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RESEARCH ARTICLE

Title: Study on the expression of blood glucose and blood lipid levels in elderly patients with atherosclerosis and their correlation with inflammatory factors

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Abstract: To investigate the expression of blood glucose and blood lipid in elderly patients with atherosclerosis and their correlation with inflammatory factors. 152 atherosclerosis elderly patients as observation group were divided into mild group, moderate group and severe group. 56 healthy physical elderly patients were selected as control group. FPG, 2hFPG and HbAlc were measured by blood glucose meter. Using blood lipid analyzer detected the TC, TG, LDL-C, HDL-C levels. ELISA was used to determine IL-2, IL-6, IL-10 levels. Immunoturbidimetry was used to determine hs-CRP level. FPG, 2hFPG, HbAlc, TC, LDL-C, IL-2, IL-6, IL-10, hs-CRP levels in observation group were higher than those in control group. 2hFPG, HbAlc, TC, LDL-C, IL-2, IL-6, IL-10, hs-CRP levels in severe group were higher than mild and moderate groups. FPG, 2hFPG, HbAlc, TC, LDL-C and IL-2, IL-6, IL-10, hs-CRP levels are positively correlated. TG, HDL-C and IL-2, IL-6, IL-10, hs-CRP levels have no correlation. Elderly patients with atherosclerosis are accompanied by abnormal blood glucose and blood lipid levels, which can reflect the severity and are related to inflammatory factors.

Keywords: Atherosclerosis; Blood glucose; Blood lipid; Inflammatory factors; Elderly patients

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1. Introduction

Atherosclerosis (AS) is an important cause of coronary heart disease, cerebral infarction and peripheral vascular disease, and lipid metabolism disorders are the basis of patients' disease [1]. Previous studies have shown [2]. For patients with AS, the intimal part is accompanied by accumulation of lipids and complex carbohydrates, bleeding and thrombosis, resulting in fibrous tissue hyperplasia, calcinosis, and some patients are accompanied by degeneration of the arterial middle layer and the development of calcification, resulting in thickening and hardening of the arterial wall, causing vascular lumen stenosis. Clinical studies have shown [3] [4]. AS has a complex etiology, which is generally believed to be related to hypertension, hyperlipidemia and smoking, as well as obesity and genetic duct factors, and the clinical manifestations of patients are mostly related to vascular disease and the degree of ischemia of the involved organs. In recent years, with the changes in people's lifestyles, the incidence of abnormal glucose and lipid metabolism in my country has been on the rise, which is an independent risk factor for the occurrence of AS [5] [6]. Studies by domestic scholars [7] for the early onset of diabetes, most patients develop AS cardiovascular disease, and as blood sugar levels continue to rise, the systemic arteries were involved. The carotid artery, because of its special location, is convenient for inspection. The level of lesions is positively correlated with other important vascular lesions and is often used as a clinical observation index [8]. For patients with carotid artery intima-media thickening, the incidence of AS will increase, and a series of cardiovascular and cerebrovascular events will occur, but the relationship with inflammatory factors is less studied [9]. Therefore, this study focused on elderly patients with atherosclerosis and healthy subjects to explore the expression of blood glucose and blood lipid levels in elderly patients with atherosclerosis and their correlation with inflammatory factors.

2. Materials and methods

2.1 Clinical data

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Selected 152 elderly patients with atherosclerosis from January 2017 to October 2019 as the object, set as the observation group, 84 males and 68 females, age (60-84) years, average (74.43 ± 5.45) years old. The course of disease was (1-8) years, with an average of (4.34 ± 0.61) years; underlying diseases: 78 cases of hypertension, 56 cases of diabetes, and 69 cases of hyperlipidemia. Vascular ultrasound examinations were performed after admission. According to the examination results, they were divided into mild group, moderate group and severe group. 56 elderly patients who selected healthy physical examination during the same period were selected as control group, 34 males and 22 females, age (61- 85) years old, with an average of (75.11 ± 5.48) years old. Basic diseases: 12 cases of hypertension, 10 cases of diabetes, 11 cases of hyperlipidemia.

2.2 Inclusion and exclusion criteria

Inclusion criteria: (1) The observation group met the AS diagnostic criteria[10]; (2) The intima-media thickness (IMT) of the common carotid artery and internal carotid artery was ⩾1.5mm or the thickness exceeded 50.0% of the peripheral blood vessel IMT; (3) None of the observation group received standard anti-atherosclerosis treatment. Exclusion criteria: (1) Patients with mental abnormalities, blood s[10]ystem, and confirmed malignant tumors; (2) Patients with severe liver and kidney dysfunction, abnormal blood coagulation or systemic infections; (3) Patients with hyperthyroidism or organs People with qualitative diseases.

2.3 Methods

(1) Grouping method. After admission, vascular ultrasound examinations were performed. According to the examination results, they were divided into mild group (IMT ⩽ 1.0mm, carotid artery plaque quantitative integration method 1-2 points, lumen stenosis <30.0%), moderate group (IMT⩽2.0 mm, carotid artery plaque quantitative integration method score 1-2 points, lumen stenosis <70.0%) and severe group (IMT>2.0mm, carotid artery plaque quantitative integration method score 3-4 points, lumen stenosis ⩾70.0%). Fifty-six elderly patients who received physical examination during the same period were selected as the control group. (2) Specimen collection. In the observation group, 3 mL of peripheral fasting blood was taken the next morning after admission, and 3 mL of peripheral fasting blood was taken from the control group on the day of healthy physical examination, centrifuged for 30 minutes at a speed of 3500 rpm, and the serum was separated and placed in a -80 ℃ refrigerator for standby [11]. The fasting blood glucose, 2h postprandial blood glucose and glycosylated hemoglobin levels of each group were measured by the blood glucose meter. The total cholesterol (TC), triglyceride (TG), low density lipoprotein (LDL-C), determination of high-density lipoprotein (HDL-C) levels, enzyme-linked immunosorbent assay was used to determine the levels of interleukin-2, 6, 10 (IL-2, 6, 10) in the observation group; immunoturbidimetry was used to determine hypersensitivity C Reactive protein (hs-CRP) level [12] [13]. (4) Correlation analysis. SPSS Pearson correlation analysis software was used to analyze the correlation between blood glucose, blood lipid levels and inflammatory factors in elderly patients with atherosclerosis.

3. Statistical analysis

The SPSS18.0 software was used to process the count data and the X^2 test was performed using n (%), and the measurement data was performed by t test. The difference was statistically significant at P<0.05.

4. Results

4.1 Comparison of blood glucose, blood lipids and inflammatory factors between the observation group and the control group

The levels of TG and HDL-C in the observation group and the control group were not statistically significant (P>0.05); the observation group FPG, 2hFPG, HbAlc, TC, LDL-C, IL-2, IL-6, IL-10, hs-CRP levels are higher than the control group (P<0.05), see Table 1.

Table 1. Comparison of blood glucose, blood lipid and inflammatory factors between observation group and control group（$\overline{x} \pm s$）

Group	observation group	control group	t	P
FPG（mmol/L）	6.89±0.42	5.71±0.36	7.391	0.000
2hFPG（mmol/L）	14.69±1.21	9.44±0.75	4.516	0.000
HbAlc（%）	6.59±0.41	5.23±0.32	6.223	0.000
TC（mmol/L）	4.34±0.59	3.41±0.43	7.321	0.000
TG（mmol/L）	1.63±0.23	1.65±0.24	1.213	0.515
LDL-C（mmol/L）	2.33±0.59	2.11±0.43	6.735	0.000
HDL-C（mmol/L）	1.19±0.32	1.20±0.33	0.967	0.636
IL-2（mg/L）	57.49±4.34	19.59±2.15	6.391	0.000
IL-6（mg/L）	47.12±3.45	6.61±0.98	5.456	0.000
IL-10（mg/L）	45.61±3.41	14.39±3.12	8.412	0.000
hs-CRP（mg/L）	14.98±1.12	2.15±0.69	7.114	0.000

4.2 Comparison of blood glucose, blood lipids and inflammatory factors in the observation group under different disease severity

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Among the 153 patients in the observation group, 42 were in the severe group, 58 were in the moderate group, and 53 were in the mild group. The levels of TG and HDL-C in the three groups were not statistically significant (P>0.05). The levels of 2hFPG, HbAlc, TC, LDL-C, IL-2, IL-6, IL-10, and hs-CRP in the severe group were higher than those in the mild group. The level of 2hFPG, HbAlc, TC, LDL-C, IL-2, IL-6, IL-10, and hs-CRP in the moderate group were higher than those in the mild group (P<0.05) (Table 2).

Table 2. Comparison of blood glucose, blood lipids and inflammatory factors in the observation group under different disease severity （$\overline{x} \pm s$）

Group	severe group	moderate group	mild group	F	P
FPG（mmol/L）	7.56±0.43	6.56±0.38	5.81±0.35	9.491	0.000
2hFPG（mmol/L）	16.22±3.42	14.15±3.49	11.59±2.58	5.625	0.000
HbAlc（%）	7.67±1.12	6.09±0.69	5.87±0.64	7.398	0.000
TC（mmol/L）	4.89±0.45	4.51±0.42	3.86±0.37	6.447	0.000
TG（mmol/L）	1.64±0.23	1.62±0.21	1.63±0.22	1.096	0.534
LDL-C（mmol/L）	2.45±0.41	2.24±0.32	2.19±0.31	5.444	0.000
HDL-C（mmol/L）	1.20±0.25	1.18±0.23	1.21±0.26	1.412	0.668
IL-2（mg/L）	66.89±6.75	56.32±6.57	43.27±4.69	5.093	0.000
IL-6（mg/L）	55.49±5.42	46.14±4.59	38.58±3.34	6.135	0.000
IL-10（mg/L）	56.73±5.68	43.29±5.11	36.42±4.37	8.142	0.000
hs-CRP（mg/L）	19.49±3.23	15.29±2.15	7.43±0.56	7.569	0.000

Table 3. Correlation analysis of blood glucose, blood lipid levels and inflammatory factors in elderly patients with AS（r，P）

Group	IL-2	IL-6	IL-10	Hs-CRP
FPG	0.784（0.000）	0.791（0.000）	0.767（0.000）	0.685（0.000）
2hFPG	0.791（0.000）	0.832（0.000）	0.694（0.000）	0.813（0.000）
HbAlc	0.773（0.000）	0.774（0.000）	0.813（0.000）	0.764（0.000）
TC	0.895（0.000）	0.789（0.000）	0.743（0.000）	0.782（0.000）
TG	0.121（0.549）	0.016（0.756）	0.124（0.551）	0.431（0.743）
LDL-C	0.785（0.000）	0.857（0.000）	0.884（0.000）	0.781（0.000）
HDL-C	0.214（0.423）	0.102（0.846）	0.224（0.559）	0.168（0.632）

4.3 Correlation analysis of blood glucose, blood lipid levels and inflammatory factors in elderly patients with AS

SPSS Pearson correlation analysis results showed that: FPG, 2hFPG, HbAlc, TC, LDL-C and IL-2, IL-6, IL-10,

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hs-CRP levels in elderly AS patients were positively correlated (P<0.05), while TG, HDL-C has no correlation with IL-2, IL-6, IL-10, hs-CRP levels (P>0.05), (Table 3).

5. Discussion

In recent years, with the changes in people's lifestyles, the incidence of elderly patients with AS in my country is higher [14]. Previous studies have shown [15] that AS is a systemic disease that can cause oxidative stress, chronic inflammation, and endothelial dysfunction. At the same time, the onset of the patient can also negatively regulate the patient's blood sugar and blood lipids, causing the excessive accumulation of end-products of glycation in the arterial wall, thus forming a vicious circle, aggravating the occurrence and development of the disease [16]. Studies by domestic scholars have shown that [17] AS is related to the occurrence of cardiovascular and cerebrovascular diseases. The thickening of the carotid artery intima-media is often used as its prediction and evaluation index. In this study, the levels of FPG, 2hFPG, HbAlc, TC, LDL-C, IL-2, IL-6, IL-10, and hs-CRP in the observation group were higher than those in the control group (P<0.05), indicating that elderly AS patients often accompanied by abnormal blood sugar and blood lipid levels. It can also cause a continuous increase in the body's inflammatory factors. Carotid artery ultrasound is a non-invasive examination method, which can clearly show the condition of carotid artery intima-media thickening, plaque formation and lumen of the lower extremities, and can realize the diagnosis and prediction of AS, and also assess the severity of the patient's disease [18]. To further analyze the influence of the levels of glucose and lipids in patients with different disease severity in elderly AS, the ultrasound carotid artery plaque measurement was completed on the patients in this study, and the grouping was completed. The results showed that the severe group 2hFPG, HbAlc, TC, LDL-C, the levels of IL-2, IL-6, IL-10, and hs-CRP were higher than those in the mild and moderate groups (P<0.05), which indicate that strengthening the levels of glycolipid and inflammatory factors in elderly patients with AS can reflect systemic vascular disease.

hs-CRP plays an important role in the occurrence of AS in the elderly. It can participate in the body's inflammatory response, promote the expression of vascular endothelial cell-related factors, and can also enhance the activation of the fibrinolytic system and improve the body's coagulation function. At the same time, hs-CRP also plays an important role in the occurrence and pathological process of coronary heart disease. IL-2, IL-6, and IL-10 are common clinical inflammatory factors, and their abnormal expression levels are related to the number of diseased blood vessels. Combined detection can assess the severity of the patient's disease [19]. Studies by domestic scholars have shown [20] those elderly patients with AS, persistent abnormal glucose and lipids could cause damage to vascular endothelial cells through multiple mechanisms, inhibit DNA synthesis in human endothelial cells, damage the endothelial barrier, and cause inflammation cascades in the body reaction. In order to further analyze the relationship between glycolipid levels and inflammatory factors in elderly AS patients, SPSS Pearson correlation analysis was performed in this study. The results showed that: FPG, 2hFPG, HbAlc, TC, LDL-C and IL-2, IL in elderly AS patients -6, IL-10, hs-CRP levels were positively correlated (P<0.05), while TG, HDL-C and IL-2, IL-6, IL-10, hs-CRP levels were not correlated (P>0.05)), which indicate that the level of glycolipid in elderly patients with AS is closely related to inflammatory factors. Therefore, clinically strengthening the determination of the level of glycolipid in patients can reflect the body's inflammatory response state, achieve disease prevention and treatment, and predict the prognosis of patients.

6. Conclusion

Elderly patients with atherosclerosis are often accompanied by abnormal blood glucose and blood lipid levels, which can reflect the severity of the patient's disease and are related to inflammatory factors. Strengthening the determination of their expression levels can guide clinical treatment.

CONFLICT OF INTEREST

Not any conflict interest.

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