PSYCHOPHYSIOLOGICAL TRAITS EVALUATED DURING HYPERVENTILATION TEST IN AFFECTIVE DISORDER PATIENTS

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Hyperventilation is an important pathogenic factor in anxiety disorders as well as in affective disorders [1]. It seems to provide symptoms by its metabolic and anxiogenic effects. We evaluated the relationships between respiratory, heart rate variability and psychological traits in affective disorder patients and healthy subjects. We evaluated respiratory and electrocardiographic characteristics during voluntary hyperventilation test in 13 healthy subjects and 10 patients with affective disorders following the protocols: spontaneous breathing (Rest) -5 min followed by a voluntary hyperventilation at 20/min HV-3 min. Hyperventilation was performed at the controlled level of hypocapnia: end tidal CO_2 ($F_{ET}CO_2$) was maintained at 1 % below the individual spontaneous level. Respiratory plethysmograph Visuresp was used to record respiratory movements, Capnostream - to record PCO2 and PCO2 of exhaled air, ECG module - to record electrocardiographic trace. PID, Beck and Nijmegen inventories were used to evaluate psychological traits.

The breath by breath analysis of respiration and R-R intervals of rest and hyperventilation periods was performed. At each breath, the tidal volume (V_T), the breath (T_{TOT}), the inspiratory (T_I) and expiratory durations, the minute ventilation, V_T/T_I, T_I/T_{TOT} were quantified determined. The spectral analysis of the RR intervals was applied to evaluate the heart rate variability characteristics –the normalized powers of high (HF) and low frequencies (LF) and LF/HF ratio [2]. The multifactorial statistical analysis was performed to evaluate the importance of different psychological traits and respiratory and heart variability characteristics.

A few significant correlations between psychological traits and respiratory and cardiovascular were found in healthy subjects group. More correlations were found in patients group during rest period. Voluntary hyperventilation increased the number of significant correlations in patients group.

The high activity of anxiogenic structure in affective disorders patients provides respiratory and heart rate variability changes. Respiratory alkalosis and hypocapnia produced by voluntary hyperventilation seem to increase the activity of anxiogenic structures and provide more psychophysiological effects in affective disorder patients in contrast with the healthy subjects.

[1] H. Festernheim. Hyperventilation and Psychopathology. *In Behavioral and Psychological Approaches to Breathing Disorders, edited by B.H. Timmons and Ronald Ley, Plenum Press, Ney Work,* 1994 p139-153.
[2] J.S. Gąsior, J. Sacha, P.J. Jeleń, J. Zieliński, J. Przybylski. Heart Rate and Respiratory Rate Influence on Heart Rate Variability Repeatability: Effects of the Correction for the Prevailing Heart Rate. *Front Physiol* **volume 7**, 2016 Aug 18:356, p1-11.