Investigation of Vaspin Level in Patients with Acute Ischemic Stroke

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Background: Cerebrovascular event is a clinical condition characterized by symptoms and findings pertaining to loss of focal cerebral function because of the vascular causes. Atherosclerosis has a forefront role in the pathogenesis of stroke. Inflammation has an important place in the formation of atherogenesis and atherosclerosis. Visceral adipose tissue–derived serpin (vaspin) is a new adipokine, which is identified recently, associated with obesity and diabetes and also has a proinflammatory characteristic. This study was intended to investigate the relation between vaspin and stroke and stroke and other risk factors. *Methods:* A total of 50 patients with stroke, as 28 men (56%) and 22 women (44%), and a total of 50 healthy individuals, as 25 men (50%) and 25 women (50%), were enrolled in the study. Blood samples were taken in the acute period (first 48 hours) in the patient group, and serum vaspin levels were measured. Vaspin level was also measured in the control group. The association of vaspin with the lipid parameters, gender, and the severity of internal carotid artery (ICA) stenosis in the patient group was evaluated. Stenotic plaques in ICA were classified as normal, mild (stenosis under 50%), moderate (stenosis 50%-69%), severe (stenosis 70%-99% to preocclusion), and occlusion. *Results:* No statistically significant difference was found between 2 groups in terms of age and gender ($P > .05$). Vaspin levels were found to be significantly higher in the patient group (164.73 ± 153.76 ng/mL) compared with the control group (116.21 ± 34.60 ng/mL) ($P < .05$). However, no relation was established between vaspin level and the severity of ICA stenosis. *Conclusions:* Vaspin levels have been shown to increase in acute ischemic stroke patients. The increased vaspin levels may vary depending on several factors in acute period of ischemic stroke. **Key Words:** Vaspin—ischemic stroke—carotid artery stenosis—cerebrovascular event—carotid artery ultrasound.

Introduction

Stroke is the third most common cause of death around the world, after coronary heart disease and cancers. Prevalence of this disease, which generally occurs in the elderly patients, increases along with the extension of average lifetime. The most important cause of ischemic strokes is atherothrombotic events.[1] The role of atherosclerosis in ischemic strokes varies between 27% and 43%.[2]

Some studies have found that adipokines are released at the atherosclerotic plaques, and they show their local and endocrinal effects on lesions.[3] Visceral adipose tissue–derived serpin (vaspin) is an important and a new adipocytokine with regulation characteristics in

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glucose and lipid mechanism. The correlation of its serum concentrations with the tests regarding obesity and lipid distribution gives rise to the thought that vaspin is a new molecule candidate for causing obesity-related atherosclerosis.[4]

The objective of our study was to investigate whether the plasma vaspin level has a predictive importance diagnostically in the acute period of ischemic cerebrovascular disease and its relation between carotid stenosis level in the patient group.

Materials and Methods

Fifty patients, who admitted to the Neurology Clinic of our hospital within the first 48 hours with the manifestation of acute ischemic stroke, diagnosed with ischemic stroke, hospitalized, and followed between March 2010 and January 2012 were enrolled in this study. And the control group consisted of 50 healthy subjects having no previous cerebrovascular disease, compatible with the patient group in terms of age and gender. Approval was obtained from the Firat University Medical Faculty Clinical Research Ethics Committee for the study (number: 21).

Diagnosis of acute ischemic stroke was put by at least 2 neurologists and 1 radiologist in the patients, who had acute focal neurological deficit lasting more than 24 hours and for whom there were no other reason except cerebrovascular disease that could cause such neurological deficit, through a complete neurological assessment including neuroradiological imaging such as cranial computed tomography and/or cranial magnetic resonance imaging (MRI).

In all patients, physical examination and neurological examination, complete blood count, liver and kidney function tests, electrocardiogram, electrolyte levels and lipid profile, cranial computed tomography, cranial MRI, and diffusion MRI with carotid system color Doppler ultrasonography (CDUS) examination were performed.

The patients with recovering neurological findings within 24 hours, the patients diagnosed with hemorrhagic cerebrovascular disease through clinical and neuroradiological assessment, and the patients with previous ischemic stroke were excluded from the study.

The patients with heart disease, which could lead to cardioembolism such as atrial fibrillation, severe heart failure, and valvular heart disease, malignant hypertension, Cushing syndrome or obesity secondary to any of the congenital diseases, central nervous system vasculitis, congenital vascular disease, trauma, dissection, and cerebral venous thrombosis; the patients with thyroid and kidney dysfunction and liver failure; and the patients with local and systemic infections were excluded from the study.

For evaluating the serum vaspin level of within the first 48 hours, the patients diagnosed with acute ischemic stroke and hospitalized, venous blood sample of 5 cc were collected. Blood samples were centrifuged at 1500*g* for 10 minutes to get the serums. The serums obtained were put in 2 separate eppendorf tubes for each patient and stored at -20 °C by avoiding repeated freezing–thawing procedures until the analysis. Same procedure was also applied to the cases selected for the control group.

Serum vaspin levels were studied by using Adipobiotech-branded Human Visceral Adipose Tissue–Derived Serine Protease Inhibitor (VASPIN) ELISA kit (Adipo Bioscience, Inc., Santa Clara, CA). Informed consent forms were requested from the patients and the healthy individuals before the procedures.

Carotid Artery CDUS Technique

Examinations were performed by using 10-MHz linear probe at General Electric Logiq-9 model CDUS (General Electric, Milwaukee, OH). As the patients were in supine position, necks were at extension, and the head was facing toward the opposite of the examination side, 2-sided carotid arteries were examined from supraclavicular region through mandibular angle by using power Doppler ultrasonographic examination. First, presence of plaque was investigated by B-mode examination. When plaque was established, the site, size, and surface characteristics of the plaque were determined. CDUS examination was performed in the longitudinal and transverse plane in color mode. Spectral waveform was taken in the main carotid artery from about 2 cm proximal to the bifurcation and center of the vessel, just distal to the ICA bulb.

Flow was measured with a 30°-60° angle to the lumen as a standard. Peak systolic velocity (PSV) and end-diastolic velocity in ICA and main carotid artery were recorded. PSV ratios (PSV in ICA/common carotid artery) were calculated over these values. For stenosis grading (%) of the plaques examined, Society of Radiologist in Ultrasound criteria were used.[5] Stenotic plaques in ICA were classified as normal, mild (stenosis under 50%), moderate (stenosis 50%-69%), severe (stenosis 70%-99% to preocclusion), and occlusion.

Statistical Analysis

For statistical analyses, the statistics program SPSS 12.0 was used. Results were submitted as ±standard deviation. Student *t* test was used for comparing parametric data between the groups, and chi-square test was used for comparing categorical data. Normality of the parametric data distribution was evaluated by Kolmogorov–Smirnow test. For the parameters showing no normal distribution, logarithmic conversions were applied before the statistical analyses. Difference of the nonparametric data among more than 2 groups was evaluated by Kruskal–Wallis test. In all statistical assessments, *P* value less than .05 was considered statistically significant.