LECTURE

Biomarkers in acute stroke

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Abstract

Blood biomarkers measurement could add in acute stroke management, in both selecting patients at the pre-hospital level, as well as guiding reperfusion therapies to evaluate efficacy and safety. In acute stroke, blood biomarkers to distinguish between real strokes and stroke-mimics would be useful at pre-hospital level, especially in patients with low symptom severity. In patients with severe symptoms, differentiation between ischemic and hemorrhagic subtypes would permit administration of pre-hospital reperfusion therapies. For this issue, portable CT-scans have been used; however, a wide generalization of these expensive tools seems not feasible in the near future. Thus, having a blood test to differentiate between ischemic and hemorrhagic stroke in the preclinical setting would be desirable. Different plasma biomarkers have been described to differentiate IS from ICH stroke during the acute phase, such as glial fibrillary acidic protein (GFAP). Also retinol-binding protein 4 (RBP-4) is as a promising biomarker to distinguish IS from ICH during the acute phase of stroke. In addition, we demonstrate that when complemented with GFAP, the discrimination of both stroke subtypes is improved.

Also, specific biomarkers that selectively evaluate the response to tPA, predict the appearance of secondary intracranial hemorrhages and identify patients with unsuccessful tPA-induced recanalization have gained in importance during the last few decades. On the other hand, the identification of patients resistant to tPA-thrombolysis would be of great interest in deciding whether stroke patients may benefit from alternative therapies such as endovascular thrombectomy. Thus, due to the efficacy of this mechanical method, specific biomarkers to anticipate unsuccessful recanalization after tPA administration are promising. Hence, pre-treatment levels of fibrinolytic inhibitors such as plasminogen activator inhibitor-1 (PAI-1) or thrombin activatable fibrInolysis inhibitor (TAFI), as well as other molecules related with coagulation, such as factor seven activating protease or A Disintegrin And Metalloproteinase with a ThromboSpondin type-1 motif, member-13 (ADAMTS13) have been associated with a poor tPA response in terms of recanalization.

Beyond the acute phase, prediction of stroke outcome and the occurrence of post-stroke complications such as stroke-associated infections and assessment of stroke etiology to guide further studies or even therapeutic measures in cases of stroke of undetermined cause represent the main indications for the use of blood biomarkers in the subacute and chronic phases.

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