Blood Pressure Management and Neuroprotective Therapy

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The established treatment modalities in acute ischemic stroke include thrombolysis, aspirin, decompressive hemicraniectomy, and stroke unit care. In contrast, the benefits of anticoagulation, neuroprotection, aggressive blood pressure reduction, and induced hypertension were not proven. While the most beneficial weapon in the acute stroke stage is thrombolysis, the application of blood pressure management and neuroprotective therapy is also important measures to prevent ischemic penumbra injury. The insufficient blood flow can be compensated by collateral circulation and its autoregulation capacity. While the elevated blood pressure increases the perfusion to the ischemic penumbra in the acute stroke, it may put the sick vessels into occlusion or rupture. Therefore, blood pressure management in the acute ischemic stroke may be a double-edged sword. Actually, there was not enough evidence to suggest if blood pressure intervention affects outcome after acute ischemic stroke, in particular, in elderly patients and patients with carotid artery disease. Recently, the China Antihypertensive Trial in Acute Ischemic Stroke (CATIS)[1], which is a single-blind, blinded end-points randomized clinical trial, investigated the effect of lowering blood pressure in 4071 patients with nonthrombolysed ischemic stroke within 48 hours of onset and elevated systolic blood pressure. Blood pressure reduction did not decrease the likelihood of death and major disability at 14 days in comparison to control group. Meanwhile, for patients who received antihypertensive treatment 24 hours or longer after stroke onset, a significant reduction in the composite outcome of death and major disability was identified at the 3-month post-treatment. So, recent guidelines recommend that blood pressure reduction should be personalized depending on the clinical and neuroradiological features. On the other hand, the thrombolytic therapy is complicated by tPA toxicity to neurons and neurovascular unit, and reperfusion injury. Moreover, thrombolysis is not feasible in all stroke patients. For acute stroke patients, neuroprotectants, which have a variety of cellular targets, have been tried for clinical application, based on convincing preclinical studies. However, to date, there were no successful agents including erythropoietin, G-CSF, membrane stabilizers, uric acid, anti-oxidants, and anti-inflammatory drugs.[2-4] Given that greatest efficacy of neuroprotectants is reasonably expected within a fairly short time window, a recent attempt targeted hyperacute stroke patients within 2 hours of last known well by giving magnesium in the ambulance (FAST-MAG trial).[5] However, the primary outcome, modified Rankin scale (mRS) score at 90 days, was exactly the same in both intervention and control groups. The passage of magnesium across the blood-brain barrier may be limited and it may be insufficient as a single agent. In future, we should consider more refined neuroprotective therapy, such as combination with reperfusion therapy, augmentation of brain penetration, and/or regeneration therapy.

Key Words: Blood pressure; Neuroprotectant; Acute stroke

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