

Procedures Involved in Assisted Reproductive Technology

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DESCRIPTION

The process of sexual intercourse is avoided with Assisted Reproductive Technology (ART), and oocyte fertilisation takes place in a laboratory setting (i.e., *in vitro* fertilization).

According to the Centers for Disease Control and Prevention (CDC), ART includes "all fertility treatments that involve the handling of both eggs and sperm. In general, ART procedures involve surgically removing eggs from a woman's ovaries, combining them with sperm in the laboratory, and either returning the eggs to the woman or donating them to another woman. According to the CDC, they do not include treatments that only handle sperm (i.e., intrauterine or artificial-insemination) or procedures in which a woman takes medicine only to stimulate egg production without the intention of having eggs retrieved."

Ovulation induction

Ovulation induction is commonly used to refer to the stimulation of ovarian follicle development by fertility medication in order to reverse anovulation or oligoovulation. These medications are administered via injection over the course of 8 to 14 days. Transvaginal ultrasound and blood tests to assess follicle growth and oestrogen production by the ovaries are used by a health care provider to closely monitor the development of the eggs. When the follicles are large enough and the eggs are mature enough, an injection of the hormone hCG triggers the ovulation process. Egg retrieval should take place between 34 and 36 hours after the hCG injection.

In vitro fertilization

In vitro fertilisation is a technique that allows male and female gametes (sperm and egg) to fertilise outside of the female body.

Transvaginal Ovum Retrieval (OVR): It is a technique used in *in vitro* fertilisation in which a small needle is inserted through the back of the vagina and guided via ultrasound into the ovarian follicles to collect the fluid containing the eggs.

Embryo transfer: The process in which one or more embryos are implanted in the uterus of a female in order to establish a pregnancy.

Assisted Zona Hatching (AZH): It is a technique used in *in vitro* fertilisation that is performed shortly before the embryo is transferred to the uterus. A small opening is made in the outer layer surrounding the egg to aid in the hatching of the embryo and the implantation of the growing embryo.

Intracytoplasmic Sperm Injection (ICSI) is beneficial in cases of male factor infertility where sperm counts are very low or previous IVF attempts failed to fertilise. A single sperm is carefully injected into the centre of an egg using a microneedle during the ICSI procedure. ICSI requires only one sperm per egg. This method is also used when donor sperm is available.

Endometrial coculture: Patients who have failed previous IVF attempts or have poor embryo quality may benefit from autologous endometrial coculture. A layer of cells from the patient's own uterine lining is placed on top of the fertilised eggs, creating a more natural environment for embryo development.

Zygote Intrafallopian Transfer (ZIFT): In this technique egg cells are removed from the woman's ovaries and fertilised in the laboratory before being placed into the fallopian tube.

Intra Cytoplasmic Sperm Injection: It's a special form of *in vitro* fertilization fashion that helps in the conformation of an embryo in the man by direct injection of the sperm into the egg/ovum. In this era, it's possible to directly fit a single sperm cell into the cytoplasm of the ova. This technique helps in the medication of gametes and conformation of embryos which is eventually transferred into the uterus of the woman.

Cytoplasmic transfer is a technique in which the contents of a fertile egg from a donor are injected, along with sperm, into the patient's infertile egg. Egg donors are available to women who have lost their eggs due to surgery, chemotherapy, or genetic causes, or who have poor egg quality, previously unsuccessful IVF cycles, or advanced maternal age. Eggs are extracted from a donor's ovaries, fertilised in the laboratory with the recipient's

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partner's sperm, and the resulting healthy embryos are returned to the recipient's uterus.

Sperm donation may be used to supply sperm for IVF procedures when the male partner does not produce sperm or has an inheritable disease, or when the woman being treated has no male partner.

Preimplantation Genetic Diagnosis (PGD) is the use of genetic screening mechanisms such as Fluorescent *in-situ* Hybridization (FISH) or Comparative Genomic Hybridization (CGH) to help identify genetically abnormal embryos and improve healthy outcomes.

CONCLUSION

Infertility affects roughly 13%-14% of reproductive-aged couples. The extent of recent advances in the field of supported

reproductive technologies is stunning. For infertile couples, these advances promise to further ameliorate the effectiveness, convenience, and accessibility to the treatment. Numerous types of ART are available to treat infertility. The success rates of ART vary according to the type of ART people choose, and factors such as the individual's age and health. Intra Cytoplasmic Sperm Injection (ICSI) is beneficial in cases of male factor infertility. Autologous endometrial coculture uses cells from the patient's own uterine lining. Egg donors are available to women who have lost their eggs due to surgery, chemotherapy or genetic causes.