

## **Creation and Transfer of a Single Embryo in Reproductive Technology: Commentary to assist with the development of a policy for SPUC.**

*Southern Cross Bioethics Institute, July 2008*

There are some preliminary matters that need to be addressed before the specific ethical issues related to the creation and transfer of a single embryo in Assisted Reproductive Technology (ART) can be considered.

First, since SPUC is primarily committed to the protection of human life from the moment of conception, other related ethical questions that arise in ART, while clearly important, are secondary to SPUC's primary interest. These other ethical questions include the separation of the act of loving union of a couple from procreation, the means of obtaining sperm and eggs, psychological harm to couples, alternate familial relationships, surrogacy, and multiple parentage, to name a few. It is possible that even in the case of the creation and transfer of a single embryo, some of these issues will arise, further complicating the ethical analysis. For example, even for a stable couple where surrogacy or multiple parentage are absent, the separation of the unitive from procreative aspects and potential psychological harm will remain.

Second, while the *transfer* of a single embryo to the body of a woman is becoming increasingly common in ART programmes, the *creation* of a single embryo for transfer is unlikely to ever occur. Typically 10 to 15 embryos will be created and between one and three transferred. So the ethical question being considered here, *viz.* the creation and transfer of a single embryo, is hypothetical.

The creation of a single embryo in ART involves conception in an environment that is foreign to the natural environment in which procreation normally occurs. Because of this, and despite the best technology available, a *prima facie* case can be made for an element of risk existing for the embryo outside the body that does not exist within the natural environment of a woman's reproductive tract. While some degree of embryo loss occurs in natural procreation<sup>1</sup>, the extent is uncertain, but in any case it is highly unlikely that artificial conditions can provide as good an environment for early development as the natural one. Indeed, in settings where reasonable statistics have been gathered, merely 4.2% of embryos created in ART ever result in a live birth<sup>2</sup>.

Because early embryonic development occurs in culture media that cannot precisely mimic the natural environment of the female reproductive, there may be an impact upon the children born of

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<sup>1</sup> The fact that some degree of embryo loss occurs naturally cannot inform the moral question of human participation in embryo loss. Natural embryo loss is, by definition, amoral. This is because moral questions only pertain to those things in which humans participate. To argue that embryos are lost naturally and that this permits humans to engineer embryo loss, or that natural embryo loss informs us about the moral value of embryos, is to fall into the naturalistic fallacy, originally exposed by Hume. At times in Africa's history, natural infant loss has been as high as 50%, but this fact tells us nothing about the moral value of infants. It is also possible that complex factors like lifestyle, diet, exposure to toxins and so on could influence 'natural' embryo loss, in which case as far as an individual is aware of the impact of their choices with regard to these factors, 'natural' embryo loss could partially result from human participation, and therefore the question could become a moral one.

<sup>2</sup> Nicholas Tonti-Filippini, *Reproductive Technology Outcomes in Australia: Analysing the Data*, *Bioethics Research Notes*, 15(1):1-3, 2003.

ART. Some researchers have raised concerns that those born of ART may develop disorders like coronary artery disease, stroke, hypertension, type II diabetes and osteoporosis later in life as a result of their embryonic development in imperfect culture media<sup>3</sup>. Currently there is considerable interest in improving culture media not only to lessen the likelihood of this occurring, but also to improve embryo implantation rates<sup>4</sup>.

Embryos can be created in ART not only by *in vitro* fertilisation (IVF), but also by intracytoplasmic sperm injection (ICSI), where a single sperm is injected into the ovum to attempt fertilisation. This procedure is typically used for men who are sub-fertile, that is, have low sperm count or other problems with sperm quality. The injection technique used in ICSI is also a cause for concern as it may cause damage to the egg.<sup>5</sup> Furthermore, the rare imprinting disorder, Angelman Syndrome is more prevalent among children born of ICSI.<sup>6</sup> There also remains a question over whether by utilising ICSI, the children born may later develop the same sorts of infertility problems that led to the use of ICSI in the first place.<sup>7</sup> There is a sense in which it appears as if ART practitioners think they can control for all variables to achieve the desired outcome, when in fact that is not the case.

The ethical significance of embryo loss in ART not only concerns the extent of loss, but also the means by which embryos are lost. Because greater control over embryos exists within ART, there is greater responsibility. Once an embryo is created outside the body, new possibilities for control are opened up. ART adds a dimension of power that does not exist in natural procreation, and with that extra power, comes greater responsibility, and potentially moral culpability.<sup>8</sup>

Once conception is within the technological control of human beings as in ART, other pressures come into play. These include the option to make a decision about *whether* to transfer an embryo. One could argue that if a single embryo were created only for transfer, then selection would not be permitted. But in reality since the embryo would be viewed under a microscope, knowledge would be gained that may be important for decisions about transfer. For example, if the embryo was clearly morphologically damaged and from the clinic's experience therefore certain not to implant, what would be done with the information? If passed on to the couple, the information could be potentially very distressing and may influence a decision about whether to proceed or not. If the couple chose to proceed, an entirely futile process would follow in which the woman would be experiencing a medical procedure almost guaranteed to fail. This would not be ethically justifiable. It would also be unethical not to inform the couple about the observation. If the couple themselves

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<sup>3</sup> Fleming TP, *et al.*, The embryo and its future. *Biology of Reproduction* 71:1046-1054, 2004. See also Lane & Gardner, " ... the importance of understanding how ovarian stimulation and culture systems affect the physiology of the oocyte and resultant embryo are increasingly important." (Lane, M & Gardner, DK, Embryo culture medium: which is the best? *Best Practice & Research Clinical Obstetrics and Gynaecology* 21(1):83-100, 2007).

<sup>4</sup> Lane, M & Gardner, DK, Embryo culture medium: which is the best? *Best Practice & Research Clinical Obstetrics and Gynaecology* 21(1):83-100, 2007.

<sup>5</sup> Powell K, Seeds of doubt. *Nature* 442:656-658, 2003.

<sup>6</sup> Cox GF, *et al.*, Intracytoplasmic sperm injection may increase the risk of imprinting defects. *Am J Human Gen* 71:162-164, 2002.

<sup>7</sup> Powell K, Seeds of doubt. *Nature* 442:656-658, 2003.

<sup>8</sup> A parallel of sorts may be found with prenatal testing, whereby knowledge about possible foetal disability introduces a new level of responsibility, because a choice to terminate based on considerations of disability now exists which did not exist before.

chose not to proceed, they would then be participating in discarding their embryonic child. In any case, the clinic may decide not to proceed, possibly against the wishes of the couple.

Therefore, the mere fact that a single embryo is created *ex vivo* produces a pressure to apply selection criteria. Furthermore, pressure would exist to apply genetic testing to this embryo, especially where there is any evidence for genetic conditions or predispositions within families. And with many genetic tests, the sex of the embryo would also become known, possibly exerting an additional pressure on the couple if they had a preference for a child of a particular gender.

Perhaps the only procedure within ART that does not involve the creation of an embryo outside of the woman's body is gamete intra fallopian transfer (GIFT). GIFT involves the direct transfer of egg and sperm into the fallopian tube where fertilisation may occur. Whilst at first glance this procedure may appear to be the only one in ART where it could be argued that no risk to the embryo is added by human intervention, it is likely that the use of GIFT shares the adverse outcomes associated in general with ART, including ectopic pregnancy, low birth weight and a high rate of multiple pregnancy.<sup>9</sup> Each of these also represents a risk to the life of the mother.

There is another ethical consideration that concerns not only risk to the embryo, but also the conscience of the couple. When a couple are deemed infertile, it is likely that it cannot be known whether in their attempts at achieving pregnancy naturally an embryo has been created or not. Infertility is typically simply defined as failure to conceive after 12 months of unprotected sex, and there are a myriad of possibilities as to why pregnancy does not appear to have occurred. These possibilities could involve the creation of an embryo which subsequently does not implant and hence dies, or failure for conception to occur at all. But the couple simply does not know. Therefore, the morally significant issue with ART is that it involves the known creation of an embryo which could then be subjected to uncertain survival because of the unknown pathophysiology of the couple's infertility. The pathophysiology may involve difficulty with implantation, but neither the clinic nor the couple would necessarily know. The couple would therefore be taking a significant additional risk by knowingly creating an embryo, which will be transferred to circumstances of uncertain survival. Is it in a child's best interests to be intentionally created and immediately placed at this sort of risk? One might argue that the couple are placing their child at risk by attempting pregnancy *without ART* since procreation by whatever means involves some risk, but the significant moral difference is that with ART the couple know they already have an embryonic child who they will then be placing at risk.

Besides risk to embryos, the two other key ethical considerations that apply for the creation and transfer of a single embryo (as well as for GIFT) are the separation of the unitive from procreative aspects of marriage, and the risk of psychological harm to the couple by the process of ART.

The separation of the unitive from procreative aspects of marriage that occurs in ART is best explained by Anthony Fisher in the following quote:

... to be a truly marital (human 'conjugal') act, procreation must involve more than gametes meeting in a test-tube ... by radically separating procreation from intimate physical-personal expression of marriage in sexual intercourse, IVF threatens and contradicts the nature of the marital relationship. Instead of supporting the procreative aspect of marriage, IVF suppresses or replaces it. Human beings become gamete-providers in a manufacturing process; their children, the products of this process, 'reproduced' rather than 'procreated'; emotion and body are no longer united in child-

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<sup>9</sup> Wright *et al.*, Assisted reproductive technology surveillance – United States, 2005. *MMWR Surveill. Summ.* 57(5):1-23, Jun 2008.

making ... IVF displaces the human act that is the essential bonding act of the family, radically separating the symbolic and reinforcing expression of the couple's love from the process by which their child is generated. Instead of being treated as the equal in dignity of those who gave him or her life, as in natural married procreation, the IVF child is in a position of profound subordination to the will of the technologists and parents. The technologist becomes the 'maker' of another without the protecting love that a parent normally provides.<sup>10</sup>

However much a couple desires the best for a child created from ART, and however much they do all in their power to remove other ethical problems, the essential separation of the procreative from the unitive act will remain inextricably tied to ART.

The potential for psychological harm to couples arises from many aspects of ART, but in part because of the necessity to accept very significant emotional (and financial) costs in the face of a significant chance of failure. Numerous studies have outlined the distress couples experience because of cycles of raised then dashed hopes. Clinics struggle with trying to strike a balance between maintaining high success rates by transferring more than one embryo and avoiding the health risks to mother and child(ren) caused by multiple pregnancies. One way in which clinics have sought to deal with the problem is by carrying out selective abortion of one or more fetuses.

It is likely to be the case that the creation and transfer of a single embryo, by lowering the overall success rate for successful implantation and continuing pregnancy, would therefore exacerbate the problem of potential psychological harm to couples.

In summary, the ethical issue related to the creation and transfer of a single embryo that is most important in terms of SPUC's primary commitment to the protection of the unborn child is the additional risk to the life of the embryo posed by ART. Importantly, in reality ART involves the intentional discarding of numerous embryos since currently there are no circumstances in which just a single embryo is created. Taken together with the other significant ethical matters raised here, the creation and transfer of a single embryo in ART, hypothetical as it is, nevertheless would be ethically problematic.

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<sup>10</sup> Anthony Fisher, *IVF: The Critical Issues*, Collins Dove, Melbourne, 1989, p170.