In vitro fertilization (IVF) and Embryo Transfer -I

In vitro fertilization (IVF) and Embryo Transfer

In vitro fertilization (IVF) is a type of assistive reproductive technology (ART). It involves retrieving eggs from a woman's ovaries and fertilizing them with sperm in a laboratory dish. This fertilized egg is either known as an embryo, which is then implanted in a woman's uterus or frozen for storage. IVF is used only when other treatment for pregnancy has not worked. Normally, a sperm penetrates an egg and fertilizes it inside the body of a woman after ovulation of a mature egg. The embryo then attaches itself to the wall of the uterus, and begins developing into a baby. This process is known as natural conception. However, if natural conception is not possible, fertility treatment is opted.

IVF has been used since the late 1970s. On 25th July 1978, the **first "test-tube baby,"** named **Louise Brown**, was born. **Robert Edwards** and **Patrick Steptoe** are considered to be the pioneers of IVF. In 2010, **Robert Edwards** received the **2010 Nobel Prize in Physiology or Medicine** "for the development of in-vitro fertilization."

Depending on the situation, IVF can use:

- Female's eggs and her partner's sperm
- Female's eggs and donor sperm
- donor eggs and the Female's partner's sperm
- donor eggs and donor sperm
- donated embryos

Embryos can also be implanted in a surrogate, or gestational carrier.

Success rate

The success rate of IVF varies. According to the American Pregnancy Association, live birth rate for women under age 35 undergoing IVF is 41 to 43 percent. This rate falls to 13 to 18 percent for women over the age of 40.

IVF helps people with infertility who want to have a baby. IVF is expensive and invasive, so couples often try other fertility treatments first. These may include taking fertility drugs or having intrauterine insemination. During that procedure, a doctor transfers sperm directly into a woman's uterus. Infertility issues for which IVF may be necessary include:

1. reduced fertility in women over the age of 40
2. blocked or damaged fallopian tubes
3. reduced ovarian function
4. endometriosis
5. uterine fibroids
6. male infertility, such as low sperm count or abnormalities in sperm shape
7. unexplained infertility

Parents may also choose IVF if they run the risk of passing a genetic disorder on to their offspring. A medical lab can test the embryos for genetic abnormalities. Then, a doctor only implants embryos without genetic defects.

Ovarian reserve testing

First women undergo ovarian reserve testing. In this process, a blood sample is taken and tests it for the level of follicle stimulating hormone (FSH). This gives information about the size and quality of the eggs.

Examination of uterus

This may be carried through an ultrasound, which uses high-frequency sound waves to create an image of the uterus. These tests can reveal the health of the uterus and help in determining the best way to implant the embryos.

Men will need to have sperm testing. This involves giving a semen sample, which a lab will analyze for the number, size, and shape of the sperm. If the sperm are weak or damaged, a procedure called **intracytoplasmic sperm injection (ICSI)** may be necessary. During ICSI, a technician injects sperm directly into the egg. ICSI can be part of the IVF process.

Procedure of IVF

There are 6 steps involved in IVF:

1. Suppressing natural menstrual cycle
2. stimulation
3. egg retrieval
4. insemination
5. embryo culture
6. transfer

1. Suppressing the natural menstrual cycle

The woman receives a drug, usually in the form of a daily injection for about 2 weeks, to suppress their natural menstrual cycle.

2. Super ovulation

Fertility drugs containing the fertility hormone follicle-stimulating hormone (FSH) are given to the woman. FSH makes the ovaries produce more eggs than usual. Vaginal ultrasound scans can monitor the process in the ovaries.

3. Egg Retrieval

Egg retrieval is known as **follicular aspiration**. The eggs are collected through a minor surgical procedure known as "follicular aspiration." A very thin needle is inserted through the vagina and into an ovary. The needle is connected to a suction device. This sucks the eggs out. This process is repeated for each ovary. In 2011, researchers suggested that collecting 15 eggs from the ovaries in one cycle gives the highest chance of a successful pregnancy. Frozen or donated eggs may also be used.

4. Insemination and fertilization

The eggs that have been collected are placed together with male sperm and kept in an environmentally controlled chamber. After a few hours, the sperm should enter the egg. Sometimes the sperm is directly injected into the egg. This is known as an intracytoplasmic sperm injection (ICSI). Frozen sperm, retrieved through testicular biopsy, may be used. This is believed to be as effective as fresh sperm in achieving a successful pregnancy. The fertilized egg divides and becomes an embryo.