# With a good quality blastocyst, single embryo transfer remains the best choice

The goal of assisted reproductive technology is to achieve a healthy singleton birth. However, multiple gestation pregnancies due to transfer of two or more embryos remain a well-known complication of in vitro fertilization (IVF) despite the increase in maternal and neonatal risks (1). The best way to reduce multiple gestation pregnancies and the associated risks is by transferring fewer embryos. While improvements in embryo culture techniques and increased utilization of blastocyst transfer have increased single-embryo transfer (SET) rates in the U.S., double embryo transfer (DET) is still common and multiple birth rates remain unacceptably high. In 2014, 23% of women under age 38 who had a successful IVF cycle had a twin gestation (2). Real or perceived increases in live birth rates drive providers and patients to choose to transfer more than one embryo, with multiple births being an acceptable side effect for many patients. While there is still an argument to be made in favor of dual embryo transfer in certain situations (advanced maternal age, no good quality embryos to transfer), efforts have been made to determine which factors may predict success with SET.

The present prospective cohort study by Dobson et al. (3) compares live-birth rates and multiple-birth rates in fresh and frozen embryo transfer cycles among patients who underwent SET with a top-quality blastocyst (AA, AB, BA, BB) to the following groups: SET with a poor quality embryo (AC, CA, BC, CB, CC), DET with two top-quality embryos; DET with a top-quality and a poor quality embryo; and DET with two poor quality embryos. They found that the addition of a poor-quality embryo to a top-quality embryo did not increase the live-birth rate but increased the multiple birth rate from 4.7% to 19%. Not surprisingly, transferring one or two poor quality embryos was associated with lower live birth rates compared to SET of a top-quality embryo. There was no statistically significant difference in live-birth rate with DET of two top-quality embryos compared with SET of a top-quality embryo. However, DET in this case was associated with a much higher multiple birth rate (20% vs. 4.7% in the SET group).

This study adds to our understanding of factors impacting live- and multiple-birth rates in IVF. In our experience, patients often ask whether transferring an additional low-quality embryo that will otherwise be discarded might improve the odds of getting pregnant, or if the poor-quality embryo will "harm" the good quality embryo. Data guiding these answers are limited, as are data on multiple gestation rates if poor quality embryos are added. This study provides another valuable tool for counseling patients on the number of embryos to transfer. Specifically, it does not appear the addition of a poor-quality embryo to a good quality embryo improves the live birth rate.

The strengths of this study are that it looked at a relatively large number of women, only one cycle per patient, and considered only blastocyst embryos with a consistent grading system. We agree with their conclusion that SET of a top-quality embryo is the best way to achieve a pregnancy while minimizing the risk of a multiple gestation. However, these results should be interpreted with caution for several reasons. First, the women in each group likely had different live-birth potential at baseline based in part on the total number of embryos available. Previous studies showed that the total number of blastocysts available to transfer or cryopreserve is predictive of outcome, regardless of how many embryos are transferred (4). As the authors pointed out, most women in group one had a SET from a cohort of multiple top-quality embryos, while those in group 4 generally only had one top-quality embryo available. Therefore, those undergoing SET or DET of high quality embryos may already be at a live birth advantage based on their larger cohort of good quality blastocysts. Second, the only variable that was controlled for was age. While this is likely the strongest predictor of success, there are multiple other factors to consider, including ovarian reserve, protocol (agonist vs antagonist), insemination method, and perhaps most importantly day of transfer or cryopreservation. Specifically, day 5 embryos have improved outcomes compared with day 6 or 7 embryos (5). In addition, while day 6 and 7 transfers represent less than 20% of the total fresh transfers, the study would have benefitted from exclusion of these women whose window of implantation was likely closing.

Based on these results, adding a poor-quality embryo to the transfer of a top-quality embryo increases the multiple birth rate without increasing the overall live birth rate. Importantly, transferring two top-quality embryos resulted in a similar live birth rate and much higher multiple birth rate compared with SET of a top-quality embryo. This is consistent with previous data and further supports SET when there is a top-quality embryo available.

**Abigail Mancuso, M.D.**
**Joshua Kapfhamer, M.D.**
Division of Reproductive Endocrinology & Infertility, University of Iowa Hospitals and Clinics, Iowa City, Iowa

https://doi.org/10.1016/j.fertnstert.2018.06.024

You can discuss this article with its authors and other readers at https://www.fertstertdialog.com/users/16110-fertility-and-sterility/posts/34145-26489

## REFERENCES

1. Pinborg A. Morbidity in a Danish National cohort of 472 IVF/ICSI twins, 1132 non-IVF/ICSI twins and 634 IVF/ICSI singletons: health-related and social implications for the children and their families. Hum Reprod 2003;18:1234–43.
2. American Society for Reproductive Medicine. Guidance on the limits to the number of embryos to transfer: a committee opinion. Fertil Steril 2017;107:901–3.
3. Dobson SJA, Lao MT, Michael E, Varghese A, Jayaprakasan K. Effect of transfer of a poor quality embryo along with a top-quality embryo on the outcome during fresh and frozen IVF cycles. Fertil Steril 2018;110:655–60.
4. Mancuso AC, Boulet SL, Duran E, Munch E, Kissin DM, Van Voorhis BJ. Elective single embryo transfer in women less than age 38 years reduces multiple birth rates, but not live birth rates, in United States fertility clinics. Fertil Steril 2016;106:1107–14.
5. Desai N, Ploskonka S, Goodman L, Attaran M, Goldberg JM, Austin C, et al. Delayed blastulation, multinucleation, and expansion grade are independently associated with live-birth rates in frozen blastocyst transfer cycles. Fertil Steril 2016;106:1370–8.