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ORIGINAL ARTICLE

Case Control Study

Diagnostic and prognostic implications of non-high-density lipoprotein cholesterol and homocysteine levels for cognitive impairment in thalamic infarction

Shan-Yao Zhu, Wei Ge, Huan Zhang

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Abstract

BACKGROUND

Patients with thalamic infarction experience abnormal blockages of multinucleated vessels, affecting the body and thereby the thalamus. Most patients with thalamic infarction have an adverse prognosis, which seriously affects their safety. Therefore, it is essential to analyze the independent risk factors that influence the prognosis of patients with thalamic infarction and develop corresponding preventive measures.

AIM

To explore the effect of non-high-density lipoprotein cholesterol (non-HDL-C) and Homocysteine (Hcy) levels in cognitive impairment in thalamic infarction.

METHODS

From March 2019 to March 2022, 80 patients with thalamic infarction were divided into a group with cognitive impairment [Montreal Cognitive Assessment (MoCA) score < 26; 35 patients] and a group with normal cognitive function (MoCA score of 26-30; 45 patients) according to the MoCA score. In addition, 50 healthy people in the same period were selected as the control group. A correlation between the non-HDL-C and Hcy levels and the MoCA score and receiver operating characteristic curve was observed, and the serum non-HDL-C and Hcy levels were analyzed for the diagnosis of cognitive impairment in patients with thalamic infarction. According to the Modified Rankin Scale (MRS) score, 80 patients with thalamic infarction were divided into a good prognosis group (MRS score ≤ 2) and a poor prognosis group (MRS score >2).

RESULTS

The non-HDL-C and Hcy levels were significantly higher in the group with cognitive impairment than in the group with normal cognitive function ($P < 0.05$).

There was no significant difference in the non-HDL-C level between the control group and the group with normal cognitive function ($P > 0.05$). The MoCA scores of the group with cognitive impairment were significantly lower than those of the group with normal cognitive function and the control group ($P < 0.05$). There was a significant difference between the control group and the group with normal cognitive function ($P < 0.05$). The non-HDL-C and Hcy levels were correlated with the MoCA score ($P < 0.05$), cognitive impairment [areas under the curve (AUC) = 0.709, 95% confidence interval (95%CI): 0.599-0.816], the non-HDL-C level, and could predict cognitive impairment in patients with thalamic infarction (AUC = 0.738, 95%CI: 0.618-0.859). Hcy combined with non-HDL-C levels can predict cognitive impairment in patients with thalamic infarction (AUC = 0.769, 95%CI: 0.721-0.895).

RESULTS

There were 50 patients in the good prognosis group and 30 patients in the poor prognosis group. Compared with the good prognosis group, in the poor prognosis group, the National Institutes of Health Stroke Scale (NIHSS) score, non-HDL-C level, Hcy level, large-area cerebral infarction, atrial fibrillation, and activated partial prothrombin time were statistically significant ($P < 0.05$). The non-HDL-C level, the Hcy level, the NIHSS score, extensive cerebral serum, and atrial fibrillation may all be independent risk factors for poor prognosis in patients with thalamic infarction ($P < 0.05$).

CONCLUSION

Non-HDL-C and Hcy levels are positively correlated with cognitive impairment in patients with thalamic infarction. Non-HDL-C and Hcy levels can be used in the diagnosis of cognitive impairment in patients with thalamic infarction, and the combined detection effect is better. The main factors affecting the prognosis of patients with thalamic infarction are the non-HDL-C level, the Hcy level, the NIHSS score, large-area cerebral infarction, and atrial fibrillation. Clinically, corresponding preventive measures can be formulated based on the above factors to prevent poor prognosis and reduce mortality.

Key Words: Thalamic infarction; Cognitive impairment; Non-high-density lipoprotein cholesterol; High homocysteine level; Diagnostic value; Prognosis; Influencing factors; Correlation

Core Tip: This study explored the diagnostic and prognostic implications of non-high-density lipoprotein cholesterol (non-HDL-C) and Homocysteine (Hcy) levels for cognitive impairment in patients with thalamic infarction. Both non-HDL-C and Hcy levels were found to be useful for the diagnosis of cognitive dysfunction in patients with thalamic infarction, with their combined detection being more effective. In addition, clinical precautions can be formulated based on their levels to prevent poor prognosis and reduce mortality.

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INTRODUCTION

The organization and structure of the thalamus is extremely complex, such as the medial nuclear group and the former nuclear group. In patients with thalamic infarction, an abnormal blocking phenomenon occurs in the blood vessels of multiple nuclei, affecting the body and thereby the thalamus. The majority of patients are mainly characterized by dementia, aphasia and stubborn sexual behavior and insomnia, aggravating the degree of the thalamic infarction, which can lead to cognitive impairment[1]. One study reported that abnormal homocysteine (Hcy) levels led to changes in hippocampal signaling and neuroplasticity in mice[2]. Therefore, abnormal Hcy levels are believed to be related to cognitive impairment in patients with thalamic infarction. Non-high-density lipoprotein cholesterol (non-HDL-C), which mainly contains low density lipoprotein (LDL), intermediate density lipoprotein and chylomicron, is calculated by subtracting HDL from total cholesterol (TC). Other studies have also reported that there is a relationship between non-HDL-C levels and cognitive impairment[3]. For example, in the study of Weaver *et al*[4], non-HDL-C levels were positively correlated with cognitive impairment in patients with lacunar cerebral infarction. As the non-HDL-C level increased in patients with lacunar cerebral infarction, the degree of cognitive impairment increased. However, whether the same occurs in patients with thalamic infarction needs to be further explored. Hcy and non-HDL-C levels are related to cognitive impairment due to disease to a certain extent. Whether Hcy and non-HDL-C levels can be used in the diagnosis of cognitive dysfunction in patients with thalamic infarction is worth exploring. Most patients with thalamic infarction have a poor prognosis, and their safety is seriously affected. The analysis of independent risk factors, especially

Hcy levels, for the prognosis of patients with thalamic infarction and the formulation of relevant prevention measures have important meaning for improving the prognosis of these patients, and whether non-HDL-C level changes can predict the prognosis of patients with thalamic infarction is worth studying. Therefore, this study mainly evaluated the use of Hcy and non-HDL-C levels in the diagnosis of cognitive impairment in patients with thalamic infarction, as well as the influencing factors of poor prognosis to provide a reference for the clinical development of preventive measures to improve the prognosis of these patients. At the same time, the efficient diagnosis of cognitive impairment in patients with thalamic infarction provides a reference for improving the prognosis of these patients, which is of great significance.

MATERIALS AND METHODS

General information

From March 2019 to March 2022, 80 patients diagnosed with thalamic infarction were selected and divided into a group with cognitive dysfunction [Montreal Cognitive Assessment (MoCA) score < 26, 35 patients] and a group with normal cognitive function (MoCA score of 26-30, 45 patients) according to the MoCA score. In addition, 50 healthy people in the same period were included as the control group. There was no significant difference in sex or age among the three groups ($P > 0.05$, see Table 1). After 2 years of follow-up, the prognosis of the 80 patients was evaluated. The selected patients with thalamic infarction were divided into a good prognosis group (Modified Rankin Scale (MRS) score ≤ 2 points) and a poor prognosis group (MRS score > 2 points) according to the MRS score. The inclusion criteria were as follows: patients who were diagnosed by computed tomography or magnetic resonance imaging; patients who met the Cerebrovascular Disease Conference criteria for the diagnosis of thalamic infarction[5]; patients who were admitted within 72 h of onset; and patients who had not taken diuretic drugs or antibiotics within 1 mo after admission. The exclusion criteria were as follows: Patients with dysfunction of the heart, lungs or other organs; patients with malignant tumors or other diseases; patients with immune system diseases; and patients with severe disorders of consciousness. Details are shown in Table 1.

Research methods

Non-HDL-C and Hcy level detection: After fasting for 12 h, venous blood was drawn from the elbow at 6 am the next day, and the serum levels of TC and HDL-cholesterol were detected by an automatic biochemical analyzer. Non-HDL-C levels were calculated as follows: TC-HDL-C.

First, blank wells, standard wells and sample wells were set, corresponding to the addition of standard solution or the solution to be tested, and incubated. Then, biotinylated antibody and enzyme conjugate working solution was added. Next, the liquid in the wells was cleared, and the substrate solution was added.

MoCA score[6]: An MoCA score of less than 26 indicates cognitive impairment, and an MoCA score of 26-30 indicates normal cognition. The evaluation content mainly includes the following aspects: Visuospatial executive ability, naming, attention, language ability, abstraction, delayed recall and orientation. According to the MoCA score, patients with thalamic infarction were divided into a group with normal cognitive function and a group with cognitive dysfunction.

MRS score[7]: An MRS score ≤ 2 indicated a good prognosis, and an MRS score of 3-6 indicated a poor prognosis; a higher score indicated a worse prognosis. An MRS score of 0 indicated that no symptoms were present, and scores of 1 to 5 points indicated different degrees of disability; the higher the score was, the more severe the disability was. A score of 6 indicates patient death. For clinical symptoms, a score of 1 point indicated mild but not significant disability. Scores of two and three points indicated moderate disability, but with the ability to walk alone. A score of 4 points indicated a moderately severe disability, with the inability to walk independently, and a score of 5 points indicated a severe disability and the complete inability to take care of oneself. According to the MRS score, patients with thalamic infarction were divided into a good prognosis group and a poor prognosis group.

National Institutes of Health Stroke Scale score[8]: The Stroke Scale developed by the National Institutes of Health[9] includes level of consciousness, level of consciousness questioning, level of consciousness commands, and optimal gaze. The total score ranges from 0 to 42, with higher scores indicating more severe neurological damage.

Outcome measures: The diagnosis of cognitive impairment was determined and the prognosis of patients with thalamic infarction was predicted using non-HDL-C and Hcy levels. MoCA score, onset time, National Institutes of Health Stroke Scale (NIHSS) score, and activated partial prothrombin time (APTT) were also used as outcome measures.

Statistical methods

SPSS 26.0 and GraphPad Prism software were used to analyze the data. Data on the non-HDL-c level, Hcy level, MoCA score, onset time, NIHSS score, APTT, *etc.* were collected. The chi square test, LSD test (homogeneity of variance test $P < 0.05$) and Tamheeni test (homogeneity of variance test $P < 0.05$) were performed in the three groups (group with cognitive impairment, control group and group with normal cognitive function), and χ^2/t tests were performed in the two groups (good prognosis group and poor prognosis group) (all were in line with a normal distribution). The *t* test was used for quantitative data and the χ^2 test was used for qualitative data. The correlation between non-HDL-C and Hcy levels and the MoCA score was analyzed by Pearson correlation analysis. The diagnostic value of non-HDL-C and Hcy levels in patients with thalamic infarction was analyzed by receiver operating characteristic (ROC) curve analysis. The independent risk factors for poor prognosis in patients with thalamic infarction were analyzed by logistic regression analysis. Logistic regression analysis was used to analyze independent risk factors for a poor prognosis in patients with

Table 1 Observed differences in basic data

Group	The number of cases	Male/female	Age (yr)
The control group	50	24/26	63.11 ± 6.45
Cognitively normal group	45	25/15	64.87 ± 6.69
Cognitive impairment group	35	27/13	64.76 ± 6.45
χ^2/F/*P* value	-	3.657/0.073	1.482/0.187

thalamic infarction.

RESULTS

Non-HDL-C and Hcy levels in the diagnosis of cognitive impairment in patients with thalamic infarction

Differences in non-HDL-C and Hcy levels in each group: The non-HDL-C and Hcy levels in the group with cognitive impairment were significantly higher than those in the group with normal cognitive function and the control group ($P < 0.05$), and there was no significant difference between the control group and the group with normal cognitive function ($P > 0.05$). Details are shown in Table 2.

Table 2 Differences in non-HDL-C and Hcy levels in each group (X ± S)

Group	The number of cases	Non-HDL-C (tendency/L)	Hcy (mol/L)
The control group	50	3.11 ± 0.52	11.66 ± 0.71
Cognitively normal group	45	3.24 ± 0.54	23.22 ± 3.68
Cognitive impairment group	35	3.98 ± 0.87[1,2]	30.34 ± 4.72[1,2]
F/P value	-	6.393/0.000	25.417/0.000

[1]$P < 0.05$ compared with the control group.
[2]$P < 0.05$ compared with the group with normal cognitive function.
Non-HDL-C: Non-high-density lipoprotein cholesterol; Hcy: Homocysteine.

Observation of differences in MoCA scores: The MoCA score of the group with cognitive impairment was significantly lower than those of the group with normal cognitive function and the control group ($P < 0.05$), and there was no significant difference between the control group and the group with normal cognitive function (P>0.05). Details are shown in Table 3.

Correlation analysis of non-HDL-C and Hcy levels with MoCA scores: Non-HDL-C and Hcy levels were positively correlated with the MoCA score ($P < 0.05$). See Table 4 for details.

ROC curve analysis of the use of serum non-HDL-C and Hcy levels in the diagnosis of cognitive impairment in patients with thalamic infarction: The areas under the curve (AUC) of Hcy levels in predicting cognitive impairment in patients with thalamic infarction was 0.709 [95% confidence interval (95%CI): 0.599-0.816]. The AUC of non-HDL-C levels in predicting cognitive impairment in patients with thalamic infarction was 0.738 (95%CI: 0.618-0.859). The AUC of Hcy combined with non-HDL-C levels in predicting cognitive impairment in patients with thalamic infarction was 0.769 (95%CI: 0.721-0.895). See Table 5 and Figure 1 for details.

The prognostic value of non-HDL-C and Hcy levels in patients with thalamic infarction

Differences in the clinical characteristics of patients with thalamic infarction in the good and poor prognosis groups: There were 50 patients in the good prognosis group and 30 patients in the poor prognosis group. There were significant differences in NIHSS scores, non-HDL-C levels, Hcy levels, and rates of massive cerebral infarction, atrial fibrillation, and APTT between the poor prognosis group and the good prognosis group ($P < 0.05$). Details are shown in Table 6.

Multivariate logistic regression analysis of the influencing factors of a poor prognosis in patients with thalamic infarction: Non-HDL-C levels, Hcy levels, NIHSS scores and atrial fibrillation may be independent risk factors for poor prognosis in patients with thalamic infarction ($P < 0.05$). Details are shown in Table 7.

Table 3 Differences in Montreal Cognitive Assessment scores (X ± S)

Group	The number of cases	Visuospatial executive ability	Named	Attention	Language ability	Abstract	Delayed recall	Directional	Total score
The control group	50	3.12 ± 1.04	2.80± 0.45	5.84 ± 0.37	2.88 ± 0.33	1.78 ± 0.51	3.10 ± 1.23	5.86 ± 0.35	25.46 ± 2.41
Cognitively normal group	45	4.39 ± 0.72	2.79 ± 0.39	5.69 ± 0.41	22.98 ± 0.09	1.87 ± 0.15	3.62 ± 0.91	5.63 ± 0.36	26.98 ± 1.20
Cognitive impairment group	35	1.73 ± 1.25	1.62 ± 0.98	12.31 ± 1.09	2.61 ± 0.50	1.43 ± 0.89	2.16 ± 1.01	4.69 ± 1.66	17.13 ± 4.53[1,2]
F/P value	-	11.962/0.000	7.309/0.000	28.304/0.000	329.283/0.000	3.263/0.002	6.784/0.000	341.597/0.000	13.992/0.000

[1]$P < 0.05$ compared with the control group.
[2]$P < 0.05$ compared with the group with normal cognitive function.

DISCUSSION

This study first analyzed the use of non-HDL-C and Hcy levels in the diagnosis of cognitive impairment in patients with thalamic infarction; 80 patients with thalamic infarction were selected as the research object, and the MoCA score was used to evaluate the degree of cognitive impairment in the patients. Patients with thalamic infarction were divided into a group with cognitive impairment and a group with normal cognitive function, and medical healthy people were included as controls. The non-HDL-C and Hcy levels in the group with cognitive impairment were significantly higher than those in the group with normal cognitive function and the control group. At the same time, the MoCA scores of the group with cognitive impairment were higher than the scores of each subgroup. In addition, the scores of the group with normal cognitive function and the control group were higher. The higher the MoCA score was, the more normal a patient's cognitive function. The above results showed that there was a certain relationship between the non-HDL-C and Hcy levels and cognitive function in patients. The higher the non-HDL-C and Hcy levels were, the lower the cognitive function of patients. Pearson correlation analysis also showed that the non-HDL-C and Hcy levels were correlated with the MoCA score. The higher the non-HDL-C and Hcy levels were, the lower the MoCA score, indicating more severe cognitive impairment in patients. The results of this study have also been confirmed in a number of studies, such as the study by Fu *et al*[10]. The study found that the Hcy level was associated with cognitive dysfunction in patients with cerebral infarction. The relationship between non-HDL-C and Hcy levels and cognitive dysfunction was further analyzed. The increase in Hcy levels resulted in an abnormal decrease in the vasodilation response, and the activity of CO synthetase was affected; this increased the degree of endothelial injury, further leading to abnormal endothelial function, and promoting the shedding of a large number of endothelial cells. In turn, the formation of arteriosclerosis was affected, ultimately leading to cognitive dysfunction[11]. In addition, an abnormal increase in non-HDL-C levels in the body leads to cognitive dysfunction, which may be mainly related to atherosclerosis. The increased levels of non-HDL-C and LDL-C in the body may lead to the development of atherosclerosis, which may lead to arterial stenosis, increased plaque formation and changes in hemodynamics. An abnormal blood supply in the thalamus may lead to some structural dysfunction, such as in the hippocampus and adjacent tissues, eventually leading to cognitive dysfunction[12].

The ROC curve was further used to analyze the diagnostic efficacy of non-HDL-C and Hcy levels for cognitive impairment in patients with thalamic infarction. The results showed that the combination of non-HDL-C and Hcy levels had higher diagnostic efficacy, which suggested that the combined measurement of non-HDL-C and Hcy levels could be considered to improve the diagnostic efficacy in the diagnosis of cognitive dysfunction in patients with thalamic

Table 4 Correlation analysis of non-high-density lipoprotein cholesterol and Homocysteine levels and the Montreal Cognitive Assessment score

Project	Hcy		non-HDL-C	
	r value	*P* value	*r* value	*P* value
Viewspace/execution	0.292	0.003	0.233	0.000
Named	0.478	0.000	0.487	0.004
Attention	0.658	0.002	0.622	0.000
Language ability	0.451	0.000	0.422	0.002
Abstract	0.302	0.001	0.368	0.000
Delay memories	0.367	0.000	0.308	0.002
Directional	0.685	0.003	0.676	0.001
MoCA scores	0.703	0.000	0.705	0.000

Non-HDL-C: Non-high-density lipoprotein cholesterol; Hcy: Homocysteine; MoCA: Montreal Cognitive Assessment.

Table 5 Receiver operating characteristic curve analysis of serum non-high-density lipoprotein cholesterol and Homocysteine levels for the diagnosis of cognitive impairment in patients with thalamic infarction

Variable	The critical value	AUC	Sensitivity	Specificity	95%CI	About an index
Hcy (μmol/L)	22.540	0.709	0.724	0.630	0.599-0.816	0.354
Non-HDL-C (tendency/L)	1.351	0.738	0.701	0.870	0.618-0.859	0.571
Hcy in combination with non-HDL-C	-	0.769	0.758	0.889	0.721-0.895	0.647

AUC: areas under the curve; Non-HDL-C: Non-high-density lipoprotein cholesterol; Hcy: Homocysteine.

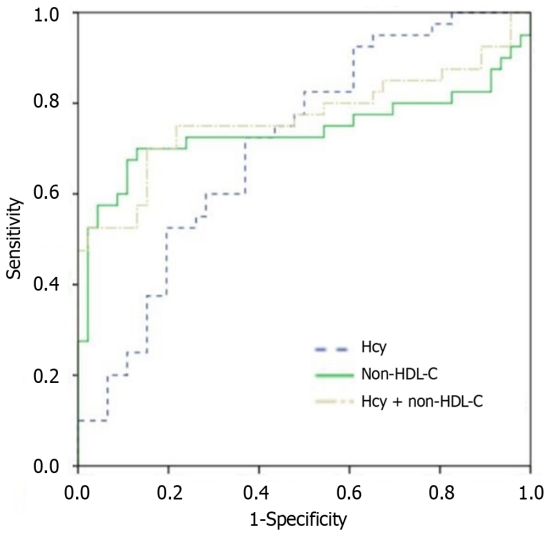

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Figure 1 Receiver operating characteristic curve analysis of serum non-high-density lipoprotein cholesterol and Homocysteine levels in the diagnosis of cognitive impairment in patients with thalamic infarction. Non-HDL-C: Non-high-density lipoprotein cholesterol; Hcy: Homocysteine.

infarction.

To analyze the independent risk factors for poor prognosis in patients with thalamic infarction, the patients were divided into groups according to their follow-up results, and the MRS score was used to evaluate the prognosis of the patients. The results showed that there were 50 patients with a good prognosis and 30 patients with a poor prognosis. There were statistically significant differences in the NIHSS score, non-HDL-C level, Hcy level, and rates of massive

Table 6 Differences in clinical characteristics between patients with thalamic infarction in the good and poor prognosis groups

Project	Good prognosis group (*n* = 50)	Poor prognosis group (*n* = 30)	χ^2/t	*P* value
Age (yr)	65.12 ± 6.74	64.13 ± 10.07	0.527	0.600
Men	32 (64.00)	20 (66.67)	0.059	0.809
Time of onset (h)	20.39 ± 3.21	20.42 ± 3.19	0.041	0.968
Smoking history	26 (52.00)	16 (53.33)	0.013	0.908
The history of drinking	24 (48.00)	13 (43.33)	0.164	0.685
Hypertension	24 (48.00)	18 (60.00)	1.083	0.298
Diabetes	14 (28.00)	9 (30.00)	0.037	0.848
CHD	8 (16.00)	4 (13.33)	0.105	0.746
NIHSS score	14.52 ± 5.43	17.91 ± 5.78	2.639	0.010
Non-HDL-C (tendency/L)	3.08 ± 0.46	3.79 ± 0.57	6.103	0.000
Hcy (μmol/L)	14.54 ± 0.78	27.51 ± 4.08	21.909	0.000
Massive cerebral infarction	13 (26.00)	15 (50.00)	4.747	0.029
Atrial fibrillation	6 (12.00)	9 (30.00)	3.988	0.046
APTT (1 S)	31.55 ± 3.45	33.43 ± 4.32	2.144	0.035

APTT: Activated partial prothrombin time; CHD: Coronary heart disease; Non-HDL-C: Non-high-density lipoprotein cholesterol; Hcy: Homocysteine; NIHSS: National Institutes of Health Stroke Scale.

Table 7 Multivariate logistic regression analysis of influencing factors of a poor prognosis in patients with thalamic infarction

Variable	OR	95%CI	Wald	*P* value
Atrial fibrillation	0.232	0.068-0.768	5.701	0.016
Non-HDL-C	1.753	1.243-2.477	10.187	0.001
Hcy	1.051	1.006-1.096	5.323	0.020
APTT	1.127	1.003-1.186	4.116	0.077
NIHSS score	1.091	1.004-1.268	4.134	0.012

95%CI: 95% confidence interval; APTT: Activated partial prothrombin time; Non-HDL-C: Non-high-density lipoprotein cholesterol; Hcy: Homocysteine; NIHSS: National Institutes of Health Stroke Scale; OR: Odds ratio.

cerebral infarction, atrial fibrillation and APTT between the good prognosis group and the poor prognosis group. Logistic regression analysis showed that there were statistically significant differences in the NIHSS score, non-HDL-C level, Hcy level, and rates of atrial fibrillation and APTT between the groups. The non-HDL-C level, Hcy level, NIHSS score, massive cerebral infarction, and atrial fibrillation may be independent risk factors for poor prognosis in patients with thalamic infarction. Hcy levels can lead to an inflammatory response and abnormal endothelial cell function and promote thrombosis, which is one of the influencing factors for poor prognosis in patients with thalamic infarction[13]. Non-HDL-C levels can lead to the development of atherosclerosis in the body and increase the risk of cognitive dysfunction. The NIHSS score is a protective factor in patients with thalamic infarction. The NIHSS score can predict the recovery of patients' neurological function and be used to further judge patient prognosis[14]. Atrial fibrillation is a common arrhythmia and is also a risk factor in patients with thalamic infarction. Due to the generation of atrial fibrillation, cardiac structural abnormalities, hemodynamics, and the micro embolus synthetic quantity are increased, cerebral perfusion and cerebral hypoperfusion are reduced, differences in the ventricular rate occur and the heart rate, cerebral blood flow, and neuronal energy is affected. The nerve fiber and amyloid beta protein levels are reduced, which leads to disorders of speech speed and thinking expression and ultimately affects the prognosis of patients with thalamic infarction[15]. Clinically, for patients with thalamic infarction, relevant preventive measures can be formulated according to the above influencing factors, such as anticoagulant drug therapy to reduce the incidence of atrial fibrillation[16]. The NIHSS was used to evaluate neurological function in patients. Appropriate supplementation with folic acid or other antipsychotic drugs can reduce the Hcy level to a certain extent[17], and the prophylactic use of statins can reduce the non-HDL-C level [18].

CONCLUSION

In conclusion, non-HDL-C and Hcy levels are positively correlated with cognitive impairment in patients with thalamic infarction. Non-HDL-C and Hcy levels can be used for the diagnosis of cognitive impairment in patients with thalamic infarction, and the combined detection effect is better. The prognostic factors of patients with thalamic infarction mainly include the non-HDL-C level, Hcy level, NIHSS score, and rates of large area cerebral infarction and atrial fibrillation. Clinically, corresponding preventive measures can be formulated according to the above factors to prevent poor prognosis and reduce mortality. However, there are some shortcomings in this study. The sample source is biased, the sample size is small, and thalamic infarction is not a common disease because non-HDL-C and Hcy levels may also be affected by other factors. Only the combination of non-HDL-C and Hcy levels in the diagnosis of cognitive dysfunction in patients indicates great deficiencies. This only indicates that non-HDL-C and Hcy levels can be detected simultaneously in the auxiliary diagnosis of cognitive dysfunction in patients with thalamic infarction to improve the diagnostic efficiency.

ARTICLE HIGHLIGHTS

Research background

In patients with thalamic infarction, the blood vessels of multiple nuclei are abnormally blocked, affecting the body and thus the thalamus. Abnormal Homocysteine (Hcy) levels are believed to be related to cognitive impairment in patients with thalamic infarction. Meanwhile, there is a positive correlation between non-high-density lipoprotein cholesterol (non-HDL-C) levels and cognitive impairment in lacunar cerebral infarction.

Research motivation

The analysis of the impact of independent risk factors, especially Hcy levels, on the prognosis of patients with thalamic infarction and the formulation of relevant prevention measures carries great clinical implications for improving patient outcomes. In addition, the value of changes in non-HDL-C levels in predicting the prognosis of patients with thalamic infarction deserves investigation.

Research objectives

To provide a reference for the clinical development of preventive measures to improve the prognosis of patients with thalamic infarction and to efficiently diagnose cognitive impairment in such patients.

Research methods

Eighty patients with thalamic infarction were included and divided into a group with cognitive impairment [Montreal Cognitive Assessment (MoCA) score: < 26] and a group without (MoCA score: 26-30), depending on their MoCA scores. In addition, 50 concurrent healthy controls were selected as a control group. Correlations of the non-HDL-C and Hcy levels with the MoCA score and receiver operating characteristic curve were observed. Serum non-HDL-C and Hcy levels were further analyzed. Furthermore, patients were grouped as a good prognosis group [Modified Rankin Scale (MRS) score: ≤ 2] and a poor prognosis group (MRS score: > 2) according to the MRS score, and the clinical characteristics were comparatively analyzed.

Research results

There was a certain relationship between non-HDL-C and Hcy levels and cognitive function in patients, with higher non-HDL-C and Hcy levels indicating worse cognitive function of patients. Pearson correlation analysis also identified an association between non-HDL-C and Hcy levels and MoCA scores. Specifically, the higher the levels of non-HDL-C and Hcy, the lower the MoCA score, indicating more severe cognitive impairment in patients.

Research conclusions

Non-HDL-C and Hcy levels are positively correlated with cognitive impairment in patients with thalamic infarction, indicating their potential to diagnose cognitive impairment in such patients. In addition, their combined detection contributes to higher diagnostic efficacy.

Research perspectives

Simultaneous detection of non-HDL-C and Hcy levels can assist in the diagnosis of cognitive dysfunction in patients with thalamic infarction, which is of great clinical significance for improving the prognosis of these patients.

FOOTNOTES

Author contributions: Zhu SY and Zhang H conceived and designed the study; Zhu SY and Ge W guided the study; Zhu SY and Zhang H collected the clinical date; Zhu SY and Zhang H analyzed the data; All authors drafted and revised the manuscript.

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