

Study examines live birth rates following in vitro fertilization

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Thirty years ago last summer, the world's first "test-tube" baby was born, and since then more than 1 million infants have been successfully conceived through in vitro fertilization (IVF), the technique in which a woman's eggs and man's sperm are fertilized in a laboratory and then implanted in the mother's womb.

When deciding whether or not to pursue IVF treatment, the obvious question of most patients is, "What is the chance that this therapy will result in a baby?" They now have an answer.

In the largest study of IVF patients to date, researchers at Boston IVF and Beth Israel Deaconess Medical Center (BIDMC) followed more than 6,000 women through six IVF cycles. Their findings, described in tomorrow's issue of *The New England Journal of Medicine (NEJM)* demonstrate that the chances of a successful live birth following IVF therapy range between 65 and 86 percent in younger women and between 23 and 42 percent in women aged 40 and older.

"This shows that, overall, IVF is extraordinarily effective and largely overcomes infertility, especially in younger women," explains lead author Beth Malizia, MD, a clinical fellow at Boston IVF and in the Division of Reproductive Endocrinology and Infertility at BIDMC.

Infertility affects more than 6 million women in the U.S. between ages 15 and 44, according to figures from the National Center for Health Statistics. The authors embarked on the study in order to provide doctors and their patients with accurate, evidence-based estimates of the likelihood that a pregnancy resulting from IVF would result in a live birth.

"Traditionally, IVF has been reported as pregnancies per IVF cycle," explains Malizia. "These calculations can not only be difficult to comprehend, but can also be misleading since they don't take into account the difference in

success between the first-time patient and the patient who did not become pregnant in previous IVF attempts. Our goal in conducting this study was to provide information that would answer the patient's primary question - What is the chance that I will walk away with a baby?"

Each IVF cycle consists of four steps: First, the patient takes a course of fertility medication to encourage egg development. Eggs are then retrieved through a minor surgical procedure. The retrieved eggs are then fertilized in the laboratory and approximately three to six days following egg retrieval, fertilized embryos are implanted in the woman's uterus.

Malizia, together with senior author Alan Penzias, MD, a reproductive endocrinologist at Boston IVF and BIDMC and coauthor Michele Hacker, ScD, MSPH, followed 6,000 couples undergoing IVF therapy between 2000 and 2005. Using a longitudinal analysis method - which makes use of repeated observations of the study group over time and provides a more accurate estimate of a woman's history over multiple IVF cycles - they calculated the cumulative live birth rate of their population. All IVF patients were included without excluding for age, ovarian reserve or other prognostic factors. And, explains Malizia, because the success of embryo cryopreservation has nearly doubled over the past decade, frozen embryo cycles were also included in the analysis.

To account for patients who did not return for further IVF treatment, the authors reported the cumulative live birth rate as both optimistic (best-case) and conservative (worst-case) estimates. They also reported multiple live births (twins, triplets, etc.), which says Malizia, is another important issue when counseling patients prior to IVF treatment.

"Our results showed that among 6,164 patients who underwent 14,248 cycles of IVF, the overall

cumulative live birth rate after six cycles was 72 percent with the optimistic analysis and 51 percent with the conservative analysis," notes Malizia, adding that the chance of a live birth for women under the age of 35 was between 65 and 86 percent, while the figures were between 23 and 42 percent for women over age 40. And, she notes, of the 3,126 live births, the majority were "singletons" while 27 percent were twin births and 2 percent were triplet births. There were no multiple births beyond triplets, a finding consistent with a national decline in multiple births [greater than twins] resulting from IVF treatment over the past decade.

"IVF treatment has come of age," notes the study's senior author Alan Penzias. "Although we continue to address the challenge of age-dependent decline in fertility, with these successful results, we have shown that fertility can be restored to the majority of young women who want to have a baby."

Source: Beth Israel Deaconess Medical Center

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