

Artificial reproduction

by Caroline Berry

Infertility affects about 1 in 8 couples and gives rise to considerable distress. Many techniques are available that can assist a couple to have a baby. How do we decide which are ethically acceptable?

A couple usually seeks advice about infertility once the woman has failed to become pregnant after 1-2 years of unprotected intercourse. In about one third of couples the problem originates in the man, in another third in the woman and in the final third no cause is identified.

Adoption is a positive option, but in reality, few babies are available, so an increasing number of people are turning to medical treatments that can assist them to have a baby.

The first IVF or test-tube birth occurred in England in 1978 and the baby, Louise Brown, is now a healthy young woman. Since then thousands of such babies have been born.

Reproductive biology

A woman normally releases an egg from one of her two ovaries about 14 days after her last period started. It floats into the Fallopian tube, where, if intercourse has occurred, it may be fertilised by one of the millions of sperm. Over the next few days the fertilised egg gradually

grows into a ball of cells. It is now called a 'pre-implantation embryo'.

At this stage it appears that any cell has the ability to develop into any part of the embryo. The embryo may even split to form genetically identical twins.

All this time the embryo is floating down the Fallopian tube and into the mother's womb. By about ten days after fertilisation the embryo starts to embed into the lining of the womb. When this is complete, a

hormone, Human Chorionic Gonadotrophin (HCG), is released from the embryo. This inhibits the next menstrual period and the mother becomes aware of the pregnancy. HCG is the hormone detected by most pregnancy test kits.

Within the ball of cells, the developing embryo becomes visible as a dark streak. From now on, different cells are committed to form different organs and twinning can no longer occur.

Artificial techniques

Artificial insemination

Artificial insemination by husband (AIH) can be used when the man's sperm count is low. It involves concentrating several semen samples and introducing this into the neck of the woman's womb when she ovulates. Unlike the other techniques it has been available for more than 50 years, but has a low success rate.

Artificial insemination using donated sperm (DI) is used where the

man either cannot produce any sperm, or is carrying a genetic disease which he does not wish to pass on to any children.

It is also used by some women who are not in a heterosexual relationship, but still want a baby.

GIFT

In Gamete Intra-Fallopian Transfer (GIFT) the egg and the sperm are collected and placed in a fine tube with the sperm and egg separated by an air bubble.

The tube is inserted into the woman's Fallopian tube, and the contents released, allowing the egg to be fertilised naturally.

ZIFT

Here the egg and sperm are brought together before being inserted into the Fallopian tube. This means that fertilisation itself occurs outside the body. The newly fertilised egg, or zygote, is then injected - Zygote Intra-Fallopian Transfer (ZIFT).

IVF

In vitro is Latin for 'in glass'. It is used to indicate that the process has occurred in a laboratory dish rather than inside a person or animal.

In *in vitro* fertilisation (IVF) eggs and sperm are collected and brought together in a petri dish. The fertilised egg, called a zygote, is incubated for a few days, by which time it is a blastocyst of eight or so identical cells. Healthy blastocysts can be inserted into the mother's womb.

The more blastocysts inserted, the more chance of a pregnancy being achieved. But if four or more are inserted there is the risk of quads or quintuplets. Consequently, in the UK, the number of blastocysts that may be returned is regulated and currently must not exceed three.

It is essential to monitor the woman's menstrual cycle and hormone levels if the process is going to have the maximum chance of working. In the best centres, about 25 per cent of IVF treatment cycles result in the woman having a baby.

ICSI

In Intra-Cytoplasmic Sperm Injection (ICSI) a single sperm is injected into the egg, which is then transferred into the woman's womb. This gives men who produce very few sperm the chance of fathering children.

PID

Some couples know that specific chromosomal or genetic disorders run in their families. In a few genetic

diseases it is technically possible to take one or two cells from the blastocyst and look for the particular mutant gene. Such Pre-Implantation Diagnosis (PID) allows doctors to pick embryos that are not affected by the disease. Only these are inserted and the rest are discarded.

The technique is very new and still under development. It is only available in very specialised centres.

Egg donation

For egg donation to have a maximum chance of working the menstrual cycles of both donor and recipient must be harmonised.

Egg donation, and collection of eggs for IVF, involves giving the donating woman powerful drugs to induce multiple ovulation. Occasionally this causes serious side-effects.

The eggs are collected using a needle or fine tube (laparoscope) and fertilised in an IVF procedure.

Surrogate mothers

If a woman has no uterus or is for some other reason unable to maintain a pregnancy it is technically possible to use IVF and return the fertilised egg to any prepared uterus. The surrogate mother carries the baby to term and 'hands' him or her to the 'commissioning' woman at birth.

The law

All techniques involving the fertilisation of eggs outside the body are regulated by the Human Fertilisation and Embryology Act 1990. Centres undertaking this type of treatment have to be licensed and inspected and keep careful records of their activity and success rates.

Any fertility centre that fails to reach the required standards, either technically or ethically, can have its licence taken away.

Ethical issues

- In all artificial techniques fertilisation occurs without the act of sexual intercourse. Whereas the use of contraception enables a couple to have intercourse but no baby, here we have the reverse.

- Some people are concerned that the sperm have to be obtained by masturbation and others that artificial techniques interfere with the couple's marriage.

- The use of donated egg or sperm, or a surrogate mother introduces a third (or even fourth or fifth) party. The child is no longer a symbol of the bond between two parents.

- Is a pre-implantation embryo a person who warrants care and protection, or a lump of cells that can be disposed of or used for research? What do we do with spare embryos?

Note that the development of most of these techniques required many pre-implantation embryos to be used in research.

- Donors, surrogates, and above all the child must be protected from financial and emotional exploitation.

- How will the child cope with an unusual form of parentage? Should he or she be informed, or should the treatment be kept secret? When a child becomes an adult should he or she be allowed to trace any donor who was a biological parent?

- Can a surrogate mother give up the child she has carried during the pregnancy without herself being emotionally wounded?

- These techniques are expensive. Should health authorities purchase them and how should they set priorities? If these techniques are only available through the private sector some people will be able to afford to have a baby, but others won't.

- Could the use of pre-implantation testing for genetic diseases lead to a world of 'designer babies' and genetic manipulation, maybe even a new form of eugenics?

Christian principles

The Bible shows that God is concerned about infertility and the heartbreak it brings. Abraham and Sarah had to wait longer than they felt able before their promised son Isaac was born¹ and Samuel's mother Hannah's anguished prayer illustrates the stress of infertility².

Several biblical heroes had unconventional parents and upbringing: Moses was brought up as an adopted son of a royal princess³, Samuel was raised largely by the temple priests and John the Baptist was born to aged parents⁴. Jesus declared that our attitude towards him is more important than that towards our blood-ties⁵.

Although Christians reach different conclusions in this highly controversial area there are certain biblical principles on which all agree.

Truth and integrity

An honest approach is essential for the counselling of both potential parents and donors. Before they start, couples must be aware of the cost in both emotional and financial terms.

The children born must have truthful information and parents need to be encouraged to be open with them about their origins.

Consideration should also be given to donors and whether or not their confidentiality needs protecting. This is a complex issue as the rights and interests of all parties need to be held in balance.

The value of the individual

Some people believe that at the moment of fertilisation a person has

Case study

Paul and Jane are a young, recently married Christian couple. Paul's father has Huntington's disease and is becoming seriously demented. A predictive test has shown Paul that he has inherited the gene and will therefore develop the disease in due course, perhaps in twenty years time.

The couple decide that if they are going to have children they should do this soon. They both know there is a 50:50 chance that any child of Paul's will inherit the Huntington's gene.

Paul's views:

He was convinced that it would be wrong for him to take that degree of risk of passing on such a devastating disorder. His father had had 40 good years, but seeing him now was too distressing. He knew a treatment might well become available, but he could not be sure of this and even if it did it could be horrendously expensive and he felt he had some responsibility towards the community as a whole.

Deciding not to have a family seemed so hard on Jane. She was already prepared to care for him when the disease showed itself. It seemed too much to expect her to forgo having a child as well. Even if she agreed now she might regret the decision later.

Would donor insemination definitely be wrong? A talk at church had compared it with adultery. But adultery was being unfaithful to your wife and he was trying to care for Jane. It would be quite humbling for him to have to accept the gift of another man's sperm and anyway Jane might not want that. He wondered too how a child would cope with such a strange origin. He would definitely tell the child and be open with other people too but would it be fair on the child?

How frustrating it was that the adoption society had turned them down because he had the Huntington's gene.

Jane's views:

She wondered how important having a family was to her. It would really be easiest if they simply decided against but she knew Paul would feel bad for her sake and he was already concerned that he would be a burden to her as he became ill. Just visiting his father brought that home to them both. How could she know how she would cope with being 43 and childless?

Perhaps they should just pray and hope that all would be well - after all Paul was perfectly well now. But she remembered how firmly she had disagreed when a friend had told her that she was not going to have her children immunised as she preferred to pray and trust God to look after them. And how devastated they had been when after so much prayer from so many people, Paul's test had given the result it had.

The geneticist had said that pre-natal testing was possible but she could never have an abortion as she was sure it would be wrong to destroy a fetus simply because it had the Huntington's gene. The other technique the geneticist mentioned was pre-implantation testing. She wondered what she thought of discarding the affected fertilised eggs. Was that equivalent to abortion or not? Perhaps they could consider that option even though it was still very new. Then again, how safe was it?

In discussion groups decide how this case history should develop.

been formed who has full human rights. Some of these people find almost all forms of artificial reproduction unacceptable.

Others believe that as the techniques are now available, despite the research used for their development, they can be used, provided no pre-implantation embryos are discarded.

Yet others believe that pre-implantation embryos do not yet have any personal status and can therefore legitimately be discarded or used for research. This view was accepted by the 1984 Warnock Committee⁶ who said that human embryos could be used in experiments up to 14 days after fertilisation.

Supporters of this view point to the fact that fertilised eggs are unwittingly lost naturally and when certain forms of contraception are used, including the widely used 'mini-pill' and contraceptive implants. They also say that the Old and New Testaments show that God is chiefly concerned with how we relate to one another and to him. If the essence of being human is forming relationships, an embryo can only start to become a person, they say, after implantation when a relationship is formed with the mother.

The value of the family

With regard to the value of the family, Christians again have differing views. To many the whole concept of 'making' babies in the laboratory rather than 'begetting' them through the loving union of the potential parents seems alien to the God-given concept of the family. Some find masturbation a wrong use of the sexual mechanisms.

Others accept the use of artificial techniques, provided only the couple's own eggs or sperm are used. Donation of eggs or sperm is

sometimes said to be equivalent to adultery. However, many Christians would argue that adultery involves human relationships outside the partnership, rather than simply introducing new genes. Even so most Christians are concerned about the potential confusion and 'genealogical bewilderment' for the child that is inherent in any form of donation and would therefore generally advise against its use.

Concern for the child

All Christians are concerned about the child and that his or her welfare has highest priority. A clause to that effect is included in the 1990 Act of Parliament. This aspect is easy to forget when faced with a couple who desperately want a baby. Interpretation is also difficult as neither parenting ability nor home stability are easy to predict.

If we believe that the creation pattern shows that for an optimal start a baby needs two parents of opposite sexes this should preclude the use of these techniques by same sex couples. Requests for such pregnancies are rare but do occur.

Also surrogate mothers are exceedingly vulnerable as they inevitably make strong bonds with the babies as they develop in their wombs. Very careful consideration of the interest of these individuals is essential and it is important that the infertile couple's desire for a child, which may be overwhelming, is kept in perspective.

Christians see children as gifts from God and none of us has any right to demand such a gift or to trample on the lives of others in order to obtain one. Yet childless people are also vulnerable and in need of help, protection and wisdom to know when to call a halt to their use of high-technology.

Conclusions

These new technologies have opened the door to a host of possibilities, but it should be clear that they also illustrate the saying that 'what is possible is not always what is right'. Some Christians see none of these techniques as permissible. Others believe they can be used responsibly in ways compatible with Christian principles. However, the case study on page three shows just how difficult it is to make these decisions.

References

- ¹ *Genesis, chapters 16-21.*
- ² *1 Samuel 1.*
- ³ *Exodus 2.*
- ⁴ *Luke 1.*
- ⁵ *Matthew 12: 48-50.*
- ⁶ *Report of the Committee of Inquiry into Human Fertilisation and Embryology (Cm 9314), HMSO London, 1984.*

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Caroline Berry has considerable experience counselling couples facing genetic problems. She was formerly the clinical director of the South Thames (East) Genetics centre, based at Guy's Hospital, London.