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AUTONOMIC NERVOUS SYSTEM ACTIVITY IN HYPERTENSIVE SUBJECTS: ANALYSIS OF TIME DOMAIN PARAMETERS OF HEART RATE VARIABILITY

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The aim of our study was to examine cardiovascular autonomic regulation, assessed by time-domain measures of Heart Rate Variability (HRV), in a group of mild to moderate hypertensive subjects, compared to normotensives. We examined 14 patients (13 men, 1 woman) with mean age 49.3 ± 5.4 years and 14 normotensives (11 men, 3 women) with mean age 48 ± 7.1 years. All hypertensive patients were requested to stop their therapy 3 days before the test. We performed an echocardiographic exam on each subject. The results showed significant differences between the two groups, concerning left ventricular SIV and posterior wall thickness, as well as left atrium dimension and early and late ventricular filling ratio. All subjects underwent a 24-hour Holter recording, in order to assess important time-domain parameters of HRV, such as SDNN (standard deviation of all normal R-R intervals) and Pnn50 (percentage of consecutive R-R intervals longer than 50 msec). Both these parameters showed significant differences between the two groups. In fact we have found in the hypertensive group a lower SDNN (145.14 ± 15 msec versus 185.23 ± 16.2 msec), as well as a significantly lower Pnn50 (11.44 ± 5.6 versus 16.2 ± 5.4). Our data, consistent with several international studies, confirm the importance of the increased sympathetic activity in the developing of hypertension, not only in the early stage of the disease, but also in patients with long-term hypertension, already showing signs of left ventricular hypertrophy.

Key Words: Autonomic Nervous System activity, Pressure Response to Exercise, Time Domain Heart Rate Variability

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DOWN REGULATION OF LEPTIN RECEPTOR EXPRESSION AND INCREASE THE SPONTANEOUS UNIT DISCHARGE IN ARCULATE NUCLEUS OF HYPOTHALAMUS IN OBESE RATS

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Arcuate nucleus neurons (ArcNs) of hypothalamus plays an important role in food ingestion. Abnormal expression of leptin receptor (ObR) in Arc of hypothalamus was found in obese rodent. This study aims to investigate whether change of ObR was related to electrophysiological activity of ArcNs in obese rats.

**Methods:** 30 male Sprague Dawley (SD) rats were divided into control (con.), overweight (ow) and obese rats (ob) induced by high fat diet. The expression of ObR in ArcN of hypothalamus was detected by immunofluorescence combined with confocal laser scanning microscopy (CLSM) and measured by western blotting. Stereomicroscopy micro-electrode was inserted into Arc nucleus and the discharge of neurons (Ns) was recorded in the basal status and after glucose and insulin were given intravenously in rat in vivo.

Results: The protein expression of ObR in hypothalamus decreased significantly in obese rats (ob: 0.237 ± 0.0126 vs con: 0.640 ± 0.0453 vs con: 1.0 +/−0.02, p < 0.01), while the discharge frequency of ArcNs was significantly higher in obese rats than that of overweight and control rats in the basal status (ob: 20.10 +/−7.55 vs ow: 16.09 +/−5.93 vs con: 11.02 +/−2.58, p < 0.01). There was a significant positive correlation between discharge frequency of ArcNs and the body weight of rats (r = 0.809, p < 0.001) and serum leptin level (r = 0.562, p < 0.001), but, ObR expression of hypothalamus was negatively correlated with the discharge frequency of ArcNs in control and obese rats (r = −0.693, p < 0.001). Administration of glucose induced a significant decrease in spike of discharge of ArcNs in control and overweight rats, especially in the control rats. In contrast, the effect of glucose on discharge of ArcNs was not observed in obese rats. After stimulation with insulin intravenously, the discharge frequency of ArcNs increased among three groups, but obese rats showed less response than those other two groups.

Conclusion: ObR down-regulation in hypothalamus and the activation of electrophysiological activities of arcuate neurons probably play an important role in the central pathogenesis of obesity.

Key Words: Arcuate Nucleus, Leptin Receptor, Obesity