LATERALIZATION OF CARDIOVASCULAR AUTONOMIC FUNCTIONS IN HEMISPHERIC ISCHEMIC STROKE

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ABSTRACT

Violations of the cardiovascular and other autonomous functions are common in the cerebrovascular disease. Various cortical and subcortical anatomical regions of the brain are involved in the autonomic regulation and cortex insularis has the most important role crust. Stimulation of the right cortex insularis increases the sympathetic cardio-vascular tone, whereas the parasympathetic activity is increased more frequently during stimulation of the left cortex insularis. The evidence regarding the impact of the lateralization of a stroke for a cardiovascular risk is contradictory. Most authors demonstrated that patients with stroke affecting the right cortex insularis are more likely to develop cardiovascular autonomic dysfunction leading to reduced heart rate variability, cerebrogenic arrhythmias and an increased incidence of cardiac mortality.

Keywords: *stroke, cardiac autonomic dysfunction, heart rate, cortex insularis, arrhythmia*

Violations of cardiovascular and other autonomous functions are common in cerebrovascular disease. Use of a different self-test complements clinical evaluation in violation of the autonomous functions.

Various cortical and subcortical anatomical regions of the brain are involved in the autonomic regulation. Certain structures of the cerebral hemispheres, as cortex insularis, amygdala and lateral hypothalamus affect the autonomic control of the heart, and the cortex insularis has the most important role cortex. Extrainsular central autonomous re-

gions and their interconnective fibers affect the autonomic regulation (1).

Several studies describe the association between autonomic dysfunction and damage to the cortex insularis and other authors define the role of other structures without hemispheric lateralization.

The evidence regarding the impact of lateralization of cortex insularis for cardiovascular risk is contradictory.

Studies in humans have shown that regardless of the location, ischemic stroke results in a change in the autonomous mechanisms which are associated with myocardial necrosis, arrhythmia and even sudden death (2).

According to them, the change in the HRV, the functional output, as well as mortality rates were not dependent on the lateralization of stroke, as well as the sex of the patients (2). Barron et al. (3) also demonstrated that brain infarcts regardless of their location in the left or in the right hemisphere, can lead to a violation of the heart rate, there was no difference in the results of the two hemispheres.

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Despite these ideas, there are those according to which the localization of the stroke can have different effects on the autonomic regulation.

Tokgözoğlu S.L. et al. discovered evidence of cortical asymmetry in the autonomous control, right-hemispheric strokes have lower parameters in the study of heart rate variability (2).

Cortex insularis is often with occlusion of the middle cerebral artery and is at high risk of cerebrovascular disease. The role of the cortex insularis in cardiovascular autonomic functions is supported by strong experimental evidence. Ischemic damage to the cortex insularis is of particular clinical relevance and has a negative impact on prognosis (4).

Most authors, however, prove that patients with right-hemispheric stroke including the cortex insularis are more likely to develop cardiovascular autonomic dysfunction leading to reduced HRV, cerebral arrhythmias and an increased incidence of cardiac mortality.

When lesions involving the right cortex insularis and left cortex insularis are considered separately, patients with right-insular lesions have the lowest SDNN entire group of patients (3).

Given these data, patients with stroke and covering the cortex insularis-particularly the right one will require more intensive monitoring of their condition. Contrary to these beliefs, Korpelainen and others (5) reported a greater decrease in HRV, in left-hemispheric strokes and covering cortex insularis

Left cortex insularis deteriorates the sympathovagal balance, which is associated with structural heart damage and cardiac arrhythmia. When compared to ischemic lesions of different brain localization it is found that the disturbed movement of the heart wall is associated with a stroke in the left cortex insularis. Damage to the right insular cortex was not associated with adverse cardiac effects or damage to the movement of the heart wall.

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