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Role of heart rate variability in autonomic function testing

Like all internal organs heart is innervated by autonomic nervous system (ANS). The constant fluctuation in blood pressure and heart rate is mainly due to interactions between the mutually opposing actions of sympathetic and parasympathetic subdivisions of the ANS. The vagal activity dominates at rest and is mainly responsible for heart rate variability (HRV).The HRV analysis can be used to find out early signs of development of pathological process, presence of functional disorder, assess stress coping ability, evaluate treatment effectiveness and prognosis to name a few. The response of parasympathetic system to stimulation is quick and transient whereas the response to sympathetic stimulation is slower but of higher amplitude. This fluctuation can be analyzed and quantified by time domain and frequency domain analysis methods that provide insight of cardiac autonomic regulation in health and disease. Out of the time domain parameters rMSSD (square root of the mean squared differences of successive NN intervals) and pNN50 (proportion of differences in consecutive NN intervals that are longer than 50 ms) describes short term variations, SDANN describes slow changes in the HRV whereas SDNN (standard deviation of NN) describes both short term and long term variability. The frequency domain or power spectral density (PSD) analysis describes heart rate as function of frequency and reveals the cyclical pattern in the series of changing RR intervals. It provides means to quantify autonomic balance at any given time. Some frequency domain parameters are Total Power (TP), Very Low Frequency (VLF), Low Frequency (LF), High Frequency (HF) and LF/HF ratio. Higher LF/HF ratio reflects sympathetic dominance whereas lower value means parasympathetic dominance.

Biography

Tribhuwan Kumar is a Faculty of Physiology at All India Institute of Medical Sciences, Patna, India. He has an inherent interest in the field of Cardiovascular Physiology and its relation with autonomic functions. Besides, he has a keen interest in the field of Medical Education. Besides having more than 10 years of teaching experience as Faculty of Physiology, he has good research experience with many research publications in national and international journals. He is also member of Association of Physiologists and Pharmacologists of India and South Association of Physiologists.

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