

A noninvasive parametric evaluation of stress effects on global cardiovascular function.

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Abstract

Stress has been recognized as an important contributing factor to many forms of cardiovascular diseases. Its quantification has been sought for decades, but to no avail. We have developed a wholly noninvasive approach to quantitatively assess mental and physical stress effects on parameters that are associated with global cardiovascular function. Blood pressure, electrocardiogram, respiration and pulse volume are recorded simultaneously in experimental subjects during imposed arithmetic mental stress and Valsalva maneuver. Results show that parameters related to heart rate variability, respiratory rate, T-wave amplitude and pulse transit time are significantly modified during stress. Changes in these parameters involved differing mechanisms, although complex, can be delineated with logical analysis of electrophysiological, hemodynamic and neurogenic origins. This noninvasive technique is useful for both psychological evaluation and for clinical stress management.