IN-VITRO FERTILISATION: THE AUSTRALIAN EXPERIENCE

(Paper presented at the SMA Silver Jubilee National Medical Convention 1985)

Carl Wood

Department of Obstetrics & Gynaecology
Monash University
Queen Victoria Medical Centre
172 Lonsdale Street
Melbourne, Vic 3000
Australia

Carl Wood, FRCS, FRCOG, FRACOG
Professor

In vitro fertilization is now used for a diversity of types of infertility. This includes infertility of unknown origin, mild types of male factor infertility, endometriosis and less common causes such as cervical mucus hostility.

The Monash University/Queen Victoria Medical Centre group has delivered over 170 babies. Of the pregnancies, about 20% are twins and 5% triplets. The miscarriage rate of 28% is slightly higher than in the natural system of conception, but this apparent high incidence may be partly related to the very careful assessment of early pregnancy subsequent to IVF. Ectopic pregnancies, 2%, do occur, but are less common than after microsurgery.

The pregnancy rate per laparoscopy is gradually increasing each year, but is only around 17% per laparoscopy. The chance of a couple having a baby will depend upon the number of treatments pursued. A rough estimate of this has been made from 280 patients treated in 1982, about 43% are calculated to have a baby by the completion of several treatments. The drop-out rate per year in this cohort of patients is about 20%. The ability for couples to pursue repeated treatments will be improved by the use of the ultrasonic needle collecting system, which allows collection of oocytes without general anaesthesia and without a laparoscopy.

The experience of pregnancy following IVF has been studied in Australia by Dr Lancaster. Pre-term delivery is 3 times higher than for non-IVF pregnancies.

The reasons for this may be related to the higher maternal age, the causes of infertility, maternal endocrine factors, obstetric factors, a higher induction of labour rate, multiple pregnancies or maternal stress associated particularly with the IVF procedure. The number of congenital malformations in the Australian series is 2 per 180. There is only one serious congenital malformation, congenital heart disease in a dizygotic twin, which has been corrected by surgery. The malformation rate is not higher than in the natural population. The stillbirth rate is higher than in the natural population, most probably because of the higher risk of pre-term labour. Caesarean section has been used more often in delivery of babies conceived following IVF, 33% of deliveries being performed by Caesarean section. This is thought to be related to the higher maternal age, the prolonged history of infertility, the association of obstetric complications and the higher incidence of pre-term labour.

Patient follow-up has been carried out with the assistance of a psychologist, psychiatrist and paediatrician. Interviews of parents and couples 1—4 years subsequent to the birth of IVF children has been carried out in a small number of patients. The babies' development have been assessed by a Bayley score, which includes the measurement of the mental, physical and social development. Of 52 parents followed up, 1 had some marital difficulty, 2 suffered from post-natal depression and 3 had difficulty in adapting to the child. This incidence is no different to the normal population. Four of the children had low Bayley scores, four being low on physical scores and one also on a mental score. The baby with the low mental score was the one with congenital heart disease and this was thought to be related to the prolonged hospital care and surgery and it is possible that the child will catch up in mental development.

Freeze-thawing has been carried out in our group for 2 years. The reasons for this are the inability to transfer the embryo, in order to reduce the number of treatment cycles for patients, to reduce the risk of multiple pregnancies, and to facilitate the donation of oocytes. The ethics of freeze-thawing raises problems. The main reason for carrying out freeze-thawing was to benefit patients. However, it does lead to increased wastage of embryos as only one in two survive the procedure. The risk of fetal malformation is thought not to be high by freeze-thawing, as in other species, the malformation rate is lower when conception occurs from embryos that have previously been frozen and thawed. The Australian community is in favour of freeze-thawing in Gallup pool surveys. The length of storage of embryos is to be reviewed every five years, so that, if couples have not used their embryos, they will have to make a decision whether to use them, donate them or dispose of them. Couples who have embryos frozen have to sign a statement stating what they consider should be done with the frozen embryos should they die, divorce or change their minds about having a child. The freeze-thaw process does require the use of a chemical protectant and the slow freezing of the embryo. During this process the embryo shrinks to about half its normal size. The chemical protectant is meant to reduce the risk of breakdown of the cell membrane and ice formation in the embryo. A quick freeze-thaw technique is being developed at the present time. Not all the cells need to survive to produce a live offspring. In several of the seven pregnancies so far occurring with this technique the embryos have not completely survived the freeze-thaw process. The reason for this is that each cell of a 2- or 4-cell embryo is capable of reproducing itself. The success rate of freeze-thawing is around 17% for the embryos that have survived the freeze-thaw process. This makes it about half as efficient as the ordinary IVF procedure. Nevertheless, it adds to the succcess of the IVF procedure because the eggs from which the frozen embryos are developed are taken at the same time as the eggs which are used for immediate transfer. On average, a third of our patients are now having embryos frozen.

Donor egg embryos are developed for patients with infertility resulting from removal of the ovaries, congenital absence of the ovaries, inadequate development of the ovaries, premature menopause, or where oocytes may transmit genetic disease. Three pregnancies have resulted from this procedure. The donors of oocytes are known or anonymous, the physical and social characteristics of the donor and recipient are matched, there is no financial reward for donation, the donors and recipients are counselled by independent counsellors, the donors are informed of the outcome of the pregnancy and non-identifying information is given to the recipient concerning the donor. This information can be given to the offspring should they so wish. Donors have no claim on the offspring and are free of obligation to the offspring. All the regulations concerning the freeze-thawing and donation of eggs have become possible since the introduction of the Infertility Bill in Victoria following the findings of the Waller Committee.