

Biography and Harmony in ART

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Infertility treatment has been performed in the infertility clinic at Siriraj Hospital for over 20 years. Since poor assisted reproductive technology in the past was underdeveloped, there were many problems and limitations in our treatment program. When I was a resident in the obstetric and gynecology training program in Siriraj Hospital, I remembered that the program for infertility treatment was not as complicated as today. For example, the women who had infertility problems, such as obvious gynecologic disease, surgical treatments were performed in order to improve the fertility and achieve conception in the future. However, the succession rate or conception rate of infertility treatment at that time was below 30%. Some couples who had normal investigation were categorized as unexplained infertility, and there is no definite treatment for unexplained infertility. In addition, intra uterine insemination was the only procedure that was performed at that time. If her husband has abnormal semen analysis or poor quality sperm, they have no chance of conception with their own genetics. The only way they achieved conception was donor sperm usage.

A few years after that time, assisted reproductive technology or ART has been fully developed especially in the infertility clinic at Siriraj Hospital. Nowadays, ART is routinely performed to improve the possibility of conception. The details of ART are described below.

1. Intrauterine insemination or IUI are the procedures like artificial insemination. In the past, the liquefied fresh semen without washing was injected through the cervix into the uterus. The most common complication that occurred from the IUI procedure was infection as well as trauma to the genital tract. In addition, prostaglandins in seminal fluid induced the vigorous uterine contractions. Sperm washing, therefore, is a vital procedure for selecting the best sperm, as well as recovering good motility sperm, before injection to the uterine cavity. However, the couples who have problems, such as cervical stenosis, impotence, and unexplained infertility will achieve conception by IUI procedure.
2. Gamete Intra-Fallopian tube transfer or Gift, which has been routinely performed since 20-30 years ago, is the procedure that transfers the mature oocyte concurrent with sperm into the fallopian tube. At that time, Ovum pick up or OPU was performed according to laparoscopic technique. After the

oocyte was aspirated from the ovarian follicle, the oocyte was immediately transferred to the fallopian tube as well as washed sperm. This procedure was like a natural fertilization process, so the chance of conception was as high as 30%. However, general anesthesia, which was required during the OPU and embryo transfer, needs a long duration for completion of all process.

A few years later, the OPU technique using transvaginal ultrasonogram guidance was established in the infertility clinic at Siriraj Hospital and this procedure is currently performed on a routine basis in the infertility clinic. Either a laparoscopic approach or a transvaginal approach using ultrasound provides the same efficiency of oocyte recovery of OPU procedure, but the transvaginal approach does not need general anesthesia. In addition, our clinic developed a special silicone catheter that was used for tubal transfer via cervical os with the GIFT procedure. Both techniques provide the same succession rate, yet gamete transfer using the transcervix approach does not need general anesthesia. Therefore, GIFT using laparoscopy is rarely performed. GIFT is a fertility treatment technique which first succeeded as recently as 1987 in Siriraj Hospital.

Now Gamete Intra-Fallopian Tube Transfer is rarely performed in most assisted reproductive centers, because previous study showed that IUI provide the same succession rate as GIFT.

3. In Vitro Fertilization and Embryo Transfer or IVF-ET is a procedure that has been established for 15-20 years and is routinely performed in Siriraj Hospital. The first conception by IVF-ET was reported in 1981 at Siriraj Hospital. For treatment using IUI or GIFT, the couple must have normal genital organs as well as normal functions. If they have abnormal genital organs, such as bilateral tubal obstruction, treatments with IUI or GIFT are unable to achieve conception. Now IVF is the technique for replacing IUI or GIFT especially with abnormal genital organs.

There are many steps in IVF: ovum pick up using transvaginal ultrasonography, oocyte incubation with washed sperm in a well controlled incubator, such as temperature, humidity, appropriate gasses. Fertilization occurs after 24 hours

of incubation, and then at least 24 hours later the embryo is transferred to uterus.

Intra Cytoplasmic Sperm Injection or ICSI is assisted fertilization which is a part of the IVF procedure. There are many indications for ICSI including male factors, such as low sperm count, poor sperm motility, and abnormal sperm morphology. The ICSI procedure requires special equipment for "micro manipulation" for direct sperm injection to the oocyte. More than 70% of ICSI oocytes are fertilized. In addition, Siriraj Hospital was the first place that established ICSI procedure with the first successes in Thailand, and now ICSI has routinely become a part of infertility treatment in Siriraj Hospital.

4. Pre implantation Genetic Diagnosis or PGD has been developed as a routine service for 2-3 years in Siriraj Hospital. Although this technique is not a direct path of infertility treatment, it was applied for early detection or genetic screening before embryo transfer. PGD requires an IVF procedure in which some blastomeres are biopsied during 8 cells stage. Each cell was stained for detection of chromosomal abnormalities especially 13, 16, 18, 21, X, and Y. Some couples, therefore, who have a history of genetic disease, are appropriate for performing PGD.

Detection of abnormal genes such as thalassemia is still being done as a research program, which cooperates with other departments. It will be applied for investigation and routine service in the near future.

5. Embryonic cloning is currently being studied and done in animal research in our infertility clinic. About ethical considerations, there is no currently application in humans.

6. Embryonic stem cells are related to research, which has been done in infertility clinics. There are many special characteristics of stem cells, which can be developed for many cell types. Now, Siriraj Hospital supports a grant for stem cell research.

As the world is still moving, knowledge, infertility treatment, and research in infertility are being refined and developed in order to improve infertility knowledge, to support the policy that Siriraj Hospital will be the best hospital in South East Asia as well as the best infertility clinic in South East Asia.

As a cause of infertility, the male factor is the most common cause of infertility especially obstruction of the vas deferens, or azoospermia. Male factor infertility treatment have been improved since 1996. There are many techniques, which have been developed for treatment in such cases and are routinely provided in Siriraj Hospital such as; microscopic epididymal sperm aspiration or MESA: directly aspirate sperm from the vas deferens, testicular sperm extraction or TESE: and recovery of sperm from testicular tissue biopsy.

Furthermore, Siriraj Hospital was the first leader that established fertilization with the round cell stage and finally achieved the first successful conception in Thailand in 1998.

Despite the above, embryo culture including blastocyst culture has been developed for more than 20 years. However, it has not been routinely performed in most assisted reproductive centers around the world because culture media were of poor quality. Until now, many researches have been done and the technique of culture media production has been developed. Embryo, therefore, can grow under culture media for 5 days which is known as the blastocyst stage. The pregnancy rate of blastocyst transfer is as high as 50-60%. On the other hand, some embryos degenerated, while they were being cultured. This point should be considered before making a decision of blastocyst culture.