

## Indications and Complications of *In Vitro* Fertilization

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### DESCRIPTION

The technique of manipulating egg cells *in vitro* is called Assisted Reproductive Technology (ART), and *In Vitro* Fertilization (IVF) is the most common form. The term "*in vitro*" means the outside of the organism because the oocyte matures *in vivo* in the ovary and the embryo develops into pregnancy in the uterus, but the oocyte fertilizes in a Petri dish. Since this major advance in fertility treatment, the field of endocrinology of reproduction/infertility has evolved rapidly and IVF now accounts for 1.6% and 4.5% of all births in the United States and Europe, respectively. Originally developed to avoid irreparable fallopian tube disease, IVF is now widely used to treat infertility from a variety of causes, including endometriosis, male factors, and unexplained infertility. Women who cannot use their eggs due to Primary Ovarian Insufficiency (POI) or an age-related decrease in egg count can become pregnant using donor *in vitro* fertilization.

### Indications

Approximately 25% to 35% of infertile women suffer from tubular peritoneal disease, and Pelvic Inflammatory Disease (PID) is the most common cause of tubular damage. PID is usually the result of Chlamydia trachomatis infection. Bacterial infections can cause tubular obstruction or peritubular capillar adhesions, reducing the likelihood of *in vitro* fertilization. IVF avoids damage to the fallopian tubes by transplanting the embryo directly into the uterus. Endometriosis is a chronic inflammatory disease defined by the presence of endometrial tissue outside the uterine cavity and is much more common in infertile women than in women without infertility. The mechanism by which endometriosis causes infertility is not fully understood, but women with endometriosis have reported pelvic adhesions, chronic intraperitoneal inflammation, impaired follicular formation, and reduced embryonic implantation. It has been. Laparoscopic surgery has been shown to increase pregnancy rates from 4.7% to 30.7%, demonstrating the importance of restoring normal pelvic anatomy to spontaneous

pregnancy. Unfortunately, women with endometriosis have a significantly lower success rate with IVF compared to other causes of infertility, with more advanced disease correlated to inferior outcomes. Poor semen quality is the sole cause of infertility in 20% of couples and contributes to fertility issues in another 20%. Decreased sperm count, motility, or morphology (shape of the sperm) can be successfully treated medically or surgically in approximately 50% of men. Intrauterine insemination can also increase pregnancy rates in couples where the male partner has a low number of motile sperm. If such treatments fail, IVF with or without Intra Cytoplasmic Sperm Injection (ICSI) can be utilized. Sperm extracted from the testicle or epididymis in cases of obstructive azoospermia or testicular hypofunction can only be used in an IVF cycle with ICSI as the sperm have not undergone the final *in vivo* maturation process, allowing it to fertilize an oocyte. Cryopreservation of eggs is also a viable option for women who want to delay childbirth. It is well known that women's fertility declines dramatically in the first 40 years of life. This decrease in fertility is the result of a decrease in both quantity and quality of oocytes.

### Complications

Ovarian hyperstimulation syndrome is a potentially life-threatening complication of ovarian stimulation. In mild cases, women experience abdominal distension, nausea, and vomiting. In more severe cases, ascites can be associated with severe abdominal pain and pleural effusion, which can lead to decreased lung function and hypoxia. Patients may show signs of hypovolemia, oliguria, increased creatinine, increased liver enzymes, leukocytosis, and electrolyte imbalances. Blood levels increase the risk of thromboembolism. In severe cases, acute renal failure and disseminated intravascular coagulation can be fatal. The World Health Organization (WHO) estimates the incidence of severe OHSS to be 0.2-1% of all pacing cycles. Twin frequency increased from 1980 to 2015, with an estimated 19% are of twins and 25% are of triplets due to IVF.

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