Introduction

Intracytoplasmic sperm injection (ICSI) has been a major breakthrough in the ‘reproductive revolution’ (Palermo et al., 1992; Van Steirteghem et al., 1993). Introduced in the early 1990s, ICSI is presently being used in hundreds of in-vitro fertilization (IVF) centres throughout the world. An estimated 5000 ‘ICSI children’ have now been born worldwide. ICSI is a dynamic technology: several variants of ICSI have been introduced which make use of spermatozoa obtained surgically using techniques termed as microsurgical epididymal sperm aspiration (MESA) and testicular sperm extraction (TESE). These terms are also used in a broader sense to describe ICSI treatments with spermatozoa obtained using the techniques mentioned. Another variant involves the injection of spermatids found in the ejaculate (Tesarik et al., 1995).

The main advantage of ICSI is that it offers couples the possibility of having a child that is genetically related to both partners, even if the male is suffering from severe subfertility. Until recently, the major alternative for these couples was donor insemination (DI). Many couples consider this option to be simply second best, while some couples reject DI altogether for religious, moral and/or emotional reasons.

At the same time, however, ICSI is controversial. Critics object to ICSI for diverse reasons. What, then, are the moral objections, and are they convincing?

Moral objections: inventory and analysis

Most objections to ICSI are the same as those that have already been put forward for the new reproductive technologies (NRT) in general. The objections can be classified as religious, feminist, and ‘health and safety’ objections (Steinbock, 1996).

Religious objections

The Roman Catholic Church, in the forefront of the religious crusade against the NRT, insists that any separation of procreation from intercourse is a violation of nature (Congregation for the Doctrine of the Faith, 1987). The ‘conjugal act’ is seen as having a natural and God-given design that joins...
the love-giving dimension with the life-giving dimension. This objection is widely rejected even among Catholic ethicists: they agree that a child must be the expression and embodiment of love, but hold that sexual intercourse is not the only or necessary source for this expression and embodiment. A second objection concerns the means by which the male’s spermatozoa are obtained as masturbation is considered to be an ‘intrinsically and seriously disordered act’. Even if it could be convincingly argued that masturbation for sexual pleasure is to be criticized as ‘self-abuse’ (quod non), it is hard to see that masturbation in order to conceive a child should be condemned as well. A curious implication of this exotic view is that MESA and TESE would be morally (somewhat) less objectionable than ICSI with ejaculated spermatozoa. From the viewpoint of Rabbinic Judaism the NRT in general, and all ICSI variants in particular, are controversial for a related reason: they involve the destruction of part, or even most, of the spermatozoon (Bleich, 1981). This objection too can hardly be seen as prohibitive.

A third objection, to IVF and ICSI in particular, concerns the inherent destruction of (human) pre-embryos. After all, surplus pre-embryos will not get a chance to develop. Furthermore, the introduction and further development of these techniques is inextricably linked to preclinical research with pre-embryos [Kola et al., 1990; Human Fertilisation and Embryology Authority (HFEA), 1996]. Finally, preclinical training using aged unfertilized eggs has been recommended to reduce the high amount of damage to oocytes that occurs when first attempting clinical ICSI (van den Bergh et al., 1994). Whether the destruction of pre-embryos is acceptable from a moral point of view depends on the ontological and moral status of the pre-embryo. The Roman Catholic Church stresses that pre-embryos should be treated as persons right from the start, and that their destruction amounts to homicide. A variety of other (humanistic as well as religious) theories, however, hold that pre-embryos need not be protected as human persons (Hursthouse, 1987). One of the stronger arguments in favour of this position is that pre-embryos lack developmental individuation. Accordingly, the destruction of pre-embryos, which is inherent in ICSI, regular IVF and related pre-embryo research, cannot be seen as an overriding objection to the practise of these techniques.

The ethical debate on pre-embryo research almost exclusively focuses on the moral status of the pre-embryo. Feminists rightly argue that this ‘fetalist’ perspective should be supplemented by a feminist perspective: how does this research affect the welfare and autonomy of the (potential) donors involved (Rowland, 1987; Royal Commission on New Reproductive Technologies, 1993)? This question is particularly relevant with regard to the creation of pre-embryos specifically for research purposes. Can this practice be reconciled with the interests of the women who donate the eggs and, if yes, under what conditions?

Feminist objections

Feminists have strongly diverging views on the NRT. ‘Radical’ feminists have serious concerns about the harmful effects of the NRT on women, both individually and collectively. They maintain that women cannot give truly voluntary consent for infertility treatments because their choices are conditioned by the patriarchal power structure and the pronatalist ideology with which it is associated. It is feared that the advent of these technologies serves to reinforce the image that women are mothers and nurturers first and foremost. Finally, some feminists object to these techniques because they involve medical and emotional risks for the women who make use of them. ‘Liberal’ feminists, however, reject this massive criticism (Steinbock, 1996). They argue that the NRT can benefit women, since they expand reproductive choices and freedoms. To insist that the desire for children is merely a social construction – false consciousness – is as untrue and offensive as insisting that women never freely choose abortion. We should neither disregard nor exaggerate the risks of IVF. In principle, women must decide for themselves whether the benefits of IVF outweigh its risks. As Mary Anne Warren (1988) eloquently expresses it: ‘If women’s right to reproductive autonomy means anything, it must mean that we are entitled to take some risks with our physical and psychological health, in the attempt to either have or not have children. Neither abortion nor many forms of

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contraception are entirely safe, but women sometimes reasonably judge that the alternatives are even less desirable. Having a wanted child can be as important a goal as avoiding an unwanted birth.’

From a radical feminist perspective, ICSI is especially problematic. After all, ICSI ‘exposes women to pathologization and medical treatment owing to a factor external to the woman herself’, namely the infertility of her partner (Danish Council on Ethics, 1995). In the Dutch debate, some critics reject ICSI because it involves treating women as objects or means to an end rather than as ends in themselves, thereby devaluing their humanity and dignity. Furthermore, these critics argue, DI involves fewer medical risks for women than ICSI.

In my opinion, this criticism is misplaced, mainly because it unjustifiably creates an opposition between the fertile female and her infertile partner. After all, we may safely assume that most, if not all, couples will experience the infertility of the man as a shared problem, as their infertility. Furthermore, it is not unreasonable that (at least) some of these couples consider ICSI to be their best option, even though it carries more medical risks for the woman than DI; after all, the child created by ICSI will be genetically related to both partners. This may be particularly important for the man, but we should not conclude that this aspect is of no importance for the woman. The fact that these infertile couples have various options underscores the importance of promoting informed choice, which involves presenting to the couple the various options, with their respective pros and cons, and supporting patients in making a choice which best fits their preferences (Royal Commission on New Reproductive Technologies, 1993). When the man as well as the woman opts for ICSI in a substantially autonomous way, the objection that ICSI involves degrading the woman is bizarre.

Health and safety objections

According to a recent interim report of a Dutch Health Council Committee (DHCC), in which I participated, the principal moral issue with regard to ICSI concerns the potential risks for the health of ICSI children (Health Council of the Netherlands, 1996). This is a complex issue, both from a scientific and a moral point of view.

A preliminary, general, question is whether the possibility of serious harm to children conceived by the NRT would provide a strong moral reason not to employ these techniques. Robertson contends that serious disorders caused by NRT would not, except in rare cases, provide a moral reason to refrain from using them. After all, so he argues, because it is better to be alive, even with serious deficits and disorders, than not, it is virtually impossible to harm or wrong a child by bringing him into existence (Robertson, 1994). Only if children are caused by these technologies to suffer devastating illnesses, i.e. illnesses which make their lives worse than non-existence, can they be said to be substantially harmed by them.

An in-depth discussion of this approach is impossible within the confines of this article. An extensive critique has been put forward by, amongst others, Cynthia Cohen (1996). If the notion of reproductive responsibility means anything, it must mean that we should take seriously the possibility of serious harm to the future child. If NRT were shown to cause a significant proportion of children to suffer either devastating or serious deficits, they would cause substantial harm to these children, and consequently ought to be rejected.

A second, more specific question, then, is, what ought infertility specialists do in the current state of inadequate knowledge about the risks of ICSI for the children thus conceived? Let me first briefly summarize the risks. The DHCC draws a distinction between known and unknown (genetic) risks (Health Council of the Netherlands, 1996). The known risks involve genetic risks which can be determined beforehand. This is the case when there is a known relationship between a form of reduced male fertility which can be circumvented using ICSI and a genetic defect which can be transmitted to the next generation. A well-documented example is the link between infertility as the result of congenital bilateral absence of the vas deferens (CBAVD) and cystic fibrosis (CF) (Anguiano et al., 1992). There is also a known genetic risk when ICSI is used for men with (numerical or structural) chromosomal aberrations. These are much more common among subfertile men than among men with normal levels of fertility. Furthermore, male infertility can be traced back to a mutation of the
Y chromosome genes involved in spermatogenesis (Reijo et al., 1995).

With regard to the unknown risks, the DHCC mentions several areas of uncertainty which have been linked to ICSI on theoretical grounds. First, certain risks are related to the invasive nature of the fertilization method. Points of concern are, amongst others, (i) that the aspiration of a small quantity of cytoplasm (the usual method for checking whether the point of the injection pipette is positioned correctly) could damage the cytoskeleton of the ovum, (ii) that ICSI may interfere with the elimination of paternal mitochondria and (iii) that the use of animal enzymes for the preparatory work on the ovum may carry risks. A second group of unknown risks involves the possible use of deviant spermatozoa. A first concern is that ICSI may interfere with natural selection against chromosomal aberrations. A second risk concerns the use of immature spermatozoa. Successful ICSI fertilization does not depend on the stage of development of the spermatozoon, as has been demonstrated by the results of injecting spermatids. These precursors of spermatozoa are usually obtained by means of a testicular biopsy, but they can also be found in the ejaculate (Tesarik et al., 1995). The use of immature spermatozoa, which may in particular involve interfering with the process of genomic imprinting, could have a variety of adverse consequences, such as growth retardation and functional disorders (Cummins and Jequier, 1995). Furthermore, attention has been drawn to the possible risks of using spermatozoa which, as a result of ageing, have acquired relatively high levels of DNA damage (breaks, etc; Cummins and Jequier, 1995). This would be especially relevant with regard to men whose infertility is the result of the obstruction or absence of the vas deferens.

Clinical practice has yielded important information with regard to these concerns. Most important are the findings of the extensive research conducted at the IVF centre of the Free University in Brussels, Belgium (Liebaers et al., 1995; Wisanto et al., 1995). To date, there has been no confirmation of the hypothesis that ICSI might result in major damage to the health of the resultant child. This emphasizes the relative nature of the theoretical doubts about the safety of the technique.

The DHCC stresses, however, that a few observations are appropriate here. First, current information is based on the results of what is still a limited number of carefully followed-up ICSI treatments. Secondly, the reassuring findings relate to the short-term effects only. For a definite answer to the question of safety, long-term effects need to be studied, as do cumulative effects of the use of ICSI during several generations. The reasoning behind this is that some ICSI-conceived children can be expected to need ICSI themselves to reproduce. Thirdly, the results of the evaluation studies conducted so far have mainly covered ICSI using ejaculated spermatozoa. According to the DHCC, the numbers of children conceived using MESA and TESE are so small that it is not possible to come to even a provisional conclusion about these ICSI variants. The same applies to the use of spermatozoa from the ejaculate.

What, then, is good clinical practice? Can we accept the risks involved in ICSI? And if yes, on what conditions?

At the core of research ethics in general is the moral requirement to perform adequate preclinical research, including research with animals, before going ahead with similar research on humans. A preclinical risk assessment is also a precondition for the introduction of NRT in the clinic. Possible risks may thus be identified and avoided. The reasons for this stepwise approach are two-fold. First, future children need to be protected against techniques which may impose serious harm on them. Second, couples applying for NRT legitimately expect that they can safely make use of these techniques.

No extensive animal trials were conducted with regard to the safety of ICSI prior to its introduction in the clinic. A suitable laboratory animal for such trials is the mouse. However, until recently, technical obstacles prevented sperm injection in mice. Only now, after these obstacles have been removed, is it possible to perform animal trials in order to examine in greater depth the various uncertainties concerning the effects of ICSI on health (Yanagimachi, 1995).

There is a fairly strong consensus that it is imperative to intensify animal research. At the same time, however, there is dissent with regard
to the implications of the availability of suitable animal models for current clinical practice. Should clinical ICSI and animal research be performed simultaneously? Or should clinical ICSI be suspended, pending the results of animal studies? After all, the stronger the arguments in favour of performing preclinical research, the weaker is the moral justification for clinical ICSI. Or is some sort of ‘middle of the road’ approach to be preferred, differentiating between the diverse variants of ICSI?

The Dutch Society of Obstetrics and Gynecology and the Dutch Society of Clinical Embryology, anticipating an identical advice of the DHCC, have recently decided to proclaim a moratorium on MESA and TESE. More animal studies should first be carried out in order to obtain a greater understanding of the actual risks these techniques involve. This cautious policy is in accordance with the core principle of general research ethics. Apparently, Dutch practitioners and the DHCC agree that the introduction of experimental ICSI variants without extensively using animal models would be akin to the development of new drugs without adequate prior animal research.

Before reaching its conclusions, the DHCC intensively discussed alternative policies. A first alternative would be to suspend all clinical ICSI treatments, pending the results of animal research (cf. the minority standpoint of the Danish Council on Ethics, 1995). Unanimously, however, the DHCC decided to be less reticent about the use of ICSI with ejaculated spermatozoa, for two reasons. First, the provisional results of the extensive Brussels evaluation studies concerning ICSI with ejaculated spermatozoa are reassuring. Furthermore, the chance of injecting either an immature spermatozoon or one that is damaged as a result of ageing is much smaller with ICSI using ejaculated spermatozoa than with MESA or TESE. This is particularly true when immotile or morphologically abnormal spermatozoa are rejected for injection.

A second, less restrictive, alternative would be to accept clinical MESA and/or TESE under certain conditions and/or for some indications. Thus, for instance, the ‘in vitro maturation of testicular spermatozoa’ has been recommended by some experts as a means to avoid the injection of immature spermatids. One might question, however, as to whether this measure has been adequately tested in preclinical safety studies.

Some critics state that MESA and TESE are entirely appropriate in cases of epididymal blockage due to trauma and infection and failed vasectomy reversal. One should realize, however, that, although these men are expected to have normal spermatogenesis, the risk of DNA damage due to the ageing of spermatozoa cannot be excluded. The appropriateness, then, is by no means self-evident.

Conditions

In view of the risks and uncertainties concerning the safety of ICSI with ejaculated spermatozoa, the DHCC recommended that this technique should be subjected to a number of conditions, including the following (Health Council of the Netherlands, 1996):

1. ICSI may only be used as a ‘last resort’, i.e. when the male’s sperm function is impaired to such an extent that regular IVF is not a genuine option. This restriction will also make it possible to obtain uncontaminated data about the risks of ICSI for males with severe fertility problems.

2. There should be a careful selection of the spermatozoa to be injected. In order to reduce the chance of injecting immature or aged spermatozoa, immotile spermatozoa or spermatozoa with severe morphological abnormalities should not be used. It is worth mentioning that the clinical use of spermatids is currently not allowed by the UK’s HFEA. The HFEA will review the findings of ongoing preclinical research regarding the use of spermatids and may allow the use of spermatids when it is satisfied about the safety of the procedure (HFEA, 1996).

3. Couples applying for ICSI should be provided with detailed information about the known and theoretical risks of the treatment. The couples should be able to balance the respective pros and cons of ICSI and the available alternatives, particularly DI. Consent should be obtained individually.

4. In view of the risk of transmitting genetic abnormalities, an extensive family history should be drawn up and adequate counselling should be provided.
5. Relevant preconception genetic testing, in particular karyotyping, of the males should be a precondition of all ICSI treatments.

6. The option of prenatal diagnosis should be offered to all women who become pregnant as a result of ICSI.

7. The data obtained in preconception testing, the course and results of all ICSI pregnancies, the results of any prenatal diagnosis, and information about the birth and the development of the child up to the age of 2 years should be properly recorded with a view to extensive follow-up research.

Genetic testing: a coercive offer?

There is consensus that the availability of genetic counselling and the (routine or selective) offering of genetic testing should be a prerequisite for clinical ICSI. Such testing can take place before the treatment (preconception testing for chromosome aberrations or gene mutations), during treatment [preimplantation genetic diagnosis (PGD) of, e.g. CF] or during pregnancy (mainly karyotyping).

Looking more closely, the consensus appears to be only partial. There is, indeed, dissent with regard to the goal of such testing. This dissent has potentially major implications for access to ICSI in individual cases.

The offering of genetic testing may have two different objectives. First, it enables the couple to make informed reproductive decisions. If they have a higher risk of getting a handicapped child, they may, or may not, opt for preventive measures (‘avoidance’). Second, genetic testing enables the doctor to take his own responsibility to prevent serious harm to children thus conceived. Sometimes, these goals may conflict, as illustrated by the following examples. In a case where an infertile man refuses to be tested for chromosome aberrations or, in the case of CBAVD, for mutations in the CFTR gene, then the couple will probably not get access to ICSI. Should the man carry a balanced chromosome translocation involving a high risk for the future child, or should both partners be carriers of CF, then most, if not all, centres will only offer ICSI if the couple intends to make use of prenatal diagnosis or PGD offered for avoidance. These examples illustrate that, at least in some cases, the offer of genetic testing is, in fact, a ‘coercive’ offer, i.e. an offer patients can hardly refuse in view of the adverse consequences for access to ICSI.

This practice is not without its critics. Bui and Wramsby (1996) argue that genetic screening in infertile patients should not be used to exclude them from infertility treatment. A similar criticism comes from Meschede et al. (1995): ‘The final decision as to whether or not to initiate therapy must reside with the patients. ... Disregarding patient autonomy and introducing elements of negative eugenics would be disastrous for the further development of assisted reproduction.’ According to these critics, the offering of genetic testing has just one legitimate purpose, namely to enable patients to make informed decisions. Testing, then, should be offered in a non-coercive way.

Let me briefly comment on the two major a priori objections to the dominant practice. First, critics hold that a ‘coercive offer’ clashes with the traditional ethics of reproductive genetic counselling, more in particular with the principle of non-directiveness. According to this principle, the doctor should respect the values and preferences of his clients and give unconditional support, whatever they may choose (Andrews et al., 1994). Second, the dominant practice involves, according to its critics, an invasion of the right to reproduce. These objections are not convincing, because they disregard the fact that doctors offering NRT have their own responsibility to avoid serious harm to the future children. For this reason, most, if not all, infertility centres – rightly – refuse to give treatment to, for example, a HIV-seropositive couple. If we do accept such selection (as we should), it cannot be consistently argued that any ‘genetic selection’ by doctors involved in assisted reproduction is unacceptable. Those who protest that the refusal to give unconditional access to ‘high risk’ patients amounts to an invasion of their right to reproduce wrongly interpret this negative claim right (or liberty right) as a positive claim right.

The real issue, then, is not whether it is acceptable to ‘coercively’ offer genetic testing and to only conditionally give access to patients identified as having a high genetic risk, but when this is acceptable and which criteria should be used. I can only briefly touch upon this vexing issue here.
Important elements of reproductive responsibility include the magnitude of the threatened harm to the future child and the probability of the harm actually occurring (Arras, 1990). In general, the greater the magnitude and probability of predicted harm, the less morally justifiable it is to conceive children or to assist in reproduction. Even if we agree that assistance in procreation is morally unsound when there is a high risk of devastating or serious harm to the future child, this ‘harm principle’ invites controversy if applied to individual cases. A level of harm that some parents and doctors might view as excessive might be perfectly acceptable for others, and a level of risk that some find prohibitive might be quite tolerable to others.

With regard to the present issue of coercively offering genetic testing and giving only conditional access to ICSI, a differentiated picture emerges. In view of the increased incidence of chromosome aberrations among infertile males, there may be good reasons for the ‘mandatory’ karyotyping of males applying for ICSI. Depending on the outcome of such testing, a refusal to accept the offer of prenatal diagnosis may constitute a valid ground to withhold access to ICSI. Similarly, testing males with CBAVD, as well as their partners, for common mutations in the CF gene, may justifiably be offered as a condition for access to ICSI. Should they be at high risk of conceiving a child with CF, access to ICSI may justifiably be made dependent on their willingness to make use of PGD or prenatal diagnosis.

There are, however, other examples of coercively offering genetic testing which are more difficult to justify. One is the routine karyotyping of female partners of infertile males. After all, they do not have an increased risk of carrying chromosome aberrations. Another example would be the ‘mandatory’ testing of males with CBAVD and their female partners for ‘poly’-T variants of intron 8 (of the CFTR gene) or the mandatory testing of males for Yq deletions (Persson et al., 1996). (On further consideration, I think the DHCC erroneously recommended the latter in its interim report.) After all, a child conceived as a result of ICSI with, for instance, a ΔF508/5T genotype or a Yq deletion will only be infertile (see below). These examples may illustrate a tendency in some centres towards a mandatory ‘preventive perfectionism’, which is both illusory and unjustified because it excessively restricts the decision-making authority of the infertile couple.

In any case, genetic testing, whether mandatory or not, requires the patient’s informed consent and the availability of pre- and post-test counselling (Andrews et al., 1994).

Transmitting infertility

With the cloning of many of the genes involved in gametogenesis, it is anticipated that many areas of infertility will prove to have a genetic basis (Ng et al., 1995). If, indeed, many cases of male infertility are of genetic origin, future generations will have a much greater incidence of male infertility, because ICSI will allow infertile males to father more infertile males. Is the risk of transmitting infertility a convincing objection to ICSI?

Those who take the affirmative view may use two arguments. First, ‘infertility constitutes a serious harm to the future male’. One may doubt, however, as to whether infertility should be classified as a truly serious harm. After all, many infertile persons live perfectly happy lives. Furthermore, future infertile males longing for genetically related children may opt for ICSI themselves. A point of concern, however, might be that the ‘transgenerational’ use of ICSI could involve an accumulation of health risks for future ICSI children. I assume that this theoretical risk might be elucidated in animal research. A second argument reads as follows: by causing the transmission of infertility, ICSI is not just an exponent of the current medicalization of reproduction, but contributes itself to further medicalization in the future. It might be questioned, however, as to whether this anti-technology sentiment is a valid reason to override the parental goals of infertile couples opting for ICSI.

The further the molecular basis of infertility is unravelled, the more it will become possible to test males opting for ICSI for mutations involved in spermatogenesis. In view of the above, such testing should not be offered coercively. It should not be used for the selection of patients, but in order to enable patients to make informed reproductive decisions.
An intriguing question is whether sex selection (either preconceptionally or by means of a selective transfer of only female pre-embryos) would be justifiable to prevent the transmission of male infertility. This possibility illustrates that the distinction between medical and non-medical reasons for sex selection is not as clear-cut as we usually hold it to be. Suspending a ‘definite’ stance, I think that such use of sex selection could be justified only, if at all, on the condition (i) that the specific method to be used carries no health risks for the female children thus conceived and (ii) that such use would not adversely affect the sex ratio. The case for such selection may become stronger if animal research indicates that the transgenerational use of ICSI carries significant risks for health.

Conclusions

I have argued that the religious and ‘radical’ feminist objections to the NRT in general and ICSI in particular are, at best, not convincing. The ethical debate concerning related research with human pre-embryos, currently dominated by a fetalist perspective, should be supplemented by a feminist perspective.

The risks and uncertainties surrounding ICSI constitute a compelling reason to subject clinical ICSI with ejaculated spermatozoa to strict conditions, and a good reason to suspend clinical MESA/TESE, pending the results of more extensive preclinical research. The latter will be seen as reassuring by experts who consider the results of preclinical studies and of clinical MESA/TESE up until now to be sufficiently reassuring. Centres which perform clinical trials with MESA/TESE should, as a minimum, inform their patients adequately about the uncertainties surrounding these variants and, like the Brussels’ centre, perform rigorous evaluation studies. The question remains, however, whether these necessary conditions for such clinical trials can be seen as sufficient conditions from an ethical point of view.

The categorical objections to ‘coercively’ offering genetic testing are not convincing. At the same time, however, this practice requires a further debate on the harm/probability ratio to be used for coercively offering testing and limiting access to treatment for patients at higher genetic risk.

Clarifying the boundaries of the concept of reproductive responsibility will hopefully allow better identification of situations (i) where the coercive offering of testing and/or the ‘genetic selection’ of patients is not morally justified, (ii) where it is to be left to the discretion of the individual centre, i.e. facultative, and (iii) where it is to be considered morally obligatory, i.e. an essential part of ‘good clinical practice’. Another issue for further discussion is whether sex selection could be an acceptable method to prevent the transmission of male infertility.

In any case, we need not discuss the theoretical possibility that ICSI might enable true hermaphrodites to ‘auto-reproduce’ to realize that the ethical issues involved in ICSI are complex (Schulman and Sherins, 1995).

References


Congregation for the Doctrine of the Faith (1987) Instruction on respect for human life in its origin and on the dignity of procreation: replies to certain questions of the day.


Ethics of ICSI: proceed with care


