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Perspective

Techniques for Selection of the Embryo for a Progressive *In Vitro* Fertilization (IVF)

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DESCRIPTION

One of the most important aspects in the success of an *In Vitro* Fertilization (IVF) cycle is the selection of those embryos with the maximum advancements and implantation capacity. A definitive selection procedure will enable lesser embryos to be replaced in each cycle, thereby reducing the prevalence of multiple gestations whilst maintaining an admissible gestation rate. At present, the most extensively used methodologies of selection depended on morphological criteria. Still, these approaches may be non-specific. Chromosomal abnormalities within embryos are quite common and may be compatible with development beyond the stage at which embryo transfer usually occurs. More invasive selection methodologies, similar as aneuploidy screening, may upgrade implantation and gestation rates, particularly for aged women, but these ways present their own ethical dilemma.

Every embryo does not lead to pregnancy. While there are numerous causes which directly impact the implantation rate, one of the most important causes is aneuploidy. Embryos with the incorrect number of chromosomes are called aneuploidy embryos. Some studies suggest that for women over the age of 40, further more than 90 of the embryos are aneuploid. However, an embryo with the correct number of chromosomes from a woman over the age of 40 seems to have the same chance of success as an analogous embryo from a woman in her 20s.

Various methods of Embryo Selection are:

Embryo grading

Embryo grading is one of the important stages in the IVF. As mentioned, information like as the mother's age, her prior pregnancy happenings, the number of embryos that can be transferred, and a suitable day for transferring are checked in the embryo grading system so that a good embryo will be opted to increase the chance of a successful gestation.

Time-lapse technology

This technology allows for continuous, uninterrupted observation of embryo development without having to remove embryos from the controlled atmosphere inside the incubator. Further information about embryo development can be attained and combined with traditional morphological evaluations. Still, some randomized controlled trials have been performed researching the efficiency and safety of inaccessible culture systems using time-lapse technology. With respect to the number of GQEs on day 2, none of the included morphokinetic variables were prophetic of live birth.

Blastocyst formation

This is another way of opting the embryos from the pool. When embryos are cultured beyond day 3, the cells divide continuously and reach an advanced stage of nearly 100 cells by day 4. This is called as morula stage. In coming one or two days a fluid filled depression is formed inside the cell mass. This stage is called as blastocyst. It has three region external trophectoderm, inner cell mass and fluid filled depression. Maximum of the embryos which are aneuploid don't grow till this stage and suffer growth arrest. So generally, aneuploid embryos are eliminated at blastocyst stage. Around 45 embryos are excluded by this method of embryo selection. Blastocysts are graded upon the morphological characteristics of trophectoderm, inner cell mass and size of the embryo. Although this is the most extensively operated system of embryo selection, it isn't full evident. Blastocysts can also have aneuploid chromosomes.

Preimplantation Genetic Screening (PGS) and Preimplantation Genetic Diagnosis (PGD)

These are the techniques where dissection is taken from the trophectoderm of the blastocyst and it's subordinated to further testing. In PGS, chromosome number is estimated to rule out trisomies of 21, 18 and 13 chromosomes. Though this approach is massively advanced but the problem is that there's compartmentalization of cell mass in the embryo. Abnormal cells are shown to be present in chambers of the cell mass. So, during biopsy if that particular chamber is biopsied, it'll lead to false positive determination of aneuploidy. In PGD, specific single gene faults are assessed. In case any particular disease is inherited in the family, scientists prepare a DNA finger print of

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that condition and also that DNA fingerprint is compared to the DNA fingerprint of the embryo to rule out that condition. Fluorescence *In Situ* Hybridization (FISH) is a system that's used to assess the chromosomes. The disadvantage is that about 12 couplets of chromosomes out of 23 couplets can be assessed by FISH. So, it leads to nearly 40 percent incorrect results.

CONCLUSION

In *In Vitro* Fertilization (IVF) we have the most advanced technology that allows us to maintain our high gestation rates by transferring a single embryo which is the pre-eminent approach. Chromosomal abnormalities usually live in early human embryos, and frequently cause embryo implantation failure and gestation loss in *In-Vitro* Fertilization (IVF) treatments. Preimplantation inheritable testing, blastocyst arrangement, time-lapse technology and embryo grading ways are employed for the selection of the embryo.