

Maternal cortisol during pregnancy is related to infant cardiac vagal control

Joshua A. Rasha, Tavis S. Campbell^a, Nicole Letourneau^{b,d}, Gerald F. Giesbrecht^{c,d},

*a*Department of Psychology, University of Calgary, 2500 University Drive N.W., Calgary, AB, Canada T2N 1N4
*b*Faculties of Nursing & Medicine (Pediatrics & Psychiatry), University of Calgary, 2500 University Drive N.W., Calgary, AB, Canada T2N 1N4
*c*Department of Pediatrics, University of Calgary, 2500 University Drive N.W., Calgary, AB, Canada T2N 1N4
*d*Alberta Children's Hospital Research Institute, University of Calgary, 2500 University Drive N.W., Calgary, AB, Canada T2N 1N4

Abstract

Background: Prenatal exposure to maternal psychological distress and glucocorticoids result in neurobiological adaptations within the fetus that increase risk for developing exaggerated emotional, behavioral, and stress responses to novelty and challenges in childhood. The current study investigated the influence of maternal depressed mood and cortisol during pregnancy on infant cardiac vagal control (CVC) to standardized laboratory challenge tasks. **Methods:** The sample comprised 194 women and their infants. Maternal reports of depressed mood and salivary cortisol were assessed at 14 and 32 weeks gestational age. Linear regression was used to examine associations between maternal measures during early and late pregnancy, and infant CVC indexed via respiratory sinus arrhythmia (RSA) at rest and in response to

laboratory tasks designed to elicit frustration when infants were 6 months of age. It was hypothesized that maternal depressed mood and cortisol would be associated with lower basal RSA and smaller decreases in RSA from baseline to challenge. **Results:** A significant decrease in infant RSA from baseline to frustration tasks indicated that laboratory tasks elicited a reliable decrease in RSA from baseline to frustration among infants which is characterized by reduction in vagal efferent activity on the heart in response to challenge. Higher maternal cortisol, but not depressed mood, was associated with lower basal RSA and greater decrease in RSA from baseline to frustration. Associations between maternal cortisol and infant basal RSA were observed for both early and late pregnancy whereas the associations between prenatal cortisol and decrease in RSA from baseline to frustration were observed for early, but not late, pregnancy.

Key words: Cardiac vagal control; Fetal programming; Depressed mood; Cortisol; Respiratory sinus arrhythmia