Predictive factors for live birth in donor oocyte-recipient cycles

The use of IVF with donor oocytes has become an increasingly common treatment modality for women who are unable to conceive using their own oocytes. Data from the Society for Assisted Reproductive Technology (SART) in the United States demonstrate that >9,000 donor oocyte-recipient cycles were initiated in 2014 and 2015. The International Committee for Monitoring Assisted Reproductive Technologies (ICMART) also reported 133,679 donor oocyte-recipient cycles between 2008 and 2010 in 40 countries, with an overall increase of 35.8% cycles between 2008 and 2010 (1). The increasing use of donor oocyte-recipient cycles on a national and global level has been due to the optimization of ovarian stimulation in oocyte donors, as well as associated clinical and laboratory protocols. Previous clinical studies have identified donor and recipient parameters that are predictive of live birth, therefore, the number of donor oocytes retrieved is a commonly investigated parameter (2). However, the association between the number of donor oocytes retrieved and live birth remains contradictory.

This issue of *Fertility and Sterility* features a retrospective study by Hariton et al. (3) that examines the association between oocyte donor ovarian response and live birth rate in fresh donor oocyte-recipient cycles. In 237 consecutive donor oocyte-recipient cycles, they compared 130 and 107 cycles with live birth and without live birth, respectively. No differences were found in baseline demographics or reproductive parameters of those with or without live births. However, the number of total oocytes, mature oocytes, oocytes with normal fertilization (zygotes), and cleaved embryos was higher in cycles associated with live births. When using a cut-off of 10, Hariton et al. (3) observed that the relative risk of live birth was higher in cycles with >10 total oocytes retrieved, >10 mature oocytes retrieved, >10 zygotes, and >10 cleaved embryos, when compared to referent category of ≤10 for any parameter. This association between live birth and >10 oocytes, mature oocytes, zygotes, and cleaved embryos remained true even after accounting for confounders of interest in a multivariable regression model. No association was noted between embryo quality or day of ET with live birth. Furthermore, Hariton et al. (3) were unable to identify a statistical threshold for the number of total oocytes, mature oocytes, zygotes, or cleaved embryos that optimized live birth rates in donor oocyte-recipient cycles.

Despite its limitations, the current study provides pertinent data regarding key clinical factors associated with live birth in fresh donor oocyte-recipient cycles. The positive association between the number of total oocytes retrieved, mature oocytes, zygotes, and cleaved embryos with live birth rate, irrespective of embryo parameters, further implies that these clinical parameters, which are up-stream of the day of ET, impact overall live birth rates. As highlighted by the investigators, future research should identify optimal ovarian response parameters that predict live birth in donor oocyte-recipient cycles. Using total oocytes retrieved as a surrogate for ovarian response, prior clinical studies of patients undergoing IVF with their own oocytes have suggested that approximately 15 oocytes are required to maximize live birth rates (4, 5). In contrast, >20 oocytes are associated with reduced live birth rates (4, 5). In the current study, the investigators further stratified their data based on cut-offs of ≤10 (referent), <20, and ≥20 and found that the relative risk of live birth was higher in cycles with <20 and ≥20 total oocytes retrieved when compared to cycles with ≤10 total oocytes retrieved. Interestingly, the relative risk of live birth was higher when comparing cycles with <20 mature oocytes, zygotes, or cleaved embryos to the referent category of ≤10, but not significant in cycles with ≥20 mature oocytes, zygotes, or cleaved embryos. These findings suggest that not all ovarian response parameters (mature oocytes, zygotes, or cleaved embryos) are associated with live birth and that exaggerated ovarian response may be detrimental to the success of fresh donor oocyte-recipient cycles. Although Hariton et al. (3) did not report the rates of ovarian hyperstimulation syndrome (OHSS) in their study cohort, it is critical to note that increased oocyte yields in autologous IVF cycles are also accompanied by a higher risk of OHSS. One study of 256,381 IVF cycles (5) reported progressively higher OHSS rates with increasing oocyte yields—0.4% (6–10 oocytes), 0.9% (11–15 oocytes), 1.7% (16–20 oocytes), 6.3% (>25 oocytes). Although it is unknown whether these trends in OHSS rates are similar in oocyte donors, it imperative that optimal follicular response in oocyte donors not only increases live birth rates, but also minimizes the risk of OHSS. Overall, the conclusions of the current study are reassuring and consistent with the results of autologous IVF studies.

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