

APPLICATION OF NEAR-INFRARED SPECTROSCOPY TECHNIQUE
FOR ASSESSING HEMODYNAMIC CHANGES OF THE BRAIN
DURING TRANSCRANIAL ELECTROMAGNETIC STIMULATION

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Aim of the study:

The assessment of the applicability of optical techniques, such as near-infrared spectroscopy, to measure the perfusion and oxygenation of the brain and the activity of the cerebral cortex in patients in the acute phase of ischemic stroke.

The processes occurring in the cerebral cortex in patients in the acute stage of ischemic stroke are not fully explored. Particularly, phenomena occurring in the contralateral hemisphere to the hemisphere in which the ischemic focus point is located need to be investigated, since the relationship between changes in cerebral cortex activity in the contralateral hemisphere and spontaneous improvement of neurological status of patients after acute ischemic stroke has been demonstrated.

Within the proposed study, the techniques of time-resolved near-infrared spectroscopy with the application of optical contrast agent Indocyanine Green (ICG) will be used for the assessment of cerebral blood flow and cerebral blood volume. Moreover, high-resolution optical tomography technique for spatial assessment of cortical activity by analyzing local changes in hemodynamic parameters during transcranial magnetic stimulation (rTMS) will be applied. The impact of stimulating and inhibitory electromagnetic stimulation on processes occurring in the cerebral cortex may help during the rehabilitation process of patients after stroke by stimulating the right hemisphere.

The results of the measurements will be correlated with the results of standard clinical measurements and with the patient's neurological status. The research will be carried out in cooperation with the Warsaw hospitals.