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THE INVESTIGATION OF CLINICALLY AND/OR RADIOLOGICALLY HIDDEN FUNCTIONAL DISTURBANCES IN THE ISCHEMIC BRAIN, USING POSITRON EMISSION TOMOGRAPHY AND 15-OXYGEN. J.P. Cheslet, J.C. Depresseux, G. Franck and J. Hodiaumont.

The elaboration of efficient therapeutical strategies in neurology ideally should be documented with diagnostic procedures detecting reversible functional disturbances rather than definitive anatomical lesions. The complexity of pathophysiological processes involved in cerebrovascular disease imperatively requires methods for simultaneously and repeatably evaluating not only cerebral blood flow but also regional cerebral energetic metabolism in man.

Regional cerebral blood flow and oxygen extraction rate were evaluated by positron emission tomography (PET) of the brain, performed at steady state radioactive concentration within blood and tissue during the continuous inhalation of C¹⁵O₂ and ¹⁵O₂. The method was applied to 25 patients suffering from transient ischemic attacks (TIA), without clinical symptoms at the time of investigation, reversible ischemic neurological deficits (RIND), with and without residual symptoms at the time of investigation, and definitive strokes.

The correlative analysis of clinical, Xray computerized tomography and PET data enables us to define four nosological patterns : (1) asymptomatic circulation/metabolism mismatch without detected anatomical lesion ; (2) symptomatic circulation/metabolism mismatch without detected anatomical lesion ; (3) perilesional ischemic shadow and (4) completed infarct.

The opportunity to investigate clinically and/or radiologically hidden functional disturbances in the course of acute or subacute cerebrovascular disease opens to a revision of criteria for deciding surgical revascularization or drug therapy.

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