Topic- In Vitro Fertilization

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Introduction

In Vitro Fertilization is a procedure when mature eggs are surgically removed from a woman's ovary and fertilized outside the body with her partner's sperm. Two or three days later, these eggs develop into embryos which are then placed into the uterus where it continues growing. A pregnancy occurs if the embryo implants or attaches to the inner lining of the uterus.

In Vitro fertilization is a complex and expensive procedure of treatment option if women's fallopian tubes are missing or blocked, man who have low sperm count , couples wants to avoid any inherited disorder before conceiving

Male Sterility

- **Sperm production problem**
- **Sperm transport problem**
- **Raised body temperature**
- **Testicular cancer**
- **Radiotherapy**
- **Medicines-**

Female Sterility

1. **Ovarian factors**

- **Polycystic Ovarian Syndrome (POS)**

The ovaries may develop numerous small collections of fluid (follicles) and fail to regularly release eggs.

- **Irregular periods.** Infrequent, irregular or prolonged menstrual cycles are the most common sign of PCOS. For example, fewer than nine periods a year, more than 35 days between periods and abnormally heavy periods.
- **Excess androgen.** Elevated levels of male hormone may result in physical signs, such as excess facial and body hair (hirsutism), and occasionally severe acne and male-pattern baldness.
- **Polycystic ovaries.** Your ovaries might be enlarged and contain follicles that surround the eggs. As a result, the ovaries might fail to function regularly.

Premature Ovarian failure (POF)

Premature ovarian failure — also known as primary ovarian insufficiency — is a loss of normal function of your ovaries before age 40. If your ovaries fail, they don't produce normal amounts of the hormone estrogen or release eggs regularly. Infertility is a common result. Women with premature ovarian failure can have irregular or occasional periods for years

2. **Body Weight**
3. **Emotional stress**
4. **Inflammatory diseases**
5. **Fallopian Tube Obstruction**
6. **Uterine Anomalies**
7. **Cervical Anomalies**

Steps of IVF

- **Collection of ova**
- **Retrieving or aspirating the eggs from the ovary**
- **Collection sperms**
- **Fertilization, monitoring and early development**
- **Transferring the embryo into the uterus**

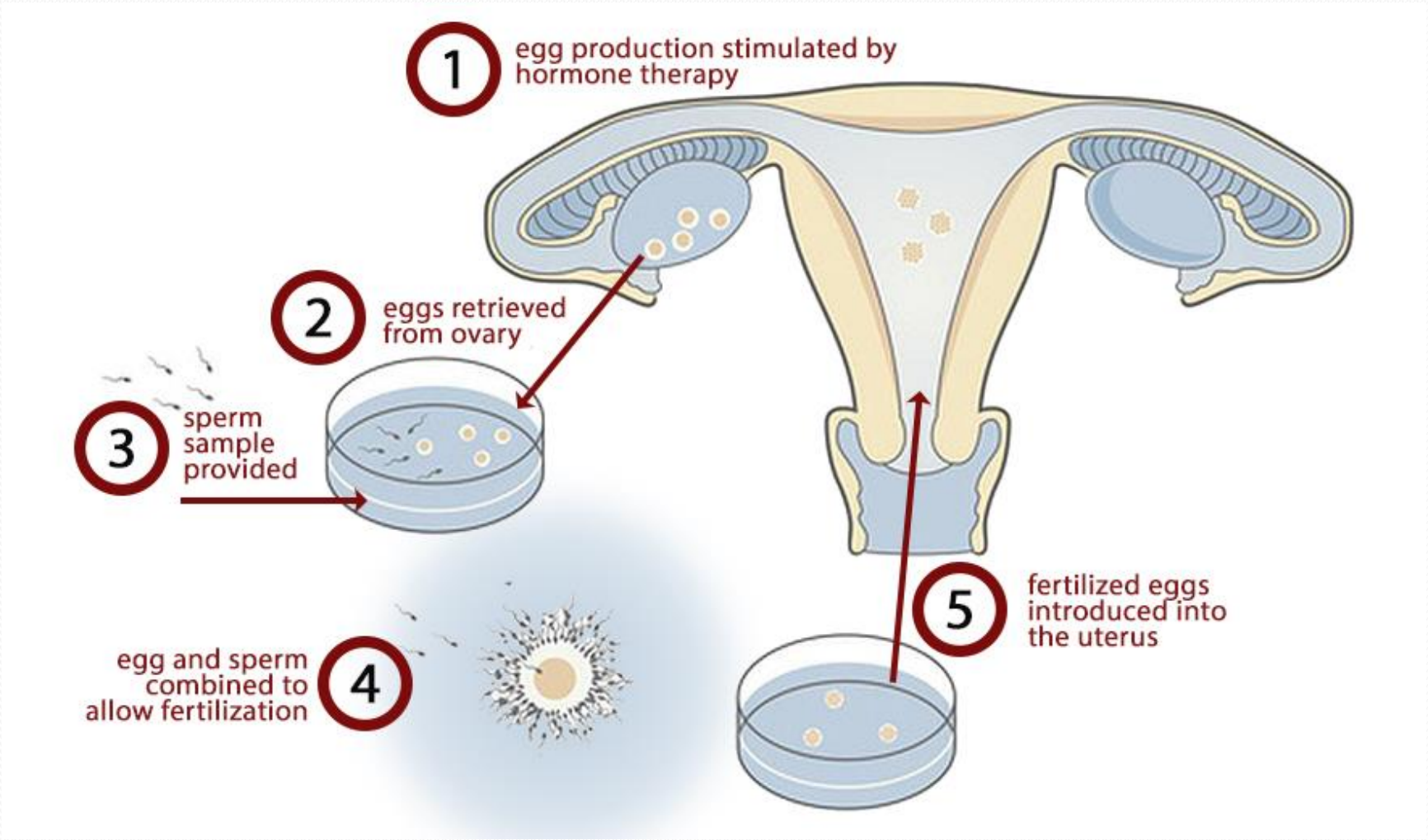

Fig. Steps of IVF

Step 1- Collection of ova

Use of GnRH containing medication (for stimualation to pituitary for ovarian hyperstimulation to induce development of multiple follicles.

To increase the chance of collecting multiple ova during menstrual cycle referred to as **ovulation induction**. Multiple ova are desired because some of ova will not develop or fertilized after retrieval. Ovum development is monitored by using ultrasound as well as urine and blood sample tests are examine to check hormone levels.

When the ovarian follicles have reached a certain level of development, then the oocyte maturation is done by **injecting human Chorionic Gonadotropin (hCG).** This hormone acts as an analouge of LH and ovulation would occur between 38 and 40 hrs after injection.

Step 2- Retrieving or aspirating the eggs from the ovary

Follicular aspiration is done by retrieving ova are retrieved through a minor surgical procedure (Transvaginal Oocyte Retrival Technique) by using ultrasound imaging to guide a hallow needle through the pelvic cavity which remove ova from the ovaries. Through this needle ova can be aspirated. In the laboratory oocyte selection has been done.

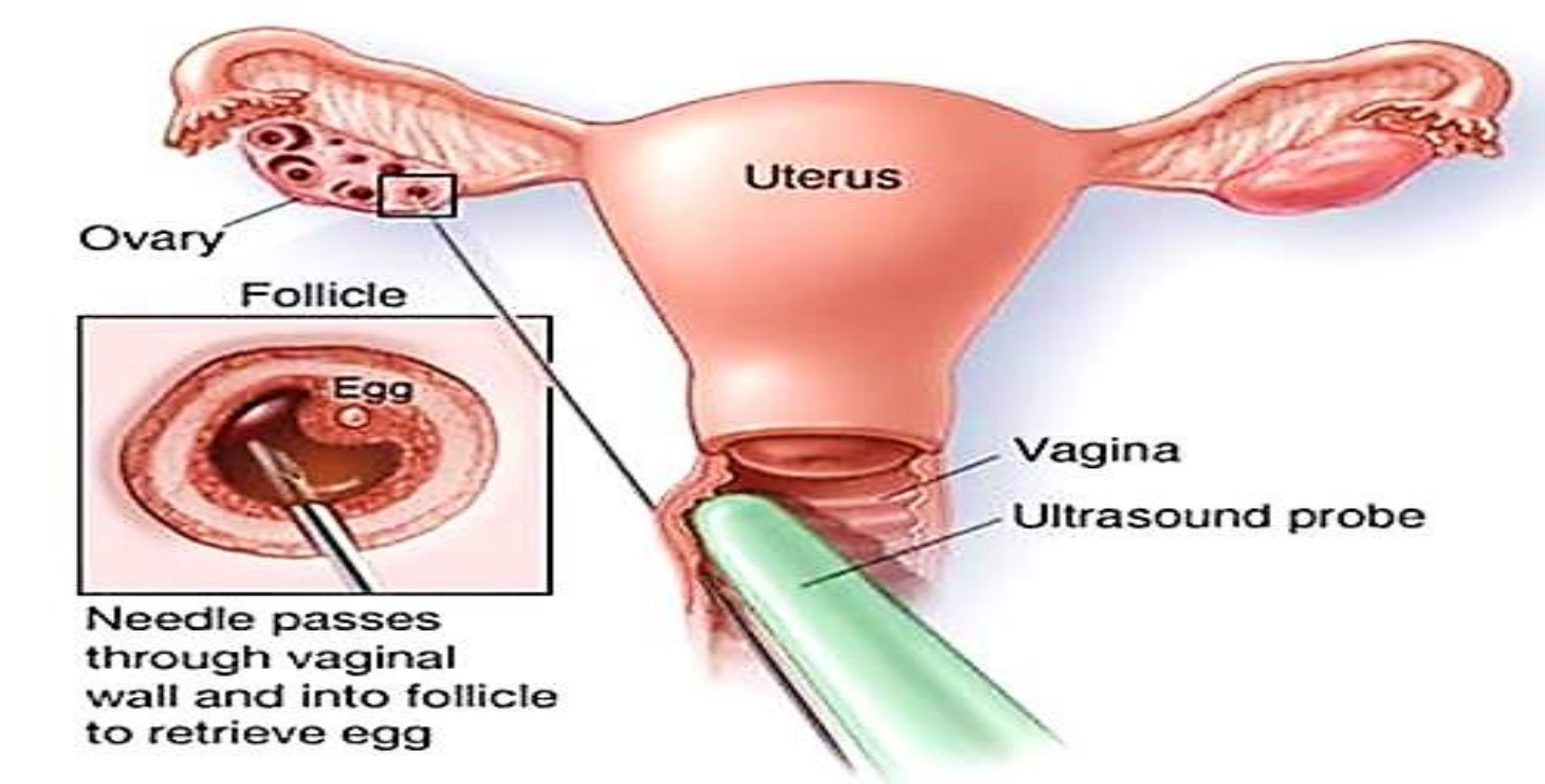

Fig. Retrieving the egg

Step 3-Collection of sperms

- Sperm, usually obtained by ejaculation and is prepared for getting the fusion with the ova. Sperm preparation is called sperm washing in which inactive cells from seminal fluid are removed. This procedure is already done for donar semen.

Step 4-Fertilization, monitoring and early development-

By insemination, the sperms and ova are placed in culture media in incubators (75000 : 1) located in the laboratories which enable fertilization. The fertilized ova are transferred to a special growth medium for 96 hrs. till it is blastocyst stage. In some cases, where lower probability of fertilization is found, intracytoplasmic injection (ICSI) may be done. The ova are monitored to confirm that fertilization and cell division are taking place and it is considered as embryos after successful fertilization.

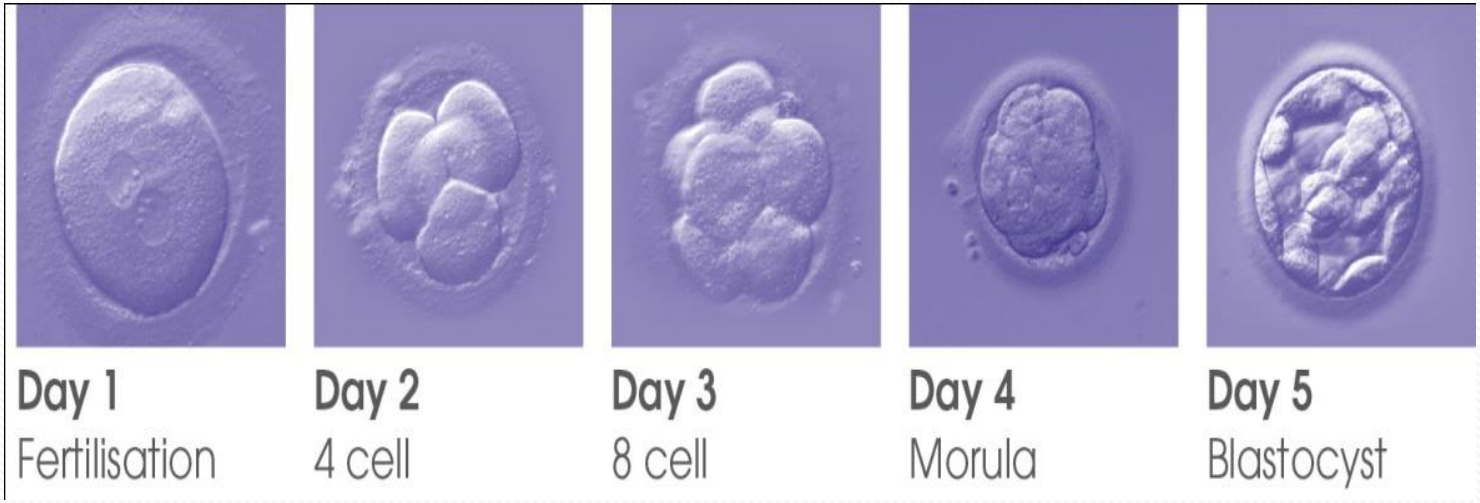

Fig. Cleavage

Step 5-Transferring the embryo into the uterus

The embryos usually transferred in to the woman's uterus from two to five days later, but in most cases the transfer occurs between two to three days following egg retrieval. At this stage, the fertilized egg has developed into a four to eight cell embryo. The transfer process involves a speculum which is inserted into the vagina to expose the cervix. A predetermined number of embryos are suspended in fluid and gently placed through a catheter in to the womb. These steps are followed sequentially under regular monitoring followed by all required blood tests and potential ultrasounds to determine successful implantation as well as finally desired occurrence of pregnancy. Medication containing Progesterone and GnRH is given under constant vigilance.

What are the chances of pregnancy ?

- The chances of a pregnancy after IVF – ET depends upon several factors such
- The case of infertility
- Age of the woman
- The quality of sperm
- The number of quality of embryos transferred
- How smoothly were the embryos transferred into the uterus.
- On an average, the chances of a women becoming pregnant are about 30-35% and the take home baby rate is about 25%