

FACTSHEET

IN VITRO FERTILISATION AND EMBRYO TRANSFER (IVF-ET)

For conception to take place, a woman needs to ovulate, or release an egg from her ovaries. The egg enters the fallopian tube where it meets the sperm. A sperm cell penetrates the egg, a process known as fertilization. The resulting embryo is transported down the tube to the womb where it implants into the lining (endometrium) a few days thereafter.

In the general population, which includes all age groups, it is estimated that around 84% couples conceive within six months of starting to try for a baby. At the end of two years, 92%, and at the end of three years, 93% of couples have conceived.

It is recommended that couples who have been trying to conceive for a year without getting pregnant, or for whom there is an obvious factor in their history indicating a fertility problem, should be investigated. Tests for the woman would usually include an ultrasound scan along with checks to test that she is ovulating and that her tubes are clear (or patent). Increasingly, ovarian reserve tests to check her supply of eggs are also carried out. A semen analysis is required for the male partner.

IVF should be considered by couples who have only a low chance of conceiving otherwise. Couples with severe male factor infertility, severe endometriosis and tubal disease that affect both fallopian tubes should consider IVF at a relatively early stage. On the other hand, for couples with unexplained infertility or minor endometriosis, particularly where the woman is below 35 years of age, there is a reasonably good chance of conceiving spontaneously in their first two years of trying and they should consider IVF after this period has elapsed.

Although IVF was originally devised for women with tubal problems, in combination with intracytoplasmic sperm injection (ICSI), it is a very effective method to treat male factor infertility too.

Outline of a typical IVF cycle

IVF involves four basic steps; ovarian stimulation, egg recovery, insemination and finally embryo replacement.

Ovarian stimulation

During a natural unstimulated cycle, a single follicle containing a single egg develops to maturity. It is possible to perform IVF using a single egg from a natural cycle, but the success rates with this are low. Hence, most IVF cycles involve stimulation of the ovaries with medicines known as gonadotrophins to produce multiple eggs. The clinic should give you written information about these drugs and their side effects. Your GP can also explain how the drugs work and discuss side effects.

Ovarian hyperstimulation (OHSS) occurs when there is an excessive response to the drugs, and is a major and potentially life threatening complication associated with gonadotrophins. Some women, particularly those with polycystic ovaries and those who have had hyperstimulation in the past, are at an increased risk of OHSS.

Clinics monitor women using ultrasound scans and often hormone blood tests as well to judge their response to the gonadotrophins. By interpreting the results of ultrasound and blood tests, the specialist will determine the best time to perform the egg collection.

About thirty six hours before the egg collection is due, an injection of human chorionic gonadotrophin (hCG) is given to initiate the final process of egg maturation. Precise timing is necessary as the eggs will be suitable for recovery thirty four to thirty six hours after the hCG injection.

Egg collection

This is done under sedation or general anaesthetic using a vaginal ultrasound probe. A needle is guided through the top of the vagina into the ovary. The fluid is drawn out of each follicle through the needle using a suction device.

Insemination and fertilization

The embryologist identifies the eggs in the laboratory and puts them in a liquid known as culture medium. They are placed in dishes in an incubator. The male partner produces a semen sample by masturbation and this is prepared in the laboratory. A number of active sperm are extracted and these are placed with the eggs to inseminate them.

If the male partner has a significant reduction in sperm numbers, ICSI is likely to be advised. With ICSI a single sperm is selected by the embryologist and injected into the egg. Surgical sperm retrieval may also be necessary with ICSI in men whose tests have shown they don't have any sperm in the ejaculate.

It takes about eighteen hours for fertilisation to be completed and about twelve hours later the embryo starts to divide. In two to three days after egg collection, embryos have usually divided into four to eight cells. They can continue to be grown in the laboratory beyond this, up to six days after egg collection. At this stage, the embryo should form a blastocyst. This is a more advanced stage of embryo development, in which the embryo shows a distinct 'inner cell mass' (which forms the baby) and an outer layer (which forms the placenta).

Embryo transfer

Embryos are transferred either at two to three days after egg collection, or when they have reached the blastocyst stage (see above). The laboratory scientists will advise which is most appropriate in your case, depending on the number of embryos that develop and their quality.

Embryo transfer is an important step and is often performed under ultrasound guidance. The procedure is virtually painless. One embryo is usually transferred unless there are specific reasons to think that it may be necessary to transfer two. There is no evidence that bed rest makes a difference to the outcome and most units recommend resuming normal activities after embryo transfer.

Luteal support

Hormone supplementations in the form of progesterone pessaries, gel or injections are usually recommended after embryo transfer to support the womb lining. Sometimes hCG injections may be used for this purpose.

Embryo freezing

Most IVF clinics offer embryo freezing and storage for spare embryos. However, not all surplus embryos are suitable for freezing as some may not survive the procedure and the implantation rate after transfer may be lower than with fresh embryo transfer.

Abandoned cycles

The abandoned cycle rate varies considerably between different units. Cycles may be abandoned before egg recovery as the ovarian response is either inadequate or excessive, and before embryo replacement if no eggs are recovered, if the eggs fail to fertilise or the embryos don't divide. In many instances it will be possible to try again using alternative drugs or methods, for example ICSI may be recommended if the eggs haven't fertilised.

Occasionally IVF cycles are abandoned because of a high risk of OHSS. In these circumstances the cycle may be cancelled during ovarian stimulation and restarted with a lower dose of drugs or allowed to proceed, but all the embryos will be frozen and replaced when the ovaries have returned to normal.

Ovarian Hyperstimulation Syndrome (OHSS)

OHSS occurs in about two to three percent of cases and can have serious effects. In the worst cases, the woman may develop nausea and vomiting, abdominal swelling and shortness of breath. These symptoms only start after the hCG injection and should be reported to the clinic or the emergency contact. In severe cases, hospital admission may be needed for relief of symptoms. In most cases, the symptoms subside over a week or ten days. However, in women who conceive, the symptoms can get worse and last longer.

Transport IVF

Some IVF clinics work in conjunction with local centres to provide a more convenient treatment option for patients. Ovarian stimulation, monitoring and egg collection takes place at a centre close to the patient's home. The eggs are then taken in a portable incubator to the licensed IVF clinic where fertilisation and subsequent embryo transfer takes place.

The role of the HFEA

The Human Fertilisation and Embryology Authority (HFEA) was established in 1991 following the Human Fertilisation and Embryology Act (1990). Its role is to license and regulate clinics that provide IVF, donor insemination and embryo research.

The HFEA publishes a Code of Practice that all IVF clinics are obliged to follow. It keeps a register of all treatment cycles and outcomes and gives information and advice to patients, clinics and the public.

Choosing an IVF programme

When choosing a clinic, it is important to try and find out as much as you can from a reliable source, such as the HFEA, about those aspects that are important to you. This may include matters such as the live birth rate among the patients treated by the clinic in your age group, but also the chance of a multiple pregnancy, availability of specific treatments, location and accessibility and cost of treatment.

When interpreting the live birth rate of a clinic, patients should be aware that this can depend upon a number of factors. The patients treated by a centre are an important factor - for instance, centres that treat mostly younger women or those with a shorter duration of infertility are likely to have a higher live birth rate. It is probably not as straightforward as it may seem to compare clinics based only on their 'success rates'.

The HFEA publishes 'Getting Started - Your guide to fertility treatment' which is available to download from the HFEA website at: www.hfea.gov.uk

It is well recognised that undergoing assisted conception treatment, particularly IVF, is stressful both emotionally and physically. It is essential that patients fully understand the proposed treatment programme and the commitment in time required for monitoring the cycle. Your clinic should be able to give you an information sheet about the process.

All licensed centres are obliged to offer patients who are planning to have IVF treatment a suitable opportunity to have independent counselling. This may prove helpful as it gives time for you to discuss your infertility and treatment confidentially with an impartial person. Some clinics also have support groups which can be helpful, and Fertility Network UK run independent support groups across the country.

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