potential paternal genetic risk, four chose DI. Three of the four wives in this DI subgroup did mention, however, that fear of a genetically abnormal offspring influenced their decision to choose DI.

**Choice of second-line treatment**

Couples were asked if they had a plan for a next step if the current infertility treatment was not successful. Table II lists the preferences of the husbands and wives in the event of treatment failure. About one-third of IVF–ICSI couples (nine men and 10 women) would consider DI as the next option.

### Table II. Preferences for second-line treatment

<table>
<thead>
<tr>
<th>Preference for next step</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>IVF-ICSI (n = 27)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DI (n = 15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undecided</td>
<td>30%</td>
<td>47%</td>
</tr>
<tr>
<td>Remain childless</td>
<td>11%</td>
<td>7%</td>
</tr>
<tr>
<td>Try DI</td>
<td>37%</td>
<td>N/A</td>
</tr>
<tr>
<td>Try IVF-ICSI</td>
<td>N/A</td>
<td>0%</td>
</tr>
<tr>
<td>Adopt a child</td>
<td>22%</td>
<td>47%</td>
</tr>
</tbody>
</table>

IVF-ICSI = in-vitro fertilization with planned intracytoplasmic sperm injection, DI = donor insemination; N/A = not applicable

Couples who had chosen DI perceived themselves as closer to the ‘end of the line’ and were more willing to consider adoption than those who opted for IVF–ICSI (Fisher’s exact test, $P = 0.048$). Men appeared to be somewhat more likely to be content remaining childless and less likely to consider adoption, although gender differences were not statistically significant (Fisher’s exact test). Men who already had children did not exhibit a strikingly different pattern in their choices from men who were childless.

**Discussion**

Although these data are based on a small sample from one clinical setting, they provide an initial ‘snapshot’ of the impact of IVF–ICSI on couples’ choices about treatment for severe male factor infertility. The most consistent difference in couples who chose IVF–ICSI versus DI was their socioeconomic status. Those with higher educational and occupational attainment had a strong preference for IVF–ICSI over DI. Although the data on a couple’s motivation in choosing treatment may be subject to bias in the psychologist’s clinical judgement, the interviews suggest that most couples who chose DI would have preferred IVF–ICSI had it been financially or medically possible. However, factors such as the limited success rates of IVF and the greater risk to the wife’s health also influenced couples’ perceptions of whether a costly trial of IVF–ICSI was worthwhile.

Given the poor insurance coverage in the USA for infertility treatment, these preliminary findings suggest we may be creating a two-tiered system of care for men with severely limited fertility: a genetic child if you can afford to pay for one, and otherwise the options of a child who is not biologically related or living without children. Economic forces already limit the availability of assisted reproductive technology, and the success of IVF–ICSI merely heightens the contrasts between rich and poor couples. DI is obviously the most inexpensive way for these couples to conceive a pregnancy. In fact in the USA, DI is also less costly and time-consuming than a typical public agency adoption, let alone a private adoption. Obviously, the cost differential between IVF–ICSI and DI is less in some nations that include assisted reproduction under a national health care system, and couples’ preferences for treatment should also be studied under those circumstances.

Comparisons between treatment groups also highlight men’s strong imperative to have a genetic child. During the first
months in which our centre offered both IVF–ICSI and DI programmes, even men who had previously fathered biological children or who risked passing on a genetic defect to their offspring typically preferred IVF–ICSI to DI or adoption. Concerns about genetic defects that may be associated with severe male infertility or with the ICSI procedure itself have led to calls for routine genetic testing and counselling for these couples (Meschede et al., 1995; Persson et al., 1996). The Dutch Society of Obstetrics and Gynaecology has even imposed a moratorium on the use of epididymal spermatozoa for ICSI in The Netherlands (June, 1996). Although our clinical experience is limited and preliminary, it suggests that couples who use IVF–ICSI may not be as welcoming of costly and time-consuming genetic testing and counselling, or as willing to use prenatal diagnosis with its small increased risk of miscarriage, as health providers would anticipate. Further research on couples’ knowledge and attitudes about the genetic risks associated with IVF–ICSI is urgently needed.

The greater linkage of the husband’s than the wife’s educational attainment to treatment choice probably reflects the greater influence of a husband’s education on the couple’s economic resources. An alternative hypothesis is that men with more education have a greater investment in producing genetic offspring. A strikingly higher percentage of men who chose DI discounted the importance of biological parenthood. However, such statements were typically volunteered as a rationale for adjusting to the economic necessity of using a donor and not as the primary reason for choosing the donor programme.

For women, both IVF–ICSI and DI offer the chance to experience pregnancy and to bear a genetically related child. In fact, it is a paradox that the wife, who typically has normal fertility, undergoes most of the medical risk and discomfort of an IVF–ICSI cycle. A greater percentage of women than men cited the increased health risks of IVF to the female partner or the fear of having a genetically abnormal child as reasons for choosing DI. Nevertheless, the majority of women interviewed preferred to try IVF–ICSI before considering DI. If their first choice of infertility treatment fails, women also are more open than men to adoption (69% of wives versus 52% of husbands) and less likely to give up the dream of being a parent (18% of wives versus 39% of husbands).

With the success of ICSI, DI may change from an option that couples choose when they have exhausted other medical alternatives to a treatment dictated by economic limitations. We intend to use these preliminary data to design a prospective study, using more standardized and objective assessment instruments, of couples’ perceptions of their choices of fertility treatment for a severe male factor. We also believe that longitudinal studies of these families are very important. A recent study in the United Kingdom suggests that families who choose DI value their children and enjoy parenting as much as families who have a child through IVF or adoption, and more than families who have a child without ever facing infertility (Golombok et al., 1995). The adjustment of the children, aged 4–8 years, was similar across groups. No evidence was found that keeping the child’s origins a secret impaired family relationships (Cook et al., 1995). Although these findings are reassuring, a concern is whether families will continue to cherish their DI children if they use a donor because of economic rather than medical necessity.

References


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