Information on I*n Vitro* Fertilization

(I) *In vitro* fertilization (IVF)

It involves the following four steps:

(1) **stimulation of ovaries**

(2) **egg collection**

(3) **sperm washing and fertilization**

(4) **embryo transfer**.

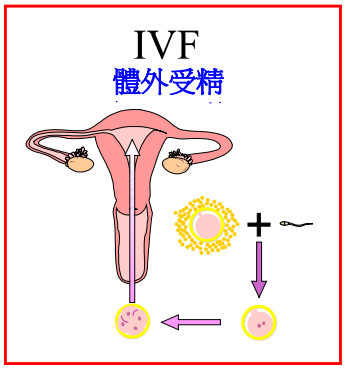

Figure 1: IVF

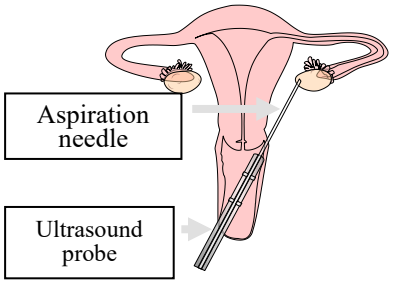

Figure 2: Egg collection

1. Stimulation of ovaries

- After the period begins, you will undergo a transvaginal scan and a blood test.
- You will then receive daily injections to stimulate the ovaries to develop multiple follicles. You will give injections yourselves.
- Antagonist or progestin is used in most patients to prevent early release of eggs.
- The ovarian response is monitored by transvaginal scanning. The scanning will usually be performed after 7-8 days of injections and subsequent scanning is arranged accordingly.
- Final maturation of the eggs will be induced when there are at least 3 follicles >17 mm in diameter.
- On average, the stimulation takes 11 days and 8-10 eggs are obtained, depending on your ovarian reserve.

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2. Egg collection (Figure 2)

- The eggs will be aspirated from your ovaries about 36 hours after hCG injection in the evening, with the help of the transvaginal ultrasound scanner.
- Antibiotic as a precautionary measure will be given prior to the collection. Therefore, you should inform the doctors in advance if you have any drug allergy. A pain-killer and a sedative will be given shortly before the procedure.
- The whole procedure will usually take 10-15 minutes.

3. Sperm washing and fertilization

- Your husband will have to submit a semen sample on the day of egg collection. Freezing of semen samples should be arranged in advance if he has problems to submit the sample due to various reasons.
- After the sperm washing, the sperms will be mixed with or injected into the eggs collected.

Intracytoplasmic sperm injection (ICSI)

- Direct injection of a single sperm into an oocyte to assist fertilization. (Figure 3)
- Indicated in couples with severe male factors or low fertilization rate (<30%) in previous cycle.
- A slight increase in the risk of sex chromosome disorder, about 1-1.5% after ICSI compared to 0.5% after natural conceptions or conventional IVF pregnancies.
- For men with no sperm in the ejaculate due to obstructive causes, sperms may be obtained by the aspiration from the distended epididymis. If the absence of ejaculated sperm is due to testicular failure, sperms can be recovered from the testicular biopsy but the success retrieval of sperm is about 40-50%.

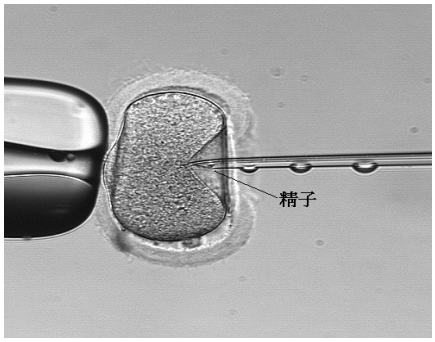

Figure 3: ICSI

Figure 4: Embryo transfer

4. Embryo transfer (Figure 4)

- Embryos are usually transferred to the womb two days after egg collection. Embryos can now be cultured in the laboratory to the fifth day after egg collection when the embryo develops to blastocyst.
- **Blastocyst culture**
  - Indicated when you have 3 or more embryos two days after egg collection.
  - Advantage includes reduction in the number of embryos to be replaced, thus reducing the risk of multiple pregnancy and increasing chance to select better embryos for transfer to shorten the time to pregnancy.
  - Only about half of the embryos will develop into blastocysts and variation in the

ability to produce blastocysts among patients is remarkable.

- Only 2-6% of patients will have no development of blastocysts based on our criteria and therefore no embryo transfer.

- You will have **ONE embryo or blastocyst replaced in each cycle**. Replacement of 2 embryos (Not blastocyst) can be considered if you :
  - ❑ Are >38 years at the time of IVF or not pregnant after 2 cycles of IVF and
  - ❑ Have no livebirth before

- After the embryo transfer, you will be given two weeks of progesterone tablets to support the luteal phase.

(II) Frozen embryo transfer (FET)

The replacement of frozen embryos can be performed in natural, letrozole or hormone replacement cycles. Please note that not all cryopreserved embryos will survive the freezing and thawing processes. The usual survival rate is more than 90%.

1. **Natural cycle**
   If you have regular menstrual cycles, the transfer of frozen embryos will be arranged after ovulation has occurred. There is no need to give luteal phase support.

2. **Letrozole cycle**
   If you have irregular menstrual periods, we will give you letrozole to induce ovulation. There is no need to give luteal phase support.

2. **Hormone replacement cycle**
   If you do not ovulate with letrozole, we will use hormone replacement cycle. You will receive hormone tablets (oestrogen and progesterone) to prepare the lining of the womb for embryo replacement. The full details will be given at the beginning of the treatment.

(III) Psychosocial support

In general, patients would experience a wide range of psychosocial distress during the treatment phase, such as anxiety, stress, anger, depression, guilt, frustration, sense of loss and so on. Significant positive effects were found on those who had received the psychosocial services.

Patients with psychological problems may be referred to our counsellor for further counselling.

Please let the staff know if you need help during or after the treatment. Counseling is offered independent of the clinical decision-making process and information obtained during counseling would be kept confidential.

(IV) Pregnancy rate

- The cumulative live birth of the first IVF cycle is 50-66% per cycle in women under the age of 40 years. It should be noted that many factors such as age of the woman, history of previous pregnancy, ovarian response and other associated factors may affect the pregnancy rate.
- There is 20-30% chance of miscarriage in early pregnancies and 4-5% chance of ectopic pregnancy.

(V) Complications

- In general, IVF is fairly safe and the complication rate is low.
- Possible complications include:
  - ❑ multiple pregnancy (~20% when two embryos are replaced);
  - ❑ ovarian hyperstimulation syndrome (patients may develop abdominal distension, vomiting, ovarian cysts, fluid in the abdomen and the lung etc.; moderate-severe: 1-5%);
  - ❑ ectopic pregnancy (i.e. pregnancy located outside the womb; ~5%);
  - ❑ complications arising from egg collection. eg. bleeding from the ovaries and pelvic infection (rare, less than 1%);
  - ❑ fertility drugs may slightly increase the risk of ovarian cancer in women with endometriosis.

(VI) Pregnancy course and obstetric outcome

- The risk of birth defects following IVF is about 4% and higher than 3% in natural conceptions.
- There is also a slight increase in the risk of sex chromosome disorder after ICSI.
- The rates of complications in pregnancy (e.g. ectopic pregnancy, miscarriage, difficulty in delivery) are similar to that in natural conception. However, there may be a 2-3 times increase in the incidence of preterm labour and small for gestational age babies even in singleton pregnancies conceived after IVF compared with those conceived spontaneously.

(VII) Miscellaneous

1. Genetic screening for the husband

- Men with very low sperm count (less than 5 million per ml in the ejaculate) or no sperm due to testicular failure are advised to undergo tests for chromosome abnormalities and microdeletion in the Y chromosome because the chromosomal or genetic abnormalities may be transmitted to their children, if present. Patients will be charged for these tests. Please ask the staff for further details when needed.

2. Preimplantation genetic testing (PGT)

- A method to determine the presence of chromosomal or gene defect in an embryo before transfer.
- Allows selection of normal embryos to be transferred to the patients seeking IVF and is an alternative to prenatal diagnosis.
- Indicated when the fetus is at risk of chromosomal abnormality (e.g. balanced translocation in the couple) or other major genetic diseases (e.g. Thalassaemia and some sex-linked diseases).
- Gender selection for non-medical reasons is not allowed in Hong Kong.
- When indicated, the couples will receive further details and genetic counselling before undergoing the PGT procedure.

More relevant information

Website: https://hkuivf.hku.hk

YouTube: **IVF counselling playlist**
https://www.youtube.com/playlist?list=PLp60AnTUVei-az7LgDXuq12jt89D9EvZv

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Recruitment Guideline in the Hospital Authority for In-Vitro-Fertilization (IVF)

I. Background

IVF is an invasive procedure and serious complications such as ovarian hyperstimulation syndrome, risks of oocyte retrieval, ectopic pregnancy and multiple pregnancy can occur. There would also be risk usually associated with pregnancies, including abortion and congenital abnormalities. The cost effectiveness of treatment is also important. For these reasons appropriate patient selection is mandatory and a clear indication for IVF must exist for this publicly funded service.

The decision on whether to recommend IVF treatment should be based on

(1) the likelihood that a pregnancy will occur without treatment;
(2) the possibility that a less invasive form of treatment might be effective;
(3) the likely outcome of IVF treatment.

II. Patient Selection Criteria

1. The female patient must not be more than 40 years of age at the time the procedure is initiated.

2. Couples must be legally married with no living child for the current marriage.

3. Couples must not have contraindications for pregnancy in terms of medical, physical and mental conditions.

4. Couples must be adequately investigated and IVF is the most appropriate treatment.

5. Clients with decreased ovarian reserve as indicated by screening test(s) will be excluded.

6. Each eligible couple will be entitled to three IVF treatment cycles within the Hospital Authority.

7. On top of the above, the individual professional team will consider other relevant factors where appropriate e.g. the underlying cause of infertility, the duration of infertility and the pregnancy history.

Hospital Authority
February 2003