

In vitro fertilization (ivf) types and effects



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Statistics shows that one out of six couples experienced the problem corresponding with infertility (Olmedo, Chilik and Kopelman, 173). Infertility can be considered a disease affecting more than 80 million people around the world consisting primarily of young population accounting to around 10-15% having problems on the ability to conceive and give live births (Hochschild, Schwarze and Alam, 2008). Considering these figures, infertility becomes one of the centers of attraction especially that many couples are becoming desperate to have a child. They would just take any chances in order to have a child after for so long time having sexual intercourse but then without contraception that takes place.

There are many advanced ways nowadays in order to treat infertility or even defy its capacity for couples not to experience contraception. Embryo transfer is one. Then one of the most popular is in vitro fertilization which is a technique used by 53 countries around the world today, implying that the treatment is no longer experimental but safe to use (Ezra and Schenker, 127).

Causes of Infertility

The continuing many studies about infertility are clear indications that the discovery on what is really is it is still on the process of creating series of scientific investigations. One of these scientific investigations is in line with knowing the probable causes of infertility. It was hypothesized that it could be due to four factors such as delayed childbearing, problem on semen quality because of bad habits such as cigarette smoking and abusive alcohol intake, changes in sexual behavior and elimination of most taboos (Olmedo, Chilik and Kopelman, 173). It is because of these considered factors that

studies on infertile couples are focused on ovulatory factor which is present to 20% of couples, utero-tubal peritoneal factor which is present to 30% of couples, then 40% of couples have together the two previous factors and 15% of couples can be diagnosed because of no alterations (Olmedo, Chilik and Kopelman, 173).

Statistics on IVF

Statistics shows the following figures regarding in vitro fertilization (Ezra and Schenker, 127). Since it started in 1985 to be used as infertility treatment, over 53, 635 women were already treated which corresponds to around 34, 316 babies born by 224, 473 treatment cycles then next after it were 160, 518 transfer cycles. With the resulting pregnancies, around 65% to 75% were able to come up with live births then the rest went to spontaneous abortions of around 26% and ectopic pregnancies of around 5. 54%. The higher rates of preterm deliveries and perinatal mortality have been expounded by around 22% of multiple pregnancy rate which was higher than the normal population. It remained to around 2. 25% of chromosomal aberrations and malformations as documented within the years and success rate for in vitro fertilization did not improve within the covered period during the survey. It was noted that the procedures were becoming much more reliable due to the scope of procedures included which became at some point, final steps in the diagnosis.

Assisted Reproductive Technology (ART)

Assisted reproductive technology (ART) is part of the changes in infertility practice. It provided a right chance to study basic reproductive processes

(Olmedo, Chilik and Kopelman, 173). The reason is that ART is an artificial means used in order to achieve pregnancy.

In 2000, the United States reported 13.5% increase in reported cycles compared to the data presented in 1999 and overall success rate of 0.6% which represents 2.2% increase as compared to the result in 1999 (Society for Assisted Reproductive Technology, American Society for Reproductive Medicine, 1207).

In 2006, Canada reported that with ART, clinical pregnancy and live birth rates continued to increase compared with the previous years, but only small rate decrease for multiple births (Gunby et al., 2189).

Indicators for IVF (in vitro fertilization)

Continuing studies about in vitro fertilization lead to significant findings of significant predictors for its success rate.

Considering that sperm morphology is correlated with fertilization failure, then the sperm chromatin packaging was found to be significant indicator of in-vitro fertilization rates. The study of Esterhuizen et al. (657) found that sperm chromatin packaging was significantly correlated with in-vitro fertilization rates.

Takahashi et al. (586) found that oocytes have great chance to be fertilized when follicles can make high concentrations of AMH in the follicular fluid. It is in this result that AMH was found to be a significant predictor for fertilization.

It was found out that follicular volume can be the new indicator of oocyte maturity. The study of Fuentes et al. (616) found that SonoAVC when it

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comes to evaluation of stimulated ovaries can be reliable allowing further to establish new criteria for timing hCG administration on follicular volume estimation instead of the follicular size.

From the result of the study of Sifer et al. (150), they found that granula cells of humans and its resistance to apoptosis has the possibility to be associated in the success rate of IVF.

There was an association between the declining of age of implanted embryo with the embryo's impaired growth rates (Hsu et al., 679).

Based on the recent findings and investigations conducted about in vitro fertilization, the above results are just one of those showing significant indicators for the success rate of in vitro fertilization. The list goes on and on. So there are remarkable and significant indicators that can possibly be associated with IVF.

Steps in the IVF Treatment

Just prior to the actual IVF treatment, there are preliminary steps that need to be undergone by a patient who wants to undergo the procedure. The following are the least steps a patient who wants to undergo with IVF can possibly undergo (Falcone and Young, 93).

Select infertility specialist

Both partners who are involved in the treatment needs to undergo series of medical tests.

Medical steps that need to be taken to address infertility needs to be considered

Agreement with the infertility specialist about the chance a patient can have with IVF.

IVF Techniques:

The following are common IVF techniques that are commonly used to treat infertility among couples who are willing to take chances.

Intra-cytoplasmic Sperm Injection (ICSI)

In Intra-cytoplasmic Sperm Injection (ICSI) sperm is mechanically injected into the cytoplasm of an oocyte. This technique was applied initially in sea urchin, followed in mouse and hamster and was successful to humans in 1992 (Peas and Lois, 23).

GIFT: Gametic Intra-fallopian Transfer

As the name implies, Gametic Intra-fallopian Transfer (GIFT) is the direct transfer of human gametes, sperm and oocytes in the fallopian tube which was first successful in 1984 (Serhal and Overton, 256). The good thing about GIFT is that it mimics the natural process in which the gamete is restored in the fallopian tube.

Z. I. F. T. Zygote Intrafallopian Transfer

Zygote intrafallopian transfer is an advanced form of gametic intrafallopian transfer. By using the gametic intra-fallopian transfer, the oocytes are harvested by transvaginal aspiration, fertilized in vitro and transfer in the fallopian tube (Schmidt and Kurjak, 85). Patients with tubal pathology cannot
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use zygote intrafallopian transfer as well as gametic intra-fallopian transfer (Schmidt and Kurjak, 85).

T. E. T (Tubal Embryo Transfer)

Tubal embryo transfer is the development of simple embryo transfer over the years. Tubal embryo transfer is part of the stage of embryogenesis transfer encompassed by zygote intrafallopina transfer in general (Allahbadia and Das, 182).

P. R. O. S. T (Pronuclear Stage Transfer)

Just like the tubal embryo transfer, as a modification of embryo transfer, the pronuclear stage transfer is also part of the stage of embryogenesis transfer encompassed by zygote intrafallopian transfer in general (Allahbadia and Das, 182).

Direct Intraperitoneal Insemination D. I. P. I

In direct intraperitoneal insemination, the syringe with prepared sperm is punctured into the vaginal pouch leading to good consistency of result especially if after ovarian stimulation (Nieschlag, Behre and Nieschlag, 473).

Peritoneal Oocyte & Sperm Transfer P. O. S. T

Peritoneal Oocyte & Sperm Transfer can be applied to women with bilateral tubal block. This procedure is an alternative to IVF. This procedure was described by Coulam et al in 1989 (Rao, 391).

Direct Oocyte & Sperm Transfer) D. O. S. T

Another alternative to IVF is direct oocyte and sperm transfer. This can also be applied to women with bilateral tubal block. This procedure was first introduced by Craft et al. in 1982 and later in modified by Bucktt and Tan by simply having oocytes with sperm directly transferred to the uterine cavity (Rao, 392). Incubation of oocytes is done in this procedure and then followed by the actual insemination in the uterine cavity.

Transuterine Fallopian Transfer) T. U. F. T

Transuterine fallopian transfer is the actual placement of an embryo into the fallopian tube after IVF has been done. The procedure involves threading the tube through the uterus and placing the embryo into the fallopian tube (Blickstein and Keith, 47)

Developing Embryos

Embryos are formed specially because there was fertilization that took place. The fertilized egg will slowly develop into an embryo undergoing different stages. It took only 12 days in the uterus for the implantation of newly formed embryo, then it will start the development of organs within 50 days. In other words, the standard definition of embryo period is two months after fertilization (Ostnor, 3).

Transferring Embryos

Embryo transfer is as good as finding its failure and success. In particular, there is a great area of interest in knowing what makes embryo transfer a success or a failure. Various studies have been developed in order to find out the factors to optimize the success of embryo transfer. The study of

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Schoolcraft, Surrey and Gardner (863) suggested that avoidance of blood, mucus, bacterial contamination, excessive uterine contraction and trauma to the endometrium is having relationship with optimal pregnancy implantation rates after embryo transfer. More so, they also found out that ultrasonographic guidance and utilization of soft catheters will provide good chance of successful embryo transfer. Therefore, it is implied that it is important to look for factors that can be associated with embryo transfer especially on embryo implantation in maximizing IVF.

The common method used in embryo transfer is transcervical intrauterine transfer. As mentioned earlier, the factors affecting its success are of great importance such as technical ability and training of personnel, catheter choice, value of a previous dummy transfer and any other factors to prevent damage of the uterine lining, bleeding and uterine contractions (Pasqualini and Quintans, 83). According to the study of Pasqualini and Quintans, the mentioned factors have negative effects on the pregnancy rates. In fact, the actual concern in embryo transfer is as much as possible eliminate or if not minimize multiple pregnancies and any unwanted side effects. Single embryo transfer and culture in the blastocyst stages are means commonly used to prevent multiple pregnancies. Techniques such as ultrasound-controlled transcervical intrauterine transfer and ultrasound-controlled transmyometrial transfer are of great interest since these are often used in order to properly and successfully implement embryo transfer. However there are also more invasive procedures that need to be taken consideration in embryo transfer such as the following: gamete intra-Fallopian transfer (GIFT), zygote intra-Fallopian transfer (ZIFT), pronuclear stage transfer and

embryo intra-Fallopian transfer (EIFT). These techniques are commonly used when the need to use of alternative assisted reproductive technologies cannot be substantially catered by laboratories. However in today's highly refined laboratories, alternative assisted reproductive technologies such as direct intra-follicular insemination, fallopian spermatic perfusion and peritoneal stage and sperm transfer and intra vaginal culture can highly be performed even with high precision.

Positive and Negative Effects of IVF Treatment

As mentioned earlier, IVF has already gained wider scope of acceptance in the field of medicine. However, such acceptance needs to be considered even more especially on finding the positive and negative effects of IVF treatment.

Even though there is a chance for successful conception with IVF treatment, it still remains a challenge today considering that not everyone has the same level of bodily response to the treatment. There are many things that need to be considered in detail. This detail can somehow be significant factor that will slowly give more meaningful improvement in the treatment.

For instance, the ovarian stimulation is said to be very important especially in the assisted reproductive technologies (Ubaldi et al. 235). The ovarian stimulation is said to be associated with several factors as far as its reduction is concerned. When it is reduced, the multifollicular growth will live to be a great challenge and it continues to be the most frequent aetiological factor. Thus, it remains a challenge when it comes to predicting ovarian response.

This is just one of the important considerations with respect to obtaining successful IVF treatment. The negative thing about it is that there is not enough assurance for everyone that it can be successful. Thus, there is a continuing area for the body of knowledge covering the issues about the success and failure of IVF treatment.

Another thing, with IVF those couples who have been psychologically depressed and at the same time so determined to have an offspring are most likely to feel discomfort the moment procedure or treatment fails. This is a common scenario. However, there are also some couples who have been so determined and it would be enough for them knowing they still have a chance with IVF. This is comforting on their side at some point knowing that they still have the chance even if that chance of getting failed is also high.

Cloning and In Vitro Fertilization

Cloning aside from in vitro fertilization is also one of the most highly studied areas in the field of genetics and molecular biology. There are good points about cloning especially when it comes to food production and other related aspects. However, there is a great challenge of cloning when it comes to creating human beings. The reason is that there are various ethical and political challenges when it comes to its implementation if ever it would be allowed. Cloning therefore cannot be applied to humans but for other animals and plants, it is well appreciated and even now it is already put into implementation for the purpose of food production and other related concerns.

Thus, when talking about cloning and in vitro fertilization, even if there is a high chance of failure in the latter, it remains to be the mostly studied in the field of human fertilization.

Conclusion

Modern techniques in human reproduction have slowly evolved and even the rate of success is becoming remarkably promising. The reason is that there are continuous studies applied in this field resulting to more discoveries of promising and significant information in order to improve the methods and procedures involved in the modern techniques of human reproduction.

The case of IVF is a very important contribution to the development of modern techniques of human reproduction in modern times. The emergence of different methods and techniques related to modern techniques of reproduction is a clear indication how important is reproduction to humans. In fact, the bottom line of these all is the fact that humans are designed to reproduce which is meant to be part of their biological design.