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Correlation between of Serum Uric Acid Level and Carotid Atherosclerotic Plaque in Patients with Acute Cerebral Infarction

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ABSTRACT. *Objective To investigate the correlation between high uric acid level and carotid atherosclerotic plaque in patients with acute cerebral infarction. Methods Select our hospital 245 cases of acute cerebral infarction patients as the study subjects, record the patient's general information, according to the results of carotid artery colour to exceed divided into patches and plaques group, further divided into according to the nature of plaque unstable plaque group and stable plaque group, determination of patients with blood uric acid level, analysis with the correlation of carotid atherosclerotic plaques. Results: there were 212 patients in the plaque group and 33 patients in the non-plaque group. There were statistically significant differences between the two groups in age, history of diabetes and serum uric acid level (P<0.05). Multifactor logistic regression analysis showed that age, history of diabetes and serum uric acid were statistically significant (P<0.05). The serum uric acid level of the plaque group was significantly higher than that of the non-plaque group (P<0.05). Unstable plaque uric acid level> stable plaque group> no plaque group, with statistical significance (P<0.05). Conclusion The increase of serum uric acid level in patients with acute cerebral infarction is related to the occurrence of carotid atherosclerotic plaque, and is most closely related to unstable plaque.*

KEYWORDS: *Cerebral infarction; Carotid atherosclerotic plaque; Uric acid*

Acute cerebral infarction is still a serious public health problem with high incidence, disability and mortality [1]. Studies have shown that atherosclerosis is the main cause of cerebral infarction [2]. In recent years, the assessment of the risk of cerebral infarction has been a research hotspot. At present, more and more studies have shown that the increase of serum uric acid level is closely related to the occurrence of carotid atherosclerosis [3] and increases the incidence and mortality of cerebral infarction patients [1]. In this study, the relationship between serum uric acid level and atherosclerotic plaques and their properties in patients with acute cerebral infarction was investigated through the determination of serum uric acid level and the results of carotid ultrasound.

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1. General information and Methods

1.1 General information

245 patients with acute cerebral infarction admitted to the department of neurology of our hospital from June 2018 to April 2019 were selected as the study objects. All the patients met the relevant diagnostic criteria of "guidelines for diagnosis and treatment of acute ischemic stroke in China 2018", and were confirmed by head CT/MRI examination. All patients were excluded from cerebral hemorrhage, tumor, rheumatism, liver and kidney diseases, pain wind, nervous system infection diseases and taking drugs that affect uric acid and kidney metabolism.

1.2 Methods

Patients with cerebral infarction were all fasting for more than 12h. 5ml of venous blood was extracted in the morning of the second day after admission, and serum lipids, uric acid and other indicators were measured and recorded by elisa with 7600 automatic biochemical analyzer. (3) Ie33 carotid artery ultrasound diagnostic instrument produced by philips was used for examination. Longitudinal and transverse scanning was performed at the beginning of the carotid artery, and bilateral common carotid artery trunk, biked, internal carotid artery and external carotid artery were examined successively. Carotid intima-media thickness (IMT) was measured and recorded, and IMT$\geqslant$1.2mm was defined as plaque formation [4]. According to the echo and surface morphology of plaque, it can be divided into hypoecho (soft plaque, lipid soft plaque), isoecho (fibrous plaque), hyperecho (hard plaque) and mixed echo (ulcerative mixed plaque). Soft plaque and ulcer plaque are called unstable plaque (vulnerable plaque); Fibrous plaques and calcified plaques are known as stable plaques. They were divided into stable plaque group, unstable plaque group and non-plaque group.

1.3 Statistical method

SPSS17.0 statistical software was used for statistical analysis. The single factor analysis of measurement data was performed by t test, and the counting data was expressed as percentage (%). Chi-square test was used for inter-group comparison, all of which were bilateral tests. Multivariate analysis was performed using logistic regression.

2. Results

2.1 General information on plaque group and non-plaque group

Among 245 patients with acute cerebral infarction, 212 patients (64.12%) were

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in the plaque group and 33 patients (35.88%) were in the non-plaque group. The general data of the two groups were compared, and the differences in age, history of diabetes and uric acid were statistically significant ($p<0.05$), while the differences in other risk factors were not significant. Chart 1:

Table 1 General data of plaque group and non-plaque group were analyzed

	Plaque group	Non-plaque group	X^2/t	*P*
Gender	136/211	22/33	0.079	0.779
Hypertension	154/212	19/33	3.123	0.077
Diabetes	77/212	6/33	4.194	0.041
Age	66.48±10.95	56.27±12.00	4.915	0.000
Triglycerides	1.65±1.18	1.81±1.71	-0.670	0.504
Cholesterol	4.36±1.12	4.52±1.22	-0.759	0.449
Uric acid	369.95±96.36	323.61±102.57	2.548	0.011
Creatinine	72.97±20.55	74.84±36.65	-0.428	0.669
Cystatin C	1.06±0.26	0.98±0.42	1.376	0.170

2.2 Correlation factor analysis

Multivariate logistic regression analysis was performed with carotid atherosclerotic plaque as the dependent variable and diabetes history, age and uric acid as independent variables. Results: diabetes history, age, uric acid were statistically significant ($P<0.05$). Table 2:

Table 2 Logistic regression analysis of carotid atherosclerotic plaque

independent variable http://dict.youdao.com/javascript:void(0);	B	SE	Wald value	*P*	OR	95%CI
Diabetes	-1.008	0.508	3.936	0.047	0.365	0.135-0.988
Age	0.089	0.020	19.507	0.000	1.093	1.050-1.136
Uric acid	0.008	0.003	8.625	0.003	1.008	1.003-1.013

2.3 Serum uric acid levels were compared among the three groups

Unstable plaque group > stable plaque group > non-plaque group the difference was statistically significant ($P < 0.05$). Table 3:

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Table 3 Serum uric acid levels were compared among the three groups

Group	Number of cases	Serum Uric Acid(μmol/L)
Unstable plaque group	150	365.49±95.27
stable plaque group	62	380.74±98.90
non-plaque group	33	323.61±102.57

Note: the difference between the unstable plaque group and the stable plaque group (t=-1.049, P =0.295) was not significant, and the difference between the non-plaque group and the non-plaque group (t=2.255, P =0.025) was statistically significant. The difference between stable plaque group and non-plaque group (t=2.647, P =0.010) was statistically significant.

3. Discussion

With the rapid development of population aging and economic level and the change of life style, the incidence of cerebral infarction is increasing year by year. The formation and development of acute cerebral infarction (ACI) involves multiple factors, of which about 18% - 25% of the patients with cerebral infarction is caused by carotid atherosclerotic disease thromboembolism [5], it is generally believed that intracranial, outside artery intima-media thickness and atherosclerotic plaque formation, and vulnerability patches worn, thrombosis is the main pathogenesis of cerebral infarction [6]. Recent studies have made people aware of the important role of atherosclerotic plaques and the nature of plaques in the pathogenesis of cerebral infarction [7].

Uric acid is the final product of purine nucleotide metabolism and is widely considered as a risk factor for atherosclerosis [8-9]. A large number of studies have shown that in addition to the identified factors such as hypertension, hyperlipidemia and diabetes, serum uric acid level is also one of the important factors affecting acute cerebral infarction [9]. This study analysis found that the blood uric acid levels in patients with unstable plaque group was obviously higher than that of stable plaque, plaque group, blood uric acid level and plaque group was obviously higher than that of no plaque group, suggests that patients with acute cerebral infarction in blood uric acid level is associated with carotid atherosclerotic plaque formation, and more closely with the formation of unstable plaque; Analysis of related factors further indicated that serum uric acid was a risk factor for the formation of atherosclerotic plaque in carotid artery after acute cerebral infarction. Therefore, for patients with acute cerebral infarction, it is necessary to add serological markers such as serum uric acid on the basis of clinical evaluation and vascular evaluation, which can provide quantitative early warning indicators for the acute stage of cerebral infarction and secondary prevention.

In conclusion, this study confirmed that serum uric acid may be involved in the occurrence and development of carotid atherosclerotic plaque in patients with acute cerebral infarction. Therefore, it is clinically necessary to closely monitor the level of serum uric acid, so as to reduce the occurrence of cerebrovascular diseases, and it may be of guiding significance for the precise treatment of patients with acute stroke.

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References

[1] Zhang B, Yang N, Lin SP, et al (2017). Suitable concentrations of uric acid can reduce cell death in models of OGD and cerebral ischemia-reperfusion injury. Cell Mol Neurobiol, vol.37, no.5, pp.931-939.

[2] Yamada K, Kawasaki M, Yoshimura S, et al (2016). High-intensity signal in carotid plaque on routine 3D-TOF-MRA is a risk factor of ischemic stroke. Cerebrovasc Dis, no.41, pp. 13-18.

[3] Song CF, Cai L, Wu LM, et al (2015). The study of correlation between serum uric acid level and carotid atherosclerosis in patients with cerebral infarction. Chin. J. Med, vol.50, no.9, pp.33-36.

[4] Liang ZG, Sun XW, Yang SW, et al (2018).Study on the level of serological indicators in acute ischemic stroke patients with carotid artery plaque. Journal of clinical neurology, vol.31, no.6, pp.425-428.

[5] Ooi YC, Gonzalez NR (2015). Management of extracranial carotid artery disease. Cardiol Clin, vol.33, no.1, pp. 1-35.

[6] Li XP (2016). Changes of serum visfatin content in patients with acute cerebral infarction and its influence on carotid atherosclerotic plaque formation and stability. Chinese Journal of Practical Neurology, vol.19, no.3, pp.103-104.

[7] Saba L, Saam T, Jäger HR, et al (2019). Imaging biomarkers of vulnerable carotid plaques for stroke risk prediction and their potential clinical implications.Lancet Neurol, vol.18, no.6, pp.559-572.

[8] Feig DI, Kang DH, Johnson RJ (2008). Uric acid and cardiovascular risk. N Engl J Med, vol. 359, no.17, pp.1811-1821.

[9] Ji W, Zhu Y, Kan P, et al (2017). Analysis of intestinal m icrobial communities of cerebral infarction and ischem ia patients based on high throughput sequencing technology and glucose and lipid m etabolism .M ol M ed Rep, vol.16, no. 4, pp.5413-5417.