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The First Pregnancy in a Transport–Intracytoplasmic Sperm Injection (T-ICSI) Scheme

Submitted: February 13, 1995
Accepted: April 13, 1995

INTRODUCTION

Intracytoplasmic sperm injection (ICSI) offers the only hope of achieving a pregnancy without the use of donor gametes to a large percentage of subfertile patients who fail to achieve fertilization in standard IVF or who, because of poor sperm quality, cannot be accepted for IVF treatment (1). Unfortunately due to the prohibitive cost of micromanipulation equipment, the high level of skill required, and a slow learning curve, few centers are at present able to offer a successful ICSI program to their patients.

There appears to be a greater imperative than with other assisted conception procedures to centralize resources and skills and organize a system whereby oocytes from satellite IVF centers can be transferred to a central embryology laboratory where ICSI is performed.

Recently, pregnancies resulting from intravaginal transport and partial zona dissection and subzonal insemination have been reported (2,3). Here we describe the first pregnancy resulting from an experimental transport–ICSI (T-ICSI) scheme established between the Women’s Hospital in Liverpool and the Embryology Laboratory at St. Mary’s Hospital in Manchester.

CASE REPORT

The couple were referred to us in 1991 with a history of 7 years of unexplained infertility. The female partner had a 10-year-old child from a previous marriage, while the male partner had not previously achieved successful fertilization. Prior to referral the couple had been treated unsuccessfully for a year with clomiphene citrate. Initial investigations of the male partner confirmed decreased testicular size and severe oligoasthenospermia with sperm counts of between 4.2 and 5.2 million/ml, a progressive motility of between 5 and 10%, and a sperm migration test of less than 0.1 million/ml (4). The patient was treated for 9 months with tamoxifen citrate, which slightly improved the sperm count but did not alter the sperm function parameters. The couple underwent one cycle of intravaginal culture (IVC) (5,6), of which nine oocytes were collected and mixed with sperm, however, fertilization failed to occur.

In 1994, following extensive counseling during which the experimental nature of T-ICSI was explained, the couple were enrolled in the T-ICSI program. Following pituitary desensitisation with nafarelin acetate (Synarel; Syntex Pharmaceuticals Ltd., Maidenhead, UK), follicular stimulation was achieved with 3 ampoules (225 IU) of human menopausal gonadotropin (Pergonal; Serono, Welwyn City, UK) daily for 9 days. Transvaginal oocyte collection performed 36 hr following administration of 5000 IU of hCG (Profasi; Serono, Welwyn City, UK) yielded 10 oocytes.

The semen sample was prepared using the standard wash and swim-up technique. However, to increase the surface area, the sample was split over

Journal of Assisted Reproduction and Genetics, Vol. 12, No. 6, 1995
several tubes. Remaining pellets were resuspended and sent as a backup. Oocytes were buffered in preequilibrated Menezo B2 medium (7) and sealed in tubes. Gametes were transported by the male partner in a transport-IVF incubator (8) to the ICSI Embryology Laboratory, situated 45 mi from the place of oocyte collection. Five oocytes had no polar body and were not injected. The remaining five oocytes were each injected with a single sperm. One oocyte fertilized and divided to two cells. Two days after oocyte retrieval the embryo was transported by the husband back to the satellite unit, where an uneventful embryo transfer was performed. The luteal phase was supported with 200 mg progesterone pessaries twice a day for a period of 2 weeks (Cyclogest; Hoechst UK Ltd., Hounslow, UK). Two weeks after embryo transfer a semiquantitative β-hCG test was strongly positive. At 5 weeks of gestation the patient reported vaginal blood loss and ultrasound confirmed early intrauterine pregnancy. A pregnancy test was still positive but the patient miscarried several days later.

DISCUSSION

The establishment of IVF made it possible for patients with tubal damage to achieve a pregnancy. Unfortunately, because of the high price and the unwillingness of national health schemes and insurance companies to finance IVF treatment, the majority of couples fail to benefit fully from the available technology. In an attempt to rectify this situation we and others have successfully dispersed parts of the treatment to community and, by doing so, decreased not only the cost but also the emotional trauma connected with infertility treatment in this category of patients (8-10). The treatment of male infertility with IVF has been less satisfactory (11) and attempts to improve the fertilization rates with medical treatment of patients (12) or by using sperm enhancement drugs (13) have increased only marginally the chances of couples suffering from male infertility to achieve a pregnancy. Very recently, with the introduction of ICSI, the chance of successful fertilization even in patients with very poor sperm parameters has improved dramatically (14). However, as some 30-40% of IVF patients could benefit from ICSI but very few centers are performing it successfully, the problem of restricted access is more acute than ever.

Here we have described a scheme which offers a realistic answer to this problem. By developing a single regional ICSI laboratory, significant advantages for patients can be achieved. The cost of equipment can be shared between a number of satellite IVF units using a single ICSI laboratory. The laboratory exposed to a large number of ICSI procedures is likely to accumulate skill and experience in a shorter period of time and achieve desired pregnancy rates more rapidly. Moreover, the central laboratory could serve as a teaching environment for embryologists from the satellite centers. We have reported previously (8) that human oocytes can be transported either in follicular fluid or in buffered culture medium for up to 2 hr without any detrimental effect on fertilization potential. This case, although only partially successful, confirms that this can be extrapolated to ICSI procedures. We conclude that T-ICSI is a viable and desirable scheme which can potentially provide access to ICSI therapy for a large proportion of patients with male-factor infertility.

REFERENCES