Tumor necrosis factor-related apoptosis-inducing ligand (TRAIL) is associated with cardiac injury and stroke severity in patients after acute ischemic stroke

M. Mihalovic1, P. Mikulenka2, H. Linkova1, I. Stetkarova2, T. Peisker2, D. Lauer2, P. Tousek1

1 Faculty Hospital Kralovske Vinohrady, Cardiocenter, 3rd Faculty of Medicine, Charles University, Prague, Czechia; 2 Faculty Hospital Kralovske Vinohrady, Department of Neurology - Third Faculty of Medicine, Prague, Czechia

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Background: Patients after acute stroke frequently show signs of myocardial injury. The pathophysiology and impact on patient’s outcome are not fully understood. Tumor necrosis factor-related apoptosis-inducing ligand (TRAIL) is cytokine known to be associated with cardiovascular events.

Purpose: We aimed to assess TRAIL level dynamic changes in patients after acute ischemic stroke and its relations to cardiac injury, stroke severity and impact on short-term outcome.

Methods: Between August 2020 and August 2021, 104 consecutive patients after acute ischemic stroke (AIS) were enrolled in our study. Blood samples were obtained from patients at the time of admission, 24- and 48-hours later to determine levels of Tumor necrosis factor-related apoptosis-inducing ligand (TRAIL), N-terminal prohormone of brain natriuretic peptide (NT-proBNP), and high-sensitive Troponin I (hs-cTnI). Twelve lead ECG at admission, 24-, 48-hours later and at the release of the patients were obtained. Patients underwent echocardiographic examination within first 5 days of hospitalization, if eligible. National Institutes of Health Stroke Scale (NIHSS) at admission and modified Rankin Scale (mRS) at 90 days following the patient’s discharge from the hospital were performed. Chi-square, Fishers exact test and regression analysis were performed to detect differences between variables using SPSS statistics. Results were considered statistically significant at a significance level of $p<0.05$.

Results: We found significant negative association between TRAIL and NT-proBNP at admission ($p=0.039$), after 24 ($p=0.043$) and 48 hours ($p=0.023$) of hospitalization. There was significant negative association between TRAIL and hs-cTnI at admission ($p=0.04$). Moreover, we found significant negative association between TRAIL and stroke severity evaluated by NIHSS at admission ($p=0.044$) and negative association with severe disability or death evaluated by mRS at 90 days both after 24 ($p=0.0022$) and 48 hours ($p=0.044$) of hospitalization. In ECG analysis, lower TRAIL levels were associated with the occurrence of premature ventricular extrasystoles ($p=0.043$), and there was a near statistically significant association with prolonged QTc interval ($p=0.07$). Two patients presented with new left ventricular regional wall motion abnormality.

Conclusions: Lower TRAIL levels are associated with laboratory markers of cardiac injury, stroke severity and unfavorable functional outcome in patients after acute ischemic stroke.