CORRELATION BETWEEN SERUM FIBULIN-3 LEVEL AND LIPIDS, LVPWT, IVST, BAPWV IN ELDERLY PATIENTS WITH HYPERTENSION

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ABSTRACT

Objective: To analyze the correlation between serum fibulin-3 level and blood lipids, brachial-ankle pulse wave velocity (baPWV), left ventricular posterior wall thickness (LVPWT), and interventricular septal thickness (IVST).

Methods: From June 2017 to April 2019, 45 elderly patients with hypertension who were admitted to the Department of Cardiology of our hospital were selected as the observation group, and another 45 healthy people were selected as the control group. We compared the correlation between serum fibulin-3 level and blood lipids (TC, FFA, TG, HDL-C, LDL-C), brachial-ankle pulse wave velocity (baPWV), left ventricular posterior wall thickness (LVPWT), and interventricular septal thickness (IVST).

Results: The level of fibulin-3 in the observation group was significantly lower than that in the control group (P<0.01); the level of HDL-C in the observation group was significantly lower than that in the control group (P<0.01); the level of LVPWT and IVST in the observation group was significantly higher than that in the control group (P<0.01); the level of baPWV in the observation group was significantly lower than that in the control group (P<0.01); fibulin-3 and HDL-C were positively correlated with TC, TG and LDL-C. Fibulin-3 was negatively correlated with LVPWT and IVST, and positively correlated with baPWV (P<0.05).

Conclusion: The level of fibulin-3 in the elderly patients with hypertension was lower than that in the healthy control group, which was closely related to LVPWT, IVST, and baPWV, and therefore it can be used as an important index to prevent and judge the disease.

Keywords: Elderly hypertension, serum fibulin-3, LVPWT, IVST, baPWV.

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Introduction

Hypertension does great harm to human health. Studies have found that hypertension can increase the mortality and morbidity of renal failure, heart failure, coronary heart disease and stroke in the elderly[1]. With changes in people's lifestyles, hypertension is the most common cardiovascular disease. As life pressure increases and exercise decreases, the intake of salt, fat and sugar in the diet greatly increases, beginning at ever younger ages, and the incidence of hypertension shows an annual increase curve[2]. Adult hypertension is slightly higher in males than in females, with a morbidity of 18% or more. The number of elderly hypertension patients in China has taken first place in the world, reaching more than 80 million, with a prevalence rate of 49%, which is significantly higher than that of adults[3]. Studies have found that antihypertensive treatment can significantly reduce cardiovascular mortality and morbidity, reduce social and economic burdens and improve the quality of life of patients over 60 years old with hypertension[4]. Fibulin-3 was first discovered in aging fibroblasts and belongs to extracellular matrix proteins with the characteristic tandem C-terminal fibulin domain and Ca2+

combined epidermal growth factor-like domain. Its main physiological role is to stabilize and participate in the formation of loose connective tissue, elastic fiber and basal membrane[5, 6].

This study analyzed and observed the correlation between serum fibulin-3 level and blood lipids, IVST, LVPWT, and baPWV in elderly patients with hypertension.

Materials and methods

General information

A total of 45 elderly patients with hypertension who were admitted to the Department of Cardiology of our hospital from June 2017 to April 2019 were selected.

Inclusion criteria were:
• Can cooperate with medical personnel to complete the examination, exhibit good compliance;
• Meet the standard of Chinese hypertension prevention and treatment guidelines[7];
• Over 60 years old.

Exclusion criteria were:
• Have liver and kidney dysfunction;
• Do not meet the inclusion criteria;
• Have severe cardiovascular diseases.

There were 23 males and 22 females in the observation group. The average age was (73.8±7.8) years, ranging from 61 to 78 years. There were 16 patients with primary hypertension, 15 patients with secondary hypertension, and 14 patients with tertiary hypertension. A total of 45 healthy elderly subjects (24 males and 21 females, age 62-79, average (74.2±7.1)) were selected as the control group. There was no significant difference in gender, age and other aspects between the two groups (P>0.05).

Methods

After centrifugation at 3000r/min, the supernatant was taken and stored in a refrigerator at -80°C. The expression of fibulin-3 was detected by enzyme-linked immunosorbent assay (ELISA). All the kits were provided by ABNova.

Observation indices

Blood lipid levels-total cholesterol (TC), lipoprotein A, free fatty acid (FFA), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C) levels-were detected by automatic biochemical Beckman detector in the United States[8]. Left ventricular posterior wall thickness (LVPWT), interventricular septal thickness (IVST) and brachial-ankle pulse wave conduction velocity (baPWV) were measured by automatic arteriosclerosis detector (BP-203RPEII). Patients were instructed to avoid fatigue the day before the examination and to abstain from strong tea, coffee and alcohol. Immediately before the examination, it was necessary to lie down and rest quietly for five minutes and remove metal objects from the body.

According to the requirements of the instrument, the pressure sensor was placed on the posterior tibial artery of the two ankles and the brachial artery of the two upper arms. A phonogram sensor was placed in the fourth intercostal area at the left edge of the sternum. Electrocardiogram clips were placed at the distal ends of both upper limbs. We started detection according to the operation method and recorded data when the baseline was stable and the signal was clear.

Statistical methods

SPSS 12.0 was used for statistical analysis. Independent sample t-test was used for level differences between groups. Data were expressed as mean ± standard deviation, and Pearson was used for correlation analysis.

Results

Comparison of fibulin-3 levels between the two groups

The level of fibulin-3 in the observation group was significantly lower than that in the control group, and the difference was statistically significant (P<0.01); see Table 1.

Group	Fibulin-3 (µg/L)
Control group	77.98±9.32
Observation group	53.34±7.56
t	13.773
P	<0.01

Table 1: Comparison of fibulin-3 levels between the two groups (x̄±s).

Comparison of blood lipid levels between the two groups

The levels of HDL-C in the observation group were significantly lower than those in the control group, and the levels of TC, lipoprotein A, FFA and TG in the observation group were significantly higher than those in the control group; the differences were statistically significant (P<0.01). See Table 2.

Group	TC (mmol/L)	lipoprotein A (mg/L)	FFA (mmol/L)	TG (mmol/L)	HDL-C (mmol/L)	LDL-C (mmol/L)
Control group	5.98±1.32	383.34±22.33	0.89±0.27	1.81±0.78	1.24±0.25	2.93±1.25
Observation group	7.34±1.25	427.36±28.59	1.37±0.74	2.31±0.98	0.89±0.20	3.76±1.17
t	5.018	8.140	4.088	2.678	7.333	3.252
P	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Table 2: Comparison of blood lipid levels between the two groups (x̄±s).

Comparison of LVPWT, IVST and baPWV levels between the two groups

The levels of LVPWT and IVST in the observation group were significantly higher than those in the control group, and the levels of baPWV in the observation group were significantly lower than those in the control group; the differences were statistically significant (P<0.01). See Table 3.

Group	N	LVPWT (mm)	IVST (mm)	baPWV (cm/s)
Control group	45	11.93±3.35	12.24±1.25	1713.34±22.33
Observation group	45	15.76±3.17	16.89±1.20	1587.36±28.59
t		5.57	18.001	23.29
P		<0.01	<0.01	<0.01

Table 3: Comparison of LVPWT, IVST and baPWV levels between the two groups (x̄±s).

Correlation analysis between fibulin-3 level and blood lipid

Fibulin-3 was positively correlated with HDL-C, and negatively correlated with TC, TG, LDL-C, and the difference was statistically significant (P<0.05); see Table 4.

Index	Fibulin-3	
	r	P
TC	-0.366	0.037
TG	-0.396	0.030
LDL-C	-0.357	0.043
HDL-C	0.423	0.032

Table 4: Correlation analysis of fibulin-3 level and blood lipid.

Correlation analysis of fibulin-3 levels with LVPWT, IVST and baPWV levels

Fibulin-3 was negatively correlated with LVPWT and IVST levels, and positively correlated with baPWV levels, with statistically significant differences (P <0.05), as shown in Table 5.

Index	Fibulin-3	
	r	P
LVPWT	-0.323	0.023
IVST	-0.300	0.024
baPWV	0.359	0.039

Table 5: Correlation analysis of fibulin-3 level and blood lipid.

Discussion

Hypertension is a chronic disease, which can easily affect the cognitive function of the elderly and cause various complications. Controlling chronic diseases is an unsolved problem that not only reduces the quality of life, but also harms the health of older people, and thus draws high attention. However, malignant hypertension in elderly patients is rare[9]. It is commonly discovered because of concurrent vascular disease or a physical examination, the expression is slow-progress, slow-onset and symptoms are not obvious or atypical. The prevalence of senile hypertension accounts for about 50% of cases, and simple systolic hypertension accounts for the majority[10]. Older people generally have age-related taste disorders, so they prefer foods with high sodium content, and they are also prone to hypertension due to centripetal obesity and abdominal fat accumulation[11]. Studies have shown that many elderly patients with hypertension have different degrees of renal function impairment[12].

Therefore, in treatment using medication, we should pay attention to the efficacy of the drug but also consider its safety, and be sure it is used under the strict guidance of a doctor, so as to effectively control blood pressure and reduce complications.

Studies have shown that fibulin-3 is involved in the stabilization and synthesis of the extracellular matrix, and the level of fibulin-3 in patients with hypertension less than five years old is significantly lower than the normal level[13]. In this study, fibulin-3 levels in the observation group were significantly lower than those in the control group (P<0.01). This suggests that a decrease in fibulin-3 is an early indicator of hypertension. The elevated levels of apolipoprotein, FFA, TC and TG in patients with hypertension can form atherosclerotic plaque and aggravate the degree of vascular stenosis in patients with hypertension[14]. The results of this study showed that the levels of HDL-C in the observation group were significantly lower than those in the control group, and the levels of TC, lipoprotein A, FFA

and TG in the observation group were significantly higher than those in the control group (P<0.01). It is suggested that lipid metabolism disorder is a risk factor for vascular disease in patients with hypertension. Pulse wave propagation velocity is an independent predictor of cardiovascular diseases and a classic clinical indicator for predicting arterial stiffness. The worse the vascular elasticity, the greater the pulse wave propagation velocity[15]. In the early stage of hypertension, arterial elasticity loss, endothelial dysfunction and other injuries may occur, but there is no significant clinical manifestation. Currently, the measurement of baPWV is used to reflect vascular elasticity. The results of this study showed that the levels of baPWV in the observation group were significantly lower than those in the control group, while the levels of LVPWT and IVST in the observation group were significantly higher than those in the control group (P<0.01), suggesting that hypertension patients usually have decreased arterial elasticity, lumen stenosis and other lesions. The correlation results showed that fibulin-3 was positively correlated with the levels of baPWV and HDL-C, and negatively correlated with the levels of LVPWT, IVST, TC, TG and LDL-C, suggesting that the decrease of fibulin-3 was often accompanied by stenosis, atherosclerosis, hyperlipidemia and other changes. In conclusion, the level of fibulin-3 in elderly patients with hypertension was lower than that in the healthy control group, which was closely related to serum lipids, LVPWT, IVST and baPWV, and can be used as an important indicator for prevention, treatment and judgment of the condition.

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