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TITLE: Heritability of ambulatory sympathetic cardiac drive

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ABSTRACT: Systolic time intervals and cardiac contractility measures derived from impedance cardiography are increasingly used in the diagnosis and management of patients suffering from heart failure. Impedance cardiography is a non-invasive way to assess left ventricular function of the heart, and is the only method that can be used in ambulatory settings. The present study determined the heritability of ambulatory, impedance derived systolic time intervals and cardiac contractility in a large group of healthy twin families. 24-hour ambulatory ECG/ICG recordings were made in 214 identical twins (76 men), 296 fraternal twins (107 men) and 245 singleton siblings (95 men) from 339 families. Average pre-ejection period (PEP), systolic time ratio (STR) and Heather Index (HI) were calculated over 4 periods of the day: morning, afternoon, evening and nighttime. Multivariate genetic model fitting was used to answer the question whether these impedance-derived variables were heritable, and to what extent. In addition, we hypothesized that a single genetic factor would underlie genetic variation throughout the day and night. For PEP, STR and HI alike, an AE model was preferred, in which one common genetic factor accounted for a substantial part of the variance during all periods of day. Additional specific genetic influences were found for PEP and HI, but only at night. It is concluded that ambulatory sympathetic activation of the heart and cardiac contractility are highly heritable traits that can be used to support genetic association and linkage studies in their search for genetic variation influencing cardiovascular disease risk.