

Hyperaemia symptoms via MR-, CT-perfusion and ultrasound index of brachiocephalic arteriovenous ratio - criteria for arterial/venous ischemic stroke's differentiation.

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Purpose was estimating of ASL MR-perfusion and brachiocephalic vessels ultrasound index of arteriovenous ratio (IAVR) possibilities in arterial/venous ischemic stroke's differentiation based on reference CT-perfusion correlation.

Examined 124 patients with ischemic stroke (22 with venous stroke due cerebral venous sinus thrombosis, 53.5±16.7y and 102 with atherothrombotic stroke, 68.3±12.1y) which were verificated by conventional MRI and MSCT; CT-angiography, PCT (perfusion CT: CBF, CBV, MTT) for all; ASL MR-perfusion (CBF, ATT; n=17). IAVR was obtained due duplex scanning of carotid common arteries (CCA) and internal jugular veins (IJV) according to the formula: IAVR=VpdIJVactual/VpdIJVoptimal*100% (VpdIJV - IJV pick diastolic blood velocity, sm/s; VpdIJVoptimal=2SCCA*VpsCCA/3SIJV; VpsCCA – CCA pick systolic blood velocity, sm/s; S – vessels area, sm^2).

Hyperaemia in perifocal zone of brain lesion was significant registered on CT-perfusion like moderate hyperperfusion (≥30%) in venous (69%) and arterial (3.9%) stroke. CBF enlarging (both PCT and ASL) and ATT shortening (ASL) were noted in venous stroke. IAVR decrease to 40±9.5% (venous stroke) vs. 67±10.2%, $p<0.00001$ (atherothrombotic stroke). There were strong correlations IAVR with PCT parameters: 1) with MTT in perifocal zone (r=-0.42); 2) with CBV in focus (r=-0.62) and perifocal zone (r=-0.52); 3) with CBF in focus (r=-0.42). Logistic model built using headache intensity on Visual analog scale (7.3±1.6 in venous stroke vs. 0.6±1.9 in atherothrombotic stroke, $p<0.00001$) and IAVR values has a high predictive ability (specificity=98%; sensitivity=95.2%).

Significant differentiation criteria of venous or arterial ischemic stroke's besides headache are hyperperfusion (≥30%) on CBF, CBV, MTT perfusion maps and decreasing to 50% IAVR threshold.

Biography

Dr. Stanislav Semenov has a leading researcher. Experience in MRI and CT for over 20 years, doctoral thesis was defended in 2003, 2009-2014 worked as head of diagnostics department of Research Institute for Complex Issues of Cardiovascular Diseases, under his direction were protected 7 doctoral theses. In 2003 at the I International NABI Congress he was awarded diploma I degree in poster session, participated in ESNR, ECR. He has more than 100 publications (including 18 Web of Science or Scopus). He is co-author of the National (Russian) Leadership "Radilogical diagnostics and therapy of head and neck diseases", 2013.

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