Mood in Pregnancy May Impact Fetal Development

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PITTSBURGH — Pregnant women with anxiety or depression have higher levels of α-amylase, a measure of adrenergic system activity, and lower morning cortisol levels, preliminary results from a longitudinal study demonstrated.

The findings suggest that the sympathetic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis may be affected in opposite directions by stress during pregnancy, Alison Shea, Ph.D. candidate, and her associates reported in a poster at the International Congress of Neuroendocrinology.

The analysis included 60 women who were among the first of 250 pregnant women to be recruited as part of the multicenter Maternal Adversity, Vulnerability, and Neurodevelopment (MAVAN) study led by Dr. Meir Steiner, of McMaster University, Hamilton, Ont.

The women were divided into three groups: those presenting with symptoms of depression or anxiety who chose psychotherapy only, those with symptoms who chose antidepressants, and a control group with no current or past psychiatric illness.

A battery of psychological tests was performed at baseline (gestational age 14-24 weeks), and morning salivary samples were collected daily to measure stress indicators such as cortisol, dehydroepiandrosterone (DHEA), and α-amylase. A follow-up assessment was performed at 24-30 weeks and included psychological testing, salivary samples, and a 24-hour Holter ECG.

Infants are being followed during the postpartum period until 3 years of age.

The results indicate that depression and anxiety scores during pregnancy are positively correlated with α-amylase levels and negatively correlated with morning cortisol levels.

Both associations were statistically significant, reported Ms. Shea, of the Women's Health Concerns Clinic, St. Joseph's Healthcare, Hamilton.

Compared with controls, both the cortisol response to awakening and the 24-hour heart rate variability were lower for mothers with anxiety and depression, particularly among those not taking antidepressants. Reduced heart rate variability indicates the body's inability to respond to stress in a changing environment, and is thought to improve with the use of antidepressants, Ms. Shea said in an interview. Interestingly, the study found that the greater the gravida's heart rate variability, the longer the gestation. "It makes sense, but it's never been looked at in pregnant women," she said.

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Head circumference at birth was strongly correlated with maternal 24-hour mean heart rate during pregnancy, even after controlling for birth weight and gestational age.

Among women with depression and anxiety, the higher the heart rate during pregnancy, the smaller the head circumference. Head circumference is purported to be a measure of brain volume and has been found to be smaller among babies born to women with posttraumatic stress disorder, she said.

Birth length was significantly smaller for babies born to women with anxiety or depression (49.64 cm), compared with those born to women treated with antidepressants (50.91 cm) and controls (53.01 cm).

Ponderal index, which is an indicator of infant body mass index, also was significantly higher among babies of women suffering from anxiety and depression (2.65 g/cm^3), compared with those of women treated with antidepressants (2.55 g/cm^3) and of controls (2.3 g/cm^3). The lower the maternal cortisol levels during pregnancy, the higher the ponderal index, which suggests some type of modulation of the HPA axis that would impact birth outcomes and growth, Ms. Shea said.

The data provide some insights into the mechanisms by which stress, depression, and anxiety impact fetal development. But Ms. Shea cautioned that the data remain preliminary and the number of patients is small. ■