IVF Tied to Higher Blood Pressure, Fasting Glucose

BY MICHELE G. SULLIVAN
Mid-Atlantic Bureau

Children born as a result of in vitro fertilization have significantly higher blood pressure and fasting glucose levels than do those conceived naturally—a finding suggestive of fetal programming during an early developmental window, Dr. Manon Ceelen and colleagues reported.

Although the possible mechanism behind this finding remains unknown, the study "underscores the importance of the continuing worldwide monitoring of postnatal development of IVF children," Dr. Ceelen and her coauthors wrote in the Journal of Clinical Endocrinology and Metabolism (2008 Feb. 19 [doi:10.1210/jc.2007-2432]).

Dr. Ceelen and her coauthors of the Free University Medical Center, Amsterdam, compared the cardiometabolic measurements of 225 IVF and 225 naturally conceived children (average age, 12 years). The parents of all the children had been part of a Dutch study on the long-term health effects of hormone stimulation in 26,400 subfertile women. Of this group, 20,000 women received IVF treatment.

Compared with naturally conceived children, those conceived through IVF weighed significantly less on average at birth (3.2 vs. 3.4 kg). In addition, there were significantly more preterm infants among the IVF group (29 vs. 6).

Average systolic blood pressure was significantly higher in IVF children than in the control group (109 mm Hg vs. 105 mm Hg); mean diastolic blood pressure was also significantly higher in the in vitro fertilization group (61 mm Hg vs. 59 mm Hg).

Children born via IVF were twice as likely as those naturally conceived to have a systolic blood pressure of at least 114 mm Hg and to have a diastolic blood pressure of at least 65 mm Hg.

Those in the IVF group had significantly greater average sum of skinfolds measurement (40 mm vs. 37 mm), although there were no significant differences in weight or body mass index between the groups.

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Significantly higher mean fasting glucose measurements were seen in the IVF group (5 mmol/L vs. 4.8 mmol/L). IVF children were 2.5 times more likely to have a fasting glucose level of at least 5.2 mmol/L.

These relationships remained significant even after the investigators adjusted for confounders (birth weight, gestational age, sum of skinfolds measurement, parity, and the cause of the mother's subfertility).

Although the differences in blood pressure appear small on an individual level, they could have significant health implications on a population level, the investigators wrote. "A slight increase in blood pressure is associated with a remarkably increased risk of developing cardiovascular disease. … Furthermore, it cannot be excluded that raised blood pressure after in vitro fertilization may be amplified throughout life, as blood pressure is known to track from childhood into adult life."

The authors could not explain the observed relationships between IVF and cardiometabolic status. Both population and animal studies show a link between prenatal environment and early gestational development. For instance, maternal malnutrition in early pregnancy has been linked to later cardiovascular disease in the offspring.

"Preconceptional undernutrition has been associated with the precocious activation of the hypothalamo-pituitary-adrenal axis," the authors wrote. This premature activation might be associated with fetal programming effects.

However, they wrote, "it remains to be elucidated whether increased blood pressure among in vitro fertilization children originates from early prenatal life adaptations mediated through neuroendocrineal pathways related to the HPA axis and/or through one of the unidentified mechanisms." ■