What is eSET?
Elective single-embryo transfer (eSET) is the transfer of only one embryo to a woman’s uterus after in vitro fertilization (IVF). It is the most effective way to lower the risk of a woman becoming pregnant with more than one baby after fertility treatment. In the past, eSET has been used in fewer than 10% of IVF cycles in the United States. The American Society for Reproductive Medicine (ASRM) says eSET should be strongly considered, but patients have been reluctant to use it because the chances for pregnancy are lower with eSET than when more than one embryo is transferred.

However, recent clinical trials demonstrated IVF success rates well above the national average when eSET was done in combination with comprehensive chromosome screening (CCS) of the embryo.

Which patients might benefit from eSET?
According to the ASRM, eSET is most appropriate for patients who are younger than 35, who have more than one high-quality embryo, who are in their first or second treatment cycle, who have had a previous successful IVF cycle, or are the recipients of embryos from donated eggs.

What is CCS?
Comprehensive chromosome screening (CCS) is the latest and most validated form of preimplantation genetic testing. The goal of CCS is to find out whether embryos have the correct number of chromosomes before they are transferred back to a woman’s uterus.

It might sound intimidating and complex, but CCS helps to answer a very simple question: Which embryos have the greatest potential to become a healthy baby? Humans have 23 pairs of chromosomes and inherit one copy of each chromosome from each parent. When a sperm fertilizes an egg, it creates an embryo that should have 23 chromosomes from the mother and 23 chromosomes from the father. Often, however, embryos are created with too many or too few chromosomes and considered to be unbalanced (or “aneuploid”).

CCS requires genetic material (DNA) from an embryo biopsy. After CCS, doctors and patients can make better decisions about which embryo(s) should be considered for IVF transfer based on their chromosomal status, not just their visual appearance.

What is aneuploidy?
“Aneuploid” refers to embryos that have the wrong number of chromosomes. Aneuploid embryos often do not implant and if they do implant, the result may be a miscarriage. The proportion of embryos produced after IVF that are aneuploid increases significantly with a woman’s age, and is more than 50% for women older than 39.

While the reasons for aneuploidy are still being investigated, we do know it is a major contributor to IVF failure and miscarriage.

What is trophectoderm biopsy?
To test the genetic status of embryos produced in IVF, a sample of DNA from cells must be obtained. Traditionally one cell from an embryo in its third day of development is removed. Recent evidence has shown that by waiting until day 5 or 6, when the embryo reaches the blastocyst stage, approximately 5 cells can be removed from the trophectoderm, which is the outer layer that becomes the placenta and membranes.
Trophectoderm biopsy has been shown to have no impact on an embryo’s chance of implanting. On the contrary, biopsy of a single cell at the cleavage stage resulted in nearly a 40% decrease in implantation rates and tended to be less accurate.

**How is euploid eSET different from traditional eSET?**

With CCS, a single embryo can be transferred that with about 99% certainty contains the appropriate genetic makeup to result in a viable pregnancy. Women of older reproductive age have a higher risk of having abnormal embryos, but if they produce a high-quality, euploid (chromosomally normal) embryo, the chances are higher that the pregnancy will result in the birth of a healthy baby. Thus, even patients not traditionally considered to be candidates for eSET can benefit from euploid eSET.

**What was the BEST Trial?**

The Blastocyst Euploid Selective Transfer Trial showed for the first time that by using CCS, eSET could be performed without sacrificing the excellent success rates patients have come to expect with the transfer of two embryos. This randomized controlled trial, published in 2013, demonstrated a 61% IVF delivery rate, plus a dramatic reduction in twins.

**What are the benefits of euploid eSET?**

The BEST trial found that the chance of a normal, singleton, term delivery was approximately twice as high after euploid eSET as after transfer of two untested embryos. Furthermore, the risk of having a low-birthweight baby or one who had to spend time in the NICU after delivery was dramatically lower after euploid eSET. The new paradigm of eSET and CCS makes IVF safer for most patients undergoing IVF, not just those traditionally considered to have the best prognosis with eSET. Euploid eSET reduces many of the clinical, emotional, and financial burdens for patients, their babies, obstetricians, hospitals, and insurers.

**For more information, visit:**


**REFERENCES**


**DR. FORMAN** is a Reproductive Endocrinologist, Reproductive Medicine Associates of New Jersey, Morristown and Basking Ridge, and Assistant Professor, Department of Obstetrics, Gynecology & Reproductive Sciences, Rutgers Robert Wood Johnson Medical School, New Brunswick, New Jersey.

**DR. SCOTT** is Laboratory and Scientific Director at Reproductive Medicine Associates of New Jersey, Basking Ridge, Professor, Department of Obstetrics, Gynecology & Reproductive Sciences and Division Director and Fellowship Director, Division of Reproductive Endocrinology & Infertility, Rutgers Robert Wood Johnson Medical School, New Brunswick, New Jersey.

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