Significance of functional integration of cerebrovascular system, CSF: Mobility and skull biomechanics in developing dementia and Alzheimer’s disease

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Introduction: The correlation between the cerebral blood supply and brain functioning is not proven in aging persons indicate the presence of some factors, besides blood circulatory system, which support brain circulatory-metabolic support, corresponding its functional activity. Aim of presentation is to investigate the role of Cerebrospinal fluid mobility (CSFm) and skull biomechanics, or cranial compliance (CC) in support of brain functioning in aging persons.

Methods: The study of brain of role of CSFm and CC in brain functioning of aging persons is based on simultaneous transcranial dopplerographic (TCD) and rheoencephalographic (REG) recordings. Consequent computer aid pulse pattern and phase analysis permits to determine CSFm, CC and CBF. By the use of psycho-physiological tests all 68 persons (age 72 - 89) was divided to 4 groups, according level of their cognitive disorders.

Results: It was found that the CD level patients with dementia the most strongly correlates with CSFm and CC indices, then with variations of CBF level. In the group with no CD, CC is 0.86 ± 0.08 and CSFm is 0.32 ± 0.10; for persons with initial CD, CC is 0.80 ± 0.08 and CSFm= 0.26 ± 0.07; for persons with pronounced CD, CC is 0.72 ± 0.08 and CSFm is 0.21 ±0.06; for group with deep CD, CC is 0.64 ± 0.05 and CSFm is 0.15 ± 0.04. Mean CBF, for all investigated persons varied up to 30% and its level doesn’t correlate with CD.

Conclusions: Brain metabolic supply is determined by functional integration of CBF, CSF systems and skull biomechanics and two last play roles in dementia developing.