

The role of the brain microcirculation in acute stroke

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The clinical consequences of an ischemic stroke are determined by the localization and extent of the loss of brain tissue. The ischemic loss of the brain tissue is a direct consequence of the impossibility of normal metabolic changes, in particular oxygen and glucose supply from the vessels to the brain, at the level of the blood brain barrier, which normal integrity and functionality is mainly dependent to the integrity of the brain microcirculation. The disruption of the microvascular compartment during and after an acute ischemic event is not the same in all patients with a similar occlusion of a cerebral artery, in terms of caliber and location; the differences are determined by many other factors, among endothelial dysfunction, the presence of previous vascular risk factors, the development of collateral circulation, the time duration since the initial occlusion of the artery are most important. These events at the level of the microcirculation are the key-elements which allow or not the reperfusion of the brain tissue in the ischemic area, even if the therapeutic interventions are performed in therapeutic window. Understanding the role of the brain microcirculation during the acute ischemic stroke is essential to understand the no-reflow phenomenon, the risk of hemorrhagic transformation and other clinical relevant problems related to the failure of the most performant actual acute reperfusion therapies.