Overview Of Reproductive Technologies

Artificial Insemination by Donor (AID)

Describing the Technology and How It Works

Artificial insemination by donor (AID) is a procedure in which a fine, flexible tube is inserted up through the cervix and into the uterus, where a small syringe inserts the sperm sample (provided by a donor other than the woman's mate) directly into the woman. AID is separated from artificial insemination by husband (AIH), in which artificial insemination is brought about by a sperm donation from the husband/woman's mate. The procedure is most effective during the woman's ovulation period due to the egg being much more accessible.

When and Why this Technology is Beneficial

Artificial Insemination

- People with unexplained fertility
    - Bypasses all the fertility issues caused by the cervix and vagina.
    - Makes the sperm's journey to the egg much less strenuous and quite easy.
- Hostile Cervical Mucus in the female
    - The sperm is artificially bypassed through the cervix in which the mucus is created.
    - The sperm is no longer attacked by the mucus and can now fertilise the available egg.
- Minor sperm abnormalities
    - Sperm could have abnormalities limiting their ability to reach and/or penetrate the egg
    - Makes the journey for the sperm much shorter and easier, therefore it becomes much easier to impregnate the female
- Men going through Chemotherapy or Radiotherapy
    - The man's semen can be frozen and kept for insemination and impregnation when the guy's body is making very small sperm count numbers.

Artificial Insemination via a donor

- Single woman wanting to have a child
    - A single woman not having a mate can be artificially impregnated using a random male's sperm
    - When a woman can't find a potential mate, this procedure can still provide the female with a child
- Lesbian Couples
    - Lesbian couples don't have the sperm that is required to fertilise the egg as they are both females.
    - A sperm donation can be inserted into one of the women to provide the couple with a child

- Males with a very poor sperm count that still want a child
    - In a relationship, if a couple wants to have a child but the male has very unhealthy sperm and a very low sperm count, a donation from another male with healthy, high sperm counts may be required.
- When the father has a genetic disease
    - If the couple knows that the father has a genetic disease that could ruin the baby's chances at living a happy, healthy life, a donation from a donor other than the female's mate is an option.

The Rate of Success and Risks associated with the Technique

Rate of Success:

The percentage of females that become pregnant after one cycle of artificial insemination ranges from 10%-20%. However, many different factors can affect these success rates including fertility problems for both men and woman, as well as age. If the female in the relationship is the one with infertility problems, he or she may be prescribed a round of fertility drugs which can better the chances of a pregnancy. Upon the use of fertility drugs, success rates drop to 10% for women aged 35-40, and a success rate of 5% per cycle for women over 40.

Artificial insemination provided by a sperm donor has much higher fertility success rates with studies finding that more than 86% of women using a sperm donor became pregnant.

Risks Associated with the Technique:

There are very few risks when undergoing artificial insemination.

Risks include:

- An increased risk of conceiving twins or triplets if a woman is receiving artificial insemination at the same time as other fertility treatment, such as gonadotrophin (a drug causing the release of luteinising hormone and Follicle Stimulating Hormone from the pituitary gland)
- Pregnancies with more than one foetus increase the chance of complications, such as premature birth or miscarriage.
- Ovarian hyperstimulation syndrome (OHSS) can cause the ovaries to swell after combining fertility medication and artificial insemination. This disease is rare, and symptoms are usually mild, but it can occasionally cause serious problems.
- OHSS symptoms include bloating, abdominal pain, possible nausea and vomiting. Severe cases may cause dehydration, chest pain and shortness of breath.
- OHSS can be overcome by staying hydrated and taking paracetamol. Severe cases may require hospital treatment.

Procedure Costs

An artificial insemination cycle is eligible for a Medicare discount and is estimated to lay around $1901 for the procedure according to IVF.com.au.

Ethical Issues

1. The Child’s Welfare using a Single Mother

An argument against the artificial insemination of a single mother is the welfare of the child, who has the right to fit into a familial relationship consisting of a mother and a father. Regarding insemination occurred by a donor, questions arise asking whether the donor who provided the sperm should be revealed and what other information should be given to the child in the future.

2. Children can be born using sperm from a male that will die soon

Defenders of this technique must have a written approval from the man whose sperm is to be used after his death. However, others claim that the child loses their inheritance rights.

3. The use of a donor in a foreign couple

The use of a donor introduces new genetic material into the family, foreign to the couple. There is a very good chance that a sperm bank will use the sperm from one man for multiple inseminations; therefore, those children will all be half-siblings. Furthermore, there may be very rare cases in which marriages occur between half-siblings, unaware of their relations.

In-vitro Fertilisation

Describing the Technology and How It Works

In-vitro Fertilisation (IVF) is a procedure used to overcome a range of fertility issues, by which an egg and sperm are joined together outside of the body in a laboratory. The embryo is left to grow in a protected environment for many days before being transferred back into the woman’s uterus, increasing pregnancy chances.

When and Why this Technology is Beneficial

The IVF procedure is beneficial when a couple is unable to have a baby due to:

- Blocked Tubes
    - For women with blocked or damaged fallopian tubes, eggs are not required to be transported throughout the tubes but are instead removed from the body and inseminated. This eliminates the inability to transport the egg to the sperm.
- Older patients/patients with a low ovarian reserve
    - Using IVF, scientists can use tests to focus on egg quality over quantity so that a baby can be created with the best chances of survival.
- Male Infertility
    - Males with infertility problems will have a much higher chance of impregnating their spouse using IVF rather than conceiving naturally. Sperm meets the egg much more easily and travels less distance.
- Unexplained infertility
    - Unexplained infertility is often countered using this method seeing as though the egg and sperm don’t have to transport throughout the body to meet each other.

- Polycystic Ovary Syndrome (PCOS)
    - PCOS is a common condition in which there is a hormone imbalance leading to irregular menstrual cycles. IVF has proven very successful in patients with PCOS, who will not conceive with ovulation induction.
- Endometriosis
    - Patients with endometriosis are suggested to try IVF as it has been proven to be successful in this group.
- Premature Ovarian Failure
    - Women with premature ovarian failure or menopause can have IVF using donor eggs, typically having high success rates.

The Rate of Success and Risks associated with the Technique

IVF Success Rates:

According to the latest Australian and New Zealand Assisted Reproduction Database report, there were 15,613 babies born as a result of IVF in 2017. In 2017, the overall birth rate per cycle was 21.2%, a slight increase from the previous year. This means that from every 1000 eggs stated with the intention of pregnancy, 212 babies were born. This rate increases to 34% when you look at the cumulative rate of IVF success.

IVF Risks:

- The largest risk is typically a woman developing OHSS including the symptoms:
    - Nausea
    - Vomiting
    - Decreased urinary frequency
    - Shortness of breath
    - Faintness
    - Severe stomach pains and bloating
    - Weight gains within three to five days
- Egg retrieval carries the risk of bleeding, infections, and damage to the bowel and/or bladder
- The chance of multiple pregnancies increases with the use of fertility treatment
    - Increases the overall risk of premature delivery and low birth weights-
- The risk of ectopic pregnancy with IVF is 2-5%
    - An ectopic pregnancy is one when a fertilised egg implants anywhere outside the uterus and is not viable for producing offspring.

Procedure Costs

Costs associated with the procedure cover:

- Consultations with your fertility specialist
- Any investigations and/or tests you may require (Sperm analysis or AMH testing)
- Fertility treatment and the medications required
- Depending on your circumstances, advanced scientific techniques (access to the donor program, or preimplantation genetic testing)

According to IVF.com.au, as of the 20th of February, a singular IVF cycle costs $9828 in total, $4837 of which is covered by Medicare for the 1st cycle, and $5390 is covered for all other consecutive cycles.

IVF Ethical Issues

1. The Possible Wrong done to the Pre-Embryo
    - There is a possibility that the scientists could kill off either of the cells (sperm and ova) before they are able to create a baby
2. The Possible Wrong done to the Infertile Couple
    - If IVF is not physically possible and has not created a foetus and/or baby, the whole treatment and procedure can bring great psychological and emotional pain towards the couple.
3. The Possible Wrong done to the Offspring of the Infertile Couple using IVF
    - The baby can be born with problems associated with low birth weight and premature births
    - Studies show that children born with IVF have greater risks of spina bifida and transposition of the great vessels and that some of the drugs used to stimulate egg production increase birth defect risks.

Surrogacy

Describing the Technology and How It Works

Surrogacy is a form of assisted reproductive technology (ART) in which a woman (the surrogate) offers to carry a baby through pregnancy on behalf of another person or couple and then return the baby to the intended parent(s) once it is born. In surrogacy, an embryo is created using an egg and sperm produced by the intending parents and is transferred into the surrogate’s uterus. The surrogate has no genetic link to the child. The baby cannot be born of the surrogates’ eggs.

When and Why this Technology is Beneficial

- Surrogacy Completes families
    - For people who have struggled with infertility, surrogacy is often the only way to complete a family
- Surrogacy allows for genetic connections
    - The intended parents that cannot bear the child themselves still have their genetics still related to their child
- Surrogacy is important for a couple to have a baby that is related to them when the female cannot physically carry the baby inside her womb
    - Keeps the genetic link between the baby and its biological parents

The Rate of Success and Risks associated with the Technique

The Surrogacy Success Rate

Surrogacy is quickly becoming one of the most popular ways to assist a couple in having a

baby, yet it is not as simple as looking at raw data to find success rates. According to conceiveabilities.com, IVF clinics in the US have a surrogacy success rate of 75%. Once the surrogate is pregnant, the chances of a healthy baby being born increase all the way up to 95%.

Risks Associated with Surrogacy

A surrogate pregnancy brings the exact same risks as a regular pregnancy.

The risks that affect the Surrogate mother include:

- Nausea from Morning Sickness
- Weight Gain
- Swelling
- Back pain
- Heartburn
- Other Uncomfortable effects

The Surrogate mother can also develop some more serious side effects such as pregnancy like gestational diabetes, hypertension or potential damage to your reproductive organs.

As with any pregnancy, risks of miscarriage and premature births are still risks.

As with all other assisted pregnancy methods, the chances of having twins or triplets have increased significantly.

Procedure Costs

Because surrogacy requires IVF to be completed prior to the surrogate mother being implanted with the egg, IVF costs are completed initially. Stats from sarahjefford.com show surrogacy in Australia to cost anywhere from $15,000 to over $100,000, resulting in this procedure being the priciest out of the three assisted pregnancy procedures.

Surrogacy Ethical Issues

After a baby is born from a surrogate mother, many ethical issues arise upon the surrogate. These include:

1. The surrogate should be the sole source of consent for all questions regarding prenatal care and delivery
2. The surrogate should have a specified time in which she can decide whether or not to carry out her original intention to place the infant for adoption

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