

COMPLEX ANALYSIS OF RUPTURE RISK OF INTRACRANIAL SACCCULAR ANEURYSMS UPON HEMODYNAMIC AND GEOMETRIC PARAMETERS

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Abstract:

The paper includes a new concept of assessment of rupture risk of intracranial saccular aneurysms using geometric and hemodynamic parameters of aneurysm, artery and blood. Previous decision systems are mainly based on the size of aneurysm and frequency of subarachnoid hemorrhages, therefore after performing simulation tests it has been proved that the complex assessment of clinical cases is possible thanks to evaluation of shape and size coefficient of a secondary aneurysm occurring on the surface of a primary aneurysm, width of a primary aneurysm neck, curvature of an artery on which a primary aneurysm is located and the size of blood impingement area at artery wall.

The paper contains results of the simulation tests of blood flow in the primary and secondary aneurysm, as well as verification of proposed criteria of rupture risk assessment for 5 clinical cases.

Keywords: aneurysm, artery curvature, Womersley velocity profile, rupture risk assessment, tensile stress, decision-making system