SUMMARY

Our Knowledge of reproductive medicine has expanded rapidly since the birth of Louise Brown, the first baby to be conceived by in vitro fertilization, which was performed by Professors Steptoe and Edwards in Bournhall, England, in 1987.

The chance of a pregnancy following a single cycle of IVF is approximately 30% in the large units.

Hardly a year goes without the development of a new modification of an existing method of assisted reproduction, Indications for this treatment include abnormal semen parameters, abnormal or hostile cervical mucus, immunological or unexplained infertility and more rarely cases of anatomic malformations (e.g. severe hypospadius), neurological disorders (e.g. retrograde ejaculation), psychological and psychogenie dysfunction (e.g. vaginismus) as well as eugenic reasons due to the presence of genetic risks (e.g. rhesus incompatibility, hemophilia, Coleys anemia, cystic fibrosis, Tay-saches disease, spinal muscular atrophy, Huntingtons chorea, schizophraniaum, and manic depressive psychosis.

As controlled ovarian hyperstimulation is used in all methods of assisted reproduction, this work-essay begins with in chapter 1.

The aims of ovarian hyperstimulation is to :

1- Promote the development of a relatively synchronous cohort of follicles; thus facilitating appropriate timing of human chorionic gonadotropine (HCG) administration and oocyte retrieval .

2- Collect multiple, mature oocytes that have the capacity to fertilize, cleave and initiate a viable pregnancy.

3- Achieve endometrial development that will support embryonic implantation and growth.

4- Minimize the cycle cancellation rate.

5- Maximize cost efficiency of medications and monitoring.

Several drugs are used to hyperstimulate the ovaries : Clomiphene citrate (CC) was the first drug used for controlled ovarian hyperstimulation and although there is a lower pregnancy rate noticed in IVF when using CC alone as stimulation protocol , probably due to the lower mean number of oocytes and , as a consequence, less embryos placed into the utrine cavity, here and there some centers still use the CC protocol in their IVF program mainly because of its low cost.

Different gonadotropins preparations are used in a fixed, individually adjusted or combined regmens. Pure FSH preparations might be ideal for the women with PCO who have more than adequate LH Production by their own Pituitary glands. The most recent and potent gonadotropin preparation is the recombinant FSH.

The use of GnRh agonists to prevent the premature LH surge caused by HMG in an in vitro fertilization program, gave rise to the short, ultrashort and long protocols which are now the current protocols used in many IVF centers, while the use of GnRH antagonists is still under trial, whether the multiple dose Lubeck protocol or the singly shot French protocol.

Ovarian hyperstimulation syndrome and ovarian cysts are the most common complications after COH.

Different semen preparation techniques are discussed. Comparison of the methods of sperm preparation yield similar fecundity rates.

In vitro fertilization means the fertilization of an oocyte with sperm outside the body The procedures involved in IVF treatment can conveniently be considered under the following headings:

I- Controlled ovarian hyperstimulation (COH) and monitoring of follicular maturation.

II- Oocyte retrieval (ovum pick-up).

III- Extracorporeal fertilization and related laboratory preparations.

IV- Embryo transfer.

V- Luteal phase support.

Many methods have been described for the retrieval (pick-up) of oocytes IVF. Laparoscopic retrieval initially was the procedure of choice and still retains an important role in oocyte recovery; however, this approach has been replaced in the majority of cases by ultrasound guided transvaginal retrieval.

As The human IVF laboratory is not an ordinary one, it is important to mention three major elements which have to be under constant rigid quality control: the microscope, incubation system and culture media. The embryological laboratory is used to isolate the oocytes, process the sperm, fertilize the oocytes, and cultivate the embryos. The culture medium used for IVF and related procedures usually contains at least minimal essential nutrients for survival of gametes and embryos, ideally, it should mimic the contents of the human oviduct during the preovulatory period.

Preimplantation genetic diagnosis (PGD) is now the field for research in order to increase the rate of implantation as it has been shown that chromosomal aberration in the transferred embryos may represent the major cause of failed implantation.

The embryo transfer (ET) process represents the culmination of the IVF cycles, since ovulation induction is associated with a 93-95% success rate in recruiting multiple oocytes. The oocyte retrieval is also associated with 89-95% success rate in obtaining oocytes.

Fertilization rates are approximately 79-85% with mature ooeytcs. However, after embryo transfer, pregnancy rates fall in the range of 15-20%. Although ET is the simplest procedure associated with IVF , it is the procedure responsible for the success rate of each individual cycle. Two out of three embryo replacements fail to implant. The ideal number of embryos to be transferred is still a matter of discussion but most centers transfer 3-5cmbrjos.

Preimplantation genetic diagnosis: ARTs can be used to generate embryos from which single cells can be obtained for genetic studies or simple sexing in cases where there are life threatening congenital diseases. Each cell in the pre-embryo is pleuripotent and so a single cell can be removed up to the blastocyst stage without damaging the development of the fetus. Using this technique it is possible to transfer only healthy prembryos and avoid the risks of antenatal testing(chorion villus biobsy, amniocentesis)and the possibility of a termination should be considered accordingly. To overcome the problem of poor fertilization results in the presence of reduced sperm numbers or motility in IVF programs, several techniques of gamete and embryo micromanipulation have been used. They are carefully manipulated with micropipettes under vision via the microscope. Thse micromanipulation techniques include the opening of window in zona pellucida to allow ingress of sperm(partial zona dissection or PZD) and injection of sperm into the perivitelline space (subzonal

insemination, or SuZI) or directly into the cytoplasm of the egg (Intracytoplasmic sperm injection, or ICSI).

The ICSI experience has allowed the fertilization rate to become considerably better, with the production of more embryos able to achieve implantation, than after the other assisted fertilization procedures . Since July 1992, ICSI was the only procedure used when assisted fertilization is necessary.

Egypt is a conservative county with traditional culture, which is governed by strong religious sentiments. Approval from religious leaders was mandatory.

Assisted reproductive technology provides a hope for those who considered absolutely sterile in the past however it is still beyond reach due to its high cost.