

The James Cook University Hospital
Department of Reproductive Medicine

INTRA-CYTOPLASMIC SPERM INJECTION (ICSI)

(This information sheet should be read in conjunction with our information sheet for IVF.)

What is ICSI?

Intra-cytoplasmic sperm injection (ICSI) is a technique in which a single sperm is injected into each egg. It is a modification of conventional IVF.

Who is suitable for ICSI treatment?

ICSI is offered to patients who have a severe problem with sperm quality (very low numbers of sperm, a high percentage of abnormally shaped sperm, or a low percentage of moving sperm).

ICSI may also be offered to couples who have been through IVF treatment previously and who failed to achieve fertilisation of the eggs or had a particularly low fertilisation rate with IVF. Failure of fertilisation may occur even when the sperm looks perfectly normal. The reasons for failed fertilisation may then be due to subtle abnormalities of the sperm or possibly to problems with the egg. In most cases, ICSI can overcome these problems.

In men who have no sperm in their ejaculate due to a blockage, sperm can be recovered by a surgical procedure. In these cases, the recovered sperm is injected into the eggs by ICSI to increase the chance of the eggs fertilising. This is because sperm recovered surgically from the testicle or the adjoining duct (called the epididymis) are usually in much smaller numbers than are needed for natural conception or IVF. In this situation, sperm may be collected in one of two ways:

- By percutaneous epididymal or testicular sperm aspiration (PESA). This is a technique whereby, under general or local anaesthetic, a needle is used to withdraw sperm from the epididymis or into the testicular substance.
- Testicular biopsy (TB). In this procedure one or, if necessary, several small portions of the testicle are removed and subsequently examined in order to extract any sperm that can be found.

These procedures are an additional complication over and above that of ICSI. Sperm which are aspirated from the epididymis work just as well for ICSI as ejaculated sperm. However, sperm retrieved from the testicle do not work so well, and in this situation the success rate is about two thirds of that for ejaculated sperm.

What happens at ICSI?

ICSI is a laboratory procedure. The couple will proceed as for conventional IVF. The superovulation, egg collection, embryo transfer, and subsequent luteal phase support and pregnancy testing are all exactly as at conventional IVF. In this respect, the couple will not notice any difference.

The main difference between IVF and ICSI is that, whereas IVF involves placing several thousand sperm together with the egg in a Petri dish, in ICSI a single sperm is injected into the substance of the egg. In IVF we need many thousands of sperm to achieve fertilisation, whereas in ICSI we only need one sperm per egg.

Will the act of injecting a sperm into the egg damage the egg?

Injecting a fine pipette into the egg can result in damage to the egg. In these cases the egg will not survive. Approximately 85% of the eggs injected will survive.

Are all eggs suitable for injection?

Eggs have to be at a certain stage of maturity for us to be able to inject them. Most eggs that are removed are at this stage, and it is rare not to have some eggs from a patient at the correct stage for injection.

Does ICSI guarantee fertilisation?

No. We can never guarantee that we will achieve fertilisation. However, on average, we expect between 60-70% of those eggs that are injected to fertilise. The incidence of complete failure of fertilisation with ICSI is very low.

Is there any possibility that ICSI will increase the chances of an abnormal baby?

ICSI was first performed in 1993 and has now been carried out routinely in many centres across the world. The total number of babies resulting from this treatment is now several thousand. There have been various reports published about the outcome of babies born following ICSI. The incidence of chromosomal abnormalities reported in at least one of these studies shows a greater than expected figure amounting to approximately 3%.

Approximately 12% of men with severe sperm problems have an increased incidence of abnormalities of the Y chromosome. There has been a reported increase in abnormalities of the sex chromosome – 1.2% compared to 0.3% in the general population. Sex chromosome abnormalities in offspring may reflect an abnormality in the paternal genes and may lead to the development of infertility in male offspring. In a small percentage of these cases there may be impaired intellectual development.

In the majority of studies the overall incidence of all abnormalities is not significantly higher than would be expected from naturally conceived children and the data is broadly reassuring. However, as yet the data requires further verification.

Are there any other risks with ICSI?

ICSI involves the same procedures and drug administration for the woman as does IVF. There are the risks of ovarian hyperstimulation because of the drug stimulation of the ovaries, and the risks of the collection of the eggs. These issues are discussed in greater detail elsewhere in our other Patient Information sheets, and before undergoing ICSI you should read this information carefully.

Will special follow-up of a pregnancy or child be necessary as a result of this treatment?

It is important for the reasons mentioned above that children are followed up in the long term so that we may learn more about male infertility. This will involve maintaining a register of children conceived in this way and periodically writing to the parents and eventually the offspring themselves – when they reach adulthood. As yet no definite plans have been established as to how this follow-up might be conducted. As far as a pregnancy is concerned, the usual pre-natal tests will be offered. You may also wish to discuss the possibility of amniocentesis to assess the chromosomes of the baby, but this is by no means essential and does carry with it a small risk of miscarriage.

How likely is this treatment to be successful?

ICSI is at least as successful as normal IVF. We expect at least 90% of treatment cycles to achieve transfer of embryos. We expect 25% or more of embryo transfers to result in a clinical pregnancy. For more up to date information on success rates for this treatment please ask the unit's staff who will be happy to provide the information.