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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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Aim of this study was to estimate 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. 124 patients with ischemic stroke (22 with venous stroke due cerebral venous sinus thrombosis, 53.5±16.7 y and 102 with atherothrombotic stroke, 68.3±12.1 y) 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) were examined. 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 hyper-perfusion (≥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 decreases 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) and; 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 hyper-perfusion (≥30%) on CBF, CBV, MTT perfusion maps and decreasing to 50% IAVR threshold.

Biography

Alexander Semenov is a practical Radiologer working in Saarlouis (Germany) also a researcher in area of brain stroke. Experience in MRI and CT over 10 years, has about 17 printed works in worldwide issues on the topic of venous stroke, also made the speech presentations in Moscow (Russia), took a part in Radiological congress in Paris (France). As a part of physicians team has won a gold medal of Kuzbass healthcare for a CT-Heart of small children.

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